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# CORNERSTONES

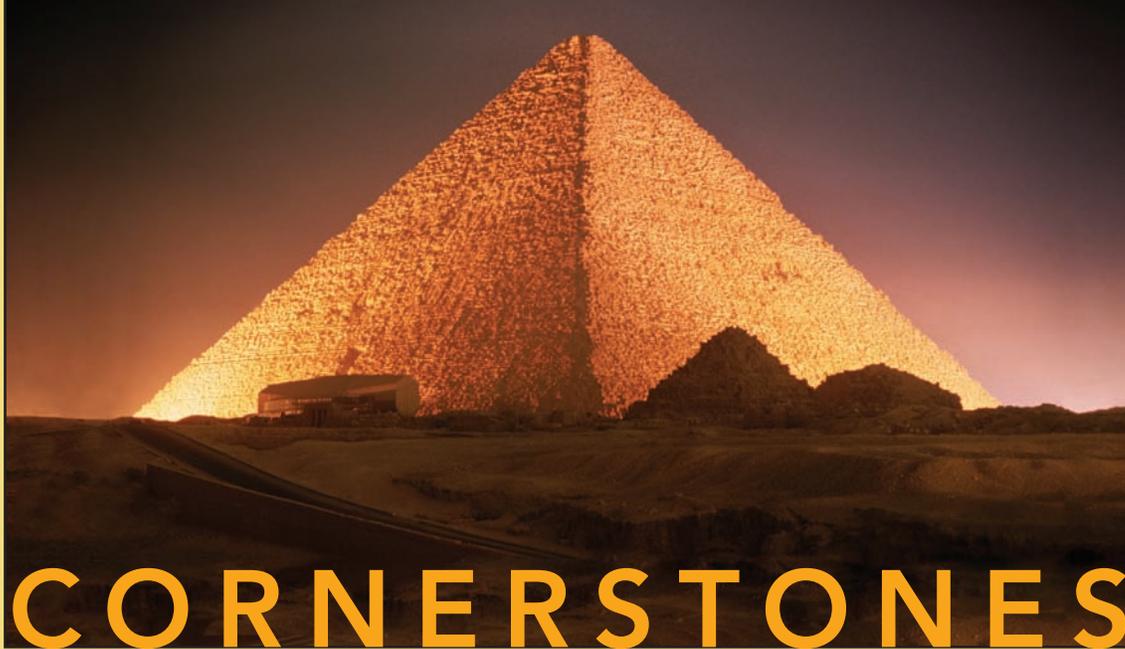
*of*

# Financial & Managerial Accounting

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Rich ▲ Jones ▲ Heitger ▲ Mowen ▲ Hansen





# CORNERSTONES

*of*

## Financial & Managerial Accounting

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Current Trends Update

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**Cornerstones of Financial & Managerial  
Accounting—Current Trends Update**

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# "CORNERSTONES"— THE PERFECT FOUNDATION FOR SUCCESSFUL LEARNING

Carefully crafted from the ground up, the “Cornerstones” in the text help you set up and solve fundamental calculations or procedures. And the “Cornerstones” go beyond simple preparation by focusing on the underlying accounting principle. There is a “Cornerstone” for every major concept in the book, serving as a “How To” guide. When you are able to master the foundations of financial accounting, it is easier to understand how accounting is used for decision-making in the business world.

Each “Cornerstone” breaks common problems into systematic parts, providing students with all the information they need to solve a problem. Here, you can see the full process to better understand the source of each number.

The **Concept** section in Chapters 1-12 links the “Cornerstone” to fundamental underlying accounting concepts such as the matching principle here.

The **Information** portion of each “Cornerstone” provides the necessary data to arrive at a solution.

The **Required** section of each exhibit provides you with each step that must be solved.

The **Solution** ends each “Cornerstone,” showing the calculations for each of the required steps in the problem. This helps you understand the necessary concepts.

**HOW TO Compute Depreciation Expense Using the Declining Balance Method**

**Concept:**  
As the service potential of a fixed asset declines, the cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received (the matching principle).

**Information:**  
On January 1, 2009, Morgan, Inc. acquired a machine for \$50,000. Morgan expects the machine to be worth \$5,000 at the end of its five-year useful life. Morgan uses the double-declining-balance method of depreciation.

**Required:**

1. Compute the double-declining-balance rate of depreciation for the machine.
2. Prepare a depreciation schedule that shows the amount of depreciation expense for each year of the machine's life.
3. Prepare the journal entry required to record depreciation expense in 2009.

**Solution:**

1. The double-declining-balance rate of depreciation (40 percent) equals twice the straight-line rate of depreciation and is calculated as follows:  
$$\frac{1}{\text{Useful Life}} \times 2 = \frac{1}{5} \times 2 = \frac{2}{5} \text{ or } 40\%$$

depreciation cal



**CORNERSTONE**  
7-3



Each “Cornerstone” has an online video offering a step-by-step presentation of the **Concept**, **Information**, **Required**, and **Solution** sections.

**Cornerstone Exercises**

**Cornerstone Exercise 7-15 COST OF A FIXED ASSET**

Borges, Inc. recently purchased land to use for the construction of its new manufacturing facility and incurred the following costs: purchase price, \$80,000; real estate commissions, \$4,800; delinquent property taxes, \$1,500; closing costs, \$3,300 clearing and grading of the land, \$8,100.

**Required:**  
Determine the cost of the land.

**OBJECTIVE > 2**  
**CORNERSTONE 7-1**

### End-of-Chapter Cornerstone Exercises

are often linked to specific "Cornerstone" features, providing a valuable reference as you complete homework. Because the Cornerstone Exercises are so closely linked to the in-chapter "Cornerstones," you quickly become an independent learner!

Beginning in 2006, South-Western began researching how accounting students use and read their textbooks. We personally interviewed hundreds of students.

## Our Conclusions

- The primary driver of success in accounting is **homework**.
- Students believe a textbook helps them succeed, but they are using books differently than the previous generation.
- Students use books as a **source of examples** and descriptions to help them complete homework. They may "skim" the text before or after class, but very few read the text from beginning to end.



As a result of this research, *Cornerstones* was fine-tuned to provide you with greater **efficiency** and more **relevance**, promising **better results**. *Cornerstones* provides you with the confidence to be more independent, allowing you more time to learn additional concepts.

"I have recently tried the problems in *Cornerstones* and found that the step-by-step examples that are placed within the text helped extremely...I compared the chapters in *Cornerstones* to our textbook and felt that *Cornerstones* was much easier to understand by just reading the chapter."

—Katie Hogan, Student at University of Cincinnati

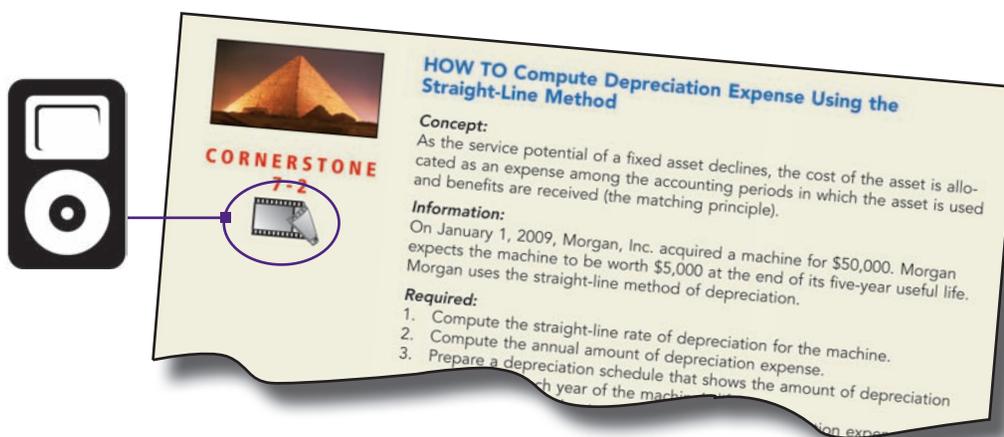
The **Cornerstones Learning System** is based on how students learn accounting today. This system incorporates the following key features:

- The actual "Cornerstones" within the chapters – unique to this family of texts!
- The "Cornerstones" references within the end-of-chapter Cornerstones Exercises.
- The summary of "Cornerstones" at the end of each chapter with page references.
- Online reinforcement of "Cornerstones" concepts with videos and demonstrations.



## Cornerstones Videos

Each “Cornerstone” in the book is accompanied by a short video clip that you may view online or download onto your portable video player. The clips provide clear, step-by-step examples that are consistently presented for today’s visual learners. They walk you through each step of every “Cornerstone.”



**70%** of instructors who reviewed these videos indicated they would recommend or require students to use them.

**80%** of students surveyed wanted access to video presentations to help explain the concepts.

To view the Cornerstone Videos, visit the  
**Cornerstones Companion Website at**  
[www.cengage.com/accounting/jones/videos](http://www.cengage.com/accounting/jones/videos)  
 and enter the following password: **jonesfinman**

“The video is excellent for students who prefer a visual presentation of the example and the concepts. It is also useful for students who missed class or don’t remember class. I like this feature very much.”

—Professor Ron Lazer, University of Houston

### Text Website

[www.cengage.com/accounting/rich](http://www.cengage.com/accounting/rich)

Ensure understanding and success with this comprehensive, resource-rich support site. It’s everything you need to ensure positive outcomes. The interactive student study center provides interactive quizzes and online tools that encourage learning.



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# 1

## Accounting and the Financial Statements

After studying Chapter 1, you should be able to:

- **1** Explain the nature of accounting.
- **2** Identify the forms of business organizations and the types of business activities.
- **3** Describe the relationships shown by the fundamental accounting equation.
- **4** Prepare a classified balance sheet and understand the information it communicates.
- **5** Prepare an income statement and understand the information it communicates.
- **6** Prepare the statement of retained earnings and understand the information it communicates.
- **7** Understand the information communicated by the statement of cash flows.
- **8** Describe the relationships among the financial statements.
- **9** Describe other information contained in the annual report and the importance of ethics in accounting.

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# E xperience Financial Accounting with Apple

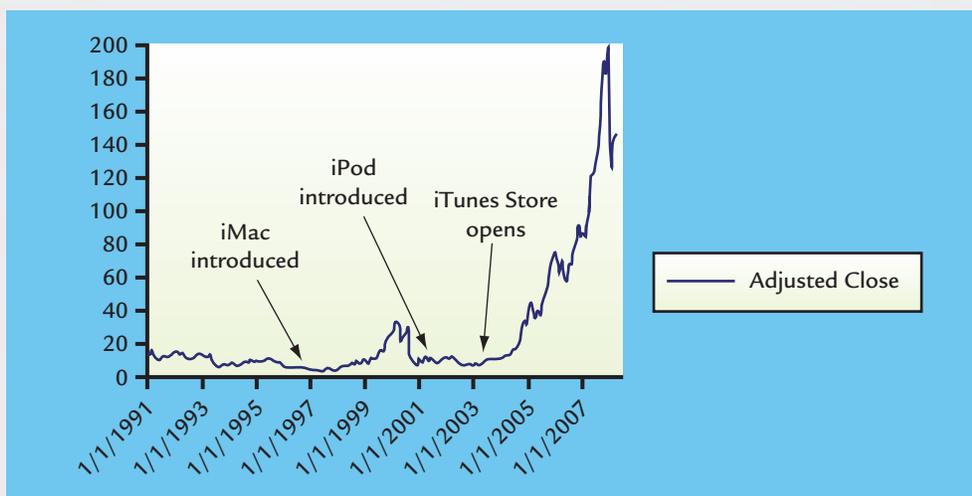
In 1976, Steve Jobs and Steve Wozniak, the founders of **Apple Computer, Inc.**<sup>1</sup> began building personal computers in the garage of Jobs' parents. By 1984, Apple had become a leader in the personal computing industry, and its Macintosh computer is regarded by many as a key contributor to the development of the desktop publishing market. Apple appeared invincible. However, the development of Microsoft's Windows operating system and several product failures led many to predict the end of one of the computer industry's most prominent companies. How could a company with such a bright future experience failure? And, perhaps more remarkable, how

could a company on the verge of extinction, experience the kind of success that Apple has recently experienced? With the introduction of the iMac, the iPod, and the iTunes Store, Apple's stock price increased from approximately \$7 per share in June 1998 to more than \$120 in June 2007 as shown in the chart below.

What type of information can help someone predict the successes of a company like Apple? A good place to start is with the financial information contained in a company's annual report. This financial information is provided in the form of financial statements—a summary of the results of a company's operations. A study of a company's

financial statements will give you insights into a company that will aid you in your investment decisions. It will help you determine how successful a company has been in the past as well as its prospects for the future. While this information is easily accessible and free of charge, your final judgment on a company's future prospects will be influenced by

how well you understand the information contained in its financial statements.



<sup>1</sup>In February 2007, Apple Computer Inc. changed its name to Apple Inc. to reflect that the future of Apple lies beyond simply the personal computer.

**OBJECTIVE** > **1**

Explain the nature of accounting.

**What Is Accounting?**

Our economy is comprised of many different businesses. Some companies, such as Apple Inc., focus on providing goods, which for Apple take the form of Macintosh computers, iPod portable digital music players, iPhone cellular phones, or downloadable music. Other companies are primarily concerned with providing services. For example, **Walt Disney** offers a variety of entertainment services from theme parks to motion pictures. While most entities, like Apple and Disney, exist in order to earn a profit, some are organized to achieve some other benefit to society (e.g., school districts exist to meet the educational needs of a community). Regardless of their objective, all entities use accounting to plan future operations, make decisions, and evaluate performance.

**Accounting** is the process of identifying, measuring, recording, and communicating financial information about a company's activities so decision makers can make informed decisions. Accounting information is useful because it helps people answer questions and make better decisions.

The demand for accounting information comes from both inside and outside the business. Inside the business, managers use accounting information to help them plan and make decisions about the company. For example, they can use accounting information to predict the consequences of their future actions and to help decide which actions to take. They also use accounting information to control the operations of the company and evaluate the effectiveness of their past decisions. Employees use accounting information to help them judge the future prospects of their company, which should translate into future promotion opportunities. Outside the business, investors use accounting information to evaluate the future prospects of a company and decide where to invest their money. Creditors use accounting information to evaluate whether to loan money to a company. Even governments use accounting information to determine taxes owed by companies, to implement regulatory objectives, and to make policy decisions. This demand for accounting information is summarized by Exhibit 1-1.

Accounting is more than the process of recording information and maintaining accounting records—activities that are frequently called bookkeeping. Accounting is the “language of business”. That is, accounting can be viewed as an information system that communicates the economic activities of a company to interested parties. The focus of this book is on providing information that satisfies the needs of external decision-makers (outside demand) and is termed **financial accounting**. The objectives of financial accounting involve providing decision-makers with information that assists them in assessing the amounts, timing, and uncertainties of a company's future

**Exhibit 1-1****The Demand for Accounting Information and Typical Questions**

cash flows. This information is provided through four basic financial statements: the balance sheet, the income statement, the statement of retained earnings, and the statement of cash flows.

In this chapter, we will discuss the basic functioning of the accounting system within a business. We will address the following questions:

- What forms do businesses take?
- What are the basic activities in which businesses engage?
- How does the accounting system report these activities?
- How can decision-makers use the information provided by the accounting system?

Regardless of your major or future plans, knowledge of accounting and the ability to use accounting information will be critical to your success in business.

## Businesses: Forms and Activities

Accounting identifies, measures, records, and communicates financial information about an accounting entity. An accounting entity is a company that has an identity separate from that of its owners and managers and for which accounting records are kept. This text emphasizes accounting for entities which take one of three different forms: sole proprietorship, partnership, or corporation.

### Forms of Business Organization

A **sole proprietorship** is a business owned by one person. Sole proprietorships, which account for more than 70 percent of all businesses, are usually small, local businesses such as restaurants, photography studios, retail stores, or website providers. This organizational form is popular due to the simplicity and low cost of formation. While a sole proprietorship is an accounting entity separate from its owner, the owner is personally responsible for the debt of the business. Sole proprietorships can be formed or dissolved at the wishes of the owner.

A **partnership** is a business owned jointly by two or more individuals. Small businesses and many professional practices of physicians, lawyers, and accountants, are often organized as partnerships. Relative to sole proprietorships, partnerships provide increased access to financial resources as well as access to the individual skills of each of the partners. Similar to sole proprietorships, partnerships are accounting entities separate from the owner-partners; however, the owner-partners are jointly responsible for all the debt of the partnership.<sup>2</sup> Finally, the partnership is automatically dissolved when any partner leaves the partnership; of course, the remaining partners may form a new partnership and continue to operate.

A **corporation** is a business organized under the laws of a particular state. A corporation, such as Apple, is owned by one or more persons called *stockholders*, whose ownership interests are represented by shares of stock. A primary advantage of the corporate form is the ability to raise large amounts of money (capital) by issuing shares of stock. Unlike a sole proprietorship or a partnership, a corporation is an “artificial person” and the stockholders’ legal responsibility for the debt of the business is limited to the amount they invested in the business. In addition, shares of stock can be easily transferred from one owner to another through capital markets without affecting the corporation that originally issued the stock. The ability to raise capital by selling new shares, the limited legal liability of owners, and the transferability of the shares give the corporation an advantage over other forms of business

## CONCEPT Q&A

How will accounting affect my life?

The business that sells us goods or services uses accounting to keep track of how much money it received as well as the cost of operating the business. Calculating the amount of tax that is due to the government requires accounting. When we invest our money, we should use accounting to understand a company's business and its prospects for the future. Plans that we make for the future often involve accounting to determine how much money we will need. Accounting will impact many aspects of our daily lives.

Possible Answer:

## OBJECTIVE 2

Identify the forms of business organizations and the types of business activities.

<sup>2</sup> Many professional partnerships—including the largest public accounting firms—have been reorganized as *limited liability partnerships* (LLPs), which protect the personal assets of the partner from being used to pay partnership debts.

organization. However, corporate shareholders generally pay more taxes than owners of sole proprietorships or partnerships. Exhibit 1-2 illustrates the advantages and disadvantages of each form of organization.

While the combined number of sole proprietorships and partnerships greatly exceeds that of corporations, the majority of business in the United States is conducted by corporations. Therefore, this book emphasizes the corporate form of organization.

### Exhibit 1-2

#### Forms of Business Organization

##### Sole Proprietorship



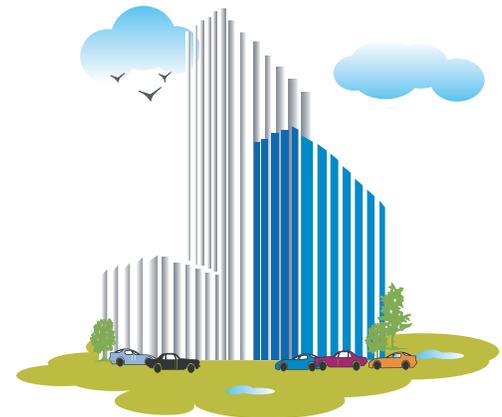
- ☺ Easily formed
- ☺ Tax advantages
- ☺ Controlled by owner
- ☹ Personal liability

##### Partnership



- ☺ Easily formed
- ☺ Tax advantages
- ☺ Shared control
- ☹ Personal liability
- ☹ Limited life

##### Corporation



- ☺ Easier to raise money
- ☺ Easier to transfer ownership
- ☺ Limited liability
- ☹ More complex to organize
- ☹ Higher taxes

## DECISION-MAKING & ANALYSIS

### Choice of Organizational Form

Joe Brooks, who is starting a campus-area bookstore, is in the process of choosing among three organizational forms—sole proprietorship, partnership, or corporation. Brooks has enough personal wealth to finance 40 percent of the business, but he must get the remaining 60 percent from other sources. The following are questions that Brooks must consider before deciding which form of entity to establish:

1. *How does organizational form impact Brooks' ability to obtain the needed funds?*

Whichever type of organizational form Brooks chooses, the additional 60 percent of the funds needed could be borrowed from a bank. However, if it proves difficult to get banks to support a new business, partnerships and corporations offer advantages over sole proprietorships. The advantage resides in the ability to obtain funds from a partner or through the issuance of stock.

2. *What is the impact of organizational form on control of the business?*

A sole proprietorship would offer Brooks the most control over the operations of the business. A partnership would transfer a 60 percent controlling interest to one or more partners who would join Brooks. Similarly, a corporation would transfer a 60 percent controlling interest to other stockholders. However, if the stock were widely dispersed among many investors, Brooks might retain effective control of operations with a 40 percent interest.

## Business Activities

Regardless of the form of a business, all businesses engage in a multitude of activities that can be categorized as financing, investing, or operating activities. These activities are illustrated in Exhibit 1-3. Because a major function of accounting is to identify, measure, record, and communicate information about these activities to interested parties, we will take a closer look at these activities.

**Financing Activities** A company's financing activities include obtaining the funds necessary to begin and operate a business. These funds come from either issuing stock or borrowing money. Most companies use both types of financing to obtain funds.

When a corporation borrows money from another entity such as a bank, it must repay the amount borrowed. The person to whom the corporation owes money is called a **creditor**. This obligation to repay a creditor is termed a **liability** and can take many forms. A common way for a corporation to obtain cash is to borrow money with the promise to repay the amount borrowed plus interest at a future date. Such borrowings are commonly referred to as *notes payable*. A special form of note payable that is used by corporations to obtain large amounts of money is called a *bond payable*.

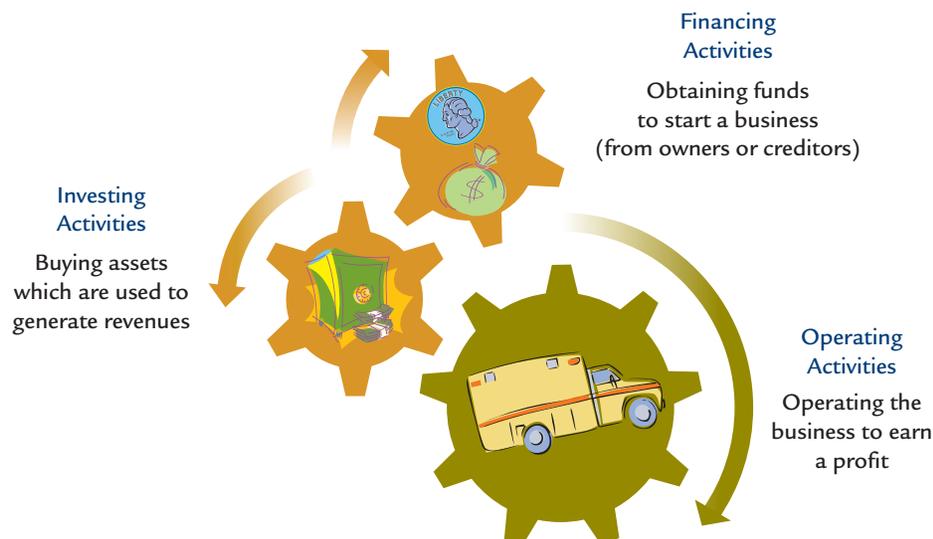
In addition to borrowing money from creditors, a corporation may issue shares of stock to investors in exchange for cash. The dollar amount paid to a corporation for these shares is termed *common stock* and represents the basic ownership interest in a corporation. As of September 29, 2007, Apple had issued 872,328,972 shares of common stock. The corporation is not obligated to repay the stockholder the amount invested; however, many corporations distribute a portion of their earnings to stockholders on a regular basis. These distributions are called *dividends*.

Creditors and stockholders have a claim on the **assets**, or economic resources, of a corporation. However, the claims on these resources differ. In the case of financial difficulty or distress, the claims of the creditors (called liabilities) must be paid prior to the claims of the stockholders (called **stockholders' equity**). The stockholders' claims are considered a residual interest in the assets of a corporation that remain after deducting its liabilities.

**Investing Activities** Once a corporation has obtained funds through its financing activities, it buys assets that enable a corporation to operate. For example, Apple has bought approximately \$1.8 billion in land, buildings, machinery, and equipment

### Exhibit 1-3

#### Business Activities



that it uses in its operations. The corporation may also obtain intangible assets that lack physical substance, such as copyrights and patents. Apple reported \$337 million of intangible assets related to technology and trademarks that it uses in its operations. The purchase (and sale) of the assets that are used in operations (commonly referred to as property, plant, and equipment) are a corporation's investing activities.

Regardless of its form, assets are future economic benefits that a corporation controls. The assets purchased by a corporation vary depending on the type of business that the corporation engages in, and the composition of these assets is likely to vary across different companies and different industries. For example, in 2007, property, plant, and equipment made up approximately 7 percent of Apple's total assets. This is typical of many technology companies. In contrast, property, plant, and equipment made up 66 percent of the total assets of Southwest Airlines, a company that relies heavily on airplanes to produce revenue.

**Operating Activities** Once a corporation has acquired the assets that it needs, it can begin to operate. While different businesses have different purposes, they all want to generate revenue. **Revenue** is the increase in assets that results from the sale of products or services. For example, Apple reported revenue of approximately \$24.6 billion in 2007. In addition to revenue, assets such as *cash*, *accounts receivable* (the right to collect an amount due from customers), *supplies*, and *inventory* (products held for resale) often result from operating activities.

To earn revenue, a corporation will incur various costs or expenses. **Expenses** are the cost of assets used, or the liabilities created, in the operation of the business. Apple reported expenses of \$15.852 billion related to the cost of iPods and other products sold in 2007.

The liabilities that arise from operating activities can be of different types. For example, if a corporation purchases goods on credit from a supplier, the obligation to repay the supplier is called an *account payable*. As of September 29, 2007, Apple reported approximately \$4.9 billion of accounts payable. Other examples of liabilities created by operating activities include *wages payable* (amounts owed to employees for work performed) and *income taxes payable* (taxes owed to the government).

The results of a company's operating activities can be determined by comparing revenues to expenses. If revenues are greater than expenses, a corporation has earned **net income**. If expenses are greater than revenues, a corporation has incurred a **net loss**.

### OBJECTIVE > 3

Describe the relationships shown by the fundamental accounting equation.

## Communication of Accounting Information

The financing, investing, and operating activities of a company are recorded by accounting systems in the form of detailed transactions. To effectively communicate a company's activities to decision-makers, these detailed transactions are summarized and reported in a set of standardized reports called **financial statements**. The role of financial statements is to provide information that will help investors, creditors, and others make judgments and predictions that serve as the basis for the various decisions they make. Financial statements help to answer questions such as those shown in Exhibit 1-4.

### The Four Basic Financial Statements

Companies prepare four basic financial statements:

- The **balance sheet** reports the resources (assets) owned by a company and the claims against those resources (liabilities and stockholders' equity) at a specific point in time.
- The **income statement** reports how well a company has performed its operations (revenues, expenses, and income) over a period of time.
- The **statement of retained earnings** reports how much of the company's income was retained in the business and how much was distributed to owners for a period of time.<sup>3</sup>
- The **statement of cash flows** reports the sources of a company's cash inflow and the uses of a company's cash over a period of time.

<sup>3</sup> Information contained in the statement of retained earnings is often included in a more comprehensive statement of changes in stockholders' equity, which describes changes in all components of stockholders' equity.

Exhibit 1-4

**Questions Answered by Financial Statements**

How much better off is the company at the end of the year than it was at the beginning of the year?



What are the economic resources of the company and the claims against those resources?

From what sources did a company's cash come and for what did the company use cash during the year?

While financial statements can be prepared for any point or period of time (e.g., monthly, quarterly, or annually), most companies prepare financial statements at the end of each month, quarter, and year. Note that the balance sheet is a point-in-time description, whereas the other financial statements are period-of-time descriptions that explain the business activities between balance sheet dates as shown in Exhibit 1-5.

These four statements are prepared and issued at the end of the year, and frequently companies issue statements monthly or quarterly to satisfy the users' needs for timely information. The annual statements usually are accompanied by supporting information and explanatory material called the notes to the financial statements.

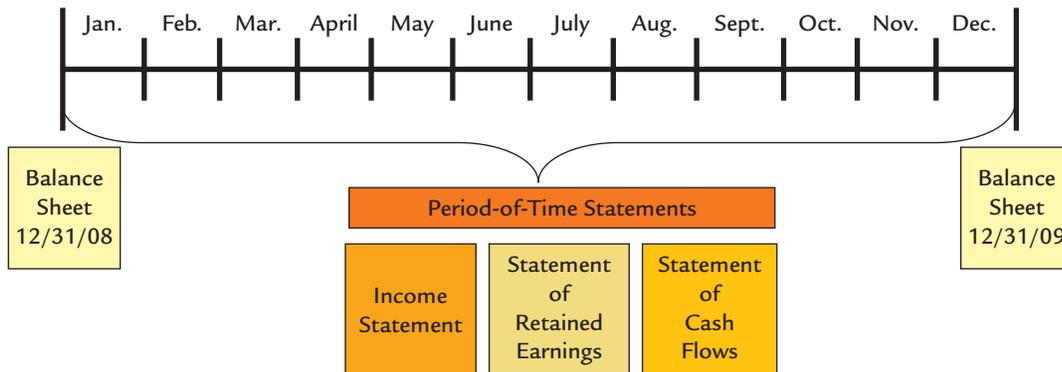
While these financial statements provide the kind of information users want and need, the financial statements do not interpret this information. The financial statement user must use his or her general knowledge of business and accounting to interpret the financial statements as a basis for decision-making. One of the main objectives of this text is help you develop an ability to interpret and analyze real financial statements.

**The Fundamental Accounting Equation**

To understand financial statements, it is necessary that you understand how the accounting system records, classifies, and reports information about business activities. The **fundamental accounting equation** illustrates the foundation of the accounting system.

Exhibit 1-5

**Financial Statement Time Periods**



### Assets = Liabilities + Stockholders' Equity

The fundamental accounting equation captures two basic features of any company. The left side of the accounting equation shows the assets, or economic resources of a company. The right side of the accounting equation indicates who has a claim on the company's assets. These claims may be the claims of creditors (liabilities) or they may be the claims of owners (stockholders' equity).

The implication of the fundamental accounting equation is that what a company owns (its assets) must always be equal to what it owes (its liabilities and stockholders' equity). **Cornerstone 1-1** illustrates this key relationship implied by the fundamental accounting equation.



## CORNERSTONE 1-1



### HOW TO Use the Fundamental Accounting Equation

**Concept:**

A company's resources (its assets) must always equal the claims on those resources (its liabilities and stockholders' equity).

**Information:**

On January 1, 2009, Gundrum Company reported assets of \$125,000 and liabilities of \$75,000. During 2009, assets increased by \$44,000 and stockholders' equity increased by \$15,000.

**Required:**

1. What is the amount reported for stockholders' equity on January 1, 2009?
2. What is the amount reported for liabilities on December 31, 2009?

**Solution:**

1. Stockholders' equity on January 1, 2009, is \$50,000. This amount is calculated by rearranging the fundamental accounting equation as follows:

$$\begin{aligned} \text{Assets} &= \text{Liabilities} + \text{Stockholders' Equity} \\ \$125,000 &= \$75,000 + \text{Stockholders' Equity} \\ \text{Stockholders' equity} &= \$125,000 - \$75,000 = \underline{\underline{\$50,000}} \end{aligned}$$

2. At December 31, 2009, liabilities are \$104,000. This amount is computed by adding the change to the appropriate balance sheet elements and then rearranging the fundamental accounting equation as follows:

$$\begin{aligned} \text{Assets} &= \text{Liabilities} + \text{Stockholders' Equity} \\ (\$125,000 + \$44,000) &= \text{Liabilities} + (\$50,000 + 15,000) \\ \text{Liabilities} &= (\$125,000 + \$44,000) - (\$50,000 + 15,000) \\ &= \$169,000 - \$65,000 = \underline{\underline{\$104,000}} \end{aligned}$$

The fundamental accounting equation will be used to capture all of the economic activities recorded by an accounting system. In Chapter 2, this equation will be expanded and used to analyze specific transactions and events.

#### OBJECTIVE > 4

Prepare a classified balance sheet and understand the information it communicates.

### The Classified Balance Sheet

The purpose of the balance sheet is to report the financial position of a company (its assets, liabilities, and stockholders' equity) at a specific point in time. The relationship between the elements of the balance sheet is given by the fundamental accounting

equation ( $\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$ ). Note that the balance sheet gets its name because the economic resources of a company (assets) must always equal, or be in balance with, the claims against those resources (liabilities and stockholders' equity).

The balance sheet is organized, or classified, to help users identify the fundamental economic similarities and differences between the various items within the balance sheet. These classifications help users answer questions such as (1) how a company obtained its resources and (2) whether a company will be able to pay its obligations when they become due. While companies often use different classifications and different levels of detail on their balance sheets, some common classifications are shown in Exhibit 1-6.

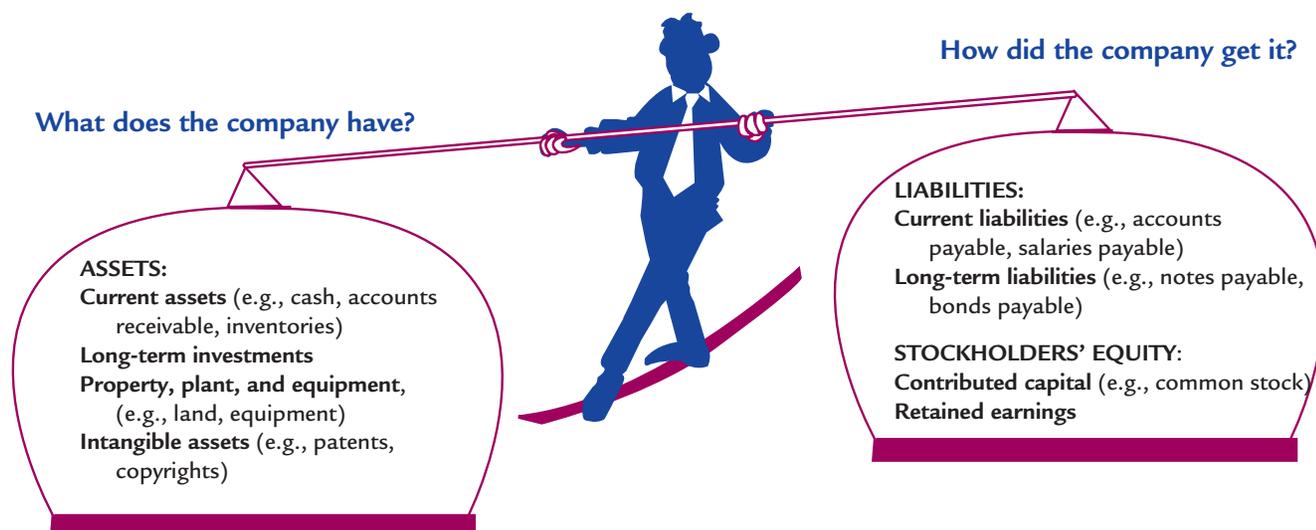
Let's examine the balance sheet classifications in more detail by looking at Apple's balance sheet shown in Exhibit 1-7. With regard to the heading of the financial statement, several items are of interest. First, the company for which the accounting information is collected and reported is clearly defined. Second, the title of the financial statement follows the name of the company. Third, the specific date of the statement is listed. Apple operates on a fiscal year that ends in September. A **fiscal year** is an accounting period that runs for one year. While many companies adopt a fiscal year that corresponds to the calendar year, others adopt a fiscal year that more closely corresponds with their business cycle. Finally, Apple reports its financial results rounded to the nearest millions of dollars. Large companies often round the amounts presented to make for a more clear presentation. For Apple, the reported cash amount of \$9,352 is actually \$9,352,000,000.

## Current Assets

The basic classification of a company's assets is between current and noncurrent items. In a typical company, it is reasonable to designate one year as the dividing line between current and noncurrent items. However, if the operating cycle of a company is longer than one year, it may be necessary to extend this dividing line beyond one year so that it corresponds to the length of the operating cycle. The **operating cycle** of a company is the average time that it takes a company to purchase goods, resell the goods, and collect the cash from customers. In other words, **current assets** consist of cash and other assets that are reasonably expected to be converted into cash within one year or one operating cycle, whichever is longer. Because most companies

Exhibit 1-6

### Common Balance Sheet Classifications



## Exhibit 1-7

**Classified Balance Sheet of Apple Inc.**

<b>Apple Inc. Balance Sheet* September 29, 2007 (in millions of dollars)</b>		
<b>ASSETS</b>		
<b>Current assets:</b>		
Cash	\$ 9,352	
Short-term investments	6,034	
Accounts receivable	1,637	
Inventories	346	
Other current assets	<u>4,587</u>	
Total current assets		\$21,956
<b>Property, plant, and equipment:</b>		
Land and buildings	\$ 762	
Machinery and equipment	2,079	
Less: accumulated depreciation	<u>(1,009)</u>	
Total property, plant, and equipment		1,832
Intangible assets		337
Other assets		<u>1,222</u>
Total assets		<u>\$25,347</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
<b>Current liabilities:</b>		
Accounts payable	\$4,970	
Salaries payable	254	
Unearned revenue	1,410	
Other current liabilities	<u>2,665</u>	
Total current liabilities		\$ 9,299
<b>Long-term liabilities:</b>		
Total liabilities		<u>1,516</u> \$10,815
<b>Stockholders' equity:</b>		
Contributed capital	\$5,368	
Retained earnings	9,101	
Other equity**	<u>63</u>	
Total stockholders' equity		14,532
Total liabilities and stockholders' equity		<u>\$25,347</u>
*The balance sheet information was taken from the annual report of Apple Inc. and has been summarized and reformatted by the authors.		
**The \$63 million of other equity reported by Apple represents accumulated other comprehensive income. The accounting for accumulated other comprehensive income is beyond the scope of this text and is not discussed.		

have operating cycles less than one year, we will use the one-year dividing line to distinguish between current and noncurrent items. Common types of current assets are:

- Cash
- Short-term investments or marketable securities—investments in the stocks and bonds of other companies as well as government securities
- Accounts receivable—the right to collect an amount due from customers
- Inventories—goods or products held for resale to customers
- Other current assets—a “catch-all” category that includes items such as prepaid expenses (advance payments for rent, insurance, and other services) and supplies

**Current assets are listed on the balance sheet in order of liquidity or nearness to cash.** That is, the items are reported in the order in which the company expects to convert them into cash.

## Noncurrent Assets

Assets that are not classified as current are classified as long-term or noncurrent assets. These include (1) long-term investments, (2) property, plant, and equipment, (3) intangible assets, and (4) other noncurrent assets.

**Long-term investments** are similar to short-term investments, except that the company expects to hold the investment for longer than one year. This category also includes land or buildings that a company is not currently using in operations. Apple does not currently report any long-term investments, but if it did, they would be reported immediately before property, plant, and equipment.

**Property, plant, and equipment** represents the tangible, long-lived, productive assets used by a company in its operations to produce revenue. This category includes land, buildings, machinery, manufacturing equipment, office equipment, and furniture. Apple reported property, plant, and equipment of \$1,832 million, representing 7.2 percent ( $\$1,832 \div \$25,347$ ) of its total assets. Because property, plant, and equipment helps to produce revenue over a number of years, companies assign, or allocate, a portion of the asset's cost as an expense in each period in which the asset is used. This process is called *depreciation*. The *accumulated depreciation* shown on Apple's balance sheet represents the total amount of depreciation that the company has expensed over the life of its assets. Because accumulated depreciation is subtracted from the cost of an asset, it is called a *contra-asset*.

**Intangible assets** are similar to property, plant, and equipment in that they provide a benefit to a company over a number of years; however, these assets lack physical substance. Examples of intangible assets include patents, copyrights, trademarks, and goodwill. *Other noncurrent assets* is a catch-all category that includes items such as deferred charges (long-term prepaid expenses) and other miscellaneous noncurrent assets.

## Current Liabilities

Current liabilities are closely related to current assets. **Current liabilities** consist of obligations that will be satisfied within one year or the operating cycle, whichever is longer. These liabilities can be satisfied through the payment of cash or by providing goods or services. **Current liabilities are typically listed in the order in which they will be paid** and include:

- Accounts payable—an obligation to repay a vendor or supplier for merchandise supplied to the company
- Salaries payable—an obligation to pay an employee for services performed
- Unearned revenue—an obligation to deliver goods or perform a service for which a company has already been paid
- Interest payable—an obligation to pay interest on money that a company has borrowed
- Taxes payable—an obligation to pay taxes on a company's income

## Long-Term Liabilities and Stockholders' Equity

**Long-term liabilities** are the obligations of the company that will require payment beyond one year or the operating cycle, whichever is longer. Common examples are:

- Notes payable—an obligation to repay cash borrowed at a future date
- Bonds payable—a form of an interest-bearing note payable issued by corporations in an effort to attract a large amount of investors

### CONCEPT Q&A

There are many classifications on the balance sheet that are essentially subtotals. Is it really important to place accounts within the right category or is it enough to simply understand if they are assets, liabilities, or stockholders' equity?

It is critical that you be able to identify accounts as assets, liabilities, or stockholders' equity accounts. However, the classifications are also important. Financial accounting is concerned with communicating useful information to decision-makers. These classifications provide decision-makers with critical information about the structure of assets, liabilities, and stockholders' equity that assists them in understanding a company's financial position.

Possible Answer:

Stockholders' equity is the final major classification on a company's balance sheet. Stockholder's equity arises from two sources:

- Contributed capital—the owners' contributions of cash and other assets to the company (includes the common stock of a company)
- Retained earnings—the accumulated net income of a company that has not been distributed to owners in the form of dividends

If a firm has been profitable for many years, and if its stockholders have been willing to forgo large dividends, retained earnings may be a large segment of equity. Apple reported approximately \$9.1 billion of retained earnings at September 29, 2007 which represents over 62 percent of its total stockholders' equity.

Together, a company's liabilities and equity make up the **capital** of a business. Apple has debt capital, capital raised from creditors, of approximately \$10.8 billion (total liabilities). Of this, approximately \$9.3 billion comes from current creditors, while approximately \$1.5 billion comes from long-term creditors. Apple's equity capital, which is the capital raised from stockholders, is approximately \$14.5 billion (total stockholders' equity).

Using the fundamental accounting equation and the common classifications of balance sheet items, a company will prepare its balance sheet. **Cornerstone 1-2** illustrates the steps in the preparation of a classified balance sheet.



## CORNERSTONE 1-2



### HOW TO Prepare a Classified Balance Sheet

#### Concept:

The balance sheet reports the financial position of a company (its assets, liabilities, and stockholders' equity) at a specific point in time.

#### Information:

Hightower Inc. reported the following account balances at December 31, 2009:

Inventories	\$ 2,300	Accounts receivable	\$ 4,200	Accounts payable	\$ 3,750
Land	12,100	Cash	2,500	Common stock	14,450
Salaries payable	1,200	Equipment	21,000	Patents	2,500
Retained earnings	11,300	Accumulated depreciation	5,800	Notes payable	8,100

#### Required:

Prepare Hightower Inc.'s balance sheet at December 31, 2009.

#### Solution:

The preparation of a classified balance sheet involves five steps:

1. Prepare a heading that includes the name of the company, the title of the financial statement, and the time period covered.
2. List the assets of the company in order of their liquidity or nearness to cash. Use appropriate classifications. Add the assets and double underline the total.
3. List the liabilities of the company in order of their time to maturity. Use appropriate classifications.
4. List the stockholders' equity balances with appropriate classifications.
5. Add the liabilities and stockholders' equity and double underline the total.

In general, only the first items in a column as well as any subtotals or totals have dollar signs. Also when multiple items exist within a classification, these items are grouped together in a separate column (to the left of the main column) and their total is placed in the main column.

Hightower Inc. Balance Sheet December 31, 2009		} Step 1	<b>CORNERSTONE</b> <b>1-2</b> <i>(continued)</i>
<b>ASSETS</b>			
Current assets:			
Cash	\$ 2,500	} Step 2	
Accounts receivable	4,200		
Inventories	<u>2,300</u>		
Total current assets	\$ 9,000		
Property, plant, and equipment:			
Land	\$12,100	} Step 2	
Equipment	21,000		
Less: accumulated depreciation	<u>(5,800)</u>		
Total property, plant, and equipment	27,300		
Intangible assets:			
Patents	<u>2,500</u>	} Step 2	
Total assets	<u>\$38,800</u>		
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>			
Current liabilities:			
Accounts payable	\$ 3,750	} Step 3	
Salaries payable	<u>1,200</u>		
Total current liabilities	\$ 4,950		
Long-term liabilities:			
Notes payable	<u>8,100</u>	} Step 3	
Total liabilities	\$13,050		
Stockholders' equity:			
Common stock	\$14,450	} Step 4	
Retained earnings	<u>11,300</u>		
Total stockholders' equity	25,750		
Total liabilities and stockholders' equity	<u>\$38,800</u>	} Step 5	

## Using Balance Sheet Information

The balance sheet conveys important information about the structure of assets, liabilities, and stockholders' equity to users of financial statements. For example, the relationship between current assets and current liabilities gives users insights into a company's **liquidity**—a company's ability to pay obligations as they become due. Two useful measures of liquidity are **working capital** (current assets – current liabilities) and the **current ratio** (current assets ÷ current liabilities). Working capital and current ratios for a company are helpful to an investor when these numbers are compared to those of other companies in the same industry. It is even more helpful to look at the trend of these measures over several years.

Because current liabilities will be settled with current assets, Apple's working capital of \$12,657 million (\$21,956 million – \$9,299 million) signals that it has adequate funds with which to pay its current obligations. Because working capital is expressed in a dollar amount, the information it can convey is limited. For example, comparing Apple's working capital of \$12,657 million to **Dell's** working capital of \$2,148 million would be misleading since Apple is more than three times as large (in

## DECISION-MAKING & ANALYSIS

### Assessing the Creditworthiness of a Prospective Customer

Thin Inc., a newly organized health club in Des Moines, Iowa, has approached the regional office of NordicTrack to purchase \$50,000 worth of exercise equipment. Thin Inc. offers to pay the full amount in six months plus 9 percent interest. John Peterson, the regional credit manager for NordicTrack has asked you, a member of his staff, to evaluate the creditworthiness of Thin Inc. and make a recommendation. At your request, Thin Inc. provides the following figures from its balance sheet:

Current Assets		Current Liabilities	
Cash	\$10,000	Accounts payable	\$25,000
Accounts receivable	50,000	Notes payable	30,000
Supplies	4,000	Current portion of mortgage payable	18,000
Total	<u>\$64,000</u>	Total	<u>\$73,000</u>

Allowing a company to purchase assets on credit requires evaluating the debtor's ability to repay the loan out of current assets. You raise the following questions to determine Thin's ability to repay the short-term loan:

1. *What is the present relationship between Thin's current assets and current liabilities?*

Thin's current liabilities exceed current assets by \$9,000 ( $\$64,000 - \$73,000$ ) resulting in negative working capital. In addition, its current ratio is 0.88 ( $\$64,000 \div \$73,000$ ).

2. *Is there likely to be any change in the relationship between current assets and current liabilities during the period of the loan?*

There is no evidence that Thin's liquidity problem will improve. Actually, it appears that Thin will have difficulty in paying its current liabilities as they come due. Thus it seems unrealistic for Thin to take on additional current liabilities at this time.

3. *Would you allow Thin Inc. to purchase the exercise equipment on credit?*

You recommend that, unless Thin can demonstrate how it will pay its current short-term obligations as well as the additional funds that would be owed to NordicTrack, short-term credit should not be extended.

terms of net assets). The current ratio is an alternative measure of liquidity that allows comparisons to be made between different companies. For example, Apple's current ratio of 2.36 ( $\$21,956 \text{ million} \div \$9,299 \text{ million}$ ) can be compared with its competitors (e.g., Dell's current ratio is 1.12).<sup>4</sup> Apple's current ratio tells us that for every dollar of current liabilities, Apple has \$2.36 of current assets. When compared to Dell, Apple is much more liquid.

#### OBJECTIVE 5

Prepare an income statement and understand the information it communicates.

### The Income Statement

The income statement reports the results of a company's operations—the sale of goods and services and the associated cost of operating the company—for a given period. The long-term survival of a company depends on its ability to produce net income by earning revenues in excess of expenses. Income enables a company to pay for the capital it uses (dividends to stockholders and interest to creditors) and attract new capital necessary for continued existence and growth. Investors buy and sell stock and creditors loan money based on their beliefs about a company's future performance. The past income reported on a company's income statement provides investors with information about a company's ability to earn future income.

<sup>4</sup>Information for Dell was obtained from Dell's fiscal year 2007 annual report that ended on February 2, 2007.

## Elements of the Income Statement

The income statement consists of two major items: revenues and expenses. An income statement for Apple is presented in Exhibit 1-8.

Examining the heading of the income statement, you should notice that it follows the same general format as the balance sheet—it indicates the name of the company, the title of the financial statement, and the time period covered by the statement. However, the income statement differs from the balance sheet in that it covers a period of time instead of a specific date.

Revenues are the increase in assets that result from the sale of products or services. Revenues can arise from different sources and have different names depending on the source of the revenue. *Sales revenue* arises from the principal activity of the business. For Apple, its sales revenue comes from sales of hardware (e.g., iPod, Macintosh computers, iPhone), software (operating systems), peripheral products and accessories, digital content (e.g., iTunes store sales) and service and support. Apple, like most other companies, generally recognizes sales revenue in the period that a sale occurs. Revenues also can be generated from activities other than the company's principal operations (e.g., nonoperating activities). For example, in addition to sales of its products, Apple also earns *interest income* from investments.

Expenses are the cost of resources used to earn revenues during a period. Expenses have different names depending on their function. Apple's income statement in Exhibit 1-8 reports five different expenses. *Cost of sales* (often called *cost of goods sold*) is the cost to the seller of all goods sold during the accounting period.<sup>5</sup> *Selling, general, and administrative expenses* are the expenses that a company incurs in selling goods, providing services, or managing the company that are not directly related to production. These expenses include advertising expenses, salaries paid to salespersons or managers, depreciation on administrative buildings and expenses related to insurance, utilities, property taxes, and repairs. *Research and development expense* represents the cost of developing new products. *Other expense* is a catch-all category used to capture other miscellaneous expenses incurred by the company. *Income tax expense* represents the income taxes paid on the company's pretax income.

Net income, or net earnings, is the difference between total revenues and expenses. Apple reported net income of \$3,496 million (\$24,653 million – \$21,157 million). If total expenses are greater than total revenues, the company would report a net loss. [Cornerstone 1-3](#) shows how to prepare an income statement.

### Exhibit 1-8

#### Income Statement

Apple Inc. Income Statement* For the fiscal year ended September 29, 2007 (in millions of dollars)			
<b>Revenues:</b>			
Net sales	\$24,006		
Interest income	647		\$24,653
<b>Expenses:</b>			
Cost of sales	\$15,852		
Selling, general, and administrative expenses	2,963		
Research and development expense	782		
Other expenses	48		
Income tax expense	1,512		21,157
<b>Net income</b>			<b>\$ 3,496</b>

\*The income statement information was taken from the annual report of Apple Inc. and has been summarized and reformatted by the authors.

<sup>5</sup>We will discuss procedures for calculating cost of sales in a later chapter.



## CORNERSTONE 1-3



### HOW TO Prepare an Income Statement

#### Concept:

The income statement reports the results of a company's operations (revenues less expenses) for a given period of time.

#### Information:

Hightower Inc. reported the following account balances for the year ending December 31, 2009:

Cost of sales	\$31,300	Interest expense	\$ 540
Salaries expense	8,800	Sales revenue	50,600
Insurance expense	700	Depreciation expense	1,500
Interest revenue	1,200	Rent expense	2,100
Income tax expense	2,000		

#### Required:

Prepare Hightower Inc.'s income statement for the year ending December 31, 2009.

#### Solution:

The preparation of an income statement involves four steps:

1. Prepare a heading that includes the name of the company, the title of the financial statement, and the time period covered.
2. List the revenues of the company, starting with sales revenue (or service revenue) and then listing other revenue items. Add the revenues to get total revenue.
3. List the expenses of the company, usually starting with cost of sales (if it exists). Add the expenses to get total expenses.
4. Subtract the expenses from the revenues to get net income (or net loss if expenses exceed revenues). Double-underline net income.

In general, only the first items in a column as well as any subtotals or totals have dollar signs. Also when multiple items exist within a classification, these items are grouped together in a separate column (to the left of the main column) and their total is placed in the main column.

<b>Hightower Inc.</b>			}	Step 1
<b>Income Statement</b>				
<b>For the Year Ended December 31, 2009</b>				
Revenues:				
Sales revenue	\$50,600		}	Step 2
Interest revenue	<u>1,200</u>			
Total revenues		\$51,800		
Expenses:				
Cost of sales	\$31,300		}	Step 3
Salaries expense	8,800			
Rent expense	2,100			
Depreciation expense	1,500			
Insurance expense	700			
Interest expense	540			
Income tax expense	<u>2,000</u>			
Total expenses		<u>46,940</u>		
Net income		<u><u>\$ 4,860</u></u>		Step 4

## Income Statement Formats

Companies prepare their income statements in one of two different formats. The format that we illustrated in Cornerstone 1-3 is called a *single-step income statement*. In a single-step income statement, there are only two categories: total revenues and total expenses. Total expenses are subtracted from total revenues in a *single step* to arrive at net income. The advantage of a single-step income statement is its simplicity.

A second income statement format is the *multiple-step income statement*. The multiple-step income statement provides classifications of revenues and expenses that financial statement users find useful. A multiple-step income statement contains three important subtotals:

1. **Gross margin (gross profit)**—the difference between net sales and cost of sales (or cost of goods sold)
2. **Income from operations**—the difference between gross margin and operating expenses
3. **Net income**—the difference between income from operations and any nonoperating revenues and expenses

A multiple-step income statement for Apple is shown in Exhibit 1-9.

Let's examine these three classifications. First, the difference between net sales and cost of goods sold is reported as a company's *gross margin* or *gross profit*. Gross margin represents the initial profit made from selling a product, but it is *not* a measure of total profit because other operating expenses have not yet been subtracted. However, gross margin is closely watched by managers and other financial statement users. A change in a company's gross margin can give insights into a company's current pricing and purchasing policies, thereby providing insight into the company's future performance.

Second, *income from operations* is computed by subtracting operating expenses from gross margin. Operating expenses are the expenses the business incurs in selling goods or providing services and managing the company. Operating expenses typically include research and development expenses, selling expenses, and general and administrative expenses. Income from operations indicates the level of profit produced by the principle activities of the company. Apple can increase its income from operations by either increasing its gross margin or decreasing its operating expenses.

### Exhibit 1-9

#### Multiple-Step Income Statement

Apple Inc. Income Statement* For the fiscal year ended September 29, 2007 (in millions of dollars)		
Net sales	\$24,006	
Cost of sales	<u>15,852</u>	
<b>Gross margin</b>		\$8,154
Operating expenses:		
Research and development expense	\$ 782	
Selling, general, and administrative expenses	<u>2,963</u>	
Total operating expenses		<u>3,745</u>
<b>Income from operations</b>		\$4,409
Other income and expense:		
Interest income	\$ 647	
Other expenses	<u>(48)</u>	599
Income before income taxes		<u>\$5,008</u>
Income tax expense		1,512
<b>Net income</b>		<u><u>\$3,496</u></u>

\*The income statement information was taken from the annual report of Apple Inc. and has been summarized and reformatted by the authors.

## Exhibit 1-10

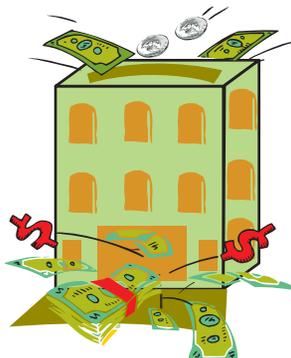
## Typical Nonoperating Items

## Other Revenues and Gains



Interest revenue on investments  
 Dividend revenue from investments  
     in stock of other companies  
 Rent revenue  
 Gains on sale of property, plant,  
 and equipment

## Other Expenses and Losses



Interest expense from loans  
 Losses from sale of property,  
     plant, and equipment  
 Losses from accidents or vandalism  
 Losses from employee strikes  
 Income tax expense

Finally, a multiple-step income statement reports nonoperating activities in a section which is frequently called *other income and expenses*. *Nonoperating activities* are revenues and expenses from activities other than the company's principle operations. They include gains and losses from the sale of equipment and other items that were not acquired for resale. For many companies, the most important nonoperating item is interest. Exhibit 1-10 lists some common nonoperating items.

These nonoperating items are subtracted from income from operations to obtain income before taxes. Income tax expense is then subtracted to obtain net income.

Regardless of the format used, notice that there is no difference in the amount of the revenue or expense items reported. That is, net income is the same under either the single-step or the multiple-step format. The only difference is how the revenues and expenses are classified.

## Using Income Statement Information

The income statement provides information about the future profitability and growth of a company. **Earnings per share**, which measures the net income earned for each share of common stock is probably one of the most frequently cited ratios in financial analysis.<sup>6</sup> Examining earnings per share ratios (and other financial information) for a company over time, investors can gain insight into the earnings performance and profitability of a company.

For example, assume that you want to invest in one of two companies, either Growth, Inc., or Stagnation Company. Your first step is to examine some key elements from the current income statements of each company:

Growth, Inc.		Stagnation Company	
Sales revenue	\$1,000,000	Sales revenue	\$1,000,000
Gross margin	\$400,000	Gross margin	\$400,000
Net income	\$50,000	Net income	\$50,000
Number of shares	20,000 shares	Number of shares	10,000 shares
Earnings per share	\$2.50	Earnings per share	\$5.00

Next, examine a five-year summary of sales revenue and net income for the two firms in order to detect trends for each company over time.

## Growth, Inc.

	2006	2007	2008	2009	2010
Sales revenue	\$625,000	\$700,000	\$750,000	\$875,000	\$1,000,000
Net income	\$30,000	\$36,000	\$40,000	\$42,000	\$50,000
Earnings per share	\$1.50	\$1.80	\$2.00	\$2.10	\$2.50

<sup>6</sup>Earnings per share will be discussed in more depth in Chapter 10.

**Stagnation Company**

	2006	2007	2008	2009	2010
Sales revenue	\$1,025,000	\$975,000	\$997,000	\$950,000	\$1,000,000
Net income	\$51,000	\$48,000	\$46,000	\$49,000	\$50,000
Earnings per share	\$5.10	\$4.80	\$4.60	\$4.90	\$5.00

As an investor, you seek those investments that will provide the largest return at the lowest risk. One factor considered to be associated with large returns is growth, and accounting information can help you judge a company's growth potential. In assessing the growth potential for our two hypothetical companies, you note that, over the last five years, Growth's sales and net income have steadily increased while Stagnation's sales and net income have remained, on average, stable. Additionally, Growth exhibits a clear upward trend in its earnings per share ratio while Stagnation's earnings per share ratio has, on average, declined. Therefore, while the future never can be predicted with certainty, the past five years' data suggest that, if Growth continues to grow more rapidly than Stagnation, an investment in Growth would probably yield the larger return.

## Statement of Retained Earnings

### OBJECTIVE > 6

Prepare the statement of retained earnings and understand the information it communicates.

The owners of a company contribute capital in one of two ways:

1. directly, through purchases of common stock from the company, and
2. indirectly, by the company retaining some or all of the net income earned each year rather than paying it out in dividends.

As noted earlier, the income earned by the company but not paid out in the form of dividends is called retained earnings. A company may choose to retain a portion of its earnings in order to provide profit to be used for future growth. The statement of retained earnings summarizes and explains the changes in retained earnings during the accounting period.<sup>7</sup> Exhibit 1-11 shows the statement of retained earnings for Apple.

#### Exhibit 1-11

### Statement of Retained Earnings

Apple Inc. Statement of Retained Earnings* For the fiscal year ended September 29, 2007 (in millions of dollars)	
Retained earnings, Sept. 30, 2006	\$5,607
Add: Net income	3,496
	<u>\$9,103</u>
Less: Dividends	0
Other**	(2)
Retained earnings, Sept. 29, 2007	<u><u>\$9,101</u></u>

\*The statement of retained earnings was created by the authors from information contained in Apple Inc.'s 2007 annual report.  
\*\*The other item deducted in Apple's statement of retained earnings is related to common stock issued under Apple's stock plans. This is an unusual item and beyond the scope of this text and is not discussed.

<sup>7</sup> Some companies may choose to report a statement of changes in stockholders' equity, which explains the changes in all of the stockholders' equity accounts, rather than a statement of retained earnings.

Notice the heading is similar to the heading for the income statement in that it covers a period of time (the fiscal year ended September 29, 2007). In addition, Apple declared no dividends for 2007 but chose to keep the net income earned within the company. The preparation of a statement of retained earnings is detailed in [Cornerstone 1-4](#).



## CORNERSTONE

1 - 4



### HOW TO Prepare a Statement of Retained Earnings

#### Concept:

The statement of retained earnings summarizes and explains the changes in retained earnings during an accounting period.

#### Information:

Hightower Inc. reported the following account balances for the year ending December 31, 2009:

Net Income	\$4,860	Retained earnings, 1/1/2009	\$10,590
Dividends	3,000	Retained earnings, 12/31/2009	11,300

#### Required:

Prepare Hightower Inc.'s statement of retained earnings for the year ending December 31, 2009.

#### Solution:

The preparation of the statement of retained earnings involves four steps:

1. Prepare a heading that includes the name of the company, the title of the financial statement, and the time period covered.
2. List the retained earnings balance at the beginning of the period obtained from the balance sheet dated December 31, 2008.
3. Add net income obtained from the income statement.
4. Subtract any dividends declared during the period. Double-underline the total which should equal retained earnings at the end of the period as reported on the balance sheet dated December 31, 2009.

<b>Hightower Inc.</b>			
<b>Statement of Retained Earnings</b>			
<b>For the Year Ended December 31, 2009</b>			} Step 1
Retained earnings, January 1, 2009	\$ 9,440		} Step 2
Add: Net income	4,860		} Step 3
Deduct: Dividends	(3,000)		
Retained earnings, December 31, 2009	<u><u>\$11,300</u></u>		} Step 4

### Use of the Statement of Retained Earnings

The statement of retained earnings is used to monitor a company's dividend payouts to its shareholders. For example, some older investors seek out companies with high dividend payouts so that they will receive cash during the year. Also, creditors are interested in a company's dividend payouts. If a company pays out too much in dividends, the company may not have enough cash on hand to repay its debt when it becomes due.

## Statement of Cash Flows

The last of the major financial statements, the statement of cash flows, describes the company's cash receipts (cash inflows) and cash payments (cash outflows) for a period of time. The statement of cash flows for Apple is shown in Exhibit 1-12.

Cash flows are classified into one of three categories:

- **Cash flows from operating activities**—any cash flows directly related to earning income. This category includes cash sales and collections of accounts receivable as well as cash payments for goods, services, salaries, and interest.
- **Cash flows from investing activities**—any cash flow related to the acquisition or sale of investments and long-term assets such as property, plant, and equipment.
- **Cash flows from financing activities**—any cash flow related to obtaining capital of the company. This category includes the issuance and repayment of debt, common stock transactions, and the payment of dividends.

The preparation of the statement of cash flows will be discussed in Chapter 11.

### Use of the Statement of Cash Flows

The statement of cash flows is used by creditors who wish to assess the creditworthiness of a company. A company with healthy cash flow—particularly if it comes from operating activities—is in a good position to repay debts as they come due and is usually a low-risk borrower. Stockholders are also interested in the adequacy of cash flows as an indicator of the company's ability to pay dividends and to expand its business. The statement of cash flows is covered in more detail in Chapter 11.

## Relationships Among the Statements

At this point, it is important to notice the natural relationships of the four basic financial statements and the natural progression from one financial statement to another. Normally, we begin an accounting period with a balance sheet. During the year, the company earns net income from operating its business. Net income from the income statement increases retained earnings on the statement of retained earnings. Ending retained earnings from the statement of retained earnings is reported in the stockholders' equity section of the balance sheet at the end of the accounting period. Finally, the statement of cash flow explains the change in cash on the balance sheets at the beginning and end of the accounting period. These relationships are shown in Exhibit 1-13.

### OBJECTIVE > 7

Understand the information communicated by the statement of cash flows.

### OBJECTIVE > 8

Describe the relationships among the financial statements.

#### Exhibit 1-12

### Statement of Cash Flows

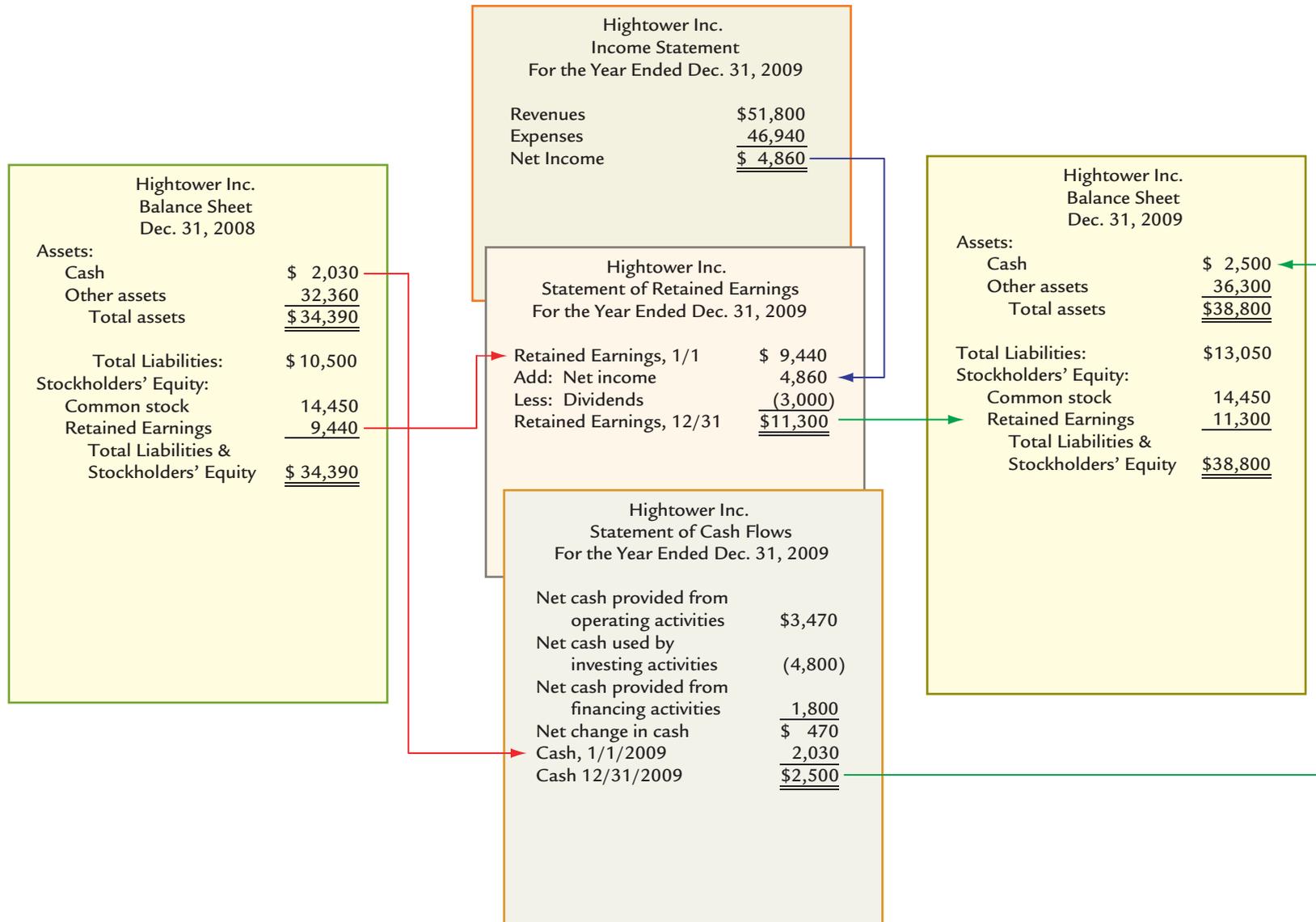
**Apple Inc.**  
**Statement of Cash Flows\***  
**For the fiscal year ended September 29, 2007**  
**(in millions of dollars)**

Net cash provided from <b>operating</b> activities	\$ 5,470
Net cash used by <b>investing</b> activities	(3,249)
Net cash provided from <b>financing</b> activities	739
Net change in cash	<u>\$ 2,960</u>
Cash at the beginning of the year	6,392
Cash at the end of the year	<u>\$ 9,352</u>

\*The statement of cash flow information was taken from the annual report of Apple Inc. and has been summarized and reformatted by the authors.

Relationships Among the Financial Statements

Beginning of the Period → End of the Period



## Other Items in the Annual Report and Professional Ethics

### OBJECTIVE 9

Describe other information contained in the annual report and the importance of ethics in accounting.

The financial statements discussed in the previous section were reported to users in an *annual report*. The annual report includes the financial statements of a company and other important information such as the notes to the financial statements, management's discussion and analysis of the condition of the company, and the auditor's report. For publicly-traded companies that are required to file reports with the Securities and Exchange Commission, the annual report is contained within the company's 10-K filing.

### Notes to the Financial Statements

The **notes to the financial statements (or footnotes)** clarify and expand upon the information presented in the financial statements. The notes are an integral part of the financial statements and help to fulfill the accountant's responsibility for full disclosure of all relevant information. Without the information contained in the notes, the financial statements are incomplete and could not be adequately understood by users. The information contained in the notes can be either quantitative (numerical) or qualitative (nonnumerical).

Generally, the first note contains a summary of significant accounting policies. For example, the following is an excerpt from Apple's notes to the financial statements concerning its accounting for revenues:

#### Revenue Recognition

The Company recognizes revenue when persuasive evidence of an arrangement exists, delivery has occurred, the sales price is fixed or determinable, and collection is probable. Product is considered delivered to the customer once it has been shipped and title and risk of loss have been transferred. For most of the Company's product sales, these criteria are met at the time the product is shipped.

Other footnotes provide additional detail on line items presented in the financial statements. For example, while Apple only reports a single number on the balance sheet for property, plant, and equipment, the company provides a detailed breakdown of the components of property, plant, and equipment (land, building, machinery, equipment, and furniture) in the notes. Other notes provide disclosures about items not reported in the financial statements. For instance, Apple provides detailed explanations of its stock option activity over the last three years—an activity not directly reported on the financial statements yet of significant interest to users.

### Management's Discussion and Analysis

The annual report also includes a section entitled "**Management's Discussion and Analysis.**" In this section, management provides a discussion and explanation of various items reported in the financial statements. Additionally, management uses this opportunity to highlight favorable and unfavorable trends and significant risks facing the company. For example, in explaining the increase in sales from the previous years, Apple disclosed the following:

### CONCEPT Q&A

Is there a single equation or financial statement which captures the business activities (operating, investing, and financing) that all companies engage in?

The fundamental accounting equation captures the business activities of companies and encompasses all of the major financial statements. While certain statements provide more information on certain business activities (e.g., the income statement provides information about a company's operating activities), information is also contained in other statements as well (e.g., current assets and current liabilities provide insight into a company's operations). Therefore, all financial statements and the notes to the financial statements must be examined as an integrated whole.

**Possible Answer:**

Net sales of iPods increased \$629 million or 8% during 2007 compared to 2006. Unit sales of iPods increased 31% compared to 2006. The iPod growth was primarily driven by increased sales of the iPod shuffle and iPod nano particularly in international markets. iPod unit sales growth was significantly greater than iPod net sales due to a shift in overall iPod product mix, as well as due to lower selling prices for the iPod classic, iPod nano and iPod shuffle in 2007 compared to 2006.

## Report of Independent Accountants

An independent accountant (or auditor) is an accounting professional who conducts an examination of a company's financial statements. The objective of this examination is to gather evidence that will enable the auditor to form an opinion as to whether the financial statements fairly present the financial position and result of operations of the company. The auditor's opinion of the financial statements is presented in the form of an **audit report**. Exhibit 1-14 shows an excerpt from the audit report for Apple.

Because financial statement users cannot directly observe the company's accounting practices, companies hire auditors to give the users of the financial statements assurance or confidence that the financial statements are a fair presentation of the company's financial health. In performing an audit, it is impractical for an auditor to retrace every transaction of the company for the entire accounting period. Instead, the auditor performs procedures (e.g., sampling of transactions) that enable an opinion to be expressed on the financial statement as a whole.

### Exhibit 1-14

#### Auditor's Report

##### Report of Independent Registered Public Accounting Firm (partial)

The Board of Directors and Shareholders  
Apple, Inc.:

We have audited the accompanying consolidated balance sheets of Apple Inc. and subsidiaries (the Company) as of September 29, 2007 and September 30, 2006, and the related consolidated statements of operations, shareholders' equity, and cash flows for each of the years in the three-year period ended September 29, 2007. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Apple Inc. and subsidiaries as of September 29, 2007 and September 30, 2006, and the results of their operations and their cash flows for each of the years in the three-year period ended September 29, 2007, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), Apple Inc.'s internal control over financial reporting as of September 29, 2007, based on criteria established in *Internal Control—Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and our report dated November 15, 2007 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

/s/ KPMG LLP  
Mountain View, California  
November 15, 2007

## DECISION-MAKING & ANALYSIS

### Career Analysis

Virtually every organization must have an accounting system; thus, accountants are employed in a wide range of businesses. Accounting knowledge and experience can also open doors to other areas of business.

**1.** *What skills and character traits are required for accountants?*

Accountants must have well-developed analytical skills and must be effective communicators, both verbally and in writing. Most accounting assignments—whether in business, government, or public accounting—are team assignments in which team members must be able to communicate effectively and work quickly and cooperatively to a solution. As a profession, accounting is subject to professional competence requirements and requires a high level of academic study. In addition, accountants must have personal integrity and behave ethically.

**2.** *What credentials are useful for a career in accounting?*

Most members of public accounting firms, and many management accountants and consultants, are (or are in the process of becoming) Certified Public Accountants (CPAs). The CPA designation is awarded under state law in each of the 50 states to ensure that accountants who offer their services to the public are properly qualified. The CPA is earned by meeting education and experience requirements and by passing a professional examination. The examination is administered nationally by the American Institute of Certified Public Accountants (AICPA). Other valuable professional certifications are the Certified Management Accountant (CMA) designation, which is awarded by the Institute of Management Accountants, and the Certified Internal Auditor (CIA) designation, which is awarded by the Institute of Internal Auditors. Some accountants have obtained the Certified Fraud Examiner (CFE) designation awarded by the Association of Certified Fraud Examiners.

**3.** *What are the career paths of accountants?*

Accountants work for many types of organizations, including private companies, public accounting firms, governments, and banks. An accounting graduate who begins in public accounting enters as a staff accountant and from there progresses to senior accountant, to manager, and finally to partner. Public accountants perform financial statement audits, provide tax services to their clients, and/or offer management consulting services (e.g., the design and installation of accounting systems). Some accounting graduates choose to begin employment with either profit or nonprofit organizations. In such organizations, an accountant may perform duties that include general accounting, internal auditing, budgeting, and cost accounting. With the knowledge and experience gained through accounting, many accountants have the opportunity to advance within the organization to the corporate executive level. As you can see, the career opportunities for accountants are virtually boundless.

### Professional Ethics

Confidence that standards of ethical behavior will be maintained—even when individuals have incentives to violate those standards—is essential to the conduct of any business activity. Owners of businesses must trust their managers, managers must trust each other and their employees, and the investing public must trust its auditors to behave according to accepted ethical standards, which may or may not be reflected in formal written codes. The violation of ethical standards may bring clear and direct penalties but more often bring subtle and long-lasting negative consequences for individuals and companies.

For the economy to function effectively and efficiently, users must have faith that the information reported in financial statements is accurate and dependable. This can only be accomplished through ethical behavior. The American Institute of Certified Public Accountants (AICPA), recognizing that its members have an obligation of self-discipline above and beyond the requirements of generally accepted accounting principles, has adopted a code of professional conduct which provides ethical guidelines for accountants in the performance of their duties. These ethical principles require accountants to serve the public interest with integrity. For example, auditors should fulfill their duties with objectivity, independence, and due professional care. In no situation should an auditor yield to pressure from management to report positively on financial statements that overstate the company's performance or prospects. Violation of these ethical standards can result in severe penalties, including revocation of an accountant's license to practice as a certified public accountant.

In recent years, there have been an increasing number of news reports about unethical behavior involving accounting practices. Acting ethically is not always easy. However, because of the important role of accounting in society, accountants are expected to maintain the highest level of ethical behavior. Throughout this book, you will be exposed to ethical dilemmas that we urge you to consider.

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## Summary of Learning Objectives

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**LO1. Explain the nature of accounting.**

- Accounting is the process of identifying, measuring, recording and communicating financial information.
- This information is used both inside and outside of the business to make better decisions.
- Accounting is also called the language of business.
- Financial accounting focuses on the needs of external decision-makers.

**LO2. Identify the forms of business organizations and the types of business activities.**

- The three forms of business organizations are a sole proprietorship (owned by one person), a partnership (jointly owned by two or more individuals), and a corporation (separate legal entity organized under the laws of a particular state).
- Regardless of the form of business, all businesses are involved in three activities. Financing activities include obtaining funds necessary to begin and operate a business. Investing activities involve buying the assets that enable a business to operate. Operating activities are the activities of a business that generate a profit.

**LO3. Describe the relationships shown by the fundamental accounting equation.**

- The fundamental accounting equation captures all of the economic activities recorded by an accounting system.
- The left side of the accounting equation shows the assets, or economic resources of a company.
- The right side of the accounting equation shows the claims on the company's assets (liabilities or stockholders' equity).

**LO4. Prepare a classified balance sheet and understand the information it communicates.**

- A balance sheet reports the resources (assets) owned by a company and the claims against those resources (liabilities and stockholders' equity) at a specific point in time.
- These elements are related by the fundamental accounting equation:  $\text{Assets} = \text{Liabilities} + \text{Stockholders Equity}$ .
- In order to help users identify the fundamental economic similarities and differences between the various items on the balance sheet, assets and liabilities are classified as either current or noncurrent (long-term). Stockholders' equity is classified as either contributed capital or retained earnings.

**LO5. Prepare an income statement and understand the information it communicates.**

- The income statement reports how well a company has performed its operations over a period of time and provides information about the future profitability and growth of a company.

- The income statement includes the revenues and expenses of a company which can be reported in either a single-step or multiple-step format.

**LO6. Prepare the statement of retained earnings and understand the information it communicates.**

- The statement of retained earnings reports how much of a company's income was retained in the business and how much was distributed to owners for a period of time.
- The statement of retained earnings provides users with insights into a company's dividend payouts.

**LO7. Understand the information communicated by the statement of cash flows.**

- The statement of cash flows reports the sources of a company's cash inflow and the uses of a company's cash over time.
- The statement of cash flows can be used to assess the creditworthiness of a company.

**LO8. Describe the relationships among the financial statements.**

- There is a natural relationship among the four basic financial statements so that financial statements are prepared in a particular order.
- Starting with the balance sheet at the beginning of the accounting period, financial statements are generally prepared in the following order: income statement, the statement of retained earnings, and the balance sheet at the end of the accounting period.
- The statement of cash flow explains the change in cash on the balance sheets at the beginning and end of the accounting period.

**LO9. Describe other information contained in the annual report and the importance of ethics in accounting.**

- The notes to the financial statements clarify and expand upon the information presented in the financial statements, and are considered an integral part of a company's financial statements.
- Management's discussion and analysis provides a discussion and explanation of various items reported in the financial statements.
- The auditor's report gives the auditor's opinion as to whether the financial statements fairly present the financial condition and results of operations of the company.
- Maintenance of standards of ethical behavior is essential to the conduct of any business activity. Violation of these standards often brings significant short- and long-term negative consequences for individuals and companies.
- The maintenance of a high ethical standard is necessary for users to have faith in the accuracy of the financial statements, which is a key factor in the effective and efficient functioning of the economy.

**CORNERSTONE 1-1** How to use the fundamental accounting equation, page 10

**CORNERSTONE 1-2** How to prepare a classified balance sheet, page 14

**CORNERSTONE 1-3** How to prepare an income statement, page 18

**CORNERSTONE 1-4** How to prepare a statement of retained earnings, page 22



**CORNERSTONES  
FOR CHAPTER 1**

## Key Terms

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Accounting, 4	Income statement, 8
Assets, 7	Intangible assets, 13
Audit report, 26	Liability, 7
Balance sheet, 8	Liquidity, 15
Capital, 14	Long-term investments, 13
Cash flows from financing activities, 23	Long-term liabilities, 13
Cash flows from investing activities, 23	Management's Discussion and Analysis, 25
Cash flows from operating activities, 23	Net income, 19
Corporation, 5	Net loss, 8
Creditor, 7	Notes to the financial statements (or footnotes), 25
Current assets, 11	Operating cycle, 11
Current liabilities, 13	Partnership, 5
Current ratio, 15	Property, plant, and equipment, 13
Earnings per share, 20	Revenue, 8
Expenses, 8	Sole proprietorship, 5
Financial accounting, 4	Statement of cash flows, 8
Financial statements, 8	Statement of retained earnings, 8
Fiscal year, 11	Stockholders' equity, 7
Fundamental accounting equation, 9	Working capital, 15
Gross margin (gross profit), 19	
Income from operations, 19	

## Review Problem

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### I. Preparing Financial Statements

#### Concept:

A company's business activities are summarized and reported in its financial statements. The balance sheet reports the company's financial position (assets, liabilities, and stockholders' equity) at a specific point in time. The income statement reports the results of a company's operations (revenues less expenses) for a given period of time. The statement of retained earnings summarizes and explains the changes in retained earnings during the accounting period.

#### Information:

Enderle Company reported the following account balances at December 31, 2009:

Equipment	\$19,800	Sales revenue	\$82,500	Interest expense	\$ 1,150
Retained earnings, 12/31/2009	15,450	Accumulated depreciation	5,450	Retained earnings, 1/1/2009	10,300
Copyright	1,200	Cash	1,900	Depreciation expense	3,500
Accounts payable	5,500	Salaries expense	18,100	Cost of sales	52,000
Interest revenue	2,300	Common stock	11,500	Inventories	5,600
Bonds payable	10,000	Land	15,000	Income tax expense	3,000
Dividends	1,850	Accounts receivable	3,700	Interest payable	300

#### Required:

1. Prepare Enderle Company's income statement for the year ending December 31, 2009.
2. Prepare Enderle Company's statement of retained earnings for the year ending December 31, 2009.
3. Prepare Enderle Company's balance sheet at December 31, 2009.

**Solution:**

1.

**Enderle Company**  
**Income Statement**  
**For the Year Ended December 31, 2009**

Revenues:		
Sales revenue	\$82,500	
Interest revenue	2,300	
Total revenues		\$84,800
Expenses:		
Cost of sales	\$52,000	
Salaries expense	18,100	
Depreciation expense	3,500	
Interest expense	1,200	
Income tax expense	3,000	
Total expenses		77,800
Net income		<u>\$ 7,000</u>

2.

**Enderle Company**  
**Statement of Retained Earnings**  
**For the Year Ended December 31, 2009**

Retained earnings, January 1, 2009	\$ 10,300
Add: Net income	7,000
Deduct: Dividends	(1,850)
<b>Retained earnings, December 31, 2009</b>	<b><u>\$15,450</u></b>

3.

**Enderle Company**  
**Balance Sheet**  
**December 31, 2009**

**ASSETS**

Current assets:		
Cash	\$ 2,900	
Accounts receivable	3,700	
Inventories	5,600	
Total current assets		\$12,200
Property, plant, and equipment:		
Land	\$15,000	
Equipment	19,800	
Less: accumulated depreciation	(5,450)	
Total property, plant, and equipment		29,350
Intangible assets:		
Copyright		1,200
Total assets		<u>\$42,750</u>

LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Accounts payable		\$ 5,500	
Interest payable		<u>300</u>	
Total current liabilities			\$ 5,800
Long-term liabilities:			
Bonds payable			<u>10,000</u>
Total liabilities			\$15,800
Stockholders' equity:			
Common stock		\$11,500	
Retained earnings		<u>15,450</u>	
Total stockholders' equity			<u>26,950</u>
Total liabilities and stockholders' equity			<u>\$42,750</u>

## Discussion Questions

1. Define *accounting*. How does accounting differ from *bookkeeping*?
2. Why is there a demand for accounting information? Name five groups that create demand for accounting information about businesses, and describe how each group uses accounting information.
3. What is an accounting entity?
4. Name and describe three different forms of business organization.
5. Name and describe the three main types of business activities.
6. Define the words *assets*, *liabilities*, and *stockholders' equity*. How are the three words related?
7. Define the words *revenue* and *expense*.
8. Name and briefly describe the purpose of the four financial statements.
9. What types of questions are answered by the financial statements?
10. What is point-in-time measurement? How does it differ from period-of-time measurement?
11. Write the fundamental accounting equation. What is its significance?
12. What information is included in the heading of each of the four financial statements?
13. Define current assets and current liabilities. Why are current assets and current liabilities separated from noncurrent assets and long-term liabilities on the balance sheet?
14. Describe how items are ordered within the current assets and current liabilities sections on a balance sheet.
15. Name the two main components of stockholders' equity. Describe the main sources of change in each component.
16. What equation describes the income statement?
17. How does the multiple-step income statement differ from the single-step income statement?
18. Explain the items reported on a statement of retained earnings.
19. Name and describe the three categories of the statement of cash flows.
20. How is the statement of changes in retained earnings related to the balance sheet? How is the income statement related to the statement of changes in retained earnings?
21. Describe the items (other than the financial statements) found in the annual report.
22. Give an example of unethical behavior by a public accountant and describe its consequences.

## Multiple-Choice Exercises

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**1-1** Which of the following statements is *false* concerning forms of business organization?

- a. A sole proprietorship is an easy type of business to form.
- b. It is easier for a corporation to raise large sums of money than it is for a sole proprietorship or partnership.
- c. A corporation has tax advantages over the other forms of business organization.
- d. Owners of sole proprietorships and partnerships have personal liability for the debts of the business while owners of corporations have limited legal liability.

**1-2** Which of the following statements regarding business activities is *true*?

- a. Operating activities involve buying the assets that enable a company to generate revenue.
- b. Investing activities center around earning interest on a company's investments.
- c. Companies spend a relatively small amount of time on operating activities.
- d. Financing activities include obtaining the funds necessary to begin and operate a business.

**1-3** At December 31, Pitt Inc. has assets of \$8,500 and liabilities of \$6,300. What is the stockholders' equity for Pitt at December 31?

- a. \$14,700
- b. \$10,700
- c. \$ 8,500
- d. \$ 2,200

**1-4** Which of the following is *not* one of the four basic financial statements?

- a. auditor's report
- b. income statement
- c. balance sheet
- d. statement of cash flows

**1-5** What type of questions do the financial statements help to answer?

- a. Is the company better off at the end of the year than at the beginning of the year?
- b. What resources does the company have?
- c. What did a company use its cash for during the year?
- d. All of the above.

**1-6** Which of the following is *not* shown in the heading of a financial statement?

- a. The title of the financial statement
- b. The name of the auditor
- c. The name of the company
- d. The time period covered by the financial statement

**1-7** At December 31, Marker reported the following items: cash, \$12,200; inventory, \$2,500; accounts payable, \$4,300; accounts receivable, \$3,500; common stock, \$5,900; property, plant, and equipment, \$10,000; interest payable, \$1,400; retained earnings, \$16,600. What is the total of Marker's current assets?

- a. \$28,200
- b. \$18,400
- c. \$18,200
- d. \$13,900

**1-8** Using the information in Multiple-Choice Exercise 1-7, what is Marker's stockholders' equity?

- a. \$22,500
- b. \$18,200
- c. \$12,500
- d. \$5,700

**1-9** Which of the following statements regarding the income statement is true?

- a. The income statement shows the results of a company's operations at a specific point in time.
- b. The income statement consists of assets, expenses, liabilities, and revenues.
- c. The income statement provides information about the future profitability and growth of a company.
- d. Typical income statement accounts include Sales revenue, Unearned revenue, and Cost of sales.

**1-10** For the most recent year, Grant Company reported revenues of \$150,000, cost of goods sold of \$84,000, inventory of \$5,000, salaries expense of \$40,000, rent expense of \$15,000, and cash of \$20,000. What was Grant's net income?

- a. \$66,000
- b. \$11,000
- c. \$26,000
- d. \$95,000

**1-11** Which of the following statements concerning retained earnings is true?

- a. Retained earnings is the difference between revenues and expenses.
- b. Retained earnings is increased by dividends and decreased by net income.
- c. Retained earnings is reported as a liability on the balance sheet.
- d. Retained earnings represents the income that has not been distributed as dividends.

**1-12** Which of the following sentences regarding the statement of cash flows is false?

- a. The statement of cash flows describes the company's cash receipts and cash payments for a period of time.
- b. The ending cash balance on the statement of cash flows equals the change in cash shown on the balance sheet.
- c. The statement of cash flows reports cash flows in three categories: cash flows from operating activities, cash flows from investing activities, and cash flows from financing activities.
- d. The statement of cash flows may be used by creditors to assess the creditworthiness of a company.

**1-13** Which of the following statements is true?

- a. The auditor's opinion is typically included in the notes to the financial statements.
- b. The notes to the financial statements are an integral part of the financial statements that clarify and expand on the information presented in the financial statements.
- c. The management's discussion and analysis section does not convey any information that cannot be found in the financial statements themselves.
- d. The annual report is required to be filed with the New York Stock Exchange.

## Cornerstone Exercises

### Cornerstone Exercise 1-14 FORMS OF BUSINESS ORGANIZATION

**OBJECTIVE** > 2

Consider the forms of business organization discussed in the chapter.

#### Required:

What are the three different forms of business organization? List the advantages and disadvantages of each form.

### Cornerstone Exercise 1-15 BUSINESS ACTIVITIES

**OBJECTIVE** > 2

Listed below are various activities that companies engage in during a period.

- The sale of goods or services
- The purchase of equipment
- The payment of a dividend
- The purchase of supplies
- Contribution of cash by owners
- The sale of equipment
- Borrowed money from a bank

#### Required:

For each of the activities listed above, classify the activity as operating (O), investing (I), or financing (F).

### Cornerstone Exercise 1-16 USING THE ACCOUNTING EQUATION

**OBJECTIVE** > 3

Listed below are three independent scenarios.

**CORNERSTONE 1-1**

Scenario	Assets	Liabilities	Equity
1	(a)	\$39,000	\$40,000
2	\$125,000	(b)	75,000
3	\$ 23,000	\$12,000	(c)

#### Required:

Use the fundamental accounting equation to find the missing amounts.

### Cornerstone Exercise 1-17 USING THE ACCOUNTING EQUATION

**OBJECTIVE** > 3

At the beginning of the year, Morgan Company had total assets of \$325,000 and total liabilities of \$225,000.

**CORNERSTONE 1-1**

#### Required:

Use the fundamental accounting equation to answer the following independent questions:

- What is total stockholders' equity at the beginning of the year?
- If, during the year, total assets increased by \$100,000 and total liabilities increased by \$25,000, what is the amount of total stockholders' equity at the end of the year?
- If, during the year, total assets decreased by \$50,000 and total stockholders' equity increased by \$25,000, what is the amount of total liabilities at the end of the year?
- If, during the year, total liabilities increased by \$110,000 and total stockholders' equity decreased by \$50,000, what is the amount of total assets at the end of the year?

### Cornerstone Exercise 1-18 FINANCIAL STATEMENTS

**OBJECTIVE** > 4 5 6 7

Listed below are elements of the financial statements.

- Revenue
- Assets

**CORNERSTONE 1-2**  
**CORNERSTONE 1-3**  
**CORNERSTONE 1-4**

- c. Dividends
- d. Net change in cash
- e. Expenses
- f. Cash flow from operating activities
- g. Liabilities
- h. Stockholders' equity

**Required:**

Match each financial statement item with its financial statement: balance sheet (B), income statement (I), statement of retained earnings (RE), or statement of cash flows (CF).

**OBJECTIVE** > **4****Cornerstone Exercise 1-19 BALANCE SHEET****CORNERSTONE 1-2**

Listed below are items that may appear on a balance sheet.

Item	Classification
1. Accounts payable	a. Current assets
2. Machinery	b. Property, plant, and equipment
3. Inventory	c. Intangible assets
4. Common stock	d. Current liabilities
5. Notes payable	e. Long-term liabilities
6. Cash	f. Contributed capital
7. Copyright	g. Retained earnings
8. Net income less dividends	
9. Accumulated depreciation	
10. Accounts receivable	

**Required:**

Match each item with its appropriate classification on the balance sheet.

**OBJECTIVE** > **4****Cornerstone Exercise 1-20 BALANCE SHEET****CORNERSTONE 1-2**

An analysis of the transactions of Cavernous Homes, Inc., yields the following totals at December 31, 2009: cash, \$2,200; accounts receivable, \$5,100; notes payable, \$4,000; supplies, \$8,500; common stock, \$10,000; and retained earnings, \$1,800.

**Required:**

Prepare a balance sheet for Cavernous Homes, Inc., at December 31, 2009.

**OBJECTIVE** > **5****Cornerstone Exercise 1-21 INCOME STATEMENT****CORNERSTONE 1-3**

An analysis of the transactions of Canary Cola, Inc., for the year 2009 yields the following information: revenue, \$70,000; supplies expense, \$30,900; rent expense, \$24,000; and dividends, \$7,000.

**Required:**

What is the amount of net income reported by Canary Cola for 2009?

**OBJECTIVE** > **6****Cornerstone Exercise 1-22 STATEMENT OF RETAINED EARNINGS****CORNERSTONE 1-4**

Parker Company has a balance of \$25,000 in retained earnings on January 1, 2009. During 2009, Parker reported revenues of \$60,000 and expenses of \$47,000. Parker also paid a dividend of \$8,000.

**Required:**

What is the amount of retained earnings on December 31, 2009?

## Exercises

### Exercise 1-23 DECISIONS BASED ON ACCOUNTING INFORMATION

**OBJECTIVE** > 1

Decision-makers use accounting information in a wide variety of decisions including the following:

1. Deciding whether or not to invest in a business
2. Deciding whether or not to lend money to a business
3. Deciding whether or not an individual has paid enough in taxes
4. Deciding whether or not to place merchandise on sale in order to reduce inventory
5. Deciding whether or not to demand additional benefits for employees

#### Required:

Identify each decision with one of the following decision-makers who is primarily responsible for the decision: a government (G), an investor (I), a labor union (U), business managers (M), or a bank (B).

### Exercise 1-24 FORMS OF BUSINESS ORGANIZATIONS

**OBJECTIVE** > 2

Listed below are the three types of business entities and definitions, examples, or descriptions.

Entity	Definition, Example, or Description
Sole proprietorship	1. Can sell goods (merchandising)
Partnership	2. Owned by one person and legally not separate from the owner
Corporation	3. Can make and sell goods (manufacturing)
	4. Jointly owned by two or more persons and legally not separate from the owners
	5. Owned by one or more persons and legally separate from the owner(s)
	6. Can provide and sell services
	7. The Coca-Cola Company
	8. A law firm owned by some of the employees, who are each liable for the financial obligations of the entity

#### Required:

For each of the three types of business entities, select as many of the definitions, examples, or descriptions as apply to that type of entity.

### Exercise 1-25 BUSINESS ACTIVITIES

**OBJECTIVE** > 2

Bill and Steve recently formed a company that manufactures and sells high-end kitchen appliances. The following are a list of activities that occurred during the year.

- a. Bill and Steve each contributed cash in exchange for common stock in the company.
- b. Land and a building to be used as a factory to make the appliances were purchased for cash.
- c. Machines used to make the appliances were purchased for cash.
- d. Various materials used in the production of the appliances were purchased for cash.
- e. Three employees were paid cash to operate the machines and make the appliances.
- f. Running low on money, the company borrowed money from a local bank.
- g. The money from the bank loan was used to buy advertising on local radio and television stations.
- h. The company sold the appliances to local homeowners for cash.
- i. Due to extremely high popularity of its products, Bill and Steve built another factory building on its land for cash.
- j. The company paid a cash dividend to Bill and Steve.

**Required:**

Classify each of the business activities listed as either an operating activity (O), an investing activity (I), or a financing activity (F).

**OBJECTIVE** > **4** **5** **6****Exercise 1-26 ACCOUNTING CONCEPTS**

A list of accounting concepts and related definitions are presented below.

Concept	Definition
1. Revenue	a. Owner's claim on the resources of a company
2. Expense	b. The difference between revenues and expenses
3. Dividend	c. Increase in assets from the sale of goods or services
4. Asset	d. Economic resources of a company
5. Stockholders' equity	e. Cost of assets consumed in the operation of a business
6. Net income (loss)	f. Creditors' claims on the resources of a company
7. Liability	g. Distribution of earnings to stockholders

**Required:**

Match each of the concepts with its corresponding definition.

**OBJECTIVE** > **3****Exercise 1-27 THE FUNDAMENTAL ACCOUNTING EQUATION**

Financial information for three independent cases is given below.

	Assets	Liabilities	Equity
a.	\$107,000	\$ ?	\$51,000
b.	275,000	150,000	?
c.	?	15,000	65,000

**Required:**

Compute the missing numbers in each of the three independent cases described above.

**OBJECTIVE** > **4****Exercise 1-28 BALANCE SHEET STRUCTURE**

The following accounts exist in the ledger of Higgins Company: Accounts payable, Accounts receivable, Accumulated depreciation on building, Accumulated depreciation on equipment, Bonds payable, Building, Common stock, Cash, Equipment, Taxes payable, Inventory, Notes payable, Prepaid insurance, Retained earnings, Trademarks, Wages payable.

**Required:**

Organize the above items into a properly prepared classified balance sheet.

**OBJECTIVE** > **4****Exercise 1-29 IDENTIFYING CURRENT ASSETS AND LIABILITIES**

Dunn Sporting Goods sells athletic clothing and footwear to retail customers. Dunn's accountant indicates that the firm's operating cycle averages six months. At December 31, 2009, Dunn has the following assets and liabilities:

- Prepaid rent in the amount of \$16,000. Dunn's rent is \$500 per month.
- A \$9,100 account payable due in 45 days.
- Inventory in the amount of \$44,230. Dunn expects to sell \$38,000 of the inventory within three months. The remainder will be placed in storage until September 2010. The items placed in storage should be sold by November 2010.
- An investment in marketable securities in the amount of \$1,900. Dunn expects to sell \$700 of the marketable securities in six months. The remainder are not expected to be sold until 2012.
- Cash in the amount of \$350.
- An equipment loan in the amount of \$60,000 of which \$10,000 is due in three months. The next \$10,000 payment is due in March 2011. Interest of \$6,000 is also due with the \$10,000 payment due in three months.
- An account receivable from a local university in the amount of \$2,850. The university has promised to pay the full amount in three months.
- Store equipment at a cost of \$8,500. Accumulated depreciation has been recorded on the store equipment in the amount of \$1,250.

**Required:**

1. Prepare the current asset and current liability portions of Dunn's December 31, 2009 balance sheet.
2. Compute Dunn's working capital and current ratio at December 31, 2009. What do these ratios tell us about Dunn's liquidity?

**Exercise 1-30 CURRENT ASSETS AND CURRENT LIABILITIES****OBJECTIVE** > **4**

Hanson Construction has an operating cycle of nine months. On December 31, 2009, Hanson has the following assets and liabilities:

- a. A note receivable in the amount of \$1,000 to be collected in six months.
- b. Cash totaling \$600.
- c. Accounts payable totaling \$1,800, all of which will be paid within two months.
- d. Accounts receivable totaling \$12,000, including an account for \$8,000 that will be paid in two months and an account for \$4,000 that will be paid in 18 months.
- e. Construction supplies costing \$9,200, all of which will be used in construction within the next 12 months.
- f. Construction equipment costing \$60,000, on which depreciation of \$22,400 has accumulated.
- g. A note payable to the bank in the amount of \$40,000, of which \$7,000 is to be paid within the next year and the remainder in subsequent years.

**Required:**

1. Calculate the amounts of current assets and current liabilities reported on Hanson's balance sheet at December 31, 2009.
2. Comment on Hanson's liquidity.

**Exercise 1-31 DEPRECIATION****OBJECTIVE** > **4** **5**

Swanson Products was organized as a new business on January 1, 2009. On that date, Swanson acquired equipment at a cost of \$400,000, which is depreciated at a rate of \$40,000 per year.

**Required:**

Describe how the equipment and its related depreciation will be reported on the balance sheet at December 31, 2009, and on the 2009 income statement.

**Exercise 1-32 STOCKHOLDERS' EQUITY****OBJECTIVE** > **4**

On January 1, 2009, Mulcahy Manufacturing, Inc., a newly formed corporation, issued 1,000 shares of common stock in exchange for \$150,000 cash. No other shares were issued during 2009, and no shares were repurchased by the corporation. On November 1, 2009, the corporation's major stockholder sold 300 shares to another stockholder for \$60,000. The corporation reported net income of \$22,300 for 2009.

**Required:**

Prepare the stockholders' equity section of the corporation's balance sheet at December 31, 2009.

**Exercise 1-33 CLASSIFIED BALANCE SHEET****OBJECTIVE** > **4**

College Spirit sells sportswear with logos of major universities. At the end of 2009, the following balance sheet account balances were available.

Accounts payable	\$106,300
Accounts receivable	6,700
Accumulated depreciation on furniture and fixtures	21,700
Bonds payable	180,000
Cash	14,200
Common stock	300,000
Furniture and fixtures	88,000
Income taxes payable	11,400
Inventory, sportswear	479,400

Long-term investment in equity securities	\$110,000
Note payable, short-term	50,000
Prepaid rent, building (current)	54,000
Retained earnings, 12/31/2009	82,900

**Required:**

1. Prepare a classified balance sheet for College Spirit at December 31, 2009.
2. Compute College Spirit's working capital and current ratio at December 31, 2009. Comment on College Spirit's liquidity.

**OBJECTIVE** > **4****Exercise 1-34 CLASSIFIED BALANCE SHEET**

Jerrison Company operates a wholesale hardware business. The following balance sheet accounts and balances are available for Jerrison at December 31, 2009.

Accounts payable	\$ 62,100
Accounts receivable	96,300
Accumulated depreciation on data processing equipment	172,400
Accumulated depreciation on warehouse	216,800
Accumulated depreciation on warehouse operations equipment	31,200
Bonds payable (due 2013)	200,000
Building, warehouse	419,500
Cash	8,400
Common stock	250,000
Equipment, data processing	309,000
Equipment, warehouse operations	106,100
Income taxes payable	21,600
Interest payable	12,200
Inventory (merchandise)	187,900
Land	41,000
Long-term investments in equity securities	31,900
Notes payable (due June 1, 2010)	50,000
Prepaid insurance (for 4 months)	5,700
Retained earnings, 12/31/2009	?
Salaries payable	14,400
Short-term investments in marketable securities	21,000

**Required:**

1. Prepare a classified balance sheet for Jerrison Company at December 31, 2009.
2. Compute Jerrison's working capital and current ratio at December 31, 2009. Comment on Jerrison's liquidity.

**OBJECTIVE** > **5****Exercise 1-35 INCOME STATEMENT STRUCTURE**

The following accounts exist in the ledger of Butler Company: administrative salaries expense, advertising expense, cost of goods sold, depreciation expense on office equipment, interest expense, income tax expense, sales revenue, and salesperson salaries expense.

**Required:**

Organize the above items into a properly prepared single-step income statement.

**OBJECTIVE** > **5****Exercise 1-36 INCOME STATEMENT**

ERS, Inc., maintains and repairs office equipment. ERS had an average of 10,000 shares of common stock outstanding for the year. The following income statement account balances are available for ERS at the end of 2009.

Advertising expense	\$ 24,200
Depreciation expense on service van	17,500
Income taxes expense (30% of income before taxes)	15,150
Interest expense	10,900

Rent expense on building	\$ 58,400
Rent expense on office equipment	11,900
Salaries expense for administrative personnel	202,100
Service revenue	928,800
Supplies expense	66,400
Wages expense for service support staff	38,600
Wages expense for service technicians	448,300

**Required:**

1. Prepare a single-step income statement for ERS for 2009.
2. Compute earnings per share for ERS. Comment on ERS's profitability.

**Exercise 1-37 MULTIPLE-STEP INCOME STATEMENT****OBJECTIVE** > **5**

The following information is available for Bergin Pastry Shop.

Gross margin	\$30,700
Income from operations	9,200
Income taxes expense (15% of income before taxes)	?
Interest expense	1,800
Net sales	80,300

**Required:**

Prepare a multiple-step income statement for Bergin.

**Exercise 1-38 INCOME STATEMENT****OBJECTIVE** > **5**

The following information is available for Wright Auto Supply at December 31, 2009.

Cost of goods sold	\$277,000
Depreciation expense on building	29,000
Income taxes expense (30% of income before taxes)	37,260
Interest expense	2,700
Rent expense on equipment	18,000
Salaries, administrative	32,000
Sales revenue	571,900
Wages expense, salespeople	89,000

**Required:**

1. Prepare a single-step income statement for the year ended December 31, 2009.
2. Prepare a multiple-step income statement for the year ended December 31, 2009.
3. Comment on the differences between the single-step and the multiple-step income statements.

**Exercise 1-39 STATEMENT OF RETAINED EARNINGS****OBJECTIVE** > **6**

At the end of 2008, Sherwood Company had retained earnings of \$21,240. During 2009, Sherwood had revenues of \$831,400 and expenses of \$792,100, and paid cash dividends in the amount of \$31,500.

**Required:**

1. Determine the amount of Sherwood's retained earnings at December 31, 2009.
2. Comment on Sherwood's dividend policy.

**Exercise 1-40 STATEMENT OF CASH FLOWS****OBJECTIVE** > **7**

Walters, Inc. began operations on January 1, 2009. The following information relates to Walters' cash flows during 2009.

Cash received from owners	\$200,000
Cash paid for purchase of land and building	129,000
Cash paid for advertising	21,000
Cash received from customers	131,000

Cash paid to purchase machine	\$ 32,000
Cash paid to employees for salaries	47,000
Cash paid for dividends to stockholders	5,000
Cash paid for supplies	23,000

**Required:**

1. Calculate the cash provided/used for each cash flow category.
2. Comment on the creditworthiness of Walters, Inc.

**OBJECTIVE 8 Exercise 1-41 RELATIONSHIPS AMONG THE FINANCIAL STATEMENTS**

Zachary Corporation's December 31, 2008 balance sheet included the following amounts:

Cash	\$ 23,400
Retained earnings	107,600

Zachary's accountant provided the following data for 2009:

Revenues	\$ 673,900
Expenses	582,100
Dividends	34,200
Cash inflow from operating activities	875,300
Cash outflow for investing activities	(994,500)
Cash inflow from financing activities	156,600

**Required:**

Calculate the amount of cash and retained earnings at the end of 2009.

**OBJECTIVE 8 Exercise 1-42 RELATIONSHIPS AMONG THE FINANCIAL STATEMENTS**

The following information is available at the end of 2009.

Total assets on 12/31/2008	\$70,000
Total assets on 12/31/2009	78,000
Total liabilities on 12/31/2008	-0-
Total liabilities on 12/31/2009	-0-
Common stock on 12/31/2008	50,000
Common stock on 12/31/2009	50,000
Net income for 2009	12,000

**Required:**

Calculate the amount of dividends reported on the statement of retained earnings for 2009.

**OBJECTIVE 8 Exercise 1-43 RELATIONSHIPS AMONG THE FINANCIAL STATEMENTS**

During 2009, Moore Corporation paid \$16,000 of dividends. Moore's assets, liabilities, and common stock at the end of 2008 and 2009 were:

	12/31/2008	12/31/2009
Total assets	\$149,200	\$188,100
Total liabilities	54,600	56,700
Common stock	60,000	60,000

**Required:**

Using the information provided, compute Moore's net income for 2009.

**OBJECTIVE 9 Exercise 1-44 ANNUAL REPORT ITEMS**

A company's annual report includes the following items:

- Financial statements
- Notes to the financial statements
- Management's discussion and analysis
- Report of independent accountants

**Required:**

For each of the following items, where would you most likely find the information in the annual report?

- Detailed information on the outstanding debt of a company, including the interest rate being charged and the maturity date of the debt.
- A description of the risks associated with operating the company in an international market.
- The total resources and claims to the resources of a company.
- A description of the accounting methods used by the company.
- An opinion as to whether the financial statements are a fair presentation of the company's financial position and results of operations.
- A discussion of the sales trends of the company's most profitable products.
- The amount of dividends paid to common stockholders.

**Exercise 1-45 PROFESSIONAL ETHICS****OBJECTIVE** > 9

Ethical behavior is essential to the conduct of business activity. Consider each of the following business behaviors:

- A manager prepares financial statements that grossly overstate the performance of the business.
- A CPA resigns from an audit engagement rather than allow a business client to violate an accounting standard.
- An internal auditor decides against confronting an employee of the business with minor violations of business policy. The employee is a former college classmate of the auditor.
- An accountant advises his client on ways to legally minimize tax payments to the government.
- A manager legally reduces the price of a product to secure a larger share of the market.
- Managers of several large companies secretly meet to plan price reductions designed to drive up-and-coming competitors out of the market.
- An accountant keeps confidential details of her employers' legal operations that would be of interest to the public.
- A recently dismissed accountant tells competitors details about her former employer's operations as she seeks a new job.

**Required:**

Identify each behavior as ethical (E) or unethical (U).

**Problem Set A****Problem 1-46A APPLYING THE FUNDAMENTAL ACCOUNTING EQUATION****OBJECTIVE** > 3

At the beginning of 2009, Huffer Corporation had total assets of \$226,800, total liabilities of \$84,200, common stock of \$80,000, and retained earnings of \$62,600. During 2009, Huffer had net income of \$31,500, paid dividends of \$11,900, and sold additional common stock for \$12,000. Huffer's total assets at the end of 2009 were \$278,200.

**Required:**

Calculate the amount of liabilities that Huffer must have at the end of 2009 in order for the balance sheet equation to balance.

**Problem 1-47A ACCOUNTING RELATIONSHIPS****OBJECTIVE** > 4 5 6 8

Information for Beethoven Music Company is given below.

Total assets at the beginning of the year	\$150,000
Total assets at the end of the year	(a)
Total liabilities at the beginning of the year	90,000
Total liabilities at the end of the year	130,000

Equity at the beginning of the year	\$ (b)
Equity at the end of the year	102,000
Dividends paid during the year	(c)
Net income for the year	80,000
Revenues	550,000
Expenses	(d)

**Required:**

Use the relationships in the balance sheet, income statement, and statement of retained earnings to determine the missing values.

**OBJECTIVE** > **5****Problem 1-48A ARRANGEMENT OF THE INCOME STATEMENT**

Powers Wrecking Service demolishes old buildings and other structures and sells the salvaged materials. During 2009, Powers had \$400,000 of revenue from demolition services and \$137,000 of revenue from salvage sales. Powers also had \$1,500 of interest revenue from investments. Powers incurred \$240,000 of wages expense, \$24,000 of depreciation expense, \$50,000 of fuel expense, \$84,000 of rent expense, \$17,000 of miscellaneous expense, and \$25,000 of income tax expense.

**Required:**

Prepare a single-step income statement for Powers Wrecking Service for 2009.

**OBJECTIVE** > **4** **5** **6** **8****Problem 1-49A INCOME STATEMENT AND BALANCE SHEET RELATIONSHIPS**

Each column presents financial information taken from one of four different companies, with one or more items of data missing.

Financial Statement Item	Company			
	A	B	C	D
Total revenue	\$100	\$ 700	(e)	\$2,900
Total expense	75	(c)	50	(g)
Net income (net loss)	(a)	150	15	(600)
Total assets	900	2,000	(f)	8,000
Total liabilities	400	(d)	120	2,000
Total equity	(b)	800	80	(h)

**Required:**

Use your understanding of the relationships among financial statements and financial statement items to find the missing values (a–h).

**OBJECTIVE** > **4** **5****Problem 1-50A INCOME STATEMENT AND BALANCE SHEET**

The following information for Rogers Enterprises is available at December 31, 2009, and includes all of Rogers' financial statement amounts except retained earnings:

Accounts receivable	\$ 72,000
Cash	15,000
Common stock (10,000 shares)	70,000
Income tax expense	6,000
Income tax payable	4,000
Interest expense	16,000
Notes payable (due in 10 years)	25,000
Prepaid rent, building	30,000
Property, plant, and equipment	90,000
Rent expense	135,000
Retained earnings	?
Salaries expense	235,000
Salaries payable	15,000

Service revenue	\$460,000
Supplies	42,000
Supplies expense	36,000

**Required:**

Prepare a single-step income statement and a classified balance sheet for the year ending December 31, 2009, for Rogers Enterprises.

**Problem 1-51A STATEMENT OF RETAINED EARNINGS****OBJECTIVE** > 6

Dittman Expositions has the following data available:

Dividends, 2009	\$ 8,500
Dividends, 2010	9,900
Expenses, 2009	386,500
Expenses, 2010	410,600
Retained earnings, 12/31/2008	16,900
Revenues, 2009	409,700
Revenues, 2010	438,400

**Required:**

Prepare statements of retained earnings for 2009 and 2010.

**Problem 1-52A RETAINED EARNINGS STATEMENTS****OBJECTIVE** > 6

The table below presents the statements of retained earnings for Bass Corporation for three successive years. Certain numbers are missing.

	2008	2009	2010
Retained earnings, beginning	\$21,500	\$ (b)	\$33,600
Add: Net income	9,200	10,100	(f)
	<u>30,700</u>	(c)	(g)
Less: Dividends	(a)	(d)	3,900
Retained earnings, ending	<u>\$27,200</u>	<u>\$ (e)</u>	<u>\$41,200</u>

**Required:**

Use your understanding of the relationship between successive statements of retained earnings to calculate the missing values (a–g).

**Problem 1-53A INCOME STATEMENT, STATEMENT OF RETAINED EARNINGS, AND BALANCE SHEET****OBJECTIVE** > 4 5 6

The following information relates to Ashton Appliances for 2009.

Accounts payable	\$ 18,000
Accounts receivable	70,000
Accumulated depreciation, building	100,000
Accumulated depreciation, fixtures	30,000
Bonds payable (due in 7 years)	192,000
Building	300,000
Cash	41,000
Common stock	245,000
Cost of goods sold	510,000
Depreciation expense, building	10,000
Depreciation expense, fixtures	12,000
Furniture and fixtures	130,000
Income tax expense	14,000
Income tax payable	12,000
Insurance expense	36,000
Interest expense	21,000

Inventory	\$ 60,000
Other assets	93,000
Rent expense, store equipment	79,000
Retained earnings, 12/31/2008	54,000
Salaries expense, administrative	101,000
Salaries payable	7,000
Sales revenue	946,000
Wages expense, store	127,000

**Required:**

1. Prepare a single-step income statement for 2009, a statement of retained earnings for 2009, and a properly classified balance sheet as of December 31, 2009.
2. How would a multiple-step income statement be different from the single-step income statement you prepared for Ashton Appliances?

**OBJECTIVE** > **8****Problem 1-54A STOCKHOLDERS' EQUITY RELATIONSHIPS**

Data from the financial statements of four different companies are presented in separate columns in the table below. Each column has one or more data items missing.

Financial Statement Item	Company			
	V	W	X	Y
Equity, 12/31/2008				
Common stock	\$50,000	\$35,000	(i)	\$15,000
Retained earnings	<u>12,100</u>	<u>(e)</u>	<u>26,400</u>	<u>21,900</u>
Total equity	(a)	\$44,300	\$66,400	\$36,900
Net income (loss) for 2009	\$ 7,000	\$ (1,800)	\$ 6,000	(m)
Dividends during 2009	\$ 2,000	\$ -0-	(j)	\$ 1,400
Equity, 12/31/2009				
Common stock	\$50,000	\$35,000	\$55,000	\$15,000
Retained earnings	<u>(b)</u>	<u>(f)</u>	<u>(k)</u>	<u>27,600</u>
Total equity	(c)	(g)	\$84,500	(n)
Total assets, 12/31/2009	\$92,500	(h)	\$99,200	(o)
Total liabilities, 12/31/2009	(d)	\$14,800	(l)	\$10,700

**Required:**

Use your understanding of the relationships among the financial statement items to determine the missing values (a–o).

**OBJECTIVE** > **3** **8****Problem 1-55A RELATIONSHIPS AMONG FINANCIAL STATEMENTS**

Carson Corporation reported the following amounts for assets and liabilities at the beginning and end of a recent year.

	Beginning of Year	End of Year
Assets	\$390,000	\$420,000
Liabilities	130,000	145,000

**Required:**

Calculate Carson's net income or net loss for the year in each of the following independent situations:

1. Carson declared no dividends, and its common stock remained unchanged.
2. Carson declared no dividends and issued additional common stock for \$33,000 cash.
3. Carson declared dividends totaling \$11,000, and its common stock remained unchanged.
4. Carson declared dividends totaling \$17,000 and issued additional common stock for \$29,000.

## Problem Set B

### Problem 1-46B APPLYING THE FUNDAMENTAL ACCOUNTING EQUATION

**OBJECTIVE** > 3

At the beginning of 2009, KJ Corporation had total assets of \$553,700, total liabilities of \$261,800, common stock of \$139,000, and retained earnings of \$152,900. During 2009, KJ had net income of \$256,200, paid dividends of \$71,100, and sold additional common stock for \$94,000. KJ's total assets at the end of 2009 were \$721,800.

#### Required:

Calculate the amount of liabilities that KJ must have at the end of 2009 in order for the balance sheet equation to balance.

### Problem 1-47B THE FUNDAMENTAL ACCOUNTING EQUATION

**OBJECTIVE** > 4 5 6 8

Information for TTL, Inc., is given below.

Total assets at the beginning of the year	\$ (a)
Total assets at the end of the year	730,000
Total liabilities at the beginning of the year	300,000
Total liabilities at the end of the year	(b)
Equity at the beginning of the year	250,000
Equity at the end of the year	(c)
Dividends paid during the year	35,000
Net income for the year	(d)
Revenues	950,000
Expenses	825,000

#### Required:

Use the relationships in the balance sheet, income statement, and statement of retained earnings to determine the missing values.

### Problem 1-48B ARRANGEMENT OF THE INCOME STATEMENT

**OBJECTIVE** > 5

Parker Renovation Inc. renovates historical buildings for commercial use. During 2009, Parker had \$762,000 of revenue from renovation services and \$5,000 of interest revenue from miscellaneous investments. Parker incurred \$227,000 of wages expense, \$135,000 of depreciation expense, \$75,000 of insurance expense, \$114,000 of utilities expense, \$31,000 of miscellaneous expense, and \$57,000 of income tax expense.

#### Required:

Prepare a single-step income statement for Parker Renovation Inc. for 2009.

### Problem 1-49B INCOME STATEMENT AND BALANCE SHEET RELATIONSHIPS

**OBJECTIVE** > 4 5 6 8

Each column presents financial information taken from one of four different companies, with one or more items of data missing.



Financial Statement Item	Company			
	A	B	C	D
Total revenue	\$900	\$ 500	(e)	\$1,200
Total expense	820	(c)	350	(g)
Net income (net loss)	(a)	250	115	(400)
Total assets	700	1,800	(f)	3,150
Total liabilities	300	(d)	420	2,400
Total equity	(b)	900	50	(h)

#### Required:

Use your understanding of the relationships among financial statements and financial statement items to find the missing values (a–h).

## OBJECTIVE &gt; 4 5

**Problem 1-50B INCOME STATEMENT AND BALANCE SHEET**

Ross Airport Auto Service provides parking and minor repair service at the local airport while customers are away on business or pleasure trips. The following account balances (except for retained earnings) are available for Ross Airport Auto Service at December 31, 2009.

Accounts payable	\$ 16,700
Accounts receivable	39,200
Accumulated depreciation, equipment	38,800
Cash	6,700
Common stock (20,000 shares)	100,000
Depreciation expense, equipment	14,300
Dividends	6,300
Equipment	269,500
Income tax expense	2,700
Income tax payable	1,100
Interest expense	18,300
Interest payable	1,800
Interest revenue, long-term investments	4,100
Inventory, repair parts	4,900
Long-term investments in debt securities	35,000
Notes payable (due May 2, 2016)	160,000
Prepaid rent (3 months)	27,300
Rent expense	103,500
Retained earnings, 12/31/2009	51,700
Service revenue, parking	224,600
Service revenue, repair	208,100
Supplies expense, repair parts	36,900
Wages expense	246,100
Wages payable	12,500

**Required:**

Prepare a single-step income statement and a classified balance sheet for Ross Airport Auto Service for the year ended December 31, 2009.

## OBJECTIVE &gt; 6

**Problem 1-51B STATEMENT OF RETAINED EARNINGS**

Magical Experiences Vacation Company has the following data available:

Dividends, 2009	\$ 12,200
Dividends, 2010	18,900
Expenses, 2009	185,300
Expenses, 2010	310,600
Retained earnings, 12/31/2008	47,100
Revenues, 2009	242,900
Revenues, 2010	391,400

**Required:**

Prepare statements of retained earnings for 2009 and 2010.

## OBJECTIVE &gt; 6

**Problem 1-52B RETAINED EARNINGS STATEMENTS**

The table below presents the statements of retained earnings for Dillsboro Corporation for three successive years. Certain numbers are missing.

	2008	2009	2010
Retained earnings, beginning	\$ (a)	\$19,500	\$26,700
Add: Net income	11,100	(c)	9,500
	26,900	(d)	(f)
Less: Dividends	7,400	5,200	(g)
Retained earnings, ending	\$ (b)	\$ (e)	\$34,100

**Required:**

Use your understanding of the relationship between successive statements of retained earnings to calculate the missing values (a–g).

**Problem 1-53B INCOME STATEMENT, STATEMENT OF RETAINED EARNINGS, AND BALANCE SHEET****OBJECTIVE** > 4 5 6

McDonald Marina provides docking and cleaning services for pleasure boats at its marina in southern Florida. The following account balances are available:

Accounts payable	\$ 26,400
Accounts receivable	268,700
Accumulated depreciation, building	64,500
Accumulated depreciation, docks	950,400
Bonds payable (due 2014)	2,000,000
Building	197,300
Cash	22,300
Common stock (40,000 shares)	600,000
Depreciation expense, building	21,500
Depreciation expense, docks	246,300
Dividends	25,300
Equipment, docks	2,490,000
Income taxes expense	21,700
Interest expense	236,000
Interest payable	18,000
Land	875,000
Rent expense, office equipment	14,600
Rent payable, office equipment	2,400
Retained earnings, 12/31/2008	128,600
Service revenue, cleaning	472,300
Service revenue, docking	1,460,000
Supplies expense	89,100
Supplies inventory	9,800
Utilities expense	239,400
Wages expense	987,200
Wages payable	21,600

**Required:**

Prepare a single-step income statement, a statement of changes in retained earnings, and a classified balance sheet for McDonald Marina for the year ended December 31, 2009.

**Problem 1-54B STOCKHOLDERS' EQUITY RELATIONSHIPS****OBJECTIVE** > 8

Data from the financial statements of four different companies are presented in separate columns in the table below. Each column has one or more data items missing.

Financial Statement Item	Company			
	A	B	C	D
Equity, 12/31/2008				
Common stock	\$45,000	\$39,000	\$ 80,000	\$25,000
Retained earnings	18,800	15,300	6,900	(k)
Total equity	\$63,800	(d)	\$ 86,900	\$38,900
Net income (loss) for 2009	(a)	\$ 7,100	\$ 9,700	\$ (4,500)
Dividends during 2009	\$ 2,100	\$ 800	(h)	\$ -0-
Equity, 12/31/2009				
Common stock	\$45,000	\$39,000	\$ 80,000	\$25,000
Retained earnings	21,700	(e)	(i)	(l)
Total equity	(b)	(f)	\$ 95,300	(m)
Total assets, 12/31/2009	(c)	\$88,200	\$113,400	(n)
Total liabilities, 12/31/2009	\$14,400	(g)	(j)	\$15,700

**Required:**

Use your understanding of the relationships among the financial statement items to determine the missing values (a–n).

**OBJECTIVE** > **3** **8****Problem 1-55B RELATIONSHIPS AMONG FINANCIAL STATEMENTS**

Leno Corporation reported the following amounts for assets and liabilities at the beginning and end of a recent year.

	Beginning of Year	End of Year
Assets	\$278,000	\$320,000
Liabilities	90,000	105,000

**Required:**

Calculate Leno's net income or net loss for the year in each of the following independent situations:

1. Leno declared no dividends, and its common stock remained unchanged.
2. Leno declared no dividends and issued additional common stock for \$12,000 cash.
3. Leno declared dividends totaling \$8,000, and its common stock remained unchanged.
4. Carson declared dividends totaling \$11,000 and issued additional common stock for \$15,000.

**Cases****Case 1-56 USING ACCOUNTING INFORMATION**

James Hadden is a freshman at Major State University. His earnings from a summer job, combined with a small scholarship and a fixed amount per term from his parents, are his only sources of income. He has a new MasterCard that was issued to him the week he began classes. It is spring term, and Jim finds that his credit card is "maxed out" and that he does not have enough money to carry him to the end of the term. Jim confesses that irresistible opportunities for spring term entertainment have caused him to overspend his resources.

**Required:**

Describe how accounting information could have helped Jim avoid this difficult situation.

**Case 1-57 ANALYSIS OF ACCOUNTING PERIODICALS**

The accounting profession is organized into three major groups: (1) accountants who work in nonbusiness entities, (2) accountants who work in business entities, and (3) accountants in public practice. The periodical literature of accounting includes monthly or quarterly journals that are written primarily for accountants within each of these groups.

**Required:**

1. Use your library and identify one journal published for each of the three professional groups. Identify the publisher of each journal and describe its primary audience.
2. Choose two of the three audiences you have just described. Briefly explain how members of one audience would benefit by reading a journal published primarily for members of the other audience.

**Case 1-58 CAREER PLANNING**

A successful career requires us to take advantage of opportunities that are difficult to foresee. Success is also aided by having a plan or strategy by which to choose among career alternatives as they arise.

**Required:**

1. How do you want to be employed in five years, and what must you do to get there?
2. How do you want to be employed in ten years, and what must you do to get there?

**Case 1-59 FINANCIAL STATEMENT ANALYSIS**

Agency Rent-A-Car, Inc., rents cars to customers whose vehicles are unavailable due to accident, theft, or repair (“Wheels while your car heals”). The company has a fleet of more than 40,000 cars located at 700 offices throughout the United States and Canada. Its balance sheets at January 31, 2009 and January 31, 2008, contain the following information (all dollar amounts are stated in thousands of dollars):

	1/31/2009	1/31/2008
<b>Assets</b>		
Cash	\$ 4,400	\$ 3,308
Accounts receivable	27,409	30,889
Supplies	6,864	7,440
Property and equipment	279,189	287,456
Other assets	15,666	14,441
	<u>\$333,528</u>	<u>\$343,534</u>
<b>Liabilities and Stockholders' Equity</b>		
Accounts payable	\$ 18,152	\$ 33,184
Other noncurrent liabilities	157,861	163,062
Stockholders' equity	157,515	147,288
	<u>\$333,528</u>	<u>\$343,534</u>

**Required:**

1. What is the dollar amount of current assets and current liabilities at January 31, 2009? At January 31, 2008? What does this information tell you about the company's liquidity?
2. Assume that stockholders were paid dividends of \$1,200 during 2009 and that there were no other changes in stockholders' equity except for net income. How much net income did the business earn during the year?

**Case 1-60 FINANCIAL STATEMENT ANALYSIS**

Reproduced on the following page are portions of the president's letter to shareholders and selected income statement and balance sheet data for the Wright Brothers Aviation Company. Wright Brothers is a national airline that provides both passenger service and package delivery service.

**Required:**

1. What trends do you detect in revenues, operating income, and net income for the period 2005–2009?
2. What happened to the difference between current assets and current liabilities over the 2005–2009 period? To what do you attribute this result?
3. The price of Wright Brothers stock declined steadily throughout the 2005–2009 period. Do you consider this decline to be a reasonable reaction to the financial results reported? Why or why not?

**To Our Stockholders:**

In 2009, the airline industry began to show some life. As fuel prices leveled and travelers showed an increased willingness to fly domestically, it was generally perceived that a gradual recovery was in place. The worldwide increase in the demand for air travel throughout the year translated into improved demand for the Company's services. In fact, revenues for both the passenger and package segments improved in every quarter of 2009. Most importantly, the Company started generating cash from operations in the last half of the year, and the passenger segments returned to generating profits in the third quarter. . . .

With improved operating performance as the basis for negotiating a financial restructuring, the next critical step for the Company is to satisfactorily restructure its obligations in order to insure that the Company can operate effectively in the future. With that in mind, a strategic decision, albeit a difficult one, was made in February 2009—the Company filed for reorganization under Chapter 11 of the U.S. Bankruptcy Code. . . .

	2009	2008	2007	2006	2005
Revenues:					
Passenger services	\$ 141,343	\$ 136,057	\$ 354,246	\$ 390,080	\$ 337,871
Package services	35,199	60,968	145,940	203,675	202,615
Total revenues	176,542	197,025	500,186	593,755	540,486
Operating income	(54,584)	(92,613)	(16,663)	52,137	39,527
Net income (loss)	(182,647)	(340,516)	(67,269)	(14,553)	(22,461)
Current assets	123,553	134,009	183,268	193,943	209,944
Total assets	542,523	678,846	1,068,509	1,180,484	1,263,922
Current liabilities	698,583	641,645	542,640	129,369	120,960
Long-term debt	—	—	144,297	576,446	655,383
Stockholders' equity	(272,632)	(82,280)	265,686	335,088	357,155

**Case 1-61 RESEARCH AND ANALYSIS USING THE ANNUAL REPORT**

Obtain Apple, Inc.'s 2007 annual report either through the "Investor Relations" portion of their website (do a web search for Apple investor relations) or go to <http://www.sec.gov> and click "Search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

Answer the following questions:

- On what date did Apple's fiscal year end? Was this date different from the previous year? If so, why?
- How many years of balance sheet and income statement information does Apple present?
- With regard to the balance sheet:
  - What amounts did Apple report as assets, liabilities, and stockholders' equity for 2007?
  - Did the amounts reported as assets, liabilities, and stockholders' equity change over the last year? If so, by how much?
  - What amounts were reported as current assets and current liabilities for the years presented?
  - Provide an assessment of Apple's liquidity based on the information obtained in part (b).
- With regard to the income statement:
  - What amounts did Apple report as revenues, expenses, and net income for 2007?
  - Do you detect any trends with regard to revenues, expenses, or net income?
- With regard to the statement of cash flows:
  - What amounts did the company report for cash flow from operating activities, cash flow from investing activities, and cash flow from financing activities for 2007?
  - How much cash did the company spend on purchasing PP&E in 2007?

6. With regard to management's discussion and analysis:
  - a. What accounting policies and estimates does Apple consider critical? Where would these policies and estimates be described?
  - b. Does management believe that the company performed well during the current year? On what do you base this assessment?
7. Are the financial statements audited? If so, by whom?

### Case 1-62 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

#### Required:

Answer the following questions:

1. What is the fiscal year-end of Abercrombie & Fitch? Of Aeropostale? Why would you expect these to be the same?
2. With regard to the balance sheet:
  - a. What amounts did each company report for assets, liabilities, and stockholders' equity for the year ended February 3, 2007?
  - b. What amounts were reported as current assets and current liabilities for the year ended February 3, 2007?
  - c. Assess the liquidity of each company.
  - d. Describe any other similarities and differences that you noticed between the two companies.
3. With regard to the income statement:
  - a. What amounts did Abercrombie & Fitch report as revenues, expenses, and net income for the year ended February 3, 2007 (fiscal 2006)? What amounts did Aeropostale report as revenues, expenses, and net income for the fiscal year ended February 3, 2007?
  - b. Compare any trends that you detect with regard to revenues, expenses, and net income?
  - c. What are the earnings per share of each company? What insights does this give you with regard to future profitability and growth?
4. What were the major sources and uses of cash for each company?
5. What is management's assessment of each company's past performance and future prospects? Where did you find this information?

### Case 1-63 PROFESSIONAL ETHICS

Professional ethics guide public accountants in their work with financial statements.

#### Required:

1. Why is ethical behavior by public accountants important to society?
2. Describe the incentives that public accountants have to behave *unethically*.
3. Describe the incentives that public accountants have to behave *ethically*.

### Case 1-64 ETHICAL ISSUES

Lola, the CEO of JB Inc., and Frank, the accountant for JB Inc., were recently having a meeting to discuss the upcoming release of the company's financial statements. Following is an excerpt of their conversation:

**Lola:** These financial statements don't show the hours of hard work that we've put in to restore this company to financial health. In fact, these results may actually prevent us from obtaining loans that are critical to our future.

**Frank:** Accounting does allow for judgment. Tell me your primary concerns and let's see if we can work something out.

**Lola:** My first concern is that the company doesn't appear very liquid. As you can see, our current assets are only slightly more than current liabilities. The company has always paid its bills—even when cash was tight. It's not really fair that the financial statements don't reflect this.

**Frank:** Well, we could reclassify some of the long-term investments as current assets instead of noncurrent assets. Our expectation is that we will hold these investments for several years, but we could sell them at any time; therefore, it's fair to count these as current assets. We could also reclassify some of the accounts payable as noncurrent. Even though we expect to pay them within the next year, no one will ever look close enough to see what we've done. Together these two changes should make us appear more liquid and properly reflect the hard work we've done.

**Lola:** I agree. However, if we make these changes, our long-term assets will be smaller and our long-term debt will be larger. Many analysts may view this as a sign of financial trouble. Isn't there something we can do?

**Frank:** Our long-term assets are undervalued. Many were purchased years ago and recorded at historical cost. However, companies that bought similar assets are allowed to record them at an amount closer to their current market values. I've always thought this was misleading. If we increase the value of these long-term assets to their market value, this should provide the users of the financial statements with more relevant information and solve our problem, too.

**Lola:** Brilliant! Let's implement these actions quickly and get back to work.

**Required:**

Describe any ethical issues that have arisen as the result of Lola and Frank's conversation.

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# 2

## The Accounting Information System

After studying Chapter 2, you should be able to:

- **1** Describe the assumptions and principles that underlie accounting.
- **2** Explain the relationships among economic events, transactions, and the expanded accounting equation.
- **3** Analyze the effect of business transactions on the accounting equation.
- **4** Discuss the role of accounts and how debits and credits are used in the double-entry accounting system.
- **5** Prepare journal entries for transactions.
- **6** Explain why transactions are posted to the general ledger.
- **7** Prepare a trial balance and explain its purpose.





# **E**xperience Financial Accounting with **General Electric**

Tracing its roots back to Thomas Edison, the **General Electric Company (GE)** has become one of the largest and most diversified companies in the world, with customers in over 100 countries and more than 300,000 employees worldwide. GE is comprised of four businesses:

- NBC-Universal—one of the world’s leading media and entertainment companies that provides network television services, produces television programs and movies, and operates theme parks.
- Technology Infrastructure—provides essential technologies in the aviation, transportation, enterprise solutions, and healthcare markets. Products in this business include aircraft engines, locomotives, power generation systems, oil and gas compressors and turbines, energy technologies (e.g., solar and nuclear), water treatment facilities, and medical technologies such as x-rays, MRIs, and patient-monitoring systems.
- Energy Infrastructure—focuses on the development, implementation, and improvement of products and technologies that harness energy resources.
- GE Capital—provides financial products and services to consumers and commercial businesses around the world. Products include business loans and leases, as well as home and personal loans, credit cards, and insurance to over 130 million consumers.

With so many different activities throughout the world, GE faces a difficult task in measuring and reporting its many business activities.

Companies like GE rely on comprehensive accounting systems to capture, record, and report their various business activities. The type of system depends on many factors, including the company’s size, the volume of transactions it processes, and the information needs of its users. Larger companies like GE will use computerized accounting systems in order to efficiently provide reliable information that is needed by the users of its financial statements. In fact, GE takes this responsibility very seriously. In its annual report, GE states that “great companies are built on a foundation of reliable financial information.” While GE invests heavily in its accounting system, it recognizes that no system is foolproof. Therefore, GE bases its financial accounting system on several key principles, including rigorous oversight by management and dedication to a system of internal controls that are designed to ensure the accuracy and reliability of its accounting records, transparent financial disclosures, and protection of its assets. With such an emphasis on its accounting system, users of GE’s financial statements can feel confident that GE’s business activities were recorded and reported properly. In short, it is GE’s accounting system that brings “light” to GE’s varied business activities.

**OBJECTIVE** > 1

Describe the assumptions and principles that underlie accounting.

## Fundamental Accounting Concepts

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In the previous chapter, we described the typical business activities in which companies engage and how accounting systems report these activities through the financial statements. In this chapter, we will discuss the underlying concepts behind any accounting system. We will also begin a discussion of the procedures that companies use to record information about business activities and how this information ultimately is transformed into financial statements. That is, you will see where the numbers on the financial statements actually come from. An understanding of these procedures is essential if you are to be an effective user of financial statements. As you review the financial statements, you are assessing a company's performance, cash flows, and financial position. To make those assessments, you need to be able to infer the actions of a company from what you see in the financial statements. That inference depends on your understanding of how companies transform the results of their activities into financial statements.

These transforming procedures are called the **accounting cycle**. We will begin the discussion of the accounting cycle in this chapter and will extend it into the next chapter. The accounting cycle is a simple and orderly process, based on a series of steps and conventions. If the financial statements are to present fairly the effects of the company's activities, proper operation of the accounting cycle is essential. For example, if General Electric failed to properly apply accounting procedures, it is likely that many of its business activities would be improperly recorded (if they were even recorded at all) and its financial statements would be seriously misstated.

In this chapter, we will discuss the basic concepts and procedures that underlie accounting systems and how the completion of each accounting procedure moves the accounting system toward its end product—the financial statements. We will address the following questions:

- What concepts and assumptions underlie accounting information?
- How do companies record business activities?
- What procedures are involved in transforming information about business activities into financial statements?
- How do business activities affect the financial statements?

### The Conceptual Framework

In order to make it easier to use financial statements over time and across companies, a common set of rules and conventions has been developed to guide the preparation of financial statements. These rules and conventions, called **generally accepted accounting principles (GAAP)**, were developed by several different organizations over a number of years. In the United States, the **Securities and Exchange Commission (SEC)** has the power to set accounting rules for publicly-traded companies. However, the SEC has delegated this authority to the **Financial Accounting Standards Board (FASB)**. While the FASB is the primary standard-setter in the United States, the FASB has been working closely with the **International Accounting Standards Board (IASB)** in an attempt to reduce the differences in accounting standards around the world. Currently the SEC accepts financial statements of foreign companies that are prepared under the rules of the IASB.<sup>1</sup>

Generally accepted accounting principles rest on a conceptual framework of accounting. This framework derives from the fundamental objective of financial reporting: to provide information that is useful in making business and economic decisions. The conceptual framework is designed to support the development of accounting standards and provide a consistent body of thought for financial reporting. An understanding of the conceptual framework should help you in understanding complex accounting standards by providing a logical structure to financial

<sup>1</sup>The SEC is also considering allowing U.S. companies to prepare their financial statements using either the standards of the FASB or the IASB. If this is allowed, there is a real possibility that the IASB may replace the FASB as the primary standard-setter in the United States.

accounting; in other words, the concepts help to explain “why” accountants adopt certain practices. Exhibit 2-1 summarizes the characteristics of useful information as well as the underlying assumptions and principles that make up the conceptual framework and serve as the foundation of GAAP.

## Qualitative Characteristics of Useful Information

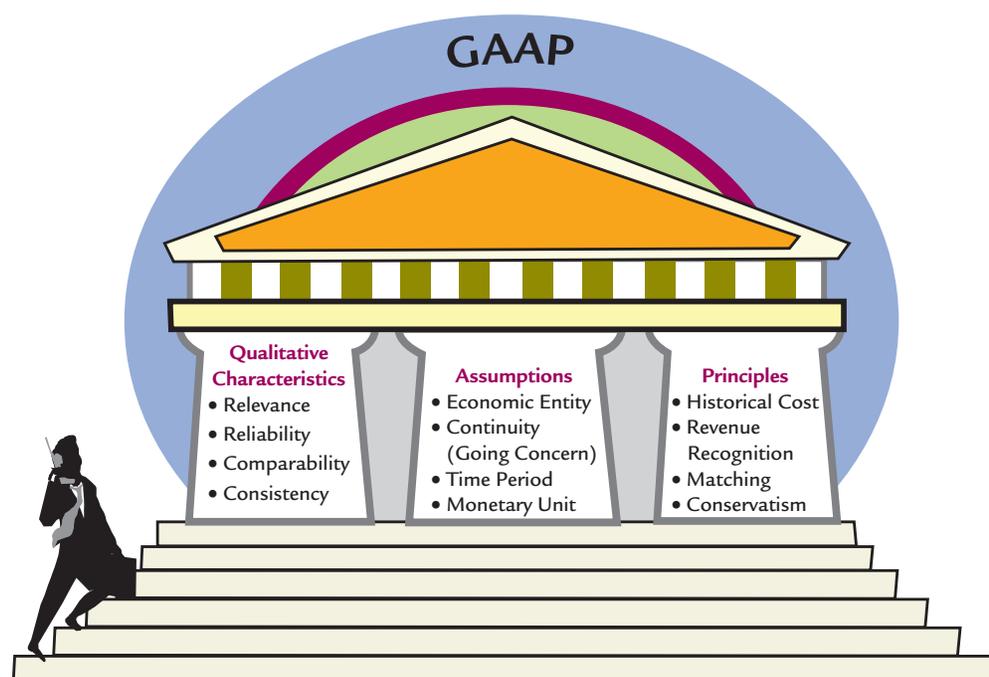
Given the overall objective of providing useful information, the FASB has developed four qualitative characteristics that useful information should possess: relevance, reliability, comparability, and consistency.

Accounting information is **relevant** if it is capable of making a difference in a business decision by helping users predict future events or if it provides feedback about prior expectations. In addition, information is only relevant if it is provided in a timely manner. If information is not provided when it is needed, it lacks relevance. Users can depend on **reliable** information. To be reliable, information should be verifiable (independent parties agree that the information is free from error or bias), representationally faithful (the information accurately portrays what it is intended to portray), and neutral (free from bias). Information is comparable if it allows comparisons to be made between companies. **Comparability** is normally achieved when different companies use the same accounting methods. **Consistency** refers to the application of the same accounting principles by a single company over time. Consistent application of accounting principles helps users identify financial trends of a company.<sup>2</sup>

It should be noted that trade-offs are often necessary in evaluating these criteria. For example, the most relevant information may not be able to be measured reliably. Similarly, changing economic situations may require a change in the accounting principle used. Such a change may decrease the consistency of the information presented. In these situations, the accountant must exercise judgment in determining the accounting principles that would produce the most useful information for the decision-maker. In all situations, accountants should follow a **full disclosure** policy. That is, any information that would make a difference to financial statement users should be revealed.

Exhibit 2-1

### The Conceptual Framework



<sup>2</sup>A current proposal seeks to replace these four qualitative characteristics with two fundamental qualitative characteristics (relevance and faithful representation) and four enhancing qualitative characteristics (comparability, verifiability, timeliness, and understandability). For more information, visit this text's Web site.

Two constraints to the qualitative characteristics described above help to further clarify what accounting information should be disclosed in the financial statements. First, the benefit received from accounting information should be greater than the costs of providing the information (**cost vs. benefit**). Second, useful information should be **material**; that is, the information should be capable of influencing a decision. If an item is judged to be immaterial (e.g., the size of the item is so small that the user's decision would not be influenced), the company does not have to follow GAAP in the reporting of this information.

## Assumptions

The four basic assumptions that underlie accounting are: the economic entity assumption, the continuity assumption, the time-period assumption, and the monetary unit assumption.

In Chapter 1 we discussed different forms of business organizations. Under the **economic entity assumption**, each company is accounted for separately from its owners. A GE shareholder's personal transactions, for instance, are not recorded in GE's financial statements. The **continuity (or going-concern) assumption** assumes

that a company will continue to operate long enough to carry out its existing commitments. Without this assumption, many of our accounting procedures could not be followed. For example, if GE were expected to go bankrupt in the near future, its assets and liabilities would be reported on the balance sheet at an amount the company expects to receive if sold (less any costs of disposal). The **time-period assumption** allows the life of a company to be divided into artificial time periods so net income can be measured for a specific period of time (e.g., monthly, quarterly, annually). Without this assumption, a company's income could only be reported at the end of its life. The **monetary unit assumption** requires that a company account for and report its financial results in monetary terms (e.g., U.S. dollar, euro, Japanese yen). This assumption implies that certain nonmonetary items (e.g., brand loyalty, customer satisfaction) are not reported in a company's financial statements.

### CONCEPT Q&A

Companies assume they are going concerns. Wouldn't the valuation of a company's assets be more relevant if this assumption was relaxed and the net assets valued at their current selling costs?

*Current selling costs are only relevant if the company intends to sell the assets in the near term. However, many assets (e.g., machinery, buildings) are used over long periods of time, and in these situations, the use of current selling prices would be of little value to financial statement users. In addition, the cost of obtaining current values for these assets would greatly outweigh the benefits received.*

Possible Answer:

## Principles

Principles are general approaches that are used in the measurement and recording of business activities. The four basic principles of accounting are: the historical cost principle, the revenue recognition principle, the matching principle, and the conservatism principle.

The **historical cost principle** requires that the activities of a company are initially measured at their cost—the exchange price at the time the activity occurs. For example, when GE buys equipment used in manufacturing its products, it initially records the equipment at the cost paid to acquire the equipment. Further, the historical cost principle requires that the equipment continue to be reported at its historical cost in future periods until the equipment is disposed of. Accountants use historical cost because it provides a reliable measure of the activity. However, the historical cost principle has been criticized as being a less relevant measure than alternatives such as market values. The FASB is aware of these criticisms and has been attempting to develop standards that provide the most relevant amount that can be reliably measured. In recent years, the FASB has allowed increasing use of market values for certain assets and liabilities such as investments in marketable securities.

The **revenue recognition principle** is used to determine when revenue is recorded and reported. Under this principle, revenue is to be recognized or recorded in the period in which it is earned and the collection of cash is reasonably assured. The **matching principle** requires that an expense be recorded and reported in the

same period as the revenue that it helped generate. Together, the application of the revenue recognition and matching principles determine a company's net income. These two principles will be discussed in more detail in Chapter 3.

The **conservatism principle** states that accountants should take care to avoid overstating assets or income when they prepare financial statements. The idea behind this principle is that conservatism is a prudent reaction to uncertainty and offsets management's natural optimism about the company's future prospects. However, conservatism should never be used to justify the deliberate understatement of assets or income.

Given this conceptual foundation, we will now turn our attention to the process of recording information about business activities in the accounting system.

## The Accounting Cycle

The sequence of procedures used by companies to transform the effects of business activities into financial statements is called the accounting cycle. The accounting cycle is shown in Exhibit 2-2.

The steps in the accounting cycle are performed each period and then repeated. Steps 1 through 4 are performed regularly each period as business activities occur. We will discuss these four steps in this chapter. Steps 5 through 7 are performed at the end of a period and are discussed in Chapter 3.

### Economic Events

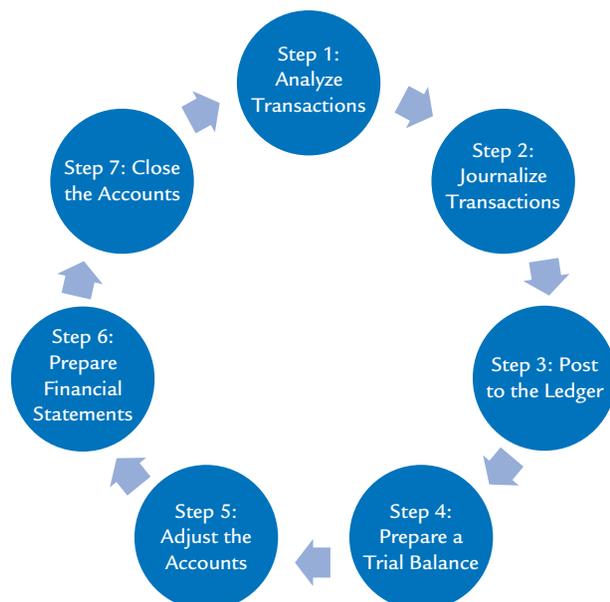
As we discussed in Chapter 1, a company engages in a multitude of activities that can be categorized as financing, investing, or operating activities. Each of these activities consists of many different **events** that affect the company. Some of these events are *external* and result from exchanges between the company and another entity outside of the company. For example, when GE issues common stock to investors, purchases equipment used to make an aircraft engine, sells a home appliance at a local retail store, or pays its employees a salary, it is engaging in an exchange with another entity. Other events are *internal* and result from the company's own actions. When GE uses

### OBJECTIVE > 2

Explain the relationships among economic events, transactions, and the expanded accounting equation.

Exhibit 2-2

### The Accounting Cycle



equipment to make its products, no other entity is involved; however, the event still has an impact on the company.

An objective of accounting is to measure the effects of events that influence a company and incorporate these events into the accounting system and, ultimately, the financial statements. However, not every event that affects a company is recorded in the accounting records. In order for an event to be recorded, or recognized, in the accounting system, the items making up the event must impact a financial statement element (asset, liability, stockholders' equity, revenue, or expense) and be measurable with sufficient reliability.

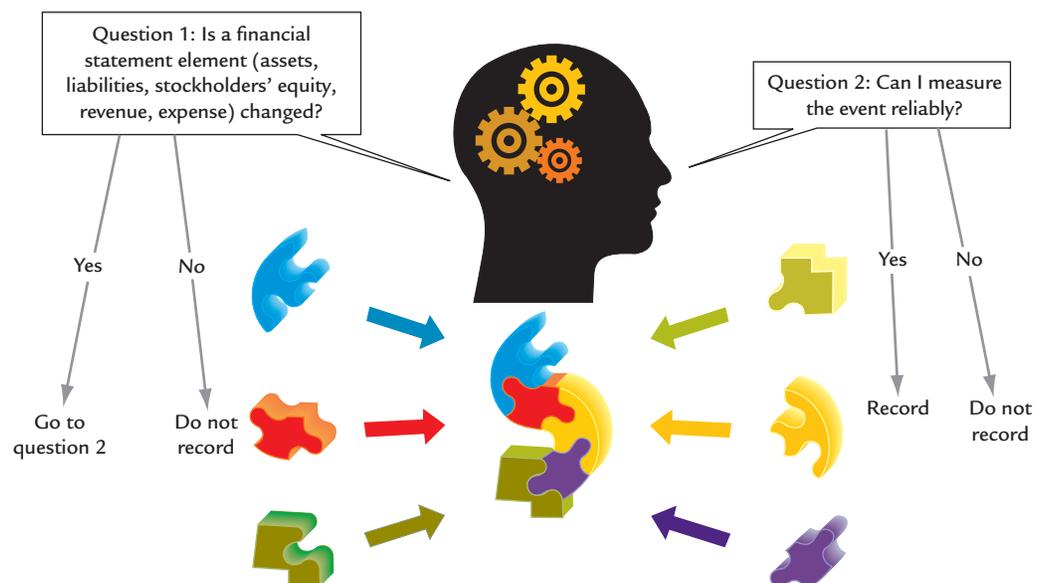
The first requirement usually is met when at least one party to a contract performs its responsibility according to the contract. For example, assume a buyer and seller agree upon the delivery of an asset and sign a contract. The signing of the contract usually is not recorded in the accounting system because neither party has performed its responsibility. Instead, recognition typically will occur once the buyer receives the asset or pays the seller, whichever comes first.

Even if the event impacts a financial statement element, it must be possible to reliably measure the event if it is to be recorded. A sudden increase in the price of oil or natural gas, for instance, may have an effect on GE's ability to sell its oil and natural gas compressors and turbines. However, the effects of this price increase cannot be measured reliably and will not be recognized in the financial statements. Providing a reliable measurement that is free from error or bias is important in accounting because unreliable information can mislead users of financial statements. A decision-maker would find it extremely difficult, if not impossible, to use financial statements that include unreliable numbers that failed to faithfully represent what has actually occurred. It is very important to pay attention to the recognition criteria as you consider an event for inclusion in the accounting system.

An accounting transaction results from an economic event that causes one of the elements of the financial statements (assets, liabilities, stockholders' equity, revenues, or expenses) to change and that can be measured reliably. We will use the term **transaction** to refer to any event, external or internal, that is recognized in the financial statements. The process of identifying events to be recorded in the financial statements is illustrated in Exhibit 2-3.

### Exhibit 2-3

#### Transaction Identification



## The Expanded Accounting Equation

Because accounting is concerned with the measurement of transactions and their effect on the financial statements, a starting point in the measurement and recording process is the fundamental accounting equation. Recall that this equation (Assets = Liabilities + Stockholders' Equity) expresses a company's resources and claims against these resources.

The two sides of the accounting equation change in response to business activities; however, the two sides must always be equal or "in balance" as a business moves through time. Accounting systems record business activities in a way that maintains this equality. As a consequence, every transaction has a two-part, or double-entry, effect on the equation.

In addition, recall that the balance sheet and the income statement are related through retained earnings. Specifically, net income (revenues minus expenses) increases retained earnings. Given this relationship, the fundamental accounting equation can be rewritten to show the elements that make up stockholders' equity.

With the expanded accounting equation shown in Exhibit 2-4, we are now ready to analyze how transactions affect a company's financial statements.

### Exhibit 2-4

#### The Expanded Accounting Equation

$$\begin{aligned}
 &\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity} \\
 &\text{Assets} = \text{Liabilities} + \text{Contributed Capital} + \text{Retained Earnings} \\
 &\text{Assets} = \text{Liabilities} + \text{Contributed Capital} + \text{Beginning Retained Earnings} + \text{Revenues} - \text{Expenses} - \text{Dividends}
 \end{aligned}$$

## Step 1: Analyze Transactions

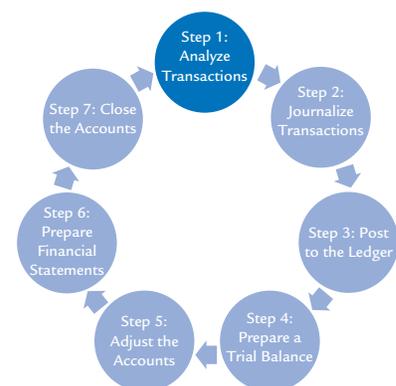
**Transaction analysis** is the process of determining the economic effects of a transaction on the elements of the accounting equation. Transaction analysis usually begins with the gathering of *source documents* that describe business activities. Source documents can be internally or externally prepared and include items such as purchase orders, cash register tapes, and invoices. In many accounting systems, source documents may be stored electronically on computer hard drives or other storage media. Source documents will describe the transaction and monetary amounts involved. These documents are the beginning of a "trail" of visible evidence that a transaction was processed by the accounting system.

After gathering the source documents, accountants must analyze these business activities to determine which transactions meet the criteria for recognition in the accounting records. Remember, not all transactions get recognized in the accounting system. For a transaction to be recorded in the accounting records, its effects must be reliably measured and it must affect a financial statement element (asset, liability, equity, revenue, or expense). Once it is determined that a transaction should be recorded in the accounting system, the transaction must be analyzed to determine how it will affect the accounting equation. In performing transaction analysis, it is important to remember that the accounting equation must always remain in balance. Therefore, each transaction will have at least two effects on the accounting equation.

**Cornerstone 2-1** illustrates the basic process of transaction analysis.

### OBJECTIVE 3

Analyze the effect of business transactions on the accounting equation.





**CORNERSTONE**  
**2 - 1**



**HOW TO Perform Transaction Analysis**

**Concept:**

The economic effect of a transaction will have a two-part, or dual, effect on the accounting equation that results in the equation remaining in balance.

**Information:**

Luigi, Inc., purchases a \$3,000 computer from WorstBuy Electronics on credit, with payment due in 60 days.

**Required:**

Determine the effect of the transaction on the elements of the financial statements. Use the accounting equation with the following captions: assets, liabilities, contributed capital, and retained earnings.

**Solution:**

Transaction analysis involves the following three steps:

Step 1: Write down the accounting equation. We use an expanded version of the accounting equation because it provides more information in the analysis. However, the basic accounting equation could also be used if you desire.

Step 2: Identify the financial statement elements that are affected by the transaction. A computer is an economic resource, or asset, that will be used by Luigi in its business. This purchase created an obligation, or liability, for Luigi that is expected to be settled within 60 days.

Step 3: Determine whether the element increased or decreased. The receipt of the computer increased assets. The creation of the obligation caused Luigi's liabilities to increase.

These three steps are illustrated below:

<b>Assets</b>	<b>=</b>	<b>Liabilities</b>	<b>+</b>	<b>Stockholders' Equity</b>
				<b>Contributed Capital</b>
				<b>Retained Earnings</b>
+\$3,000		+\$3,000		

**CONCEPT Q&A**

Why must the accounting equation always remain in balance?

The accounting equation captures the business activities of a company. The left-hand side of the accounting equation describes the economic resources, or assets, that the company has acquired. The right-hand side of the equation describes the source of these assets—either from creditors (liabilities) or from stockholders (stockholders' equity).

**Possible Answer:**

Note that the transaction analysis in Cornerstone 2-1 conformed to the two underlying principles of transaction analysis:

- There was a dual effect on the accounting equation.
- The accounting equation remained in balance (assets equaled liabilities plus stockholders' equity after the transaction).

All transactions can be analyzed using the process described above.

To provide a further illustration of the effect of transactions on the accounting equation, consider the case of HiTech Communications, Inc. HiTech is a newly formed corporation that operates an advertising agency that specializes in promoting computer-related products in the Cincinnati area. We show the effects of thirteen transactions on HiTech's financial position during its first month of operations, March 2009.

## Transaction 1: Issuing Common Stock

On March 1, HiTech sold 1,000 shares of common stock to several investors for cash of \$12,000. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$12,000				+\$12,000	

The sale of stock increases assets, specifically cash, and also increases shareholders' equity (contributed capital or common stock). Notice that there is a dual effect, and although both assets and equity change, the equality of the equation is maintained.

## Transaction 2: Borrowing Cash

On March 2, HiTech raised additional funds by borrowing \$3,000 from First Third Bank of Cincinnati. HiTech promised to pay the amount borrowed plus 8 percent interest to First Third Bank in one year. The financial effect of this transaction is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$3,000		+\$3,000			

This borrowing has two effects: the asset cash is increased and a liability is created. HiTech has an obligation to repay the cash borrowed according to the terms of the borrowing. Such a liability is termed a note payable. Because transactions 1 and 2 are concerned with obtaining funds to begin and operate a business, they are classified as financing activities.

## Transaction 3: Purchase of Equipment for Cash

On March 3, HiTech purchased office equipment (e.g., computer equipment) from MicroCenter, Inc., for \$4,500 in cash. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$4,500					
-\$4,500					

There is a reduction in cash (an asset) as it is spent and a corresponding increase in another asset, equipment. The purchased equipment is an asset because HiTech will use it to generate future revenue. Notice that this transaction merely converts one asset (cash) into another (equipment). Total assets remain unchanged and the accounting equation remains in balance. Because transaction 3 is concerned with buying long-term assets that enable HiTech to operate, it is considered an investing activity.

## Transaction 4: Purchasing Insurance

On March 4, HiTech purchased a six-month insurance policy for \$1,200 cash. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$1,200					
-\$1,200					

There is a reduction in cash (an asset) as it is spent and a corresponding increase in another asset, prepaid insurance. The purchased insurance is an asset because the insurance will benefit more than one accounting period. This type of asset is often referred to as a prepaid asset. Notice that like transaction 3, this transaction merely converts one asset (cash) into another (prepaid insurance). Total assets remain unchanged and the accounting equation remains in balance. Because transaction 4 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 5: Purchase of Supplies on Credit

On March 6, HiTech purchased office supplies from Hamilton Office Supply for \$6,500. Hamilton Office Supply agreed to accept full payment in 30 days. As a result of this transaction, HiTech received an asset (supplies) but also incurred a liability to pay for these supplies in 30 days. The financial effect of this transaction is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$6,500		+\$6,500			

A transaction where goods are purchased on credit is often referred to as a purchase “on account” and the liability that is created is referred to as an Accounts Payable. Because transaction 5 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 6: Sale of Services for Cash

On March 10, HiTech sold advertising services to Miami Valley Products in exchange for \$8,800 in cash. Remember from Chapter 1 that revenue is defined as an increase in assets resulting from the sale of products or services. As an advertising company, the sale of advertising services is HiTech’s primary revenue-producing activity. Therefore, this transaction results in an increase in assets (cash) and an increase in revenue.

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$8,800					+\$8,800

As shown in the expanded accounting equation discussed earlier, *revenues increase retained earnings*. The dual effects (the increase in assets and the increase in retained earnings) maintain the balance of the accounting equation. Because transaction 6 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 7: Sale of Services for Credit

On March 15, HiTech sold advertising services to the *Cincinnati Enquirer* for \$3,300. HiTech agreed to accept full payment in 30 days. When a company performs services for which they will be paid at a later date, this is often referred to as a sale “on account.” Instead of receiving cash, HiTech received a promise to pay from the *Cincinnati Enquirer*. This right to collect amounts due from customers creates an asset called an Accounts Receivable. Similar to the cash sale in transaction 6, the credit sale represents revenue for HiTech because assets (accounts receivable) were increased as a result of the sale of the advertising service. The financial effect of this transaction is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$3,300					+\$3,300

Consistent with the revenue recognition principle discussed earlier in this chapter, *revenue is recorded when earned* (e.g., the service is provided), regardless of whether cash was received. Because transaction 7 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 8: Receipt of Cash in Advance

On March 19, HiTech received \$9,000 from the *OA News* for advertising services to be completed in the next three months. Similar to transaction 6, HiTech received cash for services. However, due to the revenue recognition principle, HiTech cannot recognize revenue until it has performed the advertising service. Therefore, the receipt of cash creates a liability for HiTech for the work that is due in the future. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$9,000		+\$9,000			

The liability that is created by the receipt of cash in advance of performing the revenue-generating activities is called an unearned revenue. Because transaction 8 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 9: Payment of a Liability

On March 23, HiTech pays \$6,000 cash for the supplies previously purchased from Hamilton Office Supply on credit (transaction 5). The payment results in a reduction of an asset (cash) and the settlement of HiTech's obligation (liability) to Hamilton Office Supply. The financial effect of this transaction is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
-\$6,000		-\$6,000			

As a result of this cash payment, the liability "Accounts Payable" is reduced to \$500 (\$6,500 - \$6,000). This means that HiTech still owes Hamilton Office Supply \$500. Notice that the payment of cash did not result in an expense. The expense related to supplies will be recorded as supplies are used. Because Transaction 9 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 10: Payment of Salaries

On March 26 (a Friday), HiTech paid weekly employee salaries of \$1,800. Remember from Chapter 1 that an expense is the cost of an asset consumed in the operation of the business. Because an asset (cash) is consumed as part of HiTech's normal operations, salaries are an expense. As shown in the expanded accounting equation discussed earlier, *expenses decrease retained earnings*. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
-\$1,800					-\$1,800

Consistent with the matching principle discussed earlier in this chapter, *expenses are recorded in the same period as the revenue that it helped generate*. Because transaction 10

is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 11: Collection of a Receivable

On March 29, HiTech collected \$3,000 cash from the *Cincinnati Enquirer* for services sold earlier on credit (transaction 7). The collection of cash increases assets. In addition, the accounts receivable (an asset) from the *Cincinnati Enquirer* is also reduced. The financial effect of this transaction is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
+\$3,000					
-\$3,000					

As a result of this cash payment, the *Cincinnati Enquirer* still owes HiTech \$300. Notice that the cash collection did not result in the recognition of a revenue. The revenue was recognized as the service was performed (transaction 7). Because transaction 11 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 12: Payment of Utilities

On March 30, HiTech paid its utility bill of \$5,200 for March. Because an asset (cash) is consumed as HiTech performs its advertising services, the cost of utilities used during the month is an expense. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
-\$5,200					-\$5,200

Similar to the payment of salaries, utility expense is recorded as a decrease in retained earnings in the same period that it helped to generate revenue. Because transaction 12 is concerned with the operations of the company, it is classified as an operating activity.

### Transaction 13: Payment of a Dividend

On March 31, HiTech declared and paid a cash dividend of \$500 to its stockholders. Dividends are not an expense. Dividends are a distribution of net income and are recorded as a direct reduction of retained earnings. The effect of this transaction on the accounting equation is:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
-\$500					-\$500

The payment of a dividend is classified as a financing activity.

Exhibit 2-5 summarizes the transactions of HiTech Communications, Inc., in order to show their cumulative effect on the accounting equation. The transaction number is shown in the first column on the left. Revenue and expense items are identified on the right. Notice that this summary reinforces the two key principles discussed earlier:

- Each transaction has a dual effect on the elements of the accounting equation.
- The accounting equation always remains in balance—the total change in assets (\$29,100) equals the change in liabilities plus stockholders' equity (\$29,100).

## Exhibit 2-5

## Summary of Transactions

	Assets	=	Liabilities	+	Stockholders' Equity	
					Contributed Capital	Retained Earnings
(1)	+ \$12,000				+ \$12,000	
(2)	+ \$3,000		+ \$3,000			
(3)	+ \$4,500					
	- \$4,500					
(4)	+ \$1,200					
	- \$1,200					
(5)	+ \$6,500		+ \$6,500			
(6)	+ \$8,800					+ \$8,800
(7)	+ \$3,300					+ \$3,300
(8)	+ \$9,000		+ \$9,000			
(9)	- \$6,000		- \$6,000			
(10)	- \$1,800					- \$1,800
(11)	+ \$3,000					
	- \$3,000					
(12)	- \$5,200					- \$5,200
(13)	- \$500					- \$500
	\$29,100		\$12,500		\$12,000	\$4,600
	\$29,100	=	\$29,100			

Transaction analysis can be used to answer many important questions about a company and its activities. Using the information in Exhibit 2-5, we can answer the following questions:

- *What are the amounts of total assets, total liabilities, and total equity at the end of March?* At the end of March, HiTech has total assets of \$29,100, total liabilities of \$12,500 and total equity of \$16,600 (\$12,000 of contributed capital plus \$4,600 of retained earnings). These amounts for assets, liabilities, and stockholders' equity at the end of March would be carried over as the beginning amounts for April.
- *What is net income for the month?* Net income is \$5,100 which represents the excess of revenues of \$12,100 (\$8,800 + \$3,300) over expenses of \$7,000 (\$5,200 + \$1,800). Notice that dividends are not included in income; instead they are included on the statement of retained earnings.
- *How much cash was received during the month? How much was spent? How much cash does HiTech have at the end of the month?* During March HiTech received a total of \$35,800 in cash (\$12,000 + \$3,000 + \$8,800 + \$9,000 + \$3,000) and spent a total of \$19,200 (\$4,500 + \$1,200 + \$6,000 + \$1,800 + \$5,200 + \$500). At the end of the month, HiTech had cash on hand of \$16,600 (\$35,800 - \$19,200).

The summary in Exhibit 2-5 can become quite cumbersome. For example, in order to determine the amount of cash that HiTech has at the end of the month, you may find it necessary to refer back to the actual transactions to determine which ones involved cash and which did not. In addition, what if an investor or creditor wanted to know not only net income but also the types of expenses that HiTech incurred? (e.g., What was the dollar amount spent for salaries?). Clearly, to answer these questions, more information is needed than the transaction summary presents. For a company like GE, a spreadsheet such as the preceding one would prove inadequate to convey its financial information to investors and creditors. A better way to record and track information that is consistent with the preceding model is necessary. The solution is double-entry accounting.

**OBJECTIVE** 4

Discuss the role of accounts and how debits and credits are used in the double-entry accounting system.

## Double-Entry Accounting

Double-entry accounting describes the system used by companies to record the effects of transactions on the accounting equation. The effects of transactions are recorded in accounts. Under double-entry accounting, each transaction affects at least two accounts. In this section, we will explore accounts and the process by which transactions get reflected in specific accounts.

### Accounts

To aid in the recording of transactions, an organizational system consisting of accounts has been developed. An **account** is a record of increases and decreases in each of the basic elements of the financial statements. Each financial statement element is composed of a variety of accounts. All changes in assets, liabilities, stockholders' equity, revenues, or expenses are then recorded in the appropriate account. The list of accounts used by the company is termed a **chart of accounts**. A typical list of accounts is shown in Exhibit 2-6. These accounts were all discussed in Chapter 1.

**Exhibit 2-6**

*Typical Accounts*

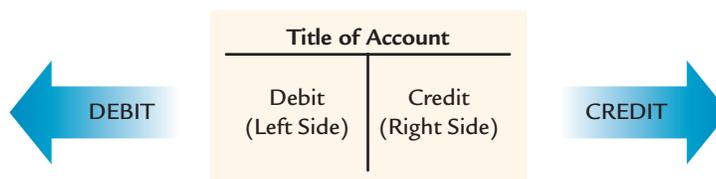
Assets	Liabilities	Stockholders' Equity	Revenue	Expense
Cash	Accounts Payable	Common Stock	Sales	Cost of Goods Sold
Short-term Investments	Salaries Payable	Retained Earnings	Interest Revenue	Salary Expense
Accounts Receivable	Unearned Revenue		Rent Revenue	Rent Expense
Inventory	Interest Payable			Insurance Expense
Long-term Investments	Taxes Payable			Depreciation Expense
Land	Notes Payable			Advertising Expense
Building	Bonds Payable			Utility Expense
Equipment				Repair Expense
Intangibles				Property Tax Expense

Every company will have a different chart of accounts depending on the nature of its business activities. However, once a company selects which accounts will be used, all transactions must be recorded into these accounts. As the company engages in transactions, the transaction will either increase or decrease an account. The amount in an account at any time is called the *balance* of the account. For example, the purchase of equipment will increase the balance in the equipment account, whereas the disposal of equipment will decrease the balance of the equipment account. For financial reporting purposes, the balances of related accounts typically are combined and reported as a single amount. For example, GE reports a combined, or net, amount of property, plant, and equipment on its balance sheet. However, in its footnotes, GE discloses the amounts of individual accounts such as land, buildings, and machinery.

Although an account can be shown in a variety of ways, transactions are frequently analyzed using a **T-account**. The T-account gets its name because it resembles the capital letter T (see Exhibit 2-7). A T-account is a two-column record that consists of an account

**Exhibit 2-7**

*Form of a T-Account*



title and two sides divided by a vertical line—the left and the right side. The left side is referred to as the **debit** side and the right side is referred to as the **credit** side.

Note that the terms debit and credit simply refer to the left and the right side of an account. The left is always the debit side and the right is always the credit side. *Debit and credit do not represent increases or decreases.* (Increases or decreases to accounts are discussed in the next section.) Instead, debit and credit simply refer to *where* an entry is made in an account. The terms debit and credit will also be used to refer to the act of entering dollar amounts into an account. For example, entering an amount on the left side of an account will be called debiting the account. Entering an amount on the right side of an account is called crediting the account.

You may be tempted to associate the terms credit and debit with positive or negative events. For example, assume you returned an item that you purchased with a credit card to the local store and the store credited your card. This is generally viewed as a positive event since you now owe less money than you previously owed. Or, if you receive a notice that your bank had debited your account to pay for service charges that you owe, this is viewed negatively because you now have less money in your account. You should try to resist this temptation. In accounting, *debit means the left side of an account and credit means the right side of an account.*

## Debit and Credit Procedures

Using the accounting equation, we can incorporate debits and credits in order to determine how balance sheet accounts increase or decrease. This procedure is shown in [Cornerstone 2-2](#).

### HOW TO Determine Increases or Decreases to a Balance Sheet Account

**Concept:**

Increases or decreases to an account are based on the normal balance of the account.

**Information:**

In your introductory accounting course, you are confronted with the three balance sheet accounts—assets, liabilities, and stockholders' equity.

**Required:**

Determine how each of the three balance sheet accounts increases or decreases.

**Solution:**

Our analysis begins with a T-account depiction of each balance sheet account and consists of three steps:

Step 1: Draw a T-account and label each side of the t-account as either debit or credit. Note that debit is always written on the left side of each account, and credit is always written on the right side.

Step 2: Determine the normal balance of an account. All accounts have a **normal balance**. Because assets are located on the left side of the accounting equation, their normal balance is a debit. Because liabilities and stockholders' equity are on the right side of the accounting equation, their normal balance is a credit. While individual transactions will increase and decrease an account, it would be unusual for an account to have a nonnormal balance.



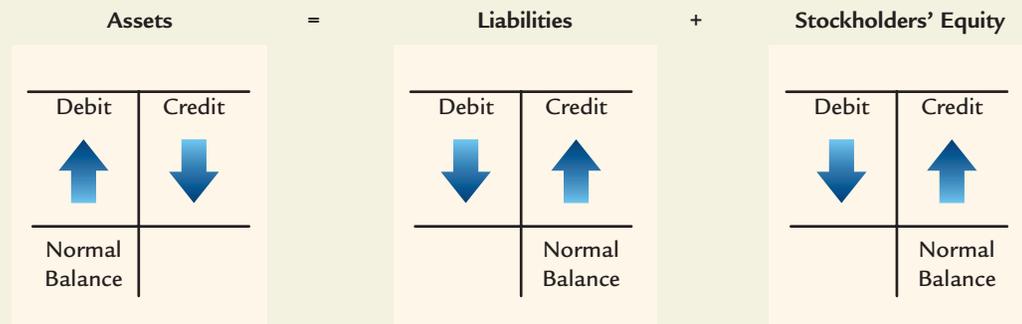
### CORNERSTONE 2-2



**CORNERSTONE**  
**2-2**  
*(continued)*

Step 3: **Increases or decreases to an account are based on the normal balance of the account.** Because assets have a normal debit balance, debits will increase assets. A credit will decrease an asset. Liabilities and stockholders' equity have a normal credit balance. Therefore, credits will increase liabilities and stockholders' equity while debits will decrease these accounts.

These three procedures are summarized below:

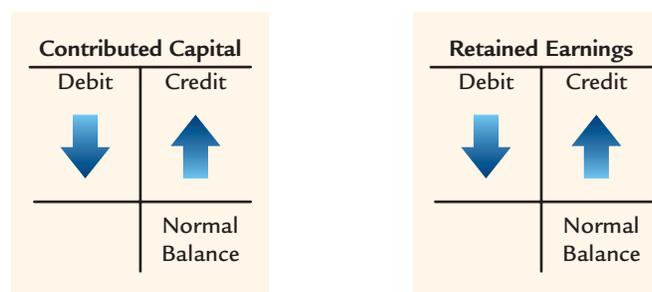


As we illustrated earlier in the chapter, every transaction will increase or decrease the elements of the accounting equation—assets, liabilities, and stockholders' equity. The direction of these increases and decreases must be such that the accounting equation stays in balance—the left side must equal the right side. In other words, *debits must equal credits*. This equality of debits and credits provides the foundation of **double-entry accounting** in which the two-sided effect of a transaction is recorded in the accounting system.

A similar procedure can be used to determine how increases and decreases are recorded for other financial statement elements. From the expanded accounting equation shown in Exhibit 2-4, we can see that stockholders' equity consists of both contributed capital (e.g., common stock) and retained earnings. As stockholder equity accounts, both contributed capital and retained earnings have normal credit balances as shown in Exhibit 2-8. Because these accounts have normal credit balances, they are increased by credits and decreased by debits.

**Exhibit 2-8**

**Normal Balances of Contributed Capital and Retained Earnings**



Retained earnings represent a company's accumulated net income (revenues minus expenses) minus any dividends. As we saw from the transaction analysis presented earlier in the chapter:

- Revenues increase retained earnings
- Expenses decrease retained earnings
- Dividends decrease retained earnings

Using these relationships, **Cornerstone 2-3** demonstrates how increases and decreases in these accounts are recorded.

## HOW TO Determine Increases or Decreases to Revenues, Expenses and Dividends

### Concept:

Increases or decreases to an account are based on the normal balance of the account.

### Information:

In your introductory accounting course, you are confronted with the three accounts—revenues, expenses, and dividends.

### Required:

Determine how each of these three accounts increases or decreases.

### Solution:

Our analysis begins with a T-account depiction of each account and consists of three steps:

Step 1: Label each side of the t-account as either debit or credit.

Step 2: Determine the normal balance of an account.

- Revenues increase stockholders' equity through retained earnings. Therefore, revenues have a normal credit balance.
- Expenses decrease stockholders' equity through retained earnings. Therefore, expenses have a normal debit balance.
- Dividends are defined as a distribution of retained earnings. Because dividends reduce retained earnings and stockholders' equity, dividends have a normal debit balance.

Step 3: Increases or decreases to an account are based on the normal balance of the account.

- Because revenues have a normal credit balance, credits will increase revenues. Debits will decrease revenues.
- Expenses and dividends have a normal debit balances. Therefore, debits will increase expenses and dividends while credits will decrease these accounts.

These procedures are summarized below.

Revenues	
Debit	Credit
↓	↑
	Normal Balance

Expenses	
Debit	Credit
↑	↓
Normal Balance	

Dividends	
Debit	Credit
↑	↓
Normal Balance	



## CORNERSTONE 2-3



**CONCEPT Q&A**

On a bank statement, a credit to a person’s account means the account has increased. Similarly, a debit means the account has decreased. Why don’t credit and debit always mean “add” and “subtract”?

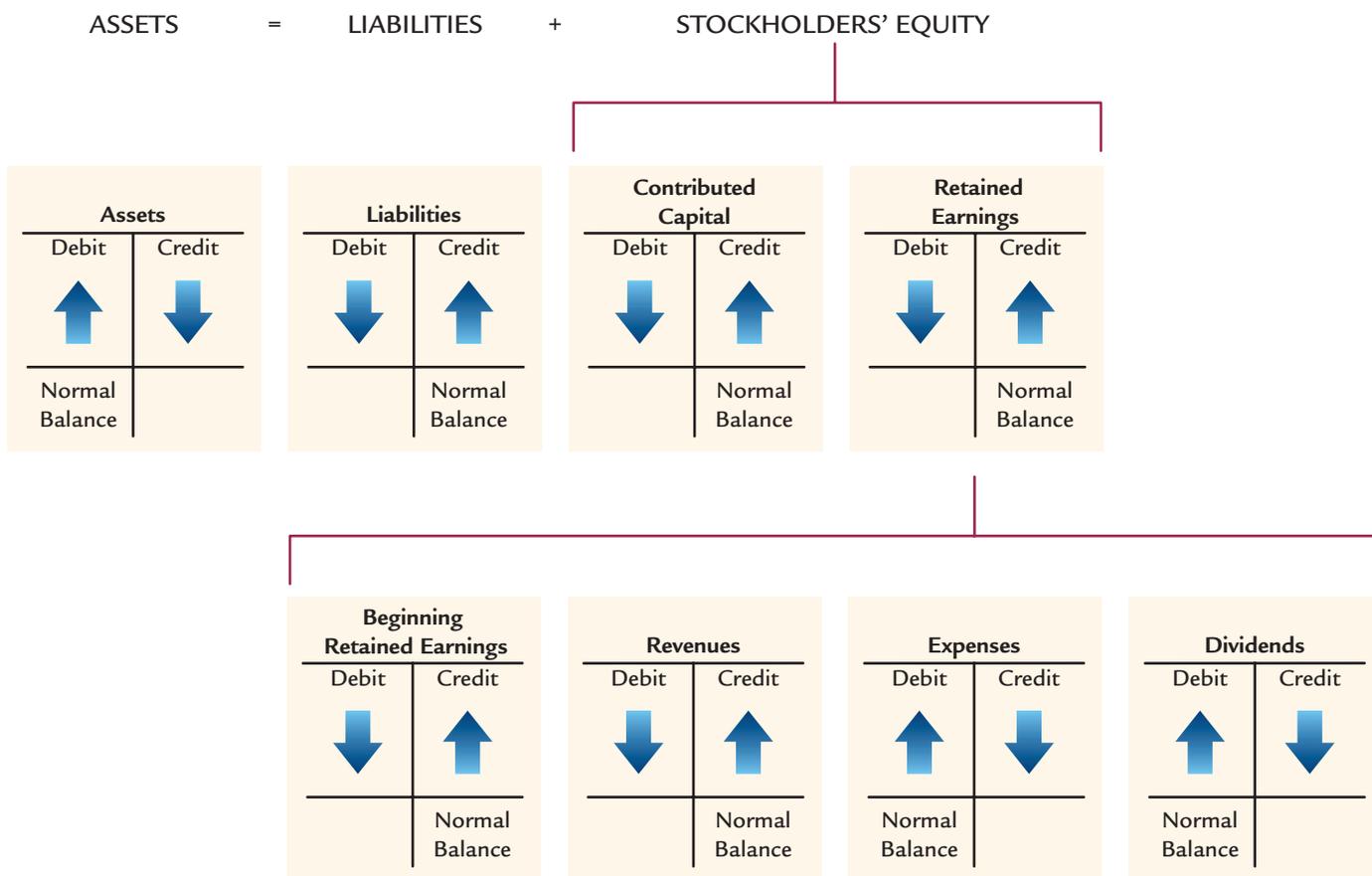
*Possible Answer:* From the bank’s perspective, a person’s account is a liability since the bank must pay cash on demand. Because liabilities have normal credit balances, a credit will increase the account and a debit will decrease the account. However, from an individual’s perspective, cash is an asset which has a normal debit balance. Therefore, debits increase cash and credits decrease cash. It is critical to always look at the normal balance of an account before determining if a transaction increases or decreases an account.

From Cornerstone 2-3, you should notice several items. First, revenues and expenses have opposite effects on retained earnings; therefore, revenues and expenses have opposite normal balances. Second, any change (increase or decrease) in revenue, expense, or dividends effects the balance of stockholders’ equity. Specifically, an increase in revenue increases stockholders’ equity and a decrease in revenue decreases stockholders’ equity. An increase in expense or dividends decreases stockholders’ equity. A decrease in expense or dividends increases stockholders’ equity. Finally, when revenues exceed expenses, a company has reported net income which increases stockholders’ equity. When revenues are less than expenses, a company has reported a net loss, which reduces stockholders’ equity.

These debit and credit procedures are summarized in Exhibit 2-9.

**Exhibit 2-9**

**Summary of Debit and Credit Procedures**



The important point from this analysis is that while debits are always on the left and credits are always on the right, the effect of a debit or credit on an account balance depends upon the normal balance of that account.

## Step 2: Journalize Transactions

### OBJECTIVE 5

Prepare journal entries for transactions.

While it would be possible to record transactions directly into accounts in a manner similar to that illustrated earlier in the chapter, most companies enter the effects of the transaction in a journal using the debit and credit procedures described in the previous section. A **journal** is a chronological record showing the debit and credit effects of transactions on a company. Each transaction is represented by a **journal entry** so that the entire effect of a transaction is contained in one place. The process of making a journal entry is often referred to as *journalizing* a transaction. Because a transaction first enters the accounting records through journal entries, the journal is often referred to as the *book of original entry*.

A journal entry consists of three parts: (1) the date of the transaction, (2) the accounts and amounts to be increased or decreased, and (3) a brief explanation of the transaction. Each journal entry shows the debit and credit effects of a transaction on specific accounts. In preparing a journal entry, almost every company follows the process illustrated in **Cornerstone 2-4**.



### HOW TO Make a Journal Entry

**Concept:**

A journal entry records the effects of a transaction on accounts using debits and credits.

**Information:**

On January 1, Luigi, Inc., purchases a \$3,000 computer from WorstBuy Electronics on credit, with payment due in 60 days.

**Required:**

Prepare a journal entry to record this transaction.

**Solution:**

Preparing a journal entry involves three basic steps.

Step 1: Analyze the transaction using the procedures described in Cornerstone 2-1. The result of this analysis is shown below.

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>	
				<b>Contributed Capital</b>	<b>Retained Earnings</b>
+\$3,000		+\$3,000			

Step 2: Determine which accounts are affected. The purchase of a computer has increased the asset account "Equipment." In addition, the liability that was created is called "Accounts Payable."

Step 3: Prepare the journal entry using the debit and credit procedures in Cornerstones 2-2 and 2-3. For the asset "Equipment," the increase is recorded with a debit. For the liability "Accounts Payable," the increase is recorded with a credit.

Date	Account and Explanation	Debit	Credit
Jan. 1	Equipment	3,000	
	Accounts Payable		3,000
	(Purchased office equipment on credit)		



### CORNERSTONE 2-4



From Step 3 of Cornerstone 2-4, notice several items. First, the date of the transaction is entered in the date column. Second, for each entry in the journal, the debit (the account and amount) is entered first and flush to the left. If there were more than one debit, it would be entered directly underneath the first debit on the next line. The credit (the account and the amount) is written below the debits and indented to the right. The purpose of this standard format is to make it possible for anyone using the journal to identify debits and credits quickly and correctly. Third, *total debits must equal total credits*. Finally, an explanation may appear beneath the credit.

In some instances, more than two accounts may be affected by an economic event. For example, assume that Luigi, Inc., purchases a \$3,000 computer from WorstBuy Electronics by paying \$1,000 cash with the remainder due in 60 days. The purchase of this equipment increased the asset “Equipment,” decreased the asset “Cash,” and increased the liability “Accounts Payable” as shown in the analysis below:

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>		
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; border-bottom: 1px solid black;">Contributed Capital</td> <td style="text-align: center; border-bottom: 1px solid black;">Retained Earnings</td> </tr> </table>	Contributed Capital	Retained Earnings
Contributed Capital	Retained Earnings					
+\$3,000		+\$2,000				
-\$1,000						

Luigi would make the following journal entry

Date	Account and Explanation	Debit	Credit
Jan. 1	Equipment	3,000	
	Cash		1,000
	Accounts Payable		2,000
	<i>(Purchased office equipment for cash and on credit)</i>		

This type of entry is called a *compound journal entry* because more than two accounts were affected.

The use of a journal helps prevent the introduction of errors in the transformation of business activities into financial statement amounts. Because all parts of the transaction appear together, it is easy to see whether equal debits and credits have been entered. If debits equal credits for *each* journal entry, then debits equal credits for *all* journal entries. At the end of the period, this fact leads to a useful check on the accuracy of journal entries. However, if the wrong amounts or the wrong accounts are used, debits can still equal credits, yet the journal entries will be incorrect. Additionally, each entry can be examined to see if the accounts that appear together are logically appropriate.

## DECISION-MAKING & ANALYSIS

### Detecting Journal Entry Errors

You have been asked to inspect a delivery company's journal. Upon doing so, you find the following entry:

Date	Account and Explanation	Debit	Credit
June 29	Equipment, Delivery Truck	11,000	
	Prepaid Rent		11,000
	<i>(Purchased delivery truck)</i>		

You know that delivery trucks are not exchanged for prepaid rent, so you conclude that an error was made in preparing this journal entry. Had the same data been entered directly into the accounts, the error would have been much more difficult to detect and correct.

**ETHICS** When an error is discovered in a journal entry, the accountant has an ethical responsibility to correct the error (subject to materiality constraints), even if others would never be able to tell that the error had occurred! For example, if an accountant accidentally records a sale of merchandise by crediting Interest Revenue instead of Sales Revenue, total revenue would be unaffected. However, this error could significantly affect summary performance measures such as gross margin (sales minus cost of goods sold) that are important to many investors. When material errors are discovered, they should be corrected, even if this means embarrassment to the accountant. ♦

To provide a further illustration of recording transactions using journal entries, consider the case of HiTech Communications, Inc. that was presented earlier in the chapter. For the remainder of the book, we will analyze each transaction and report its effects on the accounting equation in the margin next to the journal entry. Next, we identify the accounts that were affected by incorporating account titles into the transaction analysis model. Finally, we prepare the journal entry based on the analysis. You should always perform these steps as you prepare journal entries.

**CONCEPT Q&A**

If all journal entries have equal debits and credits, how can mistakes or errors occur?

Mistakes or errors could still occur when entire transactions are not recorded, transactions are recorded at the wrong amounts or in the wrong accounts, or transactions are not recorded in the proper accounting period. In addition, an accountant may post incorrect amounts or post the correct amount to an incorrect account. While journal entries provide a safeguard against errors and mistakes, it will not prevent them all.

**Possible Answer:**

**Transaction 1: Issuing Common Stock**

On March 1, HiTech sold 1,000 shares of common stock to several investors for cash of \$12,000.

Date	Account and Explanation	Debit	Credit
March 1	Cash	12,000	
	Common Stock <i>(Issued common stock)</i>		12,000

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
+12,000				+12,000

**Transaction 2: Borrowing Cash**

On March 2, HiTech raised additional funds by borrowing \$3,000 on a one-year, 8 percent note payable to First Third Bank of Cincinnati.

Date	Account and Explanation	Debit	Credit
March 2	Cash	3,000	
	Notes Payable <i>(Borrowed cash from bank)</i>		3,000

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
+3,000		+3,000		

**Transaction 3: Purchase of Equipment for Cash**

On March 3, HiTech purchased office equipment (e.g., computer equipment) from MicroCenter, Inc., for \$4,500 in cash.

Date	Account and Explanation	Debit	Credit
March 3	Equipment	4,500	
	Cash <i>(Purchased equipment)</i>		4,500

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
+4,500				
-4,500				

**Transaction 4: Purchasing Insurance**

On March 4, HiTech purchased a six-month insurance policy for \$1,200 in cash.

Date	Account and Explanation	Debit	Credit
March 4	Prepaid Insurance	1,200	
	Cash <i>(Purchased insurance in advance)</i>		1,200

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
+1,200				
-1,200				

### Transaction 5: Purchase of Supplies on Credit

On March 6, HiTech purchased office supplies from Hamilton Office Supply for \$6,500. Hamilton Office Supply agreed to accept full payment in 30 days.

Assets = Liabilities +		Stockholders'
		Equity
+6,500	+6,500	

Date	Account and Explanation	Debit	Credit
March 6	Supplies	6,500	
	Accounts Payable		6,500
	<i>(Purchased supplies on account)</i>		

### Transaction 6: Sale of Services for Cash

On March 10, HiTech sold advertising services to Miami Valley Products in exchange for \$8,800 in cash.

Assets = Liabilities +		Stockholders'
		Equity
+8,800		+8,800

Date	Account and Explanation	Debit	Credit
March 10	Cash	8,800	
	Service Revenue		8,800
	<i>(Sold advertising services)</i>		

### Transaction 7: Sale of Services for Credit

On March 15, HiTech sold advertising services to the *Cincinnati Enquirer* for \$3,300. HiTech agreed to accept full payment in 30 days.

Assets = Liabilities +		Stockholders'
		Equity
+3,300		+3,300

Date	Account and Explanation	Debit	Credit
March 15	Accounts Receivable	3,300	
	Service Revenue		3,300
	<i>(Sold advertising services)</i>		

### Transaction 8: Receipt of Cash in Advance

On March 19, HiTech received \$9,000 in advance for advertising services to be completed in the next three months.

Assets = Liabilities +		Stockholders'
		Equity
+9,000	+9,000	

Date	Account and Explanation	Debit	Credit
March 19	Cash	9,000	
	Unearned Revenue		9,000
	<i>(Sold advertising services in advance)</i>		

### Transaction 9: Payment of a Liability

On March 23, HiTech pays \$6,000 cash for the supplies previously purchased from Hamilton Office Supply (transaction 5).

Assets = Liabilities +		Stockholders'
		Equity
-6,000	-6,000	

Date	Account and Explanation	Debit	Credit
March 23	Accounts Payable	6,000	
	Cash		6,000
	<i>(Paid accounts payable)</i>		

### Transaction 10: Payment of Salaries

On March 26, HiTech paid employees their weekly salary of \$1,800 cash.

Assets = Liabilities +		Stockholders'
		Equity
-1,800		-1,800

Date	Account and Explanation	Debit	Credit
March 26	Salaries Expense	1,800	
	Cash		1,800
	<i>(Paid employee salaries)</i>		

## Transaction 11: Collection of a Receivable

On March 29, HiTech collected \$3,000 cash from the *Cincinnati Enquirer* for services sold earlier on credit (transaction 7).

Date	Account and Explanation	Debit	Credit
March 29	Cash	3,000	
	Accounts Receivable (Collected accounts receivable)		3,000

Assets	=	Liabilities	+	Stockholders' Equity
+3,000				
-3,000				

## Transaction 12: Payment of Utilities

On March 30, HiTech paid its utility bill of \$5,200 for March.

Date	Account and Explanation	Debit	Credit
March 30	Utilities Expense	5,200	
	Cash (Paid for utilities used)		5,200

Assets	=	Liabilities	+	Stockholders' Equity
-5,200				-5,200

## Transaction 13: Payment of a Dividend

On March 31, HiTech declared and paid a cash dividend of \$500 to its stockholders.

Date	Account and Explanation	Debit	Credit
March 31	Dividends	500	
	Cash (Declared and paid a cash dividend)		500

Assets	=	Liabilities	+	Stockholders' Equity
-500				-500

## Step 3: Post to the Ledger

Because the journal lists each transaction in chronological order, it can be quite difficult to use the journal to determine the balance in any specific account. For example, refer to the journal entries shown earlier for HiTech Communications. What is the balance in cash at the end of the month? This relatively simple question is difficult to answer with the use of the journal.

To overcome this difficulty, companies will use a general ledger to keep track of the balances of specific accounts. A **general ledger** is simply a collection of all the individual financial statement accounts that a company uses.<sup>3</sup> In a manual accounting system, a ledger could be as simple as a notebook with a separate page for each account. Ledger accounts are often shown using the T-account format introduced earlier or the column-balance format. We will describe the column-balance format next.

The process of transferring the information from the journalized transaction to the general ledger is called **posting**. Posting is essentially copying the information from the journal into the ledger. Debits in the journal are posted as debits to the specific ledger account, and credits in the journal are posted as credits in the specific ledger account. To facilitate this process, most journals and ledgers have a column titled "Posting Reference." As the information is copied into the ledger, the number assigned to the account is placed in the "Posting Reference" column of the journal and the journal page number is placed in the "Posting Reference" column of the ledger. This column provides a link between the ledger and journal that (1) helps to prevent errors in the posting process and (2) allows you to trace the effects of a transaction through the accounting system. The posting process is illustrated in Exhibit 2-10 which shows an illustration of a journal page and a ledger page for HiTech Communications.

### OBJECTIVE 6

Explain why transactions are posted to the general ledger.



<sup>3</sup>Most companies supplement the general ledger with subsidiary ledgers that record "subaccounts" that make up the larger general ledger account. For example, most companies have an account called Accounts Receivable in the general ledger. However, the accounts receivable for individual customers are usually contained in a subsidiary ledger. The general ledger account will equal the total balance of all the accounts in the subsidiary ledger for that account.

## Exhibit 2-10

## The Posting Process

GENERAL JOURNAL				
				Page: 2
Date	Account and Explanation	Post. Ref.	Debit	Credit
Mar. 31	Dividends	1100	500	
	Cash	1000		500
	(Declared and paid cash dividend)			

GENERAL LEDGER					
Account: CASH			Account Number: 1000		
Date	Explanation	Post. Ref.	Debit	Credit	Balance
Mar. 1	Issued stock	1	12,000		12,000
2	Borrowed from bank	1	3,000		15,000
3	Purchased equipment	1		4,500	10,500
4	Purchased insurance	1		1,200	9,300
10	Sold advertising services	1	8,800		18,100
19	Sold advertising services in advance	1	9,000		27,100
23	Paid accounts payable	1		6,000	21,100
28	Paid salaries	1		1,800	19,300
29	Collected receivable	2	3,000		22,300
30	Paid utilities	2		5,200	17,100
31	Paid dividend	2		500	16,600

The ledger for HiTech Communications is shown using T-accounts in Exhibit 2-11. The number in parentheses corresponds to the transaction number.

## OBJECTIVE 7

Prepare a trial balance and explain its purpose.



## Step 4: Prepare a Trial Balance

To aid in the preparation of financial statements, some companies will prepare a trial balance before they prepare financial statements. The **trial balance** is a list of all active accounts and each account's debit or credit balance. The accounts are listed in the order they appear in the ledger—assets first, then liabilities, stockholders' equity, revenues, and expenses. By organizing accounts in this manner, the trial balance serves as a useful tool in preparing the financial statements. The trial balance for HiTech Communications is shown in Exhibit 2-12.

In addition, the trial balance is used to *prove the equality of debits and credits*. If debits did not equal credits, the accountant would quickly know that an error had been made. The error could have been in the journalizing of the transaction, the posting of the transaction, or in the computation of the balance in the ledger. However, *a word of caution is necessary* here: A trial balance whose debits equal credits does *not* mean that all transactions were recorded correctly. A trial balance will not detect errors of analysis or amounts. Sometimes the wrong account is selected for a journal entry or an incorrect amount is recorded for a transaction. In other cases, a journal entry is omitted or entered twice. As long as both the debit and credit portions of the journal entry or posting reflect the incorrect information, the debit and credit totals in a trial balance will be equal.

## Exhibit 2-11

## General Ledger of HiTech Communications

Assets		Liabilities		Stockholders' Equity																																					
<table border="1"> <thead> <tr><th colspan="2">Cash</th></tr> </thead> <tbody> <tr><td>(1) 12,000</td><td>4,500 (3)</td></tr> <tr><td>(2) 3,000</td><td>1,200 (4)</td></tr> <tr><td>(6) 8,800</td><td>6,000 (9)</td></tr> <tr><td>(8) 9,000</td><td>1,800 (10)</td></tr> <tr><td>(11) 3,000</td><td>5,200 (12)</td></tr> <tr><td></td><td>500 (13)</td></tr> <tr><td><b>Bal. 16,600</b></td><td></td></tr> </tbody> </table>		Cash		(1) 12,000	4,500 (3)	(2) 3,000	1,200 (4)	(6) 8,800	6,000 (9)	(8) 9,000	1,800 (10)	(11) 3,000	5,200 (12)		500 (13)	<b>Bal. 16,600</b>		<table border="1"> <thead> <tr><th colspan="2">Accounts Payable</th></tr> </thead> <tbody> <tr><td>(9) 6,000</td><td>6,500 (5)</td></tr> <tr><td></td><td><b>500 Bal.</b></td></tr> </tbody> </table>		Accounts Payable		(9) 6,000	6,500 (5)		<b>500 Bal.</b>	<table border="1"> <thead> <tr><th colspan="2">Common Stock</th></tr> </thead> <tbody> <tr><td></td><td>12,000 ( 1)</td></tr> <tr><td></td><td><b>12,000 Bal.</b></td></tr> </tbody> </table>		Common Stock			12,000 ( 1)		<b>12,000 Bal.</b>	<table border="1"> <thead> <tr><th colspan="2">Salaries Expense</th></tr> </thead> <tbody> <tr><td>(10) 1,800</td><td></td></tr> <tr><td><b>Bal. 1,800</b></td><td></td></tr> </tbody> </table>		Salaries Expense		(10) 1,800		<b>Bal. 1,800</b>	
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Equipment																																									
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<b>Bal. 4,500</b>																																									

## Exhibit 2-12

## Trial Balance

HiTech Communications, Inc. Trial Balance March 31, 2009		
Account	Debit	Credit
Cash	\$16,600	
Accounts Receivable	300	
Supplies	6,500	
Prepaid Insurance	1,200	
Equipment	4,500	
Accounts Payable		\$ 500
Unearned Revenue		9,000
Notes Payable		3,000
Common Stock		12,000
Dividends	500	
Service Revenue		12,100
Salaries Expense	1,800	
Utility Expense	5,200	
	<u>\$36,600</u>	<u>\$36,600</u>

## Summary of Learning Objectives

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### LO1. Describe the assumptions and principles that underlie accounting.

- The qualitative characteristics of accounting information are:
  1. Relevance—refers to whether information is capable of making a difference in the decision-making process. Relevant information is provided in a timely manner and either helps to predict the future or provides feedback about prior expectations.
  2. Reliability—information that can be depended upon by users. Reliable information should be verifiable, representationally faithful, and neutral.
  3. Comparability—allows comparisons to be made between companies.
  4. Consistency—refers to the application of the same accounting principle by a single company over time.
- The four assumptions are:
  1. Economic entity—each company is accounted for separately from its owners
  2. Continuity (going-concern)—assumption that a company will continue to operate long enough to carry out its commitments
  3. Time-period—allows the life of a company to be divided into artificial time periods
  4. Monetary unit—requires financial information to be reported in monetary terms
- The four principles are:
  1. Historical cost—requires a business activity to be recorded at the exchange price at the time the activity occurs
  2. Revenue recognition—requires revenue to be recognized when it is realized and earned
  3. Matching principle—requires that expenses be recognized in the same period as the revenue that it helped generate
  4. Conservatism—requires care to be taken to avoid overstating assets or income.

### LO2. Explain the relationships among economic events, transactions, and the expanded accounting equation.

- A company's business activities (operating, investing, and financing) consist of many different economic events that are both external to the company as well as internal to the company. Accounting attempts to measure the economic effect of these events. However, not all events are recognized, or recorded, in the accounting system.
- A transaction is an economic event that is recognized in the financial statements. An accounting transaction causes the elements of the accounting equation (assets, liabilities, contributed capital, retained earnings, revenues, expenses, or dividends) to change in a way that maintains the equality of their relationship.

### LO3. Analyze the effect of business transactions on the accounting equation.

- This is Step 1 of the accounting cycle.
- Transaction analysis is the process of determining the economic effects of a transaction on the elements of the accounting equation.
- Transaction analysis involves three steps:
  - Step 1: Write down the accounting equation (basic or expanded version).
  - Step 2: Identify the financial statement elements that are affected by the transaction.
  - Step 3: Determine whether the element increased or decreased. Each transaction will have a dual-effect on the accounting equation, and the accounting equation will remain in balance after the effects of the transaction are recorded.

**LO4. Discuss the role of accounts and how debits and credits are used in the double-entry accounting system.**

- An account is a record of increases and decreases in each of the basic elements of the financial statements.
- Each financial statement element is made up of a number of different accounts.
- All transactions are recorded into accounts.
- The final account balance, after all changes are recorded, is used in the preparation of the financial statements.
- The left side of an account is referred to as a debit. The right side of an account is referred to as a credit.
- All accounts have a normal balance which is a positive account balance. Assets, expenses, and dividends have a normal debit balance. Liabilities, stockholders' equity, and revenues have a normal credit balance.
- Increases or decreases to an account are based on the normal balance of an account. Normal debit balance accounts (assets, expenses, and dividends) are increased with debits and decreased with credits. Normal credit balance accounts (liabilities, equity, and stockholders' equity) are increased with credits and decreased with debits.

**LO5. Prepare journal entries for transactions.**

- This is Step 2 of the accounting cycle.
- A journal entry represents the debit and credit effects of a transaction in the accounting records.
- A journal entry is prepared by following three steps:  
Step 1: Analyzing the transaction.  
Step 2: Determining which accounts are affected.  
Step 3: Using the debit and credit procedures to record the effects of the transaction.
- A journal entry is recorded in chronological order and consists of the date of the transaction, the accounts affected, the amount of the transaction, and a brief explanation.

**LO6. Explain why transactions are posted to the general ledger.**

- This is Step 3 of the accounting cycle.
- To overcome the difficulty of determining account balances listed chronologically in the journal, information in the journal is transferred to the general ledger in a process called posting.
- As result of posting, the general ledger accumulates the effects of transactions in individual financial statement accounts.

**LO7. Prepare a trial balance and explain its purpose.**

- This is Step 4 of the accounting cycle.
- The trial balance is a list of all active accounts, in the order they appear in the ledger, and each account's debit or credit balance.
- The trial balance is used to prove the equality of debits and credits and helps to uncover errors in journalizing or posting transactions.
- The trial balance serves as a useful tool in preparing the financial statements.

**CORNERSTONE 2-1** How to perform transaction analysis, page 64

**CORNERSTONE 2-2** How to determine increases or decreases to a balance sheet account, page 71

**CORNERSTONE 2-3** How to determine increases or decreases to revenues, expenses and dividends, page 73

**CORNERSTONE 2-4** How to make a journal entry, page 75



**CORNERSTONES  
FOR CHAPTER 2**

## Key Terms

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Account, 70	International Accounting Standards Board (IASB), 58
Accounting cycle, 58	Journal, 75
Chart of accounts, 70	Journal entry, 75
Comparability, 59	Matching principle, 60
Conservatism principle, 61	Material, 60
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Historical cost principle, 60	

## Review Problem

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### I. The Accounting Cycle

#### Concept:

Economic events are recorded in the accounting system through a process of analyzing transactions, journalizing these transactions in a journal, and posting them to the ledger. These activities are the initial steps in the accounting cycle.

#### Information:

Boonville Delivery Service was recently formed to fill a need for speedy delivery of small packages. In December 2009, its first month of operations, the following transactions occurred.

- On December 1, Boonville sells common stock to several investors for \$32,000.
- On December 2, Boonville borrows \$20,000 on a one-year note payable from Warrick National Bank, to be repaid with 8 percent interest on December 7, 2010.
- On December 2, Boonville pays rent of \$8,000 on its package sorting building for the month of December.
- On December 6, Boonville purchases \$7,000 worth of office furniture by paying \$1,400 in cash and signing a one-year, 12 percent note payable for the balance.
- On December 20, Boonville completes a delivery contract for Tornado Corporation and bills its customer \$15,000.
- On December 24, Boonville makes a rush delivery for \$5,300 cash.
- On December 28, Tornado pays the \$15,000 owed from transaction *e*.
- On December 28, Boonville signs an agreement with BigTime Computers to accept and deliver approximately 400 packages per business day during the

next 12 months. Boonville expects to receive \$400,000 of revenue for this contract, but the exact amount will depend on the number of packages delivered.

- i. On December 29, Boonville receives a \$1,500 bill from Mac's Catering for catering services performed at a Christmas party Boonville held for its clients. (No previous entry has been made for this activity.)
- j. On December 31, Boonville pays \$2,600 cash in salaries to its secretarial staff for work performed in December.
- k. On December 31, Boonville declares and pays dividends of \$5,000 on its common stock.

### Required:

1. Analyze and journalize the transactions *a* through *k*.
2. Post the transactions to the general ledger.
3. Prepare the December 31, 2009 trial balance for Boonville.

### Solution:

#### 1. Analyzing and Journalizing Transactions

*Transaction a: Issuing Common Stock.*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash				Common Stock	
+\$32,000				+\$32,000	

Date	Account and Explanation	Debit	Credit
Dec. 1	Cash	32,000	
	Common Stock		32,000
	<i>(Issued common stock)</i>		

*Transaction b: Borrowing Cash*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash		Note Payable			
+\$20,000		+\$20,000			

Date	Account and Explanation	Debit	Credit
Dec. 2	Cash	20,000	
	Note Payable		20,000
	<i>(Borrowed cash from bank)</i>		

*Transaction c: Paying Rent*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash					Rent Expense
-\$8,000					-\$8,000

Date	Account and Explanation	Debit	Credit
Dec. 2	Rent Expense	8,000	
	Cash		8,000
	<i>(Paid rent for December)</i>		

*Transaction d: Purchasing Asset with Cash and Credit*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash		Notes Payable			
-\$1,400		+\$5,600			
Office Furniture					
+\$7,000					
Date	Account and Explanation	Debit	Credit		
Dec. 6	Office Furniture	7,000			
	Cash		1,400		
	Notes Payable		5,600		
	<i>(Purchased office furniture)</i>				

*Transaction e: Performing Services for Credit*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Accounts Receivable					Service Revenue
+\$15,000					+\$15,000
Date	Account and Explanation	Debit	Credit		
Dec. 20	Accounts Receivable	15,000			
	Service Revenue		15,000		
	<i>(Performed delivery services)</i>				

*Transaction f: Performing Services for Cash*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash					Service Revenue
+\$5,300					+\$5,300
Date	Account and Explanation	Debit	Credit		
Dec. 24	Cash	5,300			
	Service Revenue		5,300		
	<i>(Performed delivery services)</i>				

*Transaction g: Collecting an Accounts Receivable*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash					
+\$15,000					
Accounts Receivable					
-\$15,000					

Date	Account and Explanation	Debit	Credit
Dec. 28	Cash	15,000	
	Accounts Receivable		15,000
	(Collected accounts receivable)		

*Transaction h: Signing of an Agreement to Provide Service*

This is an example of an important event that does not produce a journal entry at the time it occurs. There will be no recording of the transaction until either party performs on their parts of the contract (e.g., until Boonville provides the delivery service or BigTime Computers makes a payment to Boonville).

*Transaction i: Using Services*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
		Accounts Payable			Miscellaneous Expense
		+\$1,500			+\$1,500

Date	Account and Explanation	Debit	Credit
Dec. 29	Miscellaneous Expense	1,500	
	Accounts Payable		1,500
	(Used catering service)		

*Transaction j: Payment of Salaries*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash					Salaries Expense
-\$2,600					-\$2,600

Date	Account and Explanation	Debit	Credit
Dec. 31	Salaries Expense	2,600	
	Cash		2,600
	(Paid secretarial staff salaries)		

*Transaction k: Declaring and Paying a Cash Dividend*

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
Cash					Dividends
-\$5,000					-\$5,000

Date	Account and Explanation	Debit	Credit
Dec. 31	Dividends	5,000	
	Cash		5,000
	(Declared and paid a cash dividend)		

## 2. Posting of Transactions to the Ledger

## General Ledger of Boonville Delivery Service

Assets		Liabilities		Stockholders' Equity	
<b>Cash</b> (a) 32,000   8,000 (c) (b) 20,000   1,400 (d) (f) 5,300   2,600 (j) (g) 15,000   5,000 (k) <b>Bal. 55,300</b>		<b>Accounts Payable</b>   1,500 (i) <b>1,500 Bal.</b>		<b>Common Stock</b>   32,000 (a) <b>32,000 Bal.</b>	
<b>Accounts Receivable</b> (e) 15,000   15,000 (g) <b>Bal. 0</b>		<b>Notes Payable</b>   20,000 (b)   5,600 (d) <b>25,600 Bal.</b>		<b>Service Revenue</b>   15,000 (e)   5,300 (f) <b>20,300 Bal.</b>	
<b>Office Furniture</b> (d) 7,000   <b>Bal. 7,000</b>				<b>Miscellaneous Expense</b> (i) 1,500   <b>Bal. 1,500</b>	
				<b>Rent Expense</b> (c) 8,000   <b>Bal. 8,000</b>	
				<b>Dividends</b> (k) 5,000   <b>Bal. 5,000</b>	

## 3. Preparing a Trial Balance

Boonville Delivery Service Trial Balance December 31, 2009		
Account	Debit	Credit
Cash	\$55,300	
Accounts Receivable	0	
Office Furniture	7,000	
Accounts Payable		\$ 1,500
Notes Payable		25,600
Common Stock		32,000
Dividends	5,000	
Service Revenue		20,300
Rent Expense	8,000	
Salaries Expense	2,600	
Miscellaneous Expense	1,500	
	<u>\$79,400</u>	<u>\$79,400</u>

## Discussion Questions

1. What is the conceptual framework of accounting? What is its objective?
2. Identify the characteristics of useful information.
3. Discuss the trade-offs between relevant and reliable information.
4. Distinguish between comparability and consistency.
5. Describe the two constraints on providing useful information.
6. Identify the four assumptions that underlie accounting.

7. Discuss the four principles that are used to measure and record business transactions.
8. How are the financial statements related to generally accepted accounting principles?
9. Of all the events that occur each day, how would you describe those that are recorded in a firm's accounting records?
10. In order for a transaction to be recorded in a business' accounting records, the effects of the transaction must be reliably measurable in dollars. What is reliable measurement and why is it important?
11. What is the basic process used in transaction analysis?
12. In analyzing a transaction, can a transaction only affect one side of the accounting equation? If so, give an example.
13. How do revenues and expenses affect the accounting equation?
14. What is a T-account? Describe the basic components of any account.
15. Do you agree with the statement that "debits mean increase and credits mean decrease"? If not, what do debit and credit mean?
16. The words *debit* and *credit* are used in two ways in accounting: "e.g., to debit an account" and "a debit balance." Explain both usages of the terms *debit* and *credit*.
17. All accounts have normal balances. What is the normal balance of each of these accounts?
  - a. cash
  - b. sales
  - c. notes payable
  - d. inventory
  - e. retained earnings
  - f. salary expense
  - g. equipment
  - h. unearned revenue
18. When a journal entry is made, what must be equal? Why?
19. Can accounting transactions be directly recorded in the general ledger? If so, why do most companies initially record transactions in the journal?
20. Why is the term *double-entry* an appropriate expression for describing an accounting system?
21. What are the initial steps in the accounting cycle and what happens in each step?
22. What kinds of errors will a trial balance detect? What kinds of errors will not be detectable by a trial balance?

## Multiple-Choice Exercises

---

### 2-1 What organization is the primary standard-setter in the United States?

- a. Securities and Exchange Commission
- b. Financial Accounting Standards Board
- c. International Accounting Standards Board
- d. American Institute of Certified Public Accountants

### 2-2 Which of the following is *not* a characteristic of useful information?

- a. Relevance
- b. Reliability
- c. Conservatism
- d. Comparability

### 2-3 Information that provides feedback about prior expectations is:

- |    | Relevant | Reliable |
|----|----------|----------|
| a. | Yes      | Yes      |
| b. | Yes      | No       |
| c. | No       | Yes      |
| d. | No       | No       |

**2-4 Information that is representationally faithful is considered to be:**

	Relevant	Reliable
a.	Yes	Yes
b.	Yes	No
c.	No	Yes
d.	No	No

**2-5 Which of the following is not an assumption that underlies accounting?**

- a. Economic entity
- b. Time-period
- c. Continuity (going concern)
- d. Historical cost

**2-6 Which principle requires that expenses be recorded and reported in the same period as the revenue that it helped generate?**

- a. Matching
- b. Historical cost
- c. Revenue recognition
- d. Conservatism

**2-7 Taylor Company recently purchased a piece of equipment for \$2,000 which would be paid within 30 days after delivery. At what point would the event be recorded in Taylor's accounting system?**

- a. When Taylor signs the agreement with the seller.
- b. When Taylor receives the asset from the seller.
- c. When Taylor receives an invoice (a bill) from the seller.
- d. When Taylor pays \$2,000 cash to the seller.

**2-8 The effects of purchasing inventory on credit are to:**

- a. increase assets and increase stockholders' equity.
- b. increase assets and increase liabilities.
- c. decrease assets and decrease stockholders' equity.
- d. decrease assets and decrease liabilities.

**2-9 The effects of paying salaries for the current period are to:**

- a. increase assets and increase stockholders' equity
- b. increase assets and increase liabilities
- c. decrease assets and decrease stockholders' equity
- d. decrease assets and decrease liabilities

**2-10 Which of the following statements is false?**

- a. The amount in an account at any time is called the balance of the account.
- b. Transactions are frequently analyzed using a T-account.
- c. All T-accounts have both a debit and a credit side.
- d. The left side of a T-account is called the credit side.

**2-11 Which of the following statements are true?**

- I. Debits represent decreases and credits represent increases.
- II. Debits must always equal credits.
- III. Assets have normal debit balances while liabilities and stockholders' equity have normal credit balances.

- a. I
- b. II and III
- c. I and II
- d. All of the above are true.

**2-12 Debits will:**

- a. increase assets, liabilities, revenues, expenses, and dividends
- b. decrease assets, liabilities, revenues, expenses, and dividends
- c. increase assets, expenses, and dividends
- d. decrease liabilities, revenues, and dividends

**2-13 Which of the following statements are true?**

- I. A journal provides a chronological record of a transaction.
  - II. A journal entry contains the complete effect of a transaction.
  - III. The first step in preparing a journal entry involves analyzing the transaction.
- a. I and II
  - b. II and III
  - c. I and III
  - d. All of the above are true.

**2-14 Posting:**

- a. is an optional step in the accounting cycle.
- b. involves transferring the information in journal entries to the general ledger.
- c. is performed after a trial balance is prepared.
- d. involves transferring information to the trial balance.

**2-15 A trial balance:**

- a. lists all accounts and their balances.
- b. lists only revenue and expense accounts.
- c. will help detect omitted journal entries.
- d. detects all errors that could be made during the journalizing or posting steps of the accounting cycle.

## Cornerstone Exercises

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**Cornerstone Exercise 2-16 QUALITATIVE CHARACTERISTICS**

OBJECTIVE &gt; 1

Three statements are given below.

- a. A company uses the same depreciation method from period to period.
- b. A trash can that is purchased for \$10 is expensed even though it will be used for many years.
- c. When several accountants agree that the financial information is free from error or bias, the information is said to possess this characteristic.

**Required:**

Give the qualitative characteristic or constraint that is most applicable to each of the following statements.

**Cornerstone Exercise 2-17 QUALITATIVE CHARACTERISTICS**

OBJECTIVE &gt; 1

Three statements are given below.

- a. A quality of information that enables an analyst to evaluate the financial performance of two different companies in the same industry.

- b. Timely information that is used to predict future events or provide feedback about prior events is said to possess this characteristic.
- c. A financial item that may be useful to investors is not required to be reported because the cost of measuring and reporting this information is judged to be too great.

**Required:**

Give the qualitative characteristic or constraint that is most applicable to each of the following statements.

**OBJECTIVE** > **1** **Cornerstone Exercise 2-18 ACCOUNTING ASSUMPTIONS**

Four statements are given below.

- a. The accounting records of a company are kept separate from its owners.
- b. The accountant assigns revenues and expenses to specific years before preparing the financial statements.
- c. A company values its inventory reported in the financial statements in terms of dollars instead of units.
- d. Property, plant, and equipment is recorded at cost (less any accumulated depreciation) instead of liquidation value.

**Required:**

Give the accounting assumption that is most applicable to each of the following statements.

**OBJECTIVE** > **1** **Cornerstone Exercise 2-19 ACCOUNTING PRINCIPLES**

Four statements are given below.

- a. A company recognizes revenue when the goods are delivered to a customer, even though cash will not be collected from the customer for 30 days.
- b. Land, located in a desirable location, is reported at the original acquisition price, even though its value has increased by over 100 percent since it was purchased.
- c. The cost paid for a delivery truck is recorded as an asset and expensed over the next five years as it is used to help generate revenue.
- d. Inventory, which was recently damaged by a flood, is reported at the lower of its cost or market value.

**Required:**

Give the accounting principle that is most applicable to each of the following statements.

**OBJECTIVE** > **2** **Cornerstone Exercise 2-20 EVENTS AND TRANSACTIONS**

Several events are listed below.

- a. Common stock is issued to investors.
- b. An agreement is signed with a janitorial service to provide cleaning services over the next 12 months.
- c. Inventory is purchased.
- d. A two-year insurance policy is purchased.
- e. Inventory is sold to customers.
- f. Two investors sell their common stock to another investor.

**Required:**

For each of the events, identify which ones qualify for recognition in the financial statements. For events that do not qualify for recognition, explain your reasoning.

**OBJECTIVE** > **3** **Cornerstone Exercise 2-21 TRANSACTION ANALYSIS****CORNERSTONE 2-1**

Four transactions are listed below.

- a. Purchased supplies on account.
- b. Used supplies in operations of the business.

- c. Sold goods to customers on credit.
- d. Collected amounts due from customers.

**Required:**

Prepare three columns labeled assets, liabilities, and stockholders' equity. For each of the transactions, indicate whether the transaction increased (+), decreased (–) or had no effect (NE) on assets, liabilities, or stockholders' equity.

**Cornerstone Exercise 2-22 TRANSACTION ANALYSIS**

Morgan, Inc., entered into the following transactions.

- a. Sold common stock to investors in exchange for \$45,000 cash.
- b. Borrowed \$4,000 cash from First State Bank.
- c. Purchased \$9,000 of supplies on credit.
- d. Paid for the purchase in *c*.

**Required:**

Show the effect of each transaction using the following model.

Assets	=	Liabilities	+	Stockholders' Equity		
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;">Contributed Capital</td> <td style="text-align: center; width: 50%;">Retained Earnings</td> </tr> </table>	Contributed Capital	Retained Earnings
Contributed Capital	Retained Earnings					

**OBJECTIVE** > **3**  
**CORNERSTONE 2-1**

**Cornerstone Exercise 2-23 TRANSACTION ANALYSIS**

The Mendholm Company entered into the following transactions.

- a. Performed services on account, \$14,000
- b. Collected \$5,000 from client related to services performed in *a*
- c. Paid salaries of \$3,500 for the current month
- d. Paid \$1,500 dividend to stockholders

**Required:**

Show the effect of each transaction using the following model:

Assets	=	Liabilities	+	Stockholders' Equity		
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;">Contributed Capital</td> <td style="text-align: center; width: 50%;">Retained Earnings</td> </tr> </table>	Contributed Capital	Retained Earnings
Contributed Capital	Retained Earnings					

**OBJECTIVE** > **3**  
**CORNERSTONE 2-1**

**Cornerstone Exercise 2-24 DEBIT AND CREDIT PROCEDURES**

Refer to the accounts listed below.

- a. Accounts Receivable
- b. Retained Earnings
- c. Sales
- d. Accounts Payable
- e. Repair Expense
- f. Equipment
- g. Common Stock
- h. Salary Expense

**Required:**

For each of the accounts, complete the following table by entering the normal balance of the account (debit or credit) and the word increase or decrease in the debit and credit columns.

Account	Normal Balance	Debit	Credit
---------	----------------	-------	--------

**OBJECTIVE** > **4**  
**CORNERSTONE 2-2**  
**CORNERSTONE 2-3**

**OBJECTIVE** > **5** **Cornerstone Exercise 2-25 JOURNALIZE TRANSACTIONS****CORNERSTONE 2-4**

Four transactions are listed below.

- Issued common stock to several investors for \$71,000
- Purchased equipment for \$7,800 cash
- Made cash sales of \$12,400 to customers
- Issued a \$3,200 dividend to stockholders

**Required:**

Prepare journal entries for the transactions.

**OBJECTIVE** > **5** **Cornerstone Exercise 2-26 JOURNALIZE TRANSACTIONS****CORNERSTONE 2-4**

Four transactions are listed below.

- Borrowed cash of \$8,000 from Middle State Bank
- Made cash sales of \$7,500 to customers
- Paid salaries of \$9,800 to employees for services performed
- Purchased and used \$4,100 of supplies in operations of the business

**Required:**

Prepare journal entries for the transactions.

**OBJECTIVE** > **6** **Cornerstone Exercise 2-27 POSTING JOURNAL ENTRIES**

Listed below are selected T-accounts and their beginning balances for Lee Corporation.

Cash	Supplies	Notes Payable
12,000	6,300	0
Sales	Salary Expense	Supplies Expense
19,500	9,200	1,350

**Required:**

Post the transactions in Cornerstone Exercise 2-26 to these accounts and compute an ending balance.

**OBJECTIVE** > **7** **Cornerstone Exercise 2-28 PREPARING A TRIAL BALANCE**

Listed below are the ledger accounts for Borges, Inc., at December 31, 2009. All accounts have normal balances.

Service Revenue	\$21,630	Dividends	\$ 1,250
Cash	15,600	Salary Expense	4,300
Accounts Payable	4,600	Equipment	11,600
Common Stock	15,000	Accounts Receivable	4,900
Rent Expense	2,080	Advertising Expense	1,500

**Required:**

Prepare a trial balance for Borges, Inc.

## Exercises

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**OBJECTIVE** > **1** **Exercise 2-29 QUALITATIVE CHARACTERISTICS**

Listed below are the four qualitative characteristics that make accounting information useful.

- Relevance
- Reliability
- Comparability
- Consistency

**Required:**

Match the appropriate qualitative characteristic with the statements below.

- When users can depend on the quality of information provided, the accounting information possesses this characteristic.
- The characteristic that allows a user to compare the financial results of a company from one accounting period to another accounting period.
- If information confirms prior expectations, it possesses this characteristic.
- Freedom from bias reflects this characteristic.
- When several companies in the same industry use the same accounting methods, this qualitative characteristic exists.
- Information that accurately portrays an economic event satisfies this characteristic.
- Providing information on a timely basis enhances this characteristic.
- When several accountants can agree on the measurement of an activity, the information possesses this characteristic.
- If information helps to predict future events, it possesses this characteristic.

**Exercise 2-30 ASSUMPTIONS AND PRINCIPLES****OBJECTIVE** > **1**

Presented below are the four assumptions and four principles used in measuring and reporting accounting information.

Assumptions	Principles
Economic entity	Historical cost
Continuity (going-concern)	Revenue recognition
Time-period	Matching
Monetary unit	Conservatism

**Required:**

Identify the assumption or principle that best describes each situation below.

- Specifies that revenue should only be recognized when earned and realized
- Requires that an activity be recorded at the exchange price at the time the activity occurred
- Allows a company to report financial activities separate from the activities of the owners
- Implies that items such as customer satisfaction cannot be reported in the financial statements
- Requires that expenses be recorded and reported in the same period as the revenue that it helped generate
- Justifies why some assets and liabilities are not reported at their value if sold
- Allows the life of a company to be divided into artificial time periods so accounting reports can be provided on a timely basis
- Is a prudent reaction to uncertainty

**Exercise 2-31 EVENTS AND TRANSACTIONS****OBJECTIVE** > **2**

The following economic events that were related to K&B Grocery Store occurred during 2009.

- On February 15, K&B placed an order for a new cash register with NCR, for which \$700 would be paid after delivery.
- On February 17, K&B received a bill from Indianapolis Power and Light indicating that it had used electric power during January 2009 at a cost of \$120; the bill need not be paid until February 25, 2009.
- On February 20, the K&B store manager purchased a new passenger car for \$15,000 in cash. The car is entirely for personal use and was paid for from the manager's personal assets.
- On February 21, the cash register ordered on February 15 was delivered. Payment was not due until March.
- On February 23, K&B paid \$120 to Indianapolis Power and Light.
- On February 26, K&B signed a two-year extension of the lease on the store building occupied by the store. The new lease was effective on April 1, 2009, and required an increase in the monthly rental from \$5,750 to \$5,900.
- On March 1, K&B paid \$5,750 to its landlord for March rent on the store building.

**Required:**

1. Using the words “qualify” and “does not qualify,” indicate whether each of the above events would qualify as a transaction and be recognized and recorded in the accounting system on the date indicated.
2. For any events that did not qualify as a transaction to be recognized and recorded, explain why it does not qualify.

**OBJECTIVE** > **3** **Exercise 2-32 TRANSACTION ANALYSIS**

The following events occurred for Parker Company.

- a. Paid \$5,000 cash for land
- b. Performed consulting services for a client in exchange for \$1,200 cash
- c. Performed consulting services for a client on account, \$700
- d. Stockholders invested \$12,000 cash in the business
- e. Purchased office supplies on account, \$300
- f. Collected \$500 from client in transaction *c*
- g. Paid \$250 on account for supplies purchased in transaction *e*
- h. Paid \$200 cash for the current month’s rent
- i. Paid a \$1,000 cash dividend to stockholders

**Required:**

1. Analyze the effect of each transaction on the accounting equation. For example, for transaction *a*, the answer is “Increase assets (land) \$5,000 and decrease assets (cash) \$5,000.”
2. For *e*, what accounting principle did you use to determine the amount to be recorded for supplies?

**OBJECTIVE** > **3** **Exercise 2-33 TRANSACTION ANALYSIS**

Amanda Webb opened a home health care business under the name Home Care, Inc. During its first month of operations, the business had the following transactions:

- a. Sold common stock to Ms. Webb and other stockholders in exchange for \$25,000 cash
- b. Paid \$15,000 cash for a parcel of land on which the business will eventually build an office building
- c. Purchased supplies for \$2,900 on credit
- d. Paid rent for the month on office space and equipment, \$600 cash
- e. Performed services for clients in exchange for \$3,400
- f. Paid salaries for the month, \$1,200
- g. Purchased and used \$950 of supplies
- h. Paid \$2,100 on account for supplies purchased in transaction *c*
- i. Performed services for clients on credit in the amount of \$770
- j. Paid a \$500 dividend to stockholders

**Required:**

Prepare an analysis of the effects of these transactions on the accounting equation of the business. Use the format below.

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders’ Equity</b>		
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%; border-bottom: 1px solid black;"><b>Contributed Capital</b></td> <td style="text-align: center; width: 50%; border-bottom: 1px solid black;"><b>Retained Earnings</b></td> </tr> </table>	<b>Contributed Capital</b>	<b>Retained Earnings</b>
<b>Contributed Capital</b>	<b>Retained Earnings</b>					

**OBJECTIVE** > **3** **Exercise 2-34 TRANSACTION ANALYSIS AND BUSINESS ACTIVITIES**



The accountant for Compton Inc. has collected the following information:

- a. Compton purchased a tract of land from Jacobsen Real Estate for \$860,000 to be used in its operations.
- b. Compton issued 2,000 shares of its common stock to George Micros in exchange for \$120,000 cash.

- c. Compton purchased a John Deere backhoe for \$42,000 on credit.
- d. Michael Rotunno paid Compton \$8,000 cash for services performed. The services had been performed by Compton several months ago for a total price of \$10,000 of which Rotunno had previously paid \$2,000.
- e. Compton paid its monthly payroll by issuing checks totaling \$38,000.
- f. Compton declared and paid its annual dividend of \$10,000 cash.

**Required:**

1. Prepare an analysis of the effects of these transactions on the accounting equation of the business. Use the format below.

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>			
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><b>Contributed Capital</b></td> <td style="text-align: center; width: 50%;"><b>Retained Earnings</b></td> </tr> </table>	<b>Contributed Capital</b>	<b>Retained Earnings</b>	
<b>Contributed Capital</b>	<b>Retained Earnings</b>						

2. Indicate whether the transaction is a financing, investing, or operating activity.

**Exercise 2-35 INFERRING TRANSACTIONS FROM BALANCE SHEET CHANGES**
**OBJECTIVE** > **3**

Each of the following balance sheet changes is associated with a particular transaction:

- a. Cash increases by \$100,000 and capital stock increases by \$100,000.
- b. Cash decreases by \$22,000 and land increases by \$22,000.
- c. Cash decreases by \$9,000 and retained earnings decreases by \$9,000.
- d. Cash increases by \$15,000 and notes payable increases by \$15,000.

**Required:**

Describe each transaction listed above.

**Exercise 2-36 TRANSACTION ANALYSIS**
**OBJECTIVE** > **3**

Goal Systems, a business consulting firm, engaged in the following transactions:

- a. Sold capital stock for \$50,000 cash
- b. Borrowed \$20,000 from a bank
- c. Purchased equipment for \$7,000 cash
- d. Prepaid rent on office space for six months in the amount of \$6,600
- e. Performed consulting services in exchange for \$4,300 cash
- f. Performed consulting services on credit in the amount of \$16,000
- g. Incurred and paid wage expense of \$7,500
- h. Collected \$7,200 of the receivable arising from transaction *f*
- i. Purchased supplies for \$1,100 on credit
- j. Used \$800 of the supplies purchased in transaction *i*
- k. Paid for all of the supplies purchased in transaction *i*

**Required:**

For each transaction described above, indicate the effects on assets, liabilities, and stockholders' equity using the format below.

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>			
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><b>Contributed Capital</b></td> <td style="text-align: center; width: 50%;"><b>Retained Earnings</b></td> </tr> </table>	<b>Contributed Capital</b>	<b>Retained Earnings</b>	
<b>Contributed Capital</b>	<b>Retained Earnings</b>						

**Exercise 2-37 TRANSACTION ANALYSIS**
**OBJECTIVE** > **3**

During December, Cynthiana Refrigeration Service engaged in the following transactions:

- a. On December 3, Cynthiana sold a one-year service contract to Cub Foods for \$8,000 cash.
- b. On December 10, Cynthiana repaired equipment of the A&W Root Beer Drive-In. A&W paid \$800 in cash for the service call.

- c. On December 10, Cynthiana purchased a new GMC truck for business use. The truck cost \$16,500. Cynthiana paid \$2,500 down and signed a one-year note for the balance.
- d. Cynthiana received an \$8,000 order of repair parts from Carrier Corporation on December 19. Carrier is expected to submit a bill for \$8,000 in early January.
- e. On December 23, Cynthiana purchased 20 turkeys from Cub Foods for \$280 cash. Cynthiana gave the turkeys to its employees as a Christmas gift.

**Required:**

For each transaction described above, indicate the effects on assets, liabilities, and stockholders' equity using the format below.

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>		
				<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;"><b>Contributed Capital</b></td> <td style="text-align: center; width: 50%;"><b>Retained Earnings</b></td> </tr> </table>	<b>Contributed Capital</b>	<b>Retained Earnings</b>
<b>Contributed Capital</b>	<b>Retained Earnings</b>					

**OBJECTIVE** > 4 **Exercise 2-38 NORMAL BALANCES AND FINANCIAL STATEMENTS**

The following accounts are available for Haubstadt Shoe Works:

- Accounts Payable
- Accounts Receivable
- Accumulated Depreciation, Building
- Accumulated Depreciation, Equipment
- Building
- Cash
- Common Stock
- Cost of Goods Sold
- Depreciation Expense, Building
- Depreciation Expense, Equipment
- Equipment
- General and Administrative Expense
- Interest Expense
- Inventory
- Long-Term Notes Payable
- Retained Earnings
- Sales Revenue
- Selling Expense

**Required:**

Using a table like the one below, indicate whether each account normally has a debit or credit balance and indicate on which of the financial statements (income statement, statement of retained earnings, or balance sheet) each account appears.

Account	Debit	Credit	Financial Statement
---------	-------	--------	---------------------

**OBJECTIVE** > 4 **Exercise 2-39 DEBIT AND CREDIT EFFECTS OF TRANSACTIONS**

Lincoln Corporation was involved in the following transactions during the current year:

- a. The owners invested cash in the business in exchange for common stock.
- b. Lincoln borrowed cash from the local bank on a note payable.
- c. Lincoln purchased operating assets on credit.
- d. Lincoln purchased supplies inventory on credit.
- e. Lincoln provided services in exchange for cash from the customer.
- f. A customer secured services from Lincoln on credit.
- g. The payable from transaction *d* was paid in full.
- h. The receivable from transaction *f* was collected in full.
- i. Lincoln paid wages in cash.

- j. Lincoln used a portion of the supplies purchased in transaction *d*.
- k. Lincoln paid dividends in cash.

**Required:**

Prepare a table like the one shown below and indicate the effect on assets, liabilities, and stockholders' equity. Be sure to enter debits and credits in the appropriate columns for each of the transactions. Transaction *a* is entered as an example:

Assets	=	Liabilities	+	Stockholders' Equity	
				Contributed Capital	Retained Earnings
a. Increase (Debit)				Increase (Credit)	

**Exercise 2-40 DEBIT AND CREDIT EFFECT ON TRANSACTIONS****OBJECTIVE** > **4**

Jefferson Framers engaged in the following transactions:

- a. Purchased land for \$15,200 cash
- b. Purchased equipment for \$23,600 in exchange for a one-year, 11 percent note payable
- c. Purchased office supplies on credit for \$1,200 from Office Depot
- d. Paid the \$10,000 principal plus \$700 interest on a note payable
- e. Paid an account payable in the amount of \$2,600
- f. Provided \$62,100 of services on credit
- g. Provided \$11,400 of services for cash
- h. Collected \$29,800 of accounts receivable
- i. Paid \$13,300 of wages in cash
- j. Sold common stock for \$21,000 cash

**Required:**

Using a table like the one below, enter the necessary information for each transaction. Transaction *a* is entered as an example.

Transaction	Account	Increase/Decrease	Debit/Credit	Amount
(a)	Land	Increase	Debit	\$15,200
	Cash	Decrease	Credit	\$15,200

**Exercise 2-41 JOURNALIZING TRANSACTIONS****OBJECTIVE** > **5**

Kauai Adventures rents surfboards and snorkeling and scuba equipment. During March 2009, Kauai engaged in the following transactions:

- March 2 Received \$34,200 cash from customers for rental
- 3 Purchased on credit five new surfboards for \$110 each
- 6 Paid wages to employees in the amount of \$11,500
- 9 Paid office rent for the month in the amount of \$3,300
- 12 Purchased a new Ford truck for \$17,800; paid \$1,000 down in cash and secured a loan from Princeville Bank for the \$16,800 balance
- 13 Collected a \$650 account receivable
- 16 Paid an account payable in the amount of \$790
- 23 Borrowed \$10,000 on a six-month, 12 percent note payable
- 27 Paid the monthly telephone bill of \$345
- 30 Paid a monthly advertising bill of \$1,960

**Required:**

Prepare a journal entry for each of these transactions.

**OBJECTIVE** > **5** **Exercise 2-42 JOURNALIZING TRANSACTIONS**

Remington Communications has been providing cellular phone service for several years. During November and December 2009, the following transactions occurred:

- |      |    |  |
|------|----|--|
| Nov. | 2  | Remington received \$1,200 for November phone service from Enrico Company.   |
|      | 6  | Remington purchased \$5,800 of supplies from Technology Associates on account.   |
|      | 10 | Remington paid \$4,250 to its hourly employees for their weekly wages.   |
|      | 15 | Remington paid \$5,800 to Technology Associates in full settlement of their account payable.   |
|      | 18 | Remington purchased and used supplies of \$2,150.  |
|      | 21 | Remington received a bill from Monticello Construction for \$900 for repairs made to Remington's loading dock on November 15. Remington plans to pay the bill in early December, when it is due. |
| Dec. | 4  | Remington paid the \$900 to Monticello Construction.   |

**Required:**

1. Prepare a journal entry for each of these transactions.
2. What accounting principle did you apply in recording the November 10 transaction?

**OBJECTIVE** > **5** **Exercise 2-43 TRANSACTION ANALYSIS AND JOURNAL ENTRIES**

Pasta House, Inc., was organized in January 2009. During the year, the following transactions occurred:

- a. On January 14, Pasta House, Inc., sold Martin Halter, the firm's founder and sole owner, 10,000 shares of its common stock for \$7 per share.
- b. On the same day, Bank One loaned Pasta House \$30,000 on a 10-year note payable.
- c. On February 22, Pasta House purchased a building and the land on which it stands from Frank Jakubek for \$14,000 cash and a 5-year, \$36,000 note payable. The land and building had appraised values of \$10,000 and \$40,000, respectively.
- d. On March 1, Pasta House signed an \$18,000 contract with Cosby Renovations to remodel the inside of the building. Pasta House paid \$6,000 down and agreed to pay the remainder when Cosby completed its work.
- e. On May 3, Cosby completed its work and submitted a bill to Pasta House for the remaining \$12,000.
- f. On May 20, Pasta House paid \$12,000 to Cosby Renovations.
- g. On June 4, Pasta House purchased restaurant supplies from Glidden Supply for \$950 cash.

**Required:**

Prepare a journal entry for each of these transactions.

**OBJECTIVE** > **4** **5** **6** **7** **Exercise 2-44 ACCOUNTING CYCLE**

Rosenthal Decorating, Inc., is a commercial painting and decorating contractor that began operations in January 2009. The following transactions occurred during the year:

- a. On January 15, Rosenthal sold 500 shares of its common stock to William Hensley for \$10,000.
- b. On January 24, Rosenthal purchased \$720 of painting supplies from Westwood Builders' Supply on account.
- c. On February 20, Rosenthal paid \$720 cash to Westwood Builders' Supply for the painting supplies purchased on January 24.
- d. On April 25, Rosenthal billed Bultman Condominiums \$12,500 for painting and decorating services performed in April.
- e. On May 12, Rosenthal received \$12,500 from Bultman Condominiums for the painting and decorating work billed in April.

- f. On June 5, Rosenthal sent Arlington Builders a \$9,500 bill for a painting job completed on that day.
- g. On June 24, Rosenthal paid wages for work performed during the preceding week in the amount of \$6,700.

**Required:**

1. Prepare a journal entry for each of the transactions listed above.
2. Post the transactions to T-accounts.
3. Prepare a trial balance at June 30, 2009.

**Exercise 2-45 PREPARING A TRIAL BALANCE PREPARATION****OBJECTIVE**  **7**

The following accounts and account balances are available for Badger Auto Parts at December 31, 2009:

Accounts Payable	\$ 9,200
Accounts Receivable	41,100
Accumulated Depreciation, Furniture and Fixtures	47,300
Cash	3,700
Common Stock	100,000
Cost of Goods Sold	189,000
Depreciation Expense, Furniture and Fixtures	10,400
Furniture and Fixtures	128,000
General and Administrative Expense	9,700
Income Taxes Expense	3,700
Income Taxes Payable	3,600
Interest Expense	7,200
Interest Payable	1,800
Inventory	60,500
Long-Term Notes Payable	50,000
Prepaid Rent	15,000
Retained Earnings, 12/31/2008	15,900
Sales Revenue	268,000
Selling Expense	27,500

**Required:**

Prepare a trial balance. Assume that all accounts have normal balances.

**Exercise 2-46 EFFECT OF ERRORS ON A TRIAL BALANCE****OBJECTIVE**  **7**

The bookkeeper for Riley, Inc., made the following errors:

- a. A cash purchase of supplies of \$357 was recorded as a debit to Supplies for \$375 and a credit to Cash of \$375.
- b. A cash sale of \$3,154 was recorded as a debit to Cash of \$3,154 and a credit to Sales of \$3,145.
- c. A purchase of equipment was recorded once in the journal and posted twice to the ledger.
- d. Cash paid for salaries of \$4,100 was recorded as a debit to Salaries Expense of \$4,100 and a credit to Accounts Payable of \$4,100.
- e. A credit sale of \$8,300 was recorded correctly. However, the debit posting to Accounts Receivable was omitted.

**Required:**

Indicate whether or not the trial balance will balance after the error. If the trial balance will not balance, indicate the direction of the misstatement for any effected account (e.g., cash will be overstated by \$50).

## Problem Set A

### OBJECTIVE > 3 Problem 2-47A EVENTS AND TRANSACTIONS

The accountant for Boatsman Products, Inc., received the following information:

- Boatsman sent its customers a new price list. Prices were increased an average of 3 percent on all items.
- Boatsman accepted an offer of \$150,000 for land that it had purchased two years ago for \$130,000. Cash and the deed for the property are to be exchanged in five days.
- Boatsman accepted \$150,000 cash and gave the purchaser the deed for the property described in item *b*.
- Boatsman's president purchased 600 shares of the firm's common stock from another stockholder. The president paid \$15 per share. The former shareholder had purchased the stock from Boatsman for \$4 per share.
- Boatsman leases its delivery trucks from a local dealer. The dealer also performs maintenance on the trucks for Boatsman. Boatsman received a \$1,254 bill for maintenance from the dealer.

#### Required:

Indicate whether or not each item qualifies as a transaction and should be recorded in the accounting system. Explain your reasoning.

### OBJECTIVE > 3 7 Problem 2-48A ANALYZING TRANSACTIONS



Luis Madero, after working for several years with a large public accounting firm, decided to open his own accounting service. The business is operated as a corporation under the name Madero Accounting Services. The following captions and amounts summarize Madero's balance sheet at July 31, 2009.

Assets			=	Liabilities		+	Equity	
Cash	+ Accounts Receivable	+ Supplies	=	Accounts Payable	+ Notes Payable	+	Capital Stock	+ Retained Earnings
8,000	+ 15,900	+ 4,100	=	2,500	+ 4,000	+	12,000	+ 9,500

The following events occurred during August 2009.

- Sold common stock to Ms. Garriz in exchange for \$20,000 cash
- Paid \$700 for first month's rent on office space
- Purchased supplies of \$2,100 on credit
- Borrowed \$5,000 from the bank
- Paid \$1,200 on account for supplies purchased earlier on credit
- Paid secretary's salary for August of \$1,850
- Performed accounting services for clients who paid cash upon completion of the service in the total amount of \$2,700
- Performed accounting services for clients on credit in the total amount of \$1,500
- Purchased and used \$500 in supplies
- Collected \$690 cash from clients for whom services were performed on credit
- Paid \$300 dividend to stockholders

#### Required:

- Record the effects of the transactions listed above on the accounting equation. Use format given in the problem, starting with the totals at July 31, 2009.
- Prepare the trial balance at August 31, 2009.

### OBJECTIVE > 3 4 7 Problem 2-49A INFERRING TRANSACTIONS FROM T-ACCOUNTS

The following T-accounts summarize the operations of Chen Construction Company for July 2009.

Cash				Accounts Receivable			Supplies			
7/1	200			7/1	1,400	150	7/11	7/1	750	
7/2	1,000	150	7/5					7/4	250	
7/7	2,500	700	7/9							
7/11	150	750	7/14							

Land		Accounts Payable			Common Stock		
7/1	3,000		1,100	7/1		4,000	7/1
7/9	700		7/5	150	250	7/4	1,000

Retained Earnings			
		250	7/1
7/14	750	2,500	7/7

**Required:**

1. Assuming that only one transaction occurred on each day (beginning on July 2) and that no dividends were paid, describe the transaction that most likely took place.
2. Prepare a trial balance at July 31, 2009.

**Problem 2-50A DEBIT AND CREDIT PROCEDURES**

**OBJECTIVE 4**

A list of accounts for Montgomery, Inc., appears below.

- Accounts Payable
- Accounts Receivable
- Accumulated Depreciation
- Cash
- Common Stock
- Depreciation Expense
- Equipment
- Income Tax Expense
- Interest Expense
- Land
- Notes Payable
- Prepaid Rent
- Retained Earnings
- Salaries Expense
- Service Revenue
- Supplies Inventory

**Required:**

Complete the table below for these accounts. The information for the first account has been entered as an example.

Account	Type of Account	Normal Balance	Increase	Decrease
Accounts Payable	Liability	Credit	Credit	Debit

**Problem 2-51A JOURNALIZING TRANSACTIONS**

**OBJECTIVE 5**

Monroe Company rents electronic equipment. During September 2009, Monroe engaged in the transactions described below.

- Sept. 5 Purchased a Chevrolet truck for \$32,000 cash
- 8 Purchased Sony amplifiers for \$2,500 on account
- 10 Purchased \$1,750 of office supplies on credit
- 11 Rented sound equipment to a traveling stage play for \$15,000. The producer of the play paid for the service at the time it was provided.
- 12 Rented sound equipment and lights to a local student organization for a school dance for \$5,100. The student organization will pay for services within 30 days.

- Sept. 18 Paid employee wages of \$4,300 that have been earned during September  
 22 Collected the receivable from the September 12 transaction  
 23 Borrowed \$12,800 cash from a Citibank on a three-year note payable  
 28 Sold common stock to new stockholders for \$35,750  
 30 Paid a \$3,850 cash dividend to stockholders

**Required:**

Prepare a journal entry for each transaction.

**OBJECTIVE** > **5** **6****Problem 2-52A JOURNALIZING AND POSTING TRANSACTIONS**

Cincinnati Painting Service, Inc., specializes in painting houses. During the month of June, Cincinnati Painting engaged in the following transactions:

- June 3 Purchased painting supplies from River City Supply for \$750 on credit  
 8 Purchased a used van from Hamilton Used Car Sales for \$6,500, paying \$2,000 down and agreeing to pay the balance in six months  
 14 Paid \$3,200 to hourly employees for work performed in June  
 22 Billed various customers a total of \$8,700 for June painting jobs  
 26 Received \$5,100 cash from James Eaton for a house painting job completed and billed in May  
 29 Collected \$300 from Albert Montgomery on completion of a one-day painting job. This amount is not included in the June 22 bills.

**Required:**

1. Prepare a journal entry for each transaction.
2. Post the journal entries to Cincinnati Painting's ledger accounts.

**OBJECTIVE** > **2** **3** **4****Problem 2-53A THE ACCOUNTING CYCLE**

Karleen's Catering Service provides catered meals to individuals and businesses. Karleen's purchases its food ready to serve from Mel's Restaurant. In order to prepare a realistic trial balance, the events described below are aggregations of many individual events during 2009.

- a. During the year, Karleen's paid office rent of \$11,500.
- b. Telephone expenses incurred and paid were \$950.
- c. Wages of \$67,400 were earned by employees and paid during the year.
- d. During the year, Karleen's provided catering services:

On credit	\$142,100
For cash	21,700

- e. Karleen's paid \$62,100 for food and beverage supplies purchased.
- f. Karleen's paid dividends in the amount of \$4,000.
- g. Karleen's collected accounts receivable in the amount of \$134,200.

**Required:**

1. Analyze the events for their effect on the accounting equation.
2. Prepare journal entries (ignore the date since these events are aggregations of individual events).
3. Post the journal entries to ledger accounts.
4. Prepare a trial balance. Assume that all beginning account balances at January 1, 2009, are zero.

**OBJECTIVE** > **2** **3** **4****Problem 2-54A COMPREHENSIVE PROBLEM**

Western Sound Studios records and masters audio tapes of popular artists in live concerts. The performers use the tapes to prepare "live" albums, CDs, and MP3s. The following account balances were available at the beginning of 2009:

Accounts Payable	\$ 11,900
Accounts Receivable	384,000
Cash	16,300
Common Stock	165,000
Interest Payable	11,200
Long-Term Notes Payable	100,000
Rent Payable, Building	4,000
Rent Payable, Recording Equipment	7,000
Retained Earnings, 12/31/2008	101,200

During 2009, the following transactions occurred (the events described below are aggregations of many individual events):

- Taping services in the amount of \$994,000 were billed.
- The accounts receivable at the beginning of the year were collected.
- In addition, cash for \$983,000 of the services billed in transaction *a* was collected.
- The rent payable for the building was paid. In addition, \$48,000 of building rental costs was paid in cash. There was no rent payable or prepaid at year-end.
- The equipment rent payable on January 1 was paid. In addition, \$84,000 of equipment rental costs was paid in cash. There was no rent payable or prepaid at year-end.
- Utilities expense of \$56,000 was incurred and paid in 2009.
- Salaries expense for the year was \$702,000. All \$702,000 was paid in 2009.
- The interest payable at January 1 was paid. During the year, an additional \$11,000 of interest was paid. At year-end no interest was payable.
- Income taxes for 2009 in the amount of \$19,700 were incurred and paid.

**Required:**

- Establish a ledger for the accounts listed above and enter the beginning balances. Use a chart of accounts to order the ledger accounts.
- Analyze each transaction. Journalize as appropriate. (Ignore the date since these events are aggregations of individual events.)
- Post your journal entries to the ledger accounts. Add additional ledger accounts when needed.
- Use the ending balances in the ledger accounts to prepare a trial balance.

## Problem Set B

### Problem 2-47B EVENTS AND TRANSACTIONS

### OBJECTIVE 3

The following list contains events that occurred during January 2009 at the local Ford dealer, Malcom Motors:

- California Central University (CCU) signed a contract to purchase a fleet of Ford Crown Victoria vehicles from Malcom Motors at a total price of \$200,000, payable to Malcom in two equal amounts—one on August 1, 2009, and one on September 1, 2009. The cars will be delivered to CCU during August 2009.
- The principal stockholder in Malcom Motors sold 10 percent of her stock in the company to John Lewis, the president of Malcom Motors, in exchange for \$100,000 in cash.
- Malcom Motors issued new stock to John Lewis in exchange for \$50,000 in cash.
- Malcom Motors owns the building it occupies; the company occupied the building during the entire month of January.
- Malcom Motors owns land used for the storage of cars awaiting sale; the land was used by the company during the entire month of January.
- Malcom Motors paid its lawyer \$1,000 for services rendered in connection with the purchase agreement signed with California Central University.
- Maintenance Management Company performed cleaning services for Malcom Motors during January under a contract that does not require payment for those services until March 1, 2009.

**Required:**

Indicate whether each item qualifies as a transaction and should be recorded in the accounting system. Explain your reasoning.

**OBJECTIVE** > **3** **7****Problem 2-48B ANALYZING TRANSACTIONS**

Several years ago, Mary Emerson founded Emerson Consulting, Inc., a consulting business specializing in financial planning for young professionals. The following captions and amounts summarize Emerson Consulting's balance sheet at December 31, 2008, the beginning of the current year:

Assets			=	Liabilities		+	Equity	
Cash	+ Receivable	+ Supplies		Accounts Payable	+ Notes Payable		Capital Stock	+ Retained Earnings
3,000	+ 6,600	+ 4,800	=	500	+ 1,000	+	10,000	+ 2,900

During January 2009, the following transactions occurred:

- a. Sold common stock to a new stockholder in exchange for \$2,000 cash
- b. Performed advisory services for a client for \$1,550 and received the full amount in cash
- c. Received \$750 on account from a client for whom services had been performed on credit
- d. Purchased supplies for \$650 on credit
- e. Paid \$500 on accounts payable
- f. Performed advisory services for \$2,700 on credit
- g. Paid cash of \$1,200 for secretarial services during January
- h. Paid cash of \$800 for January's office rent
- i. Paid rent for January 2009 in the amount of \$900
- j. Paid a dividend of \$400

**Required:**

1. Record the effects of the transactions listed above on the accounting equation for the business. Use the format given in the problem, starting with the totals at December 31, 2008.
2. Prepare the trial balance at January 31, 2009.

**OBJECTIVE** > **3** **4** **7****Problem 2-49B INFERRING TRANSACTIONS FROM T-ACCOUNTS**

The following T-accounts summarize the operations of Brilliant Minds, Inc., a tutoring service, for April 2009.

<table style="width: 100%; border-collapse: collapse;"> <thead> <tr><th colspan="4" style="text-align: center; border-bottom: 1px solid black;">Cash</th></tr> </thead> <tbody> <tr><td style="width: 25%;">4/1</td><td style="width: 25%;">500</td><td style="width: 25%;">700</td><td style="width: 25%;">4/8</td></tr> <tr><td>4/3</td><td>2,000</td><td>325</td><td>4/9</td></tr> <tr><td>4/18</td><td>1,500</td><td>140</td><td>4/11</td></tr> <tr><td>4/24</td><td>375</td><td>150</td><td>4/15</td></tr> </tbody> </table>	Cash				4/1	500	700	4/8	4/3	2,000	325	4/9	4/18	1,500	140	4/11	4/24	375	150	4/15	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr><th colspan="4" style="text-align: center; border-bottom: 1px solid black;">Accounts Receivable</th></tr> </thead> <tbody> <tr><td style="width: 25%;">4/1</td><td style="width: 25%;">700</td><td style="width: 25%;">375</td><td style="width: 25%;">4/24</td></tr> </tbody> </table>	Accounts Receivable				4/1	700	375	4/24	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr><th colspan="3" style="text-align: center; border-bottom: 1px solid black;">Supplies</th></tr> </thead> <tbody> <tr><td style="width: 33%;">4/1</td><td style="width: 33%;">900</td><td style="width: 33%;"></td></tr> <tr><td>4/15</td><td>150</td><td></td></tr> </tbody> </table>	Supplies			4/1	900		4/15	150	
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Equipment																																							
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Common Stock																																							
	2,000	4/1																																					
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**Required:**

1. Assuming that only one transaction occurred on each day (beginning on April 3) and that no dividends were paid, describe the transaction that most likely took place.
2. Prepare a trial balance at April 30, 2009.

**Problem 2-50B DEBIT AND CREDIT PROCEDURES**

OBJECTIVE &gt; 4

A list of accounts for Montgomery, Inc., appears below.

Accounts Payable  
 Accounts Receivable  
 Bonds Payable  
 Building  
 Cash  
 Common Stock  
 Cost of Goods Sold  
 Depreciation Expense  
 Income Taxes Payable  
 Insurance Expense  
 Intangibles  
 Interest Expense  
 Inventory  
 Long-Term Investments  
 Retained Earnings  
 Sales  
 Unearned Revenue  
 Utility Expense

**Required:**

Complete the table below for these accounts. The information for the first account has been entered as an example.

Account	Type of Account	Normal Balance	Increase	Decrease
Accounts Receivable	Asset	Debit	Debit	Credit

**Problem 2-51B JOURNALIZING TRANSACTIONS**

OBJECTIVE &gt; 5

Monilast Chemicals engaged in the following transactions during December 2009:

- Dec. 2 Prepaid rent on office furniture for six months, \$9,000  
 3 Borrowed \$25,000 on a nine-month, 12 percent note  
 7 Provided services on credit, \$35,000  
 10 Purchased supplies on credit, \$12,000  
 13 Collected accounts receivable, \$29,000  
 19 Sold common stock, \$40,000  
 22 Paid employee wages for December, \$8,000  
 23 Paid accounts payable, \$10,000  
 25 Provided services for cash, \$11,000  
 30 Paid utility bills for December, \$2,000

**Required:**

Prepare a journal entry for each transaction.

**Problem 2-52B JOURNALIZING AND POSTING TRANSACTIONS**

OBJECTIVE &gt; 5 6

Findlay Testing, Inc., provides water testing and maintenance services for owners of hot tubs and swimming pools. During September the following transactions occurred:

- Sept. 1 Purchased chemical supplies for \$1,750 cash  
 5 Paid office rent for September, October, and November; the rent is \$800 per month  
 8 Purchased \$710 of office supplies on account  
 13 Received \$600 from Simon Kenton in response to a bill sent in August for testing his hot tub water



- Sept. 18 Received \$7,500 from Alexander Blanchard upon completion of overhaul of his swimming pool water circulation system. Since the job was completed and collected for on the same day, no bill was sent to Blanchard.
- 25 Billed the city of Bellefontaine \$4,200 for testing the water in the city's outdoor pools during September
- 30 Recorded and paid September salaries of \$3,720

**Required:**

1. Prepare a journal entry for each transaction.
2. Post the journal entries to Findley Testing's ledger accounts.

**OBJECTIVE****Problem 2-53B THE ACCOUNTING CYCLE**

Sweetwater Temporary Clerical Help Service opened for business in June 2009. From the opening until the end of the year, Sweetwater engaged in the activities described below. So that a realistic trial balance can be prepared, the events described below are aggregations of many individual events.

- a. Sold 10,000 shares of common stock for \$3.50 per share
- b. Purchased office equipment from OfficeMax for \$14,200 cash
- c. Received \$121,800 from clients for services provided
- d. Paid wages of \$84,900
- e. Borrowed \$15,000 from the Bank of America on a three-year note payable
- f. Paid office rent of \$17,500
- g. Purchased office supplies on credit for \$1,300 from OfficeMax
- h. Paid \$1,000 toward the payable established in transaction *g*
- i. Paid telephone charges incurred during the year of \$910

**Required:**

1. Analyze the events for their effect on the accounting equation.
2. Prepare journal entries (ignore the date since these events are aggregations of individual events).
3. Post the journal entries to ledger accounts.
4. Prepare a trial balance.

**OBJECTIVE****Problem 2-54B COMPREHENSIVE PROBLEM**

Mulberry Services sells electronic data processing services to firms too small to own their own computing equipment. Mulberry had the following accounts and account balances as of January 1, 2009:

Accounts Payable	\$ 14,000
Accounts Receivable	130,000
Common Stock	114,000
Cash	6,000
Interest Payable	8,000
Long-Term Notes Payable	80,000
Prepaid Rent, Computing Equipment (Short-Term)	96,000
Retained Earnings, 12/31/2008	16,000

During 2009, the following transactions occurred (the events described below are aggregations of many individual events):

- a. During 2009, Mulberry sold \$690,000 of computing services, all on credit.
- b. Mulberry collected \$570,000 from the credit sales in transaction *a* and an additional \$129,000 from the accounts receivable outstanding at the beginning of the year.
- c. Mulberry paid the interest payable of \$8,000.
- d. Wages of \$379,000 were paid in cash.
- e. Administrative expenses of \$90,000 were incurred and paid.
- f. The prepaid rent at the beginning of the year was used in 2009. In addition, \$28,000 of computer rental costs were incurred and paid. There is no prepaid rent or rent payable at year-end.

- g. Mulberry purchased computer paper for \$13,000 cash in late December.
- h. None of the paper was used by year-end.
- i. Advertising expense of \$26,000 was incurred and paid.
- j. Income tax of \$10,300 was incurred and paid in 2009.
- k. \$10,000 of interest was paid on the long-term loan.

**Required:**

1. Establish a ledger for the accounts listed above and enter the beginning balances. Use a chart of accounts to order the ledger accounts.
2. Analyze each transaction. Journalize as appropriate. (Ignore the date since these events are aggregations of individual events.)
3. Post your journal entries to the ledger accounts. Add additional ledger accounts when needed.
4. Use the ending balances in the ledger accounts to prepare a trial balance.

**Cases****Case 2-55 ANALYSIS OF THE ACCOUNTING CYCLE**

Susan Eel wants to sell you her wholesale fish store. She shows you a balance sheet with total assets of \$150,000 and total liabilities of \$20,000. According to the income statement, last year's net income was \$40,000.

When examining the accounting records, you notice that several accounts receivable in the \$10,000 to \$15,000 range are not supported by source documents. You also notice that there is no source documentation to support the \$30,000 balance in the building account and the \$10,000 balance in the equipment account. Susan tells you that she gave the building and refrigeration equipment to the business in exchange for stock. She also says that she has not had time to set up and monitor any paperwork for accounts receivable or accounts payable.

**Required:**

1. What requirements for transaction recognition appear to have been ignored when the accounts receivable, building, and equipment were recorded?
2. What would be the effect on the financial statements if the values appearing in the balance sheet for accounts receivable, building, and equipment were overstated? What would be the effect if the accounts payable were understated?
3. Assuming that you would like to purchase the company, what would you do to establish a reasonable purchase price?

**Case 2-56 ANALYSIS OF THE EFFECTS OF CURRENT ASSET AND CURRENT LIABILITY CHANGES ON CASH FLOWS**

You have the following data for Cable Company's accounts receivable and accounts payable for 2009:

Accounts receivable, 1/1/2009	\$ 5,900
2009 sales on credit	97,400
Accounts receivable, 12/31/2009	7,200
Wages payable, 1/1/2009	4,600
2009 wage expense	38,100
Wages payable, 12/31/2009	5,300

**Required:**

1. How much cash did Cable collect from customers during 2009?
2. How would you classify cash collected from customers on the statement of cash flows?
3. How much cash did Cable pay for wages during 2009?
4. How would you classify the cash paid for wages on the statement of cash flows?

**Case 2-57 ETHICAL ISSUES**

Kathryn Goldsmith is the chief accountant for Clean Sweep, a national carpet-cleaning service with a December fiscal year-end. As Kathryn was preparing the 2009 financial statements for Clean Sweep, she noticed several odd transactions in the general ledger for December. For example, rent for January 2010, which was paid in December 2009, was recorded by debiting rent expense instead of prepaid rent. In another transaction, Kathryn noticed that the use of supplies was recorded with a debit to insurance expense instead of supplies expense. Upon further investigation, Kathryn discovered that the December ledger contained numerous such mistakes. Even with the mistakes, the trial balance still balanced.

Kathryn traced all of the mistakes back to a recently hired bookkeeper, Ben Goldsmith, Kathryn's son. Kathryn had hired Ben to help out in the accounting department over Christmas break so that he could earn some extra money for school. After discussing the situation with Ben, Kathryn determined that Ben's mistakes were all unintentional.

**Required:**

1. What ethical issues are involved?
2. What are Kathryn's alternatives? Which would be the most ethical alternative to choose?

**Case 2-58 RESEARCH AND ANALYSIS USING THE ANNUAL REPORT**

Obtain General Electric's 2008 annual report either through the "Investor Relations" portion of its Web site (do a web search for GE investor relations) or go to <http://www.sec.gov> and click "Search for company filings" under "Filings and Forms (EDGAR)."

**Required:**

Answer the following questions:

1. Determine the amounts in the accounting equation for the most recent year. Does it balance?
2. What is the normal balance for the following accounts?
  - a. Current Receivables
  - b. Short-Term Borrowings
  - c. Sales of Services
  - d. Property, Plant, and Equipment—Net
  - e. Cost of Goods Sold
  - f. Inventories
  - g. Provision for Income Taxes
3. Identify the additional account that is most likely involved when:
  - a. Accounts Payable is decreased.
  - b. Accounts Receivables is increased.
  - c. Common Stock is increased.
  - d. Short-Term Borrowings is increased.

**Case 2-59 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

Answer the following questions:

1. Determine the amounts in the accounting equation for the year ending February 3, 2007 for each company. Does the accounting equation balance?
2. Set up a T-account for Abercrombie & Fitch's accounts receivable account and include the beginning and ending balances. Complete the T-account to reflect the sales and cash collections for the year. Assume all sales are on account.
3. Provide the journal entry to record the following two events and post the amount to the T-account. For simplicity, assume the event was recorded in a single journal entry.
  - a. What journal entry is necessary to record Abercrombie & Fitch's net sales for the year ending February 3, 2007? Assume that all sales were made on account.

- b. What journal entry is necessary to record Abercrombie & Fitch's cash collections from customers during the year ending February 3, 2007?
4. Where does Abercrombie & Fitch and Aeropostale report credit card receivables? (Hint: You may want to refer to the Summary of Significant Accounting Policies in the Notes to the Financial Statements.)
5. Provide the journal entry to record the amount of selling, general, and administrative expenses incurred during the year ending February 3, 2007 (fiscal 2006). Assume all expenses incurred during the year were paid during the year. Why are Aeropostale's selling, general, and administrative expenses smaller than Abercrombie & Fitch's selling, general, and administrative expenses?

**Case 2-60 ACCOUNTING FOR PARTIALLY COMPLETED EVENTS:  
A PRELUDE TO CHAPTER 3**

Ehrlich Smith, the owner of The Shoe Box, has asked you to help him understand the proper way to account for certain accounting items as he prepares his 2009 financial statements. Smith has provided the following information and observations:

- a. A three-year fire insurance policy was purchased on May 1, 2009, for \$1,800. Smith believes that a part of the cost of the insurance policy should be allocated to each period that benefits from its coverage.
- b. The store building was purchased for \$60,000 in January 2001. Smith expected then (as he does now) that the building will be serviceable as a shoe store for 20 years from the date of purchase. In 2001, Smith estimated that he could sell the property for \$6,000 at the end of its serviceable life. He feels that each period should bear some portion of the cost of this long-lived asset that is slowly being consumed.
- c. The Shoe Box borrowed \$20,000 on a one-year, 11 percent note that is due on September 1 next year. Smith notes that \$22,200 cash will be required to repay the note at maturity. The \$2,200 difference is, he feels, a cost of using the loaned funds and should be spread over the periods that benefit from the use of the loan funds.

**Required:**

1. Explain what Smith is trying to accomplish with the three preceding items. Are his objectives supported by the concepts that underlie accounting?
2. Describe how each of the three items should be reflected in the 2009 income statement and the December 31, 2009 balance sheet to accomplish Smith's objectives.

# 3

## Accrual Accounting

After studying Chapter 3, you should be able to:

- ▶ **1** Explain the difference between cash-basis and accrual-basis accounting.
- ▶ **2** Explain how the time-period assumption, revenue recognition, and matching principles affect the determination of income.
- ▶ **3** Identify the kinds of transactions that may require adjustments at the end of an accounting period.
- ▶ **4** Prepare adjusting entries for accruals and deferrals.
- ▶ **5** Prepare financial statements from an adjusted trial balance.
- ▶ **6** Explain why and how companies prepare closing entries.
- ▶ **7** Understand the steps in the accounting cycle.
- ▶ **8** (Appendix 3A) Understand how to use a worksheet to prepare financial statements.



# E xperience Financial Accounting with FedEx

**FedEx Corporation** began operations in 1973 with 14 jets that connected 25 U.S. cities. Some employees even used their own cars to deliver packages! As a pioneer of the hub and spoke model for overnight package delivery, FedEx is now the world's largest express transportation company with operations in over 220 countries. During this time, FedEx claims many industry "firsts"—including being the first to offer next-day delivery by 10:30 a.m. and the first to offer Saturday delivery. With more than 143,000 employees, 669 aircraft, and 53,000

vehicles and trailers,<sup>1</sup> FedEx has the ability to "absolutely, positively" get a package delivered overnight.

While companies conduct business throughout the year, the accounting for business activities does not stop at the end of the year. The end of the fiscal year, or accounting period, is a busy time as companies make adjustments to the accounting information. These adjustments are necessary because a company's business activities often occur over several accounting periods. These adjustments are often quite significant. In its 2007 annual report as shown in

## Exhibit 3-1

### Excerpt from FedEx's Financial Statements

**FedEx Corporation**  
**Consolidated Income Statement (partial)**  
**For the Year Ended May 31, 2007**

(in millions)

Revenues	\$ 35,214
Operating expenses	(31,938)
Other income (expense)	(61)
Income before income taxes	\$ 3,215
Income taxes	(1,199)
Net income	<u>\$ 2,016</u>

**Sample of expenses resulting from adjustment:**

Salaries and compensated absences	\$ 755
Employee benefits	599
Insurance	548
Taxes other than income taxes	310
Depreciation and amortization	1,742
Other	561
Total (14% of Operating expenses)	<u>\$4,515</u>

<sup>1</sup> Information obtained from FedEx's 2007 Annual Report.

Exhibit 3-1, FedEx's financial statements include many expenses that would not have been recognized without adjustments.

This sample of expenses, which doesn't include all the adjustments made, represents over 14 percent of the total expenses that FedEx reported on its 2007 income statement. When FedEx recognized these expenses

(except for depreciation and amortization), it also recorded a liability for them. These liabilities represented 51% of FedEx's current liabilities. The adjustment to recognize depreciation and amortization expense resulted in a decrease in assets of \$1.742 million. Clearly, the failure to adjust for these expenses would significantly affect FedEx's financial statements.

### OBJECTIVE 1

Explain the difference between cash-basis and accrual-basis accounting.

## Completing the Accounting Cycle

In the previous chapter, we examined how companies use the double-entry accounting system to record business activities that occur during the accounting period. However, accountants also make numerous adjustments at the end of accounting periods for business activities that occur over several accounting periods—activities like the performance of services for customers, the renting of office space, and the use of equipment. As shown in the opening scenario of this chapter, these adjustments can be significant.

Why are so many business activities recognized in the accounts through adjustments rather than through the normal journal entries recorded within the accounting period that we described in Chapter 2? The illustrations used in Chapter 2 excluded activities that were still underway at the end of the accounting period. Accrual accounting requires that any incomplete activities be recognized in the financial statements. This often requires estimates and judgments about the timing of revenue and expense recognition. The end result is that accountants must adjust the accounts to properly reflect these partially-completed business activities.

In this chapter, we will review the concepts that form the basis for adjustments—the time-period assumption, the revenue recognition principle, and the matching principle. We will then complete the accounting cycle that was introduced in Chapter 2 by exploring the preparation and effects of adjusting journal entries, preparing financial statements from the adjusted accounts, and closing the accounts in order to prepare for the next accounting period. We will address the following questions:

- What is the difference between the cash basis and the accrual basis of accounting?
- What is the purpose of adjusting entries?
- What types of transactions require adjustment and how are the adjustments recorded in the accounting system?
- Which accounts are closed at the end of the period and why is this necessary?

The recognition of business activities in financial accounting uses the accrual basis of accounting. In the following section, we will examine the differences between accrual-basis and cash-basis accounting. In addition, we will look at the three key concepts—the time-period assumption, the revenue recognition principle, and the matching principle—that underlie the accrual basis of accounting.

### Accrual Versus Cash Basis of Accounting

If you were asked how much your income for the month was, what would you do? Most likely, you would go online and look at your bank activity for the month. You would then list the total of the deposits as revenue and the total of the withdrawals as expenses. The difference would be your income. This method of accounting is

called **cash-basis accounting**. Under cash-basis accounting, revenue is recorded when cash is received, regardless of when it is actually earned. Similarly, an expense is recorded when cash is paid, regardless of when it is actually incurred. Therefore, cash-basis accounting does not tie recognition of revenues and expenses to the actual business activity but rather the exchange of cash. In addition, by recording only the cash effect of transactions, cash-basis financial statements may not reflect all of the assets and liabilities of a company at a particular date. For this reason, most companies, except for the smallest, do not use cash-basis accounting.

**Accrual-basis accounting** (also called accrual accounting) is an alternative to cash-basis accounting that is required by generally accepted accounting principles. Under accrual accounting, transactions are recorded when they occur. Accrual accounting is superior to cash-basis because it ties income measurement to selling, the principle activity of the company. That is, revenue is recognized as it is earned and expenses are recognized when they are incurred. In contrast to cash-basis accounting, accrual accounting is a more complex system that records both *cash and noncash* transactions.

## Key Elements of Accrual Accounting

As shown in Exhibit 3-2, an accrual accounting system rests on three elements of the conceptual framework that were introduced in Chapter 2—the time-period assumption, the revenue recognition principle, and the matching principle.

### OBJECTIVE > 2

Explain how the time-period assumption, revenue recognition, and matching principles affect the determination of income.

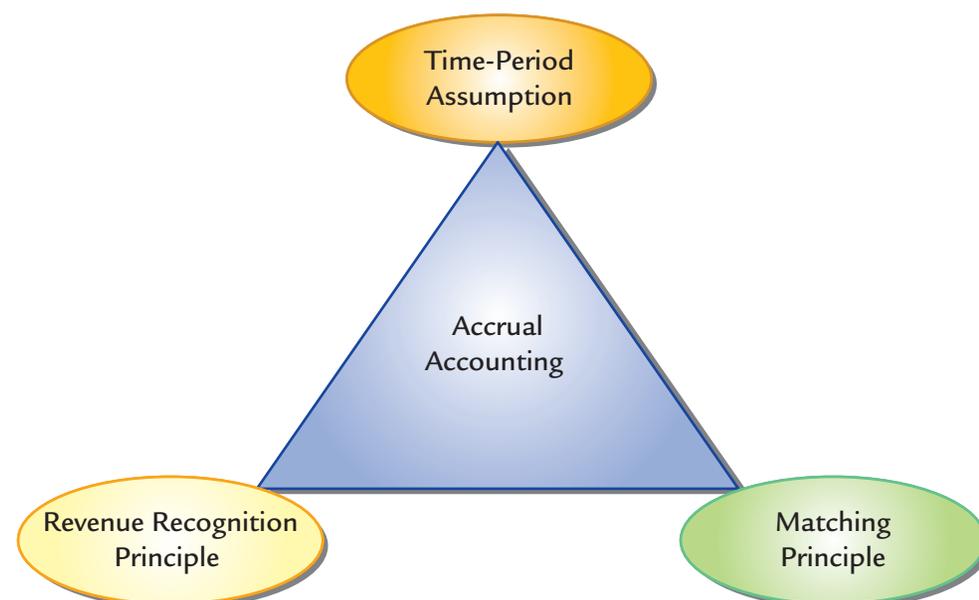
### Time-Period Assumption

Investors, creditors and other financial statement users demand timely information from companies. For that reason, it is necessary for companies to report their financial results for specific periods of time—a month, a quarter, or a year. The **time-period assumption** allows companies to artificially divide their operations into time periods so that they can satisfy users' demands for information.

If all transactions occurred at a single point in time, the creation of financial reports for specific time periods would not be a problem. However, companies

Exhibit 3-2

### Key Elements of Accrual Accounting



frequently engage in activities that continue for some period of time and affect more than one time period. For example, the aircraft and vehicles used by FedEx are purchased at a single point in time but are used over many years. In addition, FedEx often receives cash from a company to deliver products in one time period, although the actual delivery does not occur until a different time period. To properly record the use of these aircraft and the providing of its service, accrual accounting requires that FedEx assign the revenue and expenses to the proper time period. This is quite often a difficult task and is guided by the revenue recognition and matching principles.

## The Revenue Recognition Principle

The **revenue recognition principle** is used to determine when revenue is recorded and reported. Under this principle, revenue is to be recognized or recorded in the period in which both of the following conditions are met:

- The revenue has been earned
- The collection of cash is reasonably assured.

These requirements are usually met when goods have been delivered to a customer or when services have been performed for a customer. At this point, the risks and rewards of ownership usually have been transferred from the seller to the buyer.<sup>2</sup>

**Notice that revenue is recorded when these two conditions are met, regardless of when cash is received.**

To illustrate revenue recognition, assume that on March 31, FedEx picks up a computer from **Apple's** distribution center and receives a cash payment of \$30 to ship the computer to a customer. FedEx delivers the computer on April 2. Even though cash was received on March 31, FedEx will recognize the \$30 of revenue on April 2, the date the computer is delivered to the customer. Notice that revenue is not recognized until it is earned by FedEx (delivery of the computer), and that the receipt of cash prior to the delivery does not affect when revenue is recognized. Exhibit 3-3 shows an excerpt of FedEx's revenue recognition policy that is disclosed in the notes to its financial statements.

## The Matching Principle

Companies incur expenses for a variety of reasons. Sometimes expenses are incurred when an asset is used. In other instances, expenses are incurred when a liability is created. For example, FedEx incurs fuel expense as it uses fuel to deliver its packages. FedEx also incurs salary expense when its employees work but are not paid immediately. The key idea is that **an expense is recorded when it is incurred, regardless of when cash is paid.**

Expense recognition is the process of identifying an expense with a particular time period. Under accrual accounting, expenses are recognized following the

### Exhibit 3-3

#### Annual Report Excerpt: FedEx's Revenue Recognition Policy

##### Note 1: Summary of Significant Accounting Policies (in part)

**REVENUE RECOGNITION.** We recognize revenue upon delivery of shipments for our transportation businesses and upon completion of services for our business services, logistics and trade services businesses. For shipments in transit, revenue is recorded based on the percentage of service completed at the balance sheet date.

<sup>2</sup>The Securities and Exchange Commission expanded upon this principle and stated that the revenue recognition criteria are normally met when (1) delivery has occurred or services have been rendered, (2) persuasive evidence of an arrangement exists, (3) the selling price is fixed or determinable, and (4) the collection of cash is reasonably assured.

**matching principle**, which requires that expenses be recorded and reported in the same period as the revenue that it helped to generate. Expenses for an accounting period should *include* only those costs used to earn revenue that was recognized in the accounting period. Expenses for an accounting period should *exclude* those costs used to earn revenue in an earlier period and those costs that will be used to earn revenue in a later period. Thus, the key to expense recognition is matching the expense with revenue.

**ETHICS** The revenue recognition and matching principles can and have been abused in recent years. As companies strive to meet or exceed Wall Street expectations, management may be tempted to recognize revenue that has not yet been earned or to hide expenses that should be recognized. In recent years, the Securities and Exchange Commission (SEC) has conducted numerous investigations involving the abuse of both revenue and expense recognition. Some notable cases are listed in Exhibit 3-4.

### Exhibit 3-4

#### Instances of Accounting Abuses

Company	Action
<b>Regina Vacuum</b>	Backdated sales invoices, improperly recorded revenue on consignment sales that had not been earned, and hid unpaid bills in a filing cabinet to reduce expenses. Chairman, CEO, and president Donald Sheelen pleaded guilty to fraud, fined \$25,000, and sentenced to one year in a work release program in Florida.
<b>Miniscribe</b>	Improperly recognized revenue through a variety of means, including packaging and shipping bricks as finished products. Chief executive Q.T. Wiles fined \$250 million.
<b>Sunbeam</b>	Used a variety of techniques to improperly recognize revenue (e.g., bill and hold transactions, channel stuffing). CEO Al Dunlap fined \$500,000 and barred from ever serving as an officer or director of a public company.
<b>WorldCom</b>	Improperly reduced operating expenses, which inflated income, by reversing (releasing) accrued liabilities and improperly classifying certain expenses as assets. Chief executive Bernie Ebbers was sentenced to 25 years in jail.

While the above actions were fraudulent and led to severe fines or jail time for many of the company executives, other innocent parties were also affected by these unethical actions. Stockholders, many of whom had bought the stock at an inflated price, saw a significant drop in the stock's value after these actions were made public. In addition, innocent employees lost their jobs as the companies struggled to deal with the fraud that occurred. When faced with an ethical dilemma to manipulate the recognition of revenue or expense, make the decision that best portrays the economic reality of your company. It will be a decision that will let you sleep at night. ♦

### Applying the Principles

If you want to use the financial statements, it is important for you to understand how the revenue recognition and matching principles affect the amounts reported on the financial statements. To illustrate the effect of these principles, **Cornerstone 3-1** compares how the application of these principles results in accrual-basis income that differs from cash-basis income.

Notice that accrual accounting follows the revenue recognition and matching principles. That is, revenue is recognized when it is earned and expenses are matched with

### CONCEPT Q&A

Cash-basis accounting seems straightforward. Why do we complicate matters by introducing accrual accounting?

The fundamental objective of financial reporting is to provide information that is useful in making business and economic decisions. Most of these decisions involve predicting a company's future cash flows. The use of accrual accounting through the application of the revenue recognition and matching principles ties income recognition to the principal activity of the company, selling goods and services. Therefore, accrual accounting provides a better estimate of future cash flows than cash-basis accounting.

Possible Answer:



## CORNERSTONE 3-1



### HOW TO Apply the Revenue Recognition and Matching Principles

#### Concept:

Under accrual accounting, revenue is recognized when it is earned and the collection of cash is reasonably assured. Expenses are recognized in the same period as the revenue they helped generate.

#### Information:

The state of Georgia hired Conservation Inc., a consulting company specializing in the conservation of natural resources, to explore the state's options for providing water resources to the Atlanta metropolitan area. In November 2009, Conservation Inc. incurred \$60,000 of expenditures, on account, investigating the water shortage facing the state. Conservation Inc. also delivered its recommendations to the state and billed the state \$100,000 for its work. In December 2009, Conservation Inc. paid the \$60,000 of expenses. In January 2010, Conservation Inc. received the state's check for \$100,000.

#### Required:

1. Calculate income for November 2009, December 2009, and January 2010 using the cash-basis of accounting.
2. Calculate income for November 2009, December 2009, and January 2010 using the accrual-basis of accounting.

#### Solution:

1. Cash-basis income is computed as follows:

November 2009		December 2009		January 2010	
Revenue	\$0	Revenue	\$ 0	Revenue	\$100,000
Expense	<u>0</u>	Expense	<u>60,000</u>	Expense	<u>0</u>
Net Income	<u>\$0</u>	Net Income	<u>\$(60,000)</u>	Net Income	<u>\$100,000</u>

➔ Performed Service ➔ Paid Expenses ➔ Received Payment

2. Accrual-basis income is computed as follows:

November 2009		December 2009		January 2010	
Revenue	\$100,000	Revenue	\$0	Revenue	\$0
Expense	<u>60,000</u>	Expense	<u>0</u>	Expense	<u>0</u>
Net Income	<u>\$ 40,000</u>	Net Income	<u>\$0</u>	Net Income	<u>\$0</u>

➔ Performed Service ➔ Paid Expenses ➔ Received Payment

revenues. Even though Conservation Inc. did not receive the payment from the state of Georgia until January 2010, Conservation Inc. had performed services in November 2009 and appropriately recognized the revenue as the service was performed. The \$60,000 of expenses were matched with revenues and also recognized in November 2009. If cash-basis accounting would have been used, the expenses, \$60,000, would have been recognized in December 2009 (when the cash was paid), and revenue, \$100,000, would have been recognized in January 2010 (when the cash was received). By following the revenue recognition and matching principles, net income was properly recognized in the period that the business activity occurred. In short, the difference between cash-basis and accrual-basis accounting is a matter of timing.

## DECISION-MAKING & ANALYSIS

### Recognition of a Security Service Contract

Secure Entry Inc., a security company, has a two-year contract with the Metropolis Stadium Authority to provide security services at its stadium gates. The contract was signed in April 2008 and is effective for calendar years 2009 and 2010. Under the terms of the contract, Metropolis Stadium Authority agrees to make 24 equal monthly payments to Secure Entry beginning in October 2008. Security services will begin to be performed in January 2009.

**1.** *When would Secure Entry Inc. record the contract?*

Secure Entry would record the contract in October 2008, when Metropolis makes the first payment. At that time, Secure Entry would record an increase in cash for the amount of the payment received and an equal increase in a liability (Unearned Revenue) to recognize that future services are owed. Note that Secure Entry would not record the contract in its accounting system in April 2008 because the event does not meet the recognition criteria discussed in Chapter 2.

**2.** *When would Secure Entry recognize revenue related to the contract?*

Consistent with the revenue recognition principle, Secure Entry would begin recognizing revenue related to the contract in 2009, when services are performed.

**3.** *When would Secure Entry recognize the salary expense related to the security services provided at Metropolis Stadiums?*

According to the matching principle, expenses related to the performance of security services should be matched against revenue from providing the security services. Because the revenue will be recognized monthly beginning in January 2009, the matching principle requires that the salary expense related to providing security services be recognized monthly beginning in 2009, as the security services are performed.

## Accrual Accounting and Adjusting Entries

A company accounts for its activities using accrual accounting in order to produce financial statements that include the effects of the activities when they occur, regardless of when cash was received or paid. Accrual accounting requires that revenues be recognized when earned and expenses be recognized when incurred. In this section, we will examine the adjustments required to implement accrual accounting.

### OBJECTIVE 3

Identify the kinds of transactions that may require adjustments at the end of an accounting period.

### Which Transactions Require Adjustment?

If all accounting transactions occurred at a point in time, the application of accrual accounting would, like cash-basis accounting, be relatively straightforward. However, many activities continue for some period of time. Obvious examples include the use of rented facilities or interest on borrowed money.<sup>3</sup> Because entries in the accounting system are made at particular points in time rather than continuously, adjustments are needed at the end of an accounting period to record these partially complete activities. **Adjusting entries** are journal entries made at the end of an accounting period to record the completed portion of these partially completed transactions. Adjusting entries are necessary to apply the revenue recognition and matching principles and ensure that a company's financial statements include the proper amount for revenues, expenses, assets, liabilities, and stockholders' equity.

<sup>3</sup>The distinction between business activities requiring adjustment and those that do not depends to some extent on our ability and willingness to keep track of activities. Some activities may occur so frequently or are so difficult to measure individually that no record of individual activities is maintained. In such cases, the sequence of individual activities becomes, for all intents and purposes, a continuous activity. For example, the use of office supplies is often treated as a continuous business activity because it is too costly to maintain a record of each time supplies are used.

In **Cornerstone 3-2**, three representative transactions are described and the implications of the “length” of these transactions for recognition in the accounting system and for adjustment is discussed.



## CORNERSTONE 3-2



### HOW TO Determine Which Transactions Require Adjustment

**Concept:**

Adjusting journal entries are required for continuous transactions that are partially complete at the end of an accounting period.

**Information:**

Computer Town sells computer equipment as well as providing computer repair service. Sales are typically made in cash or on account. Repair service is provided under service contracts. Customers purchase a service contract for a specified period of time (two, three, or five years) and pay for this contract upfront. The customer pays nothing when the computer is brought in for repair.

**Required:**

1. How should Computer Town account for cash and credit sales of equipment?
2. How should Computer Town account for repair services provided under service contracts?
3. How should Computer Town account for the use of office supplies?

**Solution:**

1. Cash sales should be recorded as they occur and the equipment is delivered, often at a cash register that tracks total sales for the day. When orders are received from customers who want to purchase equipment on credit, the sale should be recorded when the equipment is delivered to the customer. In both situations, the sale is complete at a single point in time (the delivery of the equipment) and no adjusting entry is needed.
2. In contrast to both cash and credit sales of equipment, repair service contracts are continuous activities. At the end of the accounting period, a portion of the revenue associated with incomplete service contracts should be recognized as an adjustment. Revenue is earned as time passes under the service contract and should be recorded in proportion to the period of time that has passed since the contract became effective. The unexpired portion of the service contract should be recorded as a liability (unearned revenue) until earned. Any expenses associated with the repair services should be recognized as the repair service revenue is recognized (the matching principle).
3. The use of supplies can be viewed as a sequence of individual activities. However, the preparation of documents required to keep track of each activity individually would be too costly. Instead the use of supplies will be treated as a continuous transaction and recognized through an adjusting entry. Any supplies used will be reported as an expense while the unused portion of supplies is reported as an asset.

Notice that in the second and third situations, the continuous activities cannot be properly recorded by the normal journal entries made within the accounting period as described in Chapter 2. For these continuous transactions, the preparation of adjusting entries is necessary to get the account balances properly stated and up-to-date. These end-of-period adjustments can have significant effects on a company's financial statements, as we illustrated for FedEx at the beginning of this chapter.

## Step 5: Adjusting the Accounts

Under accrual accounting, revenue is recognized when it is earned and the collection of cash is reasonably assured. Expenses are recognized in the same period as the revenue they helped generate. Adjustments are often necessary because timing differences exist between when a revenue or expense is recognized and cash is received or paid. These timing differences give rise to two categories of adjusting entries—accruals and deferrals. As shown in Exhibit 3-5, each category has two subcategories, which gives rise to four possible types of adjustments.

The purpose of all adjustments is to make sure that revenues and expenses get recorded in the proper time period. As the revenue and expense balances are adjusted, asset and liability balances will be adjusted also. Therefore, **all adjusting entries will affect at least one income statement account and one balance sheet account. Note that cash is never affected by adjustments.**

### OBJECTIVE 4

Prepare adjusting entries for accruals and deferrals.



Exhibit 3-5

### Types of Adjusting Entries

#### Accruals:

1. **Accrued revenues:** Previously unrecorded revenues that have been earned but for which no cash has yet been received
2. **Accrued expenses:** Previously unrecorded expenses that have been incurred but not yet paid in cash

#### Deferrals:

1. **Deferred (unearned) revenues:** Liability arising from the receipt of cash for which revenue has not yet been earned
2. **Deferred (prepaid) expenses:** Asset arising from the payment of cash which has not been used or consumed by the end of the period

To assist you in making adjusting journal entries, a three-step procedure can be followed.

Step 1: Identify pairs of income statement and balance sheet accounts that require adjustment.

Step 2: Calculate the amount of the adjustment based on the amount of revenue that was earned or the amount of expense that was incurred during the accounting period.

Step 3: Record the adjusting journal entry.

Cornerstones 3-3 through 3-6, shown in the following sections, explain how to make each of the four types of adjustments that are necessary at the end of an accounting period.

### Accrued Revenues

It is common for a company to engage in revenue-producing activities, yet not be paid until after the activity is complete. For example, FedEx recognizes revenue when it delivers a package, even though the customer may not be billed and will not pay for the service until later. In addition, some packages are in transit at the end of an accounting period, meaning that FedEx has only partially completed its service. These transactions for which FedEx has earned revenue but not received the cash are called **accrued revenues**. Other examples of accrued revenues include interest earned, but not yet received, on a loan that is made. While interest is earned as time passes, the company only

### CONCEPT Q&A

Why don't adjusting entries involve cash?

Cash receipts and cash payments occur at a specific point in time and are recorded through normal, within-period journal entries. Adjusting entries, on the other hand, record partially completed transactions. Adjusting entries are concerned with applying the revenue recognition and matching principles to these continuous activities. Because revenue and expense recognition does not depend on cash receipt or cash payment, adjusting entries for continuous revenue and expense activities will not involve cash.

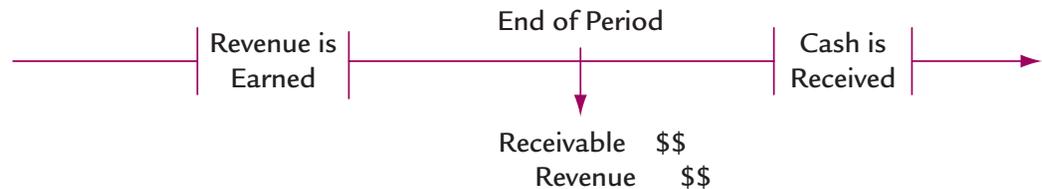
Possible Answer:

receives the cash related to interest periodically (e.g., monthly, semiannually, or annually). Therefore, an adjustment is necessary to record the amount of interest earned but not yet received.

For accrued revenues, an adjustment is necessary to record the revenue and the associated increase in a company's assets, usually an account receivable. Exhibit 3-6 demonstrates the process necessary to record accrued revenues. Note that the accrual of revenue is necessary because the revenue was earned prior to the receipt of cash.

### Exhibit 3-6

#### Accrued Revenues



The adjusting entry required to record accrued revenues is shown in **Cornerstone 3-3**.



### CORNERSTONE 3-3



#### HOW TO Record Accrued Revenues

##### Concept:

Revenue is recognized when it is earned, regardless of when cash is received. The adjusting entry for an accrued revenue will result in an increase to a revenue account and an increase to an asset account.

##### Information:

Assume that Porter Properties, Inc., a calendar-year company, rented office space to the Tiger Travel Agency on November 1, 2009, for \$5,000 per month to be occupied immediately. Porter Properties requires Tiger Travel to make a rental payment at the end of every three months. No payment was made on November 1.

##### Required:

1. Prepare the adjusting journal entry necessary on December 31, 2009, for Porter Properties.
2. Prepare the entry necessary on January 31, 2010, to record the receipt of cash.

##### Solution:

1. At the end of the accounting period, Porter Properties will perform the following three steps to prepare the adjusting entry:

**Step 1: Identify the accounts that require adjustment.** Rent Revenue needs to be increased because Porter Properties has earned revenue from providing the office space. The revenue recognition principle requires revenue to be recognized when it is earned, regardless of when cash is collected. Because no payment was received, Porter Properties would need to increase Rent Receivable to reflect their right to receive payment from Tiger Travel.

**Step 2: Calculate the amount of the adjustment.** The amount of the adjustment would be \$10,000, calculated as \$5,000 per month times the two months that the office space was occupied by Tiger Travel.

**Step 3: Record the adjusting journal entry.** The adjusting journal entry at December 31, 2009, would be:

**CORNERSTONE**  
**3-3**  
*(continued)*

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Rent Receivable	10,000	
	Rent Revenue		10,000
	<i>(To record rent revenue earned in 2009 but not received)</i>		

Assets = Liabilities + Stockholders' Equity	
+10,000	+10,000

2. When the cash is received, Porter Properties will make the following entry:

Date	Account and Explanation	Debit	Credit
Jan. 31, 2010	Cash	15,000	
	Rent Revenue		5,000
	Rent Receivable		10,000
	<i>(To record revenue earned in 2010 and the receipt of cash)</i>		

Assets = Liabilities + Stockholders' Equity	
+15,000	+5,000
-10,000	

The amount of cash received, \$15,000, is calculated as \$5,000 per month times the three months that the office space was rented. The \$5,000 of Rent Revenue represents the one month earned in 2010.

If the adjusting entry on December 31, 2009, was not made, assets, stockholders' equity, revenues, and income would be understated. The adjusting journal entry recognizes two months of revenue (November and December 2009) in the accounting period in which it was earned and updates the corresponding balance in rent receivable. The revenue has been earned because Porter Properties has provided a service to Tiger Travel. Later, when cash is received, the remaining portion of the revenue that was earned in January 2010 is recognized and the receivable is reduced to reflect that it was paid. Consistent with the revenue recognition principle, revenue is recorded in the period that it is earned.

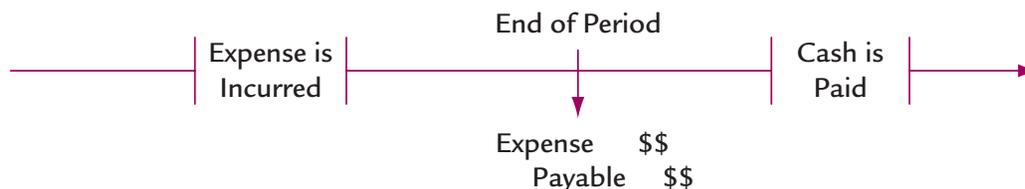
### Accrued Expenses

Similar to the situation with accrued revenues, many companies will incur expenses in the current accounting period but not pay cash for these expenses until a later period. For example, in Exhibit 3-1, we showed you that FedEx reported \$283 million of salary expense related to services performed by FedEx employees but not paid as of the end of the year. This situation is quite common for several operating costs such as payroll, taxes, utilities, rent, and interest. **Accrued expenses** are previously unrecorded expenses that have been incurred but not yet paid in cash.

For accrued expenses, an adjustment is necessary to record the expense and the associated increase in a company's liabilities, usually a payable. Exhibit 3-7 demonstrates the process necessary to record accrued expenses.

**Exhibit 3-7**

#### Accrued Expenses



Note that the accrual of the expense is necessary because the expense was incurred prior to the payment of cash. The adjusting entry required to record accrued expenses is shown in **Cornerstone 3-4**.



## CORNERSTONE 3-4



### HOW TO Record Accrued Expenses

#### Concept:

Expenses are recorded as they are incurred, regardless of when cash is paid. The adjusting entry for an accrued expense will result in an increase to an expense account and an increase to a liability account.

#### Information:

Assume that Porter Properties, Inc., a calendar-year company, paid its clerical employees every two weeks. Employees work five days a week for a total of 10 work days every two weeks. Also assume that December 31 is four days into a 10-day pay period for which these employees will collectively earn \$50,000 every two weeks.

#### Required:

1. Prepare the adjusting journal entry necessary on December 31, 2009, for Porter Properties.
2. Prepare the entry necessary on January 10, 2010, to record the payment of salaries.

#### Solution:

1. At the end of the accounting period, Porter Properties will perform the following three steps to prepare the adjusting entry:

**Step 1: Identify the accounts that require adjustment.** Salaries Expense needs to be increased because Porter Properties has incurred an expense related to its employees working for four days in December that needs to be matched against December revenues (an application of the matching principle). Because no payment to the employees was made, Porter Properties would need to increase Salaries Payable to reflect its obligation to pay its employees.

**Step 2: Calculate the amount of the adjustment.** The amount of the adjustment would be \$20,000, calculated as 4/10 of the \$50,000 bi-weekly salaries.

**Step 3: Record the adjusting entry.** The adjusting journal entry at December 31, 2009, would be:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Salaries Expense	20,000	
	Salaries Payable		20,000
	<i>(To record expenses incurred not paid)</i>		

2. When the cash is paid, Porter Properties will make the following entry:

Date	Account and Explanation	Debit	Credit
Jan 10, 2010	Salaries Expense	30,000	
	Salaries Payable	20,000	
	Cash		50,000
	<i>(To record expense incurred in 2010 and the payment of cash)</i>		

The amount of the salaries expense for the current year, \$30,000, would be calculated as 6/10 of the \$50,000 bi-weekly salaries. This would represent the six days worked in January.

Assets = Liabilities + Stockholders' Equity
+20,000                      -20,000

Assets = Liabilities + Stockholders' Equity
-50,000                      -20,000                      -30,000

If the adjusting journal entry on December 31, 2009, were not made, liabilities and expenses would be understated while income and stockholders' equity would be overstated. The adjusting journal entry recognizes the expense that was incurred during the accounting period and updates the balance in the corresponding liability. Later, when the cash is paid to the employees, the portion of the expense that was incurred in January 2010 is recognized and the previously created liability is reduced. Consistent with the matching principle, expenses are recorded in the period that they were incurred.

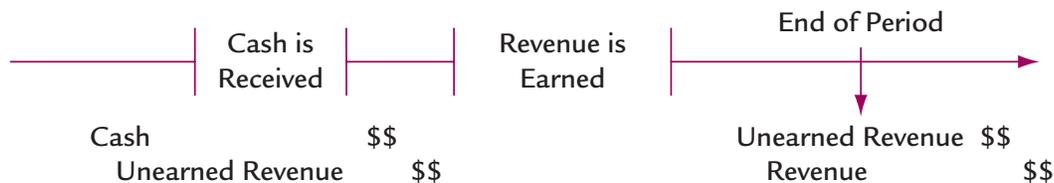
## Deferred (Unearned) Revenues

A business may collect payment for goods or services that it sells before it delivers those goods or services. For example, FedEx often collects cash for a package delivery prior to the actual performance of the delivery service. When the cash is collected, the revenue recognition is deferred, or delayed, until the service is performed. Transactions for which a company has received cash but has not yet earned the revenue are called **deferred revenues**. Other examples of deferred revenues include rent received in advance, magazine or newspaper subscriptions received in advance, and tickets (e.g., for airlines, sporting events, concerts) sold in advance. In all of these situations, the receipt of cash creates a liability (called an **unearned revenue**) for the company to deliver goods or perform services in the future. The unearned revenue account delays, or defers, the recognition of revenue by recording the revenue as a liability until it is earned.

As the goods are delivered or the service is performed, an adjustment is necessary to reduce the previously recorded liability and to recognize the portion of the revenue that has been earned. The portion of revenue that has not been earned remains in the liability account, unearned revenue, until it is earned. Therefore, revenue recognition is delayed, or deferred, until the revenue is earned. Exhibit 3-8 demonstrates the process necessary to record deferred revenues.

### Exhibit 3-8

#### Deferred Revenues



Note that the deferral of revenue is necessary because the revenue was not earned at the time of cash receipt. The adjusting entry recognizes the amount of revenue that has been earned from the time of cash receipt until the end of the accounting period. The adjusting entry required to adjust deferred revenues is shown in **Cornerstone 3-5**.

### HOW TO Adjust Deferred (Unearned) Revenues

#### Concept:

Revenues are recognized when earned, regardless of when cash is received. The adjusting entry for deferred revenue will result in an increase to a revenue account and a decrease to a liability account.

#### Information:

Assume that Porter Properties, Inc., a calendar-year company, rented office space to the Tiger Travel Agency for occupancy on November 1, 2009, for \$5,000 per month. Porter Properties requires Tiger Travel to make a rental



### CORNERSTONE 3-5



**CORNERSTONE**  
**3 - 5**  
*(continued)*

payment every three months. If Tiger Travel pays its entire three-month rental in advance, Porter Properties has agreed to reduce the monthly rental to \$4,500. Tiger Travel agrees and pays Porter Properties \$13,500 for three months rental.

**Required:**

1. Prepare the entry on November 1, 2009, to record the receipt of cash.
2. Prepare the adjusting journal entry necessary on December 31, 2009, for Porter Properties.

**Solution:**

1. When the cash is received, Porter Properties will make the following entry to defer the revenue:

			Stockholders'
Assets =	Liabilities +		Equity
+13,500	+13,500		

Date	Account and Explanation	Debit	Credit
Nov. 1, 2009	Cash	13,500	
	Unearned Rent Revenue		13,500
	<i>(To record receipt of cash for three months rent)</i>		

2. At the end of the accounting period, Porter Properties will perform the following three steps to prepare the adjusting entry:

**Step 1: Identify the accounts that require adjustment.** Rent Revenue needs to be increased because Porter Properties has earned revenue from providing the office space. Because a liability was previously recorded, Porter Properties would need to decrease the liability, Unearned Rent Revenue, to reflect the decrease in their obligation to perform the service.

**Step 2: Calculate the amount of the adjustment.** The amount of the adjustment would be \$9,000, calculated as \$4,500 per month times the two months that the office space was rented.

**Step 3: Record the adjusting entry.** The adjusting journal entry at December 31, 2009, would be:

			Stockholders'
Assets =	Liabilities +		Equity
	-9,000		+9,000

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Unearned Rent Revenue	9,000	
	Rent Revenue		9,000
	<i>(To record rent revenue earned in 2009)</i>		

If the adjusting entry on December 31, 2009, was not made, liabilities (Unearned Rent Revenue) would be overstated while stockholders' equity and revenue would be understated. The adjusting journal entry recognizes two months of revenue (November and December 2009) in the accounting period in which it was earned and updates the corresponding balance in the liability, Unearned Rent Revenue. As a result of the adjusting entry, revenue is recorded in the period that it is earned.

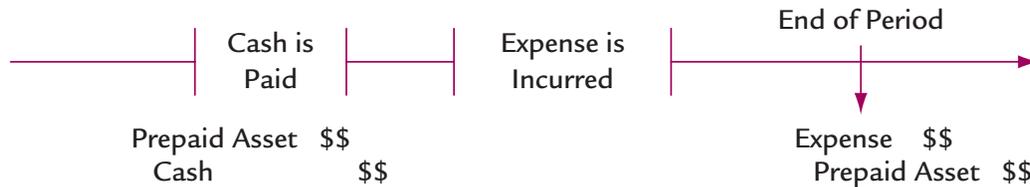
## Deferred (Prepaid) Expenses

Companies often acquire goods and services before they are used. These prepayments are recorded as assets called **deferred (or prepaid) expenses**. For example, FedEx reports prepaid expenses of \$244 million on its December 31, 2007, balance sheet. Common prepaid expenses include items such as supplies, prepaid rent, prepaid advertising, and prepaid insurance. The purchases of buildings and equipment also are considered prepayments.

As the prepaid asset is used to generate revenue, an adjustment is necessary to reduce the previously recorded prepaid asset and recognize the related expense. The portion of the prepaid asset that has not been used represents the unexpired benefits from the prepayment and remains in the asset account until it is used. Therefore, expense recognition is delayed, or deferred, until the expense is incurred. Exhibit 3-9 demonstrates the process necessary to record deferred expenses.

## Exhibit 3-9

## Deferred (Prepaid) Expenses



Note that the deferral of the expense is necessary because the initial cash payment did not result in an expense. Instead, an asset that provides future economic benefit was created. The adjusting entry recognizes the amount of expense that has been incurred from the time of the cash payment until the end of the accounting period. The adjusting entry required to adjust deferred expenses is shown in Cornerstone 3-6.

## HOW TO Adjust Deferred (Prepaid) Expenses

**Concept:**

Expenses are recognized when incurred, regardless of when cash is paid. The adjusting entry for deferred expenses will result in an increase to an expense account and a decrease to an asset account.

**Information:**

Assume that Porter Properties, Inc., a calendar-year company, had \$4,581 of office supplies on hand at the beginning of November. On November 10, Porter Properties purchased office supplies totaling \$12,365. The amount of the purchase was added to the Office Supplies account. At the end of the year, the balance in Office Supplies was \$16,946 (\$4,581 + \$12,365) but a count of office supplies on hand indicated that \$3,263 of supplies remained on hand.

**Required:**

1. Prepare the entry on November 10, 2009, to record the purchase of supplies.
2. Prepare the adjusting journal entry necessary on December 31, 2009, for Porter Properties.

**Solution:**

1. When the supplies are purchased, Porter Properties will make the following entry to defer the expense:

Date	Account and Explanation	Debit	Credit
Nov. 10, 2009	Office Supplies	12,365	
	Cash		12,365
	<i>(To record purchase of office supplies)</i>		

CORNERSTONE  
3-6

Assets =	Liabilities +	Stockholders' Equity
+12,365		
-12,365		

**CORNERSTONE**  
**3 - 6**  
*(continued)*

2. At the end of the accounting period, Porter Properties will perform the following three steps to prepare the adjusting entry:

**Step 1: Identify the accounts that require adjustment.** Office Supplies Expense needs to be increased because Porter Properties has used office supplies during November and December of 2009. The use of the supplies would also decrease the asset, Office Supplies.

**Step 2: Calculate the amount of the adjustment.** The amount of the adjustment would be \$13,683. This amount represents the cost of supplies used during November and December 2009. It is calculated as \$16,946 of supplies available to be used minus \$3,263 of supplies on hand (and, therefore, unused) at the end of the year.

**Step 3: Record the adjusting entry.** The adjusting journal entry at December 31, 2009, would be:

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-13,683				-13,683

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Office Supplies Expense	13,683	
	Office Supplies		13,683
	<i>(To record the use of office supplies during 2009)</i>		

If the adjusting entry on December 31, 2009, was not made, assets, stockholders' equity, and net income would be overstated and expenses would be understated. The adjusting journal entry recognizes the expense incurred during November and December 2009 and updates the corresponding balance in the asset, Office Supplies. As a result of the adjusting entry, the expense is recorded in the period that it is incurred.

**Depreciation** While most deferred (prepaid) expenses are accounted for in a manner similar to that illustrated in Cornerstone 3-6, the purchase of long-lived assets such as buildings and equipment presents a unique situation. Recall from Chapter 1, that these types of assets are classified as property, plant, and equipment on the balance sheet. Because property, plant, and equipment helps to produce revenue over a number of years (instead of just one period), the matching principle requires companies to systematically assign, or allocate, the asset's cost as an expense in each period in which the asset is used. This process is called **depreciation**. This concept and the methods used to compute depreciation expense are discussed in Chapter 7.

The depreciation process requires an adjustment to recognize the expense incurred during the period and reduce the long-lived asset. The unused portion of the asset is reported as a component of property, plant, and equipment on the balance sheet. Therefore, the purchase of a long-lived asset is essentially a long-term prepayment for the service that the asset will provide.

Assume that Porter Properties purchased an office building on January 1, 2007, for \$450,000. The depreciation expense on this building is \$15,000 per year. Because depreciation is a continuous activity, Porter Properties would need to make the following adjustment at the end of 2009.

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-15,000				-15,000

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense	15,000	
	Accumulated Depreciation		15,000
	<i>(To record depreciation for 2009)</i>		

Depreciation expense represents the portion of the cost of the long-lived asset that is matched against the revenues that the asset helped to generate. In addition, the depreciation process reduces the asset. Accountants normally use a contra-account to reduce the amount of a long-lived asset. **Contra accounts** are accounts that have a

## Exhibit 3-10

## Financial Statement Presentation of Accumulated Depreciation

Porter Properties Inc. Balance Sheet December 31, 2009		Sample of accumulated depreciation presentation:	
Assets:		Building	\$ 450,000
Current assets	\$ 370,000	Less: Accumulated depreciation	<u>(45,000)</u>
Property, plant, and equipment (net)	1,450,000	Building (net)	<u>\$ 405,000</u>
Other assets	80,000		
Total assets	<u>\$ 1,900,000</u>		
Liabilities	\$ 825,000		
Equity	1,075,000		
Total liabilities and equity	<u>\$ 1,900,000</u>		

balance that is opposite of the balance in a related account. In this case, Accumulated Depreciation is a contra account to the building. Therefore, while the asset has a normal debit balance, the contra account has a normal credit balance. Contra accounts are deducted from the balance of the related asset account in the financial statements, and the resulting difference is known as the *book value* of the asset. Therefore, by increasing the contra account, the above journal entry reduces the book value of the asset. Exhibit 3-10 shows the financial statement presentation of the accumulated depreciation account.

Notice that accumulated depreciation shows the total amount of depreciation taken in all years of the asset's life (\$15,000 per year for 2007, 2008, and 2009). Therefore, the balance in the accumulated depreciation account will increase over the asset's life. The use of the contra account provides more information to users of the financial statements because it preserves both the original cost of the asset and the total cost that has expired to date.

## Summary of Financial Statement Effects of Adjusting Entries

The effects of the adjustment process are summarized in Exhibit 3-11.

## Exhibit 3-11

## Effects of Adjusting Entries on the Financial Statements

Type of Adjustment	Asset	Liability	Stockholders' Equity	Revenue	Expense
Accrued Revenue	↑		↑	↑	
Accrued Expense		↑	↓		↑
Deferred Revenue		↓	↑	↑	
Deferred Expense	↓		↓		↑

## CONCEPT Q&A

What is the relationship between the cash receipt or payment and the recognition of accruals or deferrals?

Possible Answer: Adjusting entries can be classified as accruals or deferrals depending on the timing of the cash flow relative to when the revenue is earned or the expense is incurred. When the revenue is earned or the expense is incurred **before** the associated cash flow occurs, an accrual adjusting entry is necessary. When the revenue is earned or the expense is incurred **after** the associated cash flow occurs, a deferral adjusting entry is necessary.

Adjusting entries are internal events that do not involve another company. The purpose of all adjustments is to make sure that revenues and expenses get recorded in the proper time period. As the revenue and expense balances are adjusted, asset and liability balances will be adjusted also. Therefore, note that *all adjusting entries will affect at least one income statement account and one balance sheet account*. Remember that *the cash account is never used in an adjusting entry*.

## Comprehensive Example

To provide a comprehensive example of the adjusting process, consider the trial balance of HiTech Communications that was introduced in Chapter 2. This trial balance is reproduced in Exhibit 3-12 for your convenience.

Exhibit 3-12

### Trial Balance

HiTech Communications, Inc. Trial Balance March 31, 2009		
Account	Debit	Credit
Cash	\$16,600	
Accounts Receivable	300	
Supplies	6,500	
Prepaid Insurance	1,200	
Equipment	4,500	
Accounts Payable		\$ 500
Unearned Revenue		9,000
Notes Payable		3,000
Common Stock		12,000
Dividends	500	
Service Revenue		12,100
Salaries Expense	1,800	
Utility Expense	5,200	
	<u>\$36,600</u>	<u>\$36,600</u>

Upon review of the trial balance, the accountant for HiTech noted that several accounts needed to be adjusted. Specifically, the following adjustments were needed.

**Adjustment 1: Accrued Revenue** HiTech's accountant noted that HiTech had performed \$1,500 of advertising services for which it had not yet billed the customer. Because the services had not yet been billed, no entry was made in the accounting system. However, HiTech must record the revenue that was earned during the accounting period, even though the cash flow will not occur until later. The adjusting entry to record this accrued revenue is:

Assets	=	Liabilities	+	Stockholders' Equity
+1,500				+1,500

Date	Account and Explanation	Debit	Credit
March 31	Accounts Receivable	1,500	
	Service Revenue		1,500
	(To recognize services earned)		

**Adjustment 2: Accrual of Interest** The note payable for \$3,000 that HiTech signed on March 2 required it to pay interest at an annual rate of 8 percent. The formula for computing interest is:

$$\text{Interest} = \text{Principal} \times \text{Interest Rate} \times \text{Time}$$

The principal amount of the loan is usually the face value of the note. The interest rate is stated as an annual rate, and the time period is the fraction of a year that the note is outstanding. For HiTech, interest expense for March 2009 is computed as:

$$\text{Interest} = \$3,000 \times 8\% \times 1/12 = \$20$$

Because interest expense has been incurred but the cash payment for interest will not occur until a later date, interest is an accrued expense that requires an increase to an expense account and an increase to a liability account. The adjusting entry to recognize accrued interest is:

Date	Account and Explanation	Debit	Credit
March 31	Interest Expense	20	
	Interest Payable		20
	<i>(To recognize accrued interest)</i>		

			Stockholders'
Assets	=	Liabilities	+ Equity
		+20	-20

**Adjustment 3: Accrual of Salaries** HiTech paid its weekly salaries on March 26, a Friday, and properly recorded an expense (Transaction 10 from Chapter 2). Salaries for a five-day work week are \$1,800, or \$360 per day. HiTech will not pay salaries again until April 2. However, employees worked on March 29, March 30, and March 31. Because employees have worked but will not be paid until a later date, an adjustment is necessary to record the salaries incurred in March. Accrued salaries are \$1,080 (3 days  $\times$  \$360 per day). The adjusting entry to recognize accrued salaries is:

Date	Account and Explanation	Debit	Credit
March 31	Salaries Expense	1,080	
	Salaries Payable		1,080
	<i>(To recognize accrued salaries)</i>		

			Stockholders'
Assets	=	Liabilities	+ Equity
		+1,080	-1,080

**Adjustment 4: Deferred (Unearned) Revenue** HiTech's trial balance shows that a customer paid \$9,000 in advance for services to be performed at a later date. This amount was originally recorded as a liability, Unearned Revenue. As HiTech performs services, the liability will be reduced and revenue will be recognized. Based on HiTech's analysis of work performed during March, it is determined that \$3,300 of revenue has been earned. The adjusting entry to record this previously unearned revenue is:

Date	Account and Explanation	Debit	Credit
March 31	Unearned Revenue	\$3,300	
	Service Revenue		\$3,300
	<i>(To recognize service revenue earned)</i>		

			Stockholders'
Assets	=	Liabilities	+ Equity
		-3,300	+3,300

**Adjustment 5: Prepaid Expense—Supplies** HiTech's trial balance shows a balance of \$6,500 in the Supplies account. However, an inventory count at the close of business on March 31 determined that supplies on hand were \$1,200. Because it was not efficient to record supplies expense during the period, HiTech must make an adjustment at the end of the period to record the supplies used during the period. It was determined that HiTech used \$5,300 (\$6,500 available to be used minus \$1,200 not used) of supplies. The adjustment necessary to record the supplies used during March is:

Date	Account and Explanation	Debit	Credit
March 31	Supplies Expense	5,300	
	Supplies		5,300
	<i>(To recognize supplies used)</i>		

			Stockholders'
Assets	=	Liabilities	+ Equity
-5,300			-5,300

**Adjustment 6: Prepaid Expense—Insurance** HiTech's trial balance shows a balance of \$1,200 in the Prepaid Insurance account related to a six-month insurance policy purchased at the beginning of March. Because time has passed since the purchase of the insurance policy, the asset, Prepaid Insurance, has partially expired

and an expense needs to be recognized. The expired portion of the insurance is \$200 ( $\$1,200 \times 1/6$ ). The adjustment necessary to record insurance expense is:

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-200				-200

Date	Account and Explanation	Debit	Credit
March 31	Insurance Expense	200	
	Prepaid Insurance		200
	<i>(To recognize insurance used)</i>		

**Adjustment 7: Depreciation** HiTech's trial balance shows that \$4,500 of equipment was purchased. As this equipment is used to generate revenue, a portion of the cost of the equipment must be allocated to expense. For HiTech, assume that depreciation expense is \$125 per month. The adjustment necessary to record depreciation expense is:

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-125				-125

Date	Account and Explanation	Debit	Credit
March 31	Depreciation Expense	125	
	Accumulated Depreciation— Equipment		125
	<i>(To recognize depreciation on equipment)</i>		

The ledger for HiTech Communications, after posting of the adjusting journal entries, is shown in Exhibit 3-13.

**Exhibit 3-13**

**General Ledger of HiTech Communications**

Assets	Liabilities	Stockholders' Equity																															
<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Cash</td></tr> <tr><td style="width: 50%;">Bal. 16,600</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 16,600</td><td></td></tr> </table>	Cash		Bal. 16,600		Bal. 16,600		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Accounts Payable</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">500 Bal.</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">500 Bal.</td></tr> </table>	Accounts Payable			500 Bal.		500 Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Common Stock</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">12,000 Bal.</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">12,000 Bal.</td></tr> </table>	Common Stock			12,000 Bal.		12,000 Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Interest Expense</td></tr> <tr><td style="width: 50%;">(A2) 20</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 20</td><td></td></tr> </table>	Interest Expense		(A2) 20		Bal. 20							
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<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Accounts Receivable</td></tr> <tr><td style="width: 50%;">Bal. 300</td><td style="width: 50%;"></td></tr> <tr><td style="width: 50%;">(A1) 1,500</td><td></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 1,800</td><td></td></tr> </table>	Accounts Receivable		Bal. 300		(A1) 1,500		Bal. 1,800		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Notes Payable</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">3,000 Bal.</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">3,000 Bal.</td></tr> </table>	Notes Payable			3,000 Bal.		3,000 Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Service Revenue</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">12,100 Bal.</td></tr> <tr><td style="width: 50%;">1,500 (A1)</td><td></td></tr> <tr><td style="width: 50%;">3,300 (A4)</td><td></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 16,900</td><td style="border-top: 1px solid black;">Bal.</td></tr> </table>	Service Revenue			12,100 Bal.	1,500 (A1)		3,300 (A4)		Bal. 16,900	Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Insurance Expense</td></tr> <tr><td style="width: 50%;">(A6) 200</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 200</td><td></td></tr> </table>	Insurance Expense		(A6) 200		Bal. 200	
Accounts Receivable																																	
Bal. 300																																	
(A1) 1,500																																	
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Bal. 16,900	Bal.																																
Insurance Expense																																	
(A6) 200																																	
Bal. 200																																	
<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Supplies</td></tr> <tr><td style="width: 50%;">Bal. 6,500</td><td style="width: 50%;"></td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">5,300 (A5)</td></tr> <tr><td style="border-top: 1px solid black;">Bal. 1,200</td><td></td></tr> </table>	Supplies		Bal. 6,500			5,300 (A5)	Bal. 1,200		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Unearned Revenue</td></tr> <tr><td style="width: 50%;">(A4) 3,300</td><td style="width: 50%;">9,000 Bal.</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">5,700 Bal.</td></tr> </table>	Unearned Revenue		(A4) 3,300	9,000 Bal.		5,700 Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Salaries Expense</td></tr> <tr><td style="width: 50%;">Bal. 1,800</td><td style="width: 50%;"></td></tr> <tr><td style="width: 50%;">(A3) 1,080</td><td></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 2,880</td><td></td></tr> </table>	Salaries Expense		Bal. 1,800		(A3) 1,080		Bal. 2,880		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Supplies Expense</td></tr> <tr><td style="width: 50%;">(A5) 5,300</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 5,300</td><td></td></tr> </table>	Supplies Expense		(A5) 5,300		Bal. 5,300			
Supplies																																	
Bal. 6,500																																	
	5,300 (A5)																																
Bal. 1,200																																	
Unearned Revenue																																	
(A4) 3,300	9,000 Bal.																																
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Bal. 2,880																																	
Supplies Expense																																	
(A5) 5,300																																	
Bal. 5,300																																	
<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Prepaid Insurance</td></tr> <tr><td style="width: 50%;">Bal. 1,200</td><td style="width: 50%;"></td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">200 (A6)</td></tr> <tr><td style="border-top: 1px solid black;">Bal. 1,000</td><td></td></tr> </table>	Prepaid Insurance		Bal. 1,200			200 (A6)	Bal. 1,000		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Interest Payable</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">20 (A2)</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">20 Bal.</td></tr> </table>	Interest Payable			20 (A2)		20 Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Utility Expense</td></tr> <tr><td style="width: 50%;">Bal. 5,200</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 5,200</td><td></td></tr> </table>	Utility Expense		Bal. 5,200		Bal. 5,200		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Dividends</td></tr> <tr><td style="width: 50%;">Bal. 500</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 500</td><td></td></tr> </table>	Dividends		Bal. 500		Bal. 500					
Prepaid Insurance																																	
Bal. 1,200																																	
	200 (A6)																																
Bal. 1,000																																	
Interest Payable																																	
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<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Equipment</td></tr> <tr><td style="width: 50%;">Bal. 4,500</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 4,500</td><td></td></tr> </table>	Equipment		Bal. 4,500		Bal. 4,500		<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Salaries Payable</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">1,080 (A3)</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">1,080 Bal.</td></tr> </table>	Salaries Payable			1,080 (A3)		1,080 Bal.	<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Depreciation Expense</td></tr> <tr><td style="width: 50%;">(A7) 125</td><td style="width: 50%;"></td></tr> <tr><td style="border-top: 1px solid black;">Bal. 125</td><td></td></tr> </table>	Depreciation Expense		(A7) 125		Bal. 125														
Equipment																																	
Bal. 4,500																																	
Bal. 4,500																																	
Salaries Payable																																	
	1,080 (A3)																																
	1,080 Bal.																																
Depreciation Expense																																	
(A7) 125																																	
Bal. 125																																	
<table border="1" style="width: 100%;"> <tr><td colspan="2" style="text-align: center;">Accumulated Depreciation</td></tr> <tr><td style="width: 50%;"></td><td style="width: 50%;">125 (A7)</td></tr> <tr><td style="border-top: 1px solid black;"></td><td style="border-top: 1px solid black;">125 Bal.</td></tr> </table>	Accumulated Depreciation			125 (A7)		125 Bal.																											
Accumulated Depreciation																																	
	125 (A7)																																
	125 Bal.																																

Two major items should be apparent. First, adjusting entries affect one balance sheet account and one income statement account. Without adjusting entries, the balances reported on both the balance sheet and the income statement would have been incorrect. If the adjustments were not recorded, HiTech would have understated revenue by \$4,800 and understated expenses by \$6,725. Second, notice that adjusting entries do not affect cash.

## Step 6: Preparing the Financial Statements

After a company has journalized and posted all of the adjusting entries, it updates the trial balance to reflect the adjustments that have been made. This trial balance is called an **adjusted trial balance**. Similar to the trial balance, the adjusted trial balance lists all of the active accounts and proves the equality of debits and credits. In addition, the adjusted trial balance is the primary source of information needed to prepare the financial statements. The adjusted trial balance for HiTech Communications is shown in Exhibit 3-14.

The financial statements can now be prepared using the balances obtained from the adjusted trial balance. As discussed in Chapter 1, the financial statements are interrelated. That is, there is a natural progression from one financial statement to another as the numbers in one financial statement flow into another financial statement. Because of this natural progression, financial statements are prepared in a particular order. First, the income statement is prepared from the revenue and expense accounts. Next, net income is used as a component of the retained earnings statements. Finally, retained earnings is presented on the balance sheet as a component of equity. The financial statements and their interrelationship are shown in Exhibits 3-15 through 3-17.

### OBJECTIVE 5

Prepare financial statements from an adjusted trial balance.



Exhibit 3-14

### Adjusted Trial Balance

HiTech Communications, Inc. Trial Balance March 31, 2009		
Account	Debit	Credit
Cash	\$16,600	
Accounts receivable	1,800	
Supplies	1,200	
Prepaid insurance	1,000	
Equipment	4,500	
Accumulated depreciation—equipment		\$ 125
Accounts payable		500
Unearned revenue		5,700
Interest payable		20
Salaries payable		1,080
Notes payable		3,000
Common stock		12,000
Dividends	500	
Service revenue		16,900
Salaries expense	2,880	
Utility expense	5,200	
Depreciation expense	125	
Interest expense	20	
Insurance expense	200	
Supplies expense	5,300	
	<u>\$39,325</u>	<u>\$39,325</u>

## Exhibit 3-15

## Income Statement

HiTech Communications, Inc. Income Statement For the Month Ended March 31, 2009		
Service revenue		\$16,900
Expenses:		
Salaries expense	\$ 2,880	
Utility expense	5,200	
Depreciation expense	125	
Interest expense	20	
Insurance expense	200	
Supplies expense	5,300	
Net income		<u>13,725</u> <u>\$ 3,175</u>

## Exhibit 3-16

## Statement of Retained Earnings

HiTech Communications, Inc. Statement of Retained Earnings For the Month Ended March 31, 2009	
Retained earnings, March 1, 2009	\$ 0
Add: Net income	3,175
	<u>\$3,175</u>
Less: Dividends	(500)
Retained earnings, March 31, 2009	<u>\$2,675</u>

## Exhibit 3-17

## Balance Sheet

HiTech Communications, Inc. Balance Sheet March 31, 2009			
ASSETS		LIABILITIES AND STOCKHOLDERS' EQUITY	
Current assets:		Current liabilities:	
Cash	\$16,600	Accounts payable	\$ 500
Accounts receivable	1,800	Unearned revenue	5,700
Supplies	1,200	Interest payable	20
Prepaid insurance	1,000	Salaries payable	1,080
Total current assets	<u>\$20,600</u>	Total current liabilities	<u>\$ 7,300</u>
Property, plant, and equipment:		Long-term liabilities:	
Equipment	\$ 4,500	Notes payable	3,000
Less: Accumulated depreciation	<u>(125)</u>	Total liabilities	<u>\$10,300</u>
Total property, plant, & equipment	<u>4,375</u>	Stockholders' equity:	
		Common stock	\$12,000
		Retained earnings	2,675
		Total stockholders' equity	<u>14,675</u>
		Total liabilities & stockholders' equity	<u>\$24,975</u>
Total assets	<u>\$ 24,975</u>		

## Step 7: Closing the Accounts

When we introduced the fundamental accounting equation in Chapter 1, we identified three kinds of balance sheet accounts: assets, liabilities, and stockholders' equity. These accounts are **permanent accounts** in that their balances are carried forward from the current accounting period to future accounting periods. We also identified three other accounts: revenues, expenses and dividends. These accounts are used to collect the activities of only one period, so they are considered **temporary accounts**. The final step of the accounting cycle, closing the accounts, is done to:

1. Transfer the effects of revenues, expenses, and dividends (the temporary accounts) to the permanent stockholders' equity account, Retained Earnings.
2. Clear the revenue, expenses, and dividends (reduce their balances to zero) so they are ready to accumulate the business activities of the next accounting period. Without closing entries, these accounts would accumulate the business activities of *all* accounting periods, not just the current time period.

The closing process is accomplished through a series of journal entries that are dated as of the last day of the accounting period. Often, another temporary account, called income summary, is used to aid the closing process. The use of the income summary account allows the company to easily identify the net income (or net loss) for the period. The closing process can be completed in a four-step procedure:

Step 1: Close revenues to income summary.

Step 2: Close expenses to income summary. At this point, the balance in the income summary account should be equal to net income.

Step 3: Close income summary to retained earnings.

Step 4: Close dividends to retained earnings.

The closing process is illustrated in **Cornerstone 3-7**.

### OBJECTIVE > 6

Explain why and how companies prepare closing entries.



### HOW TO Close the Accounts

#### Concept:

The closing process is designed to transfer the balances in the temporary accounts to retained earnings and to prepare the temporary accounts for the next accounting period.

#### Information:

For 2009, Porter Properties' general ledger shows the following balances: Rental Revenue \$2,174,000; Salaries Expense \$1,300,000; Supplies Expense \$150,000; Interest Expense \$15,000; Insurance Expense \$20,000; Retained Earnings at the beginning of the year, \$1,135,000; and Dividends \$5,000.

#### Required:

Prepare the closing entries for Porter Properties at December 31, 2009.

#### Solution:

The closing process involves four steps:

##### Step 1: Close revenues to Income Summary.

Date	Account and Explanation	Debit	Credit
Dec. 31	Service Revenue	2,174,000	
	Income Summary		2,174,000
	(To close revenues accounts)		



### CORNERSTONE 3-7



**CORNERSTONE**  
**3-7**  
*(continued)*

**Step 2: Close expenses to Income Summary.**

Date	Account and Explanation	Debit	Credit
Dec. 31	Income Summary	1,485,000	
	Salaries Expense		1,300,000
	Supplies Expense		150,000
	Interest Expense		15,000
	Insurance Expense		20,000
	<i>(To close expense accounts)</i>		

**Step 3: Close Income Summary to Retained Earnings.**

Date	Account and Explanation	Debit	Credit
Dec. 31	Income Summary	689,000	
	Retained Earnings		689,000
	<i>(To close Income Summary)</i>		

**Step 4: Close Dividends to Retained Earnings.**

Date	Account and Explanation	Debit	Credit
Dec. 31	Retained Earnings	5,000	
	Dividends		5,000
	<i>(To close Dividends)</i>		

**CONCEPT Q&A**

What would happen if we didn't make closing entries?

*The closing process transfers temporary account balances (revenues, expenses, and dividends) to retained earnings. If the accounts were not closed, these amounts would not get properly reflected in stockholders' equity and the accounting equation wouldn't balance. In addition, the temporary accounts would accumulate amounts from different accounting periods, making it extremely difficult to determine the effect of business activities for a specific accounting period.*

**Possible Answer:**

Notice that revenues, which have a normal credit balance, are closed by debiting the revenue account. Similarly, expenses, which normally have a debit balance are closed by crediting the expense accounts. Also, after the first two journal entries, the balance in the income summary account is \$689,000 ( $\$2,174,000 - \$1,485,000$ ), which is the amount of income for the period. This amount is then transferred to retained earnings. Finally, the dividends account is not closed to income summary (because dividends are not part of income) but closed directly to retained earnings. The ending retained earnings account will have a balance of \$1,819,000 ( $\$1,135,000 + 689,000 - 5,000$ ). The closing process for Porter Properties is illustrated in Exhibit 3-18.

**OBJECTIVE** > **7**

Understand the steps in the accounting cycle.

**Summary of the Accounting Cycle**

In Chapter 2, we introduced the accounting cycle as a sequence of procedures that transforms business activities into financial statements. The accounting cycle is shown in Exhibit 3-19.

Notice that the accounting cycle begins with the analysis of transactions to determine which business activities are recognized in the accounting records and their effect on the fundamental accounting equation. Those criteria that met the recognition criteria are journalized and posted to the ledger. These three steps are repeated many times during an accounting period. The remaining steps of the accounting cycle are performed only at the end of the accounting period. For those transactions still underway at the end of the accounting period, the portion that has been completed

Exhibit 3-18

The Closing Process

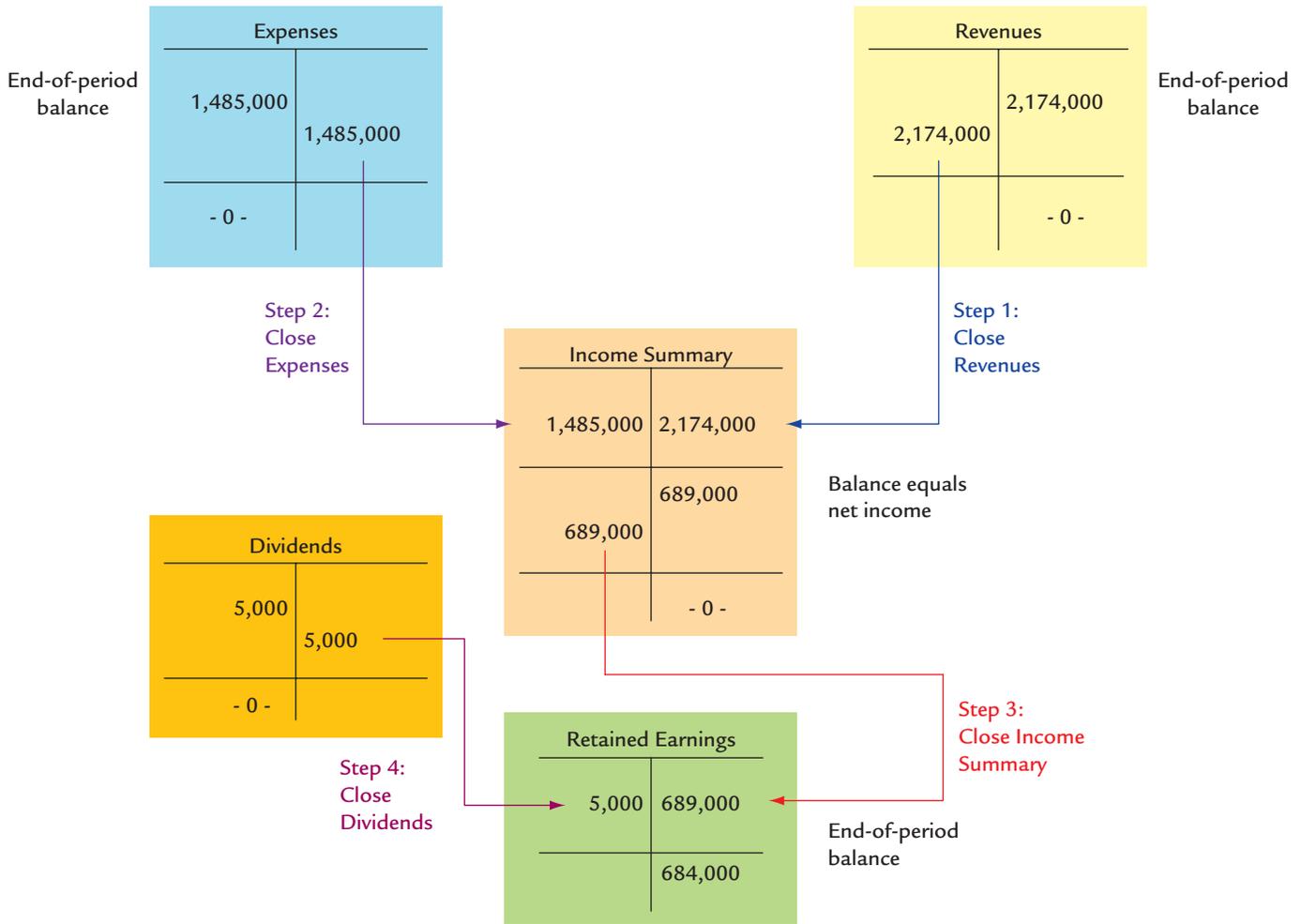


Exhibit 3-19

The Accounting Cycle



is recognized with adjustments. Next, the financial statements are prepared. Finally, the temporary accounts—revenues, expenses, and dividends—are closed and their balances transferred to retained earnings. At this point, the income statement accounts have zero balances, and the balance sheet accounts all contain the correct beginning balances for the start of the next accounting period. The accounting cycle can begin again.

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## Summary of Learning Objectives

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- LO1. Explain the difference between cash-basis and accrual-basis accounting.**
- Cash-basis and accrual-basis accounting are two alternatives for recording business activities in the accounting records.
  - Under cash-basis accounting, revenues and expenses are recorded when cash is received or paid, regardless of when the revenues are earned or the expenses are incurred.
  - Accrual-basis accounting ties income measurement to the selling activities of a company by recognizing revenues and expenses when they occur.
- LO2. Explain how the time-period assumption, revenue recognition, and matching principles affect the determination of income.**
- The revenue recognition principle states that revenue is recognized or recorded in the period in which the revenue is earned and the collection of cash is reasonably assured (realized or realizable). These conditions are normally met when goods have been delivered or services have been performed.
  - The matching principle requires that expenses be recognized in the same period as the revenue it helped generate.
  - The application of these two principles results in income being measured as the business activity occurs, regardless of when cash is received or paid.
- LO3. Identify the kinds of transactions that may require adjustments at the end of an accounting period.**
- Many business activities do not occur at a single point in time but continuously over time. Because entries in the accounting system are made at particular points in time, adjustments are needed at the end of an accounting period to record the completed portion of any partially completed activities.
  - Adjusting entries apply the revenue recognition and matching principles to ensure that a company's financial statements reflect the proper amount for revenues, expenses, assets, liabilities, and stockholders' equity.
  - Adjusting entries are categorized as either accruals (accrued revenues and accrued expenses) or deferrals (deferred revenues and deferred expenses).
- LO4. Prepare adjusting entries for accruals and deferrals.**
- Accruals occur when revenues have been earned or expenses have been incurred but no cash has been received or paid.
  - The adjusting entry for an accrued revenue will result in an increase to a revenue account and an increase to an asset account. The adjusting entry for an accrued expense account will result in an increase to an expense account and an increase to a liability account.
  - Deferrals (prepayments) occur when cash has been received or paid prior to revenue being earned or the expense being incurred.
  - The adjusting entry for a deferred revenue will result in an increase to a revenue account and a decrease to a liability account. The adjusting entry for a deferred expense will result in an increase to an expense account and a decrease to an asset account.

**LO5. Prepare financial statements from an adjusted trial balance.**

- An adjusted trial balance lists all of the active accounts and updates the trial balance to reflect the adjustments that have been made.
- The adjusted trial balance is the primary source of information needed to prepare the financial statements.
- Due to the interrelation between the financial statements, the income statement is prepared first, followed by the statement of retained earnings, and finally, the balance sheet.

**LO6. Explain why and how companies prepare closing entries.**

- Closing entries (a) transfer the effects of revenues, expenses, and dividends to the stockholders' equity account, Retained Earnings, and (b) clear the balances in revenues expenses, and dividends (reduce their balances to zero) so that they are ready to accumulate the business activities of the next accounting period.
- To close the accounts, companies make a series of journal entries, dated as of the last day of the accounting period.

**LO7. Understand the steps in the accounting cycle.**

- During the accounting period, transactions are analyzed to determine their effect on the accounting equation.
- Transactions that meet the recognition criteria are then journalized and posted to the general ledger.
- A trial balance is prepared to summarize the effects of these transactions.
- At the end of the accounting period, adjusting entries are prepared to recognize the completed portion of any partially completed business activities.
- The financial statements are then prepared from the adjusted trial balance and the temporary accounts are closed.
- The accounting cycle then repeats for the next accounting period.

**CORNERSTONE 3-1** How to apply the revenue recognition and matching principles, page 118

**CORNERSTONE 3-2** How to determine which transactions require adjustment, page 120

**CORNERSTONE 3-3** How to record accrued revenues, page 122

**CORNERSTONE 3-4** How to record accrued expenses, page 124

**CORNERSTONE 3-5** How to adjust deferred (unearned) revenues, page 125

**CORNERSTONE 3-6** How to adjust deferred (prepaid) expenses, page 127

**CORNERSTONE 3-7** How to close the accounts, page 135



## CORNERSTONES FOR CHAPTER 3

## Key Terms

Accrual-basis accounting, 115

Accrued expenses, 123

Accrued revenues, 121

Adjusted trial balance, 133

Adjusting entries, 119

Cash-basis accounting, 115

Contra accounts, 128

Deferred (or prepaid) expenses, 126

Deferred revenues, 125

Depreciation, 128

Matching principle, 117

Permanent accounts, 135

Revenue recognition principle, 116

Temporary accounts, 135

Time-period assumption, 115

Unearned revenue, 125

**OBJECTIVE** > **8**

Understand how to use a worksheet to prepare financial statements.

## Appendix: Using a Worksheet to Prepare Financial Statements

---

The discussion of closing completes our presentation of the essential procedures that make up the accounting cycle. Accountants often use an informal schedule called a **worksheet** to assist them in organizing and preparing the information necessary to perform the end-of-period steps in the accounting cycle—namely the preparation of adjusting entries, financial statements, and closing entries. The worksheet is not a financial statement but simply an organizational tool that summarizes the information generated by the accounting system and enables the accountant to check the information for completeness and consistency. While worksheets can be completed manually, most worksheets today are created in computer spreadsheets.

A typical worksheet is shown in Exhibit 3-20. This exhibit uses the information for HiTech Communications that was presented in Chapter 2 and earlier in Chapter 3. The completion of the worksheet requires the following steps:

- **Step 1: Unadjusted Trial Balance.** The worksheet starts with the unadjusted trial balance. The first column contains the listing of accounts used during the period in the same order as the accounts appear in the trial balance—the balance sheet accounts first followed by the income statement accounts. Note that a retained earnings account was added. Because this is the first month of operations, this account has a zero balance. The next two columns contain the unadjusted balances of these accounts and are totaled to ensure the equality of debits and credits.
- **Step 2: Adjusting Entry Columns.** The next two columns contain the adjustments made to record the completed portion of business activities that remain underway at the end of the accounting period. Rather than take the time to make formal adjusting journal entries, the accountant typically enters the adjustments directly into the worksheet and then makes the formal journal entries after the worksheet has been completed. Two items should be noted. First, adjustments often require the addition of accounts not included in the unadjusted trial balance. These additional accounts can be added, in no particular order, beneath the previous listing of accounts. Second, letters are typically used on a worksheet to identify the adjusting entries and to allow the accountant to easily match the debit and credit sides of each adjusting entry. The letters (a) through (g) correspond to the adjusting entries (1) through (7) shown earlier in the chapter. The two columns are totaled to ensure the equality of debits and credits.
- **Step 3: Adjusted Trial Balance.** The next two columns represent an adjusted trial balance. The adjustments in columns entered in columns D and E are added to or subtracted from the unadjusted balances in columns B and C. The two columns are totaled to ensure the equality of debits and credits. The adjusted trial balance is the basis for preparing the financial statements.
- **Step 4: Income Statement.** The income statement balances are transferred to the income statement columns of the worksheet and the columns are totaled. The difference between the two columns is the net income or loss of the period. In Exhibit 3-20, HiTech reports its net income of \$3,175 in the debit column of the income statement and the credit column of the statement of retained earnings. This entry is made (1) to balance the two income statement columns and (2) to transfer net income to retained earnings.
- **Step 5: Statement of Retained Earnings.** The amounts for beginning retained earnings and dividends are transferred from the adjusted trial balance columns (columns F and G) to the statement of retained earnings columns (columns J and K). The columns are totaled and the difference is the amount of ending retained earnings. This amount is entered in the debit column of the statement of retained earnings (to balance the two columns) and transferred to the credit column of the balance sheet as shown by letter (i).
- **Step 6: Balance Sheet.** The final portion of the worksheet is completed by transferring all the balance sheet account balances from the adjusted trial balance columns (columns F and G) to the balance sheet columns (columns L and M).

At this point, the worksheet provides all the necessary information to prepare the financial statements. The completed financial statements were shown in Exhibits 3-15, 3-16, and 3-17.

Exhibit 3-20

Worksheet

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	<b>HiTech Communications, Inc.</b>												
2	<b>Work Sheet</b>												
3	<b>For the Month Ended March 31, 2010</b>												
4		<b>Unadjusted Trial Balance</b>		<b>Adjusting Entries</b>		<b>Adjusted Trial Balance</b>		<b>Income Statement</b>		<b>Statement of Retained Earnings</b>		<b>Balance Sheet</b>	
5	<b>Account Titles</b>	<b>Debit</b>	<b>Credit</b>	<b>Debit</b>	<b>Credit</b>	<b>Debit</b>	<b>Credit</b>	<b>Debit</b>	<b>Credit</b>	<b>Debit</b>	<b>Credit</b>	<b>Debit</b>	<b>Credit</b>
6	Cash	16,600				16,600						16,600	
7	Accounts Receivable	300		(a) 1,500		1,800						1,800	
8	Supplies	6,500			(e) 5,300	1,200						1,200	
9	Prepaid Insurance	1,200			(f) 200	1,000						1,000	
10	Equipment	4,500				4,500						4,500	
11	Accounts Payable		500				500						500
12	Unearned Revenue		9,000	(d) 3,300			5,700						5,700
13	Notes Payable		3,000				3,000						3,000
14	Common Stock		12,000				12,000						12,000
15	Retained Earnings, 3/1/2010		0				0					0	
16	Dividends	500				500				500			
17	Service Revenue		12,100		(a) 1,500 (d) 3,300		16,900		16,900				
18	Salaries Expense	1,800		(c) 1,080		2,880		2,880					
19	Utility Expense	5,200				5,200		5,200					
20		<u>36,600</u>	<u>36,600</u>										
21													
22	Interest Expense			(b) 20		20			20				
23	Interest Payable				(b) 20		20						20
24	Salaries Payable				(c) 1,080		1,080						1,080
25	Supplies Expense			(e) 5,300		5,300		5,300					
26	Insurance Expense			(f) 200		200		200					
27	Depreciation Expense			(g) 125		125		125					
28	Accumulated Depreciation — Equipment				(g) 125		125						125
29				<u>11,525</u>	<u>11,525</u>	<u>39,325</u>	<u>39,325</u>	<u>13,725</u>	<u>16,900</u>				
30	Net Income							(h) 3,175		(h) 3,175			
31								<u>16,900</u>	<u>16,900</u>	500	3,175		
32	Retained Earnings, 3/31/2010									(i) 2,675			(i) 2,675
33										<u>3,175</u>	<u>3,175</u>	<u>25,100</u>	<u>25,100</u>
34													

## Appendix: Summary of Learning Objectives

### LO8. Understand how to use a worksheet to prepare financial statements.

- A worksheet is an informal schedule that assists accountants in organizing and preparing the information necessary to perform the end-of-period steps in the accounting cycle.
- The worksheet begins with a trial balance and includes columns for adjusting entries, the adjusted trial balance, the income statement, the statement of retained earnings, and the balance sheet.

## Key Terms

Worksheet, 140

## Review Problem

### The Adjustment Process

#### Concept:

Adjusting journal entries are required for continuous transactions that are partially complete at the end of an accounting period. This often requires estimates and judgments about the timing of revenue and expense recognition. Once the adjustments are made, financial statements can be prepared and the accounts are closed so that the accounts are ready to accumulate business activities in the next accounting period.

#### Information:

Kenny's Laundry has one laundry plant and uses five rented storefronts on the west side of Indianapolis as its retail locations. At the end of 2009, Kenny's Laundry had the following balances in its accounts before adjustment:

Cash 4,800	Accounts Receivable 26,000	Supplies Inventory 128,000
Land 124,400	Building 249,000	Accumulated Depreciation, Building 36,000
Equipment 122,000	Accumulated Depreciation, Equipment 24,000	Other Assets 16,000
Accounts Payable 8,000	Notes Payable (due 2015) 120,000	Unearned Service Revenue 12,000
Common Stock 240,000	Retained Earnings, 12/31/2008 69,000	Service Revenue 874,200
Rent Expense 168,000	Wages Expense 431,000	Insurance Expense 14,000
Salaries Expense 92,000	Interest Expense 8,000	

An examination identified the following items that require adjustment:

- Kenny's launders shirts for the service staff of a local car dealer. At the end of 2009, the car dealer owes Kenny's \$1,040 for laundry services that have been performed but will not be billed until early in 2010.
- Kenny's supplies inventory on hand at 12/31 was \$21,400.
- Kenny's launders uniforms for a nearby McDonalds franchise. The franchisee pays Kenny's in advance for the laundry service once each three months. After examining the records, Kenny's accountant determines that the Laundry has earned \$8,400 of the \$12,000 of unearned revenue.
- Salaries in the amount of \$1,500 are owed but unpaid and unrecorded.
- Two months' interest at 8 percent on the note payable (due in 2015) is owed but unpaid and unrecorded.
- Depreciation expense for the building is \$12,000
- Depreciation expense for the equipment is \$24,000.
- Income taxes expense of \$5,200 is owed but unpaid and unrecorded.

#### Required:

- Determine the adjusting entries at 12/31/2009 for Kenny's Laundry.
- Record and post the effects of the adjustments to the before adjustment account balances.
- Prepare an income statement, statement of changes in retained earnings, and a balance sheet for Kenny's Laundry using the adjusted account balances.
- Close the necessary accounts.

#### Solution:

- The adjustments for Kenny's Laundry are as follows:

- The adjustment to record accrued revenue for services already provided is:

Date	Account and Explanation	Debit	Credit
Dec. 31	Accounts Receivable	1,040	
	Service Revenue		1,040
	<i>(To recognize revenue for services performed but not billed)</i>		

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
+1,040				+1,040

- The before adjustment balance in supplies inventory is \$128,000. Supplies actually on hand are \$21,400. Supplies expense (used) is \$106,600 (\$128,000 – \$21,400):

Date	Account and Explanation	Debit	Credit
Dec. 31	Supplies Expense	106,600	
	Supplies		106,600
	<i>(To recognize supplies used)</i>		

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-106,600				-106,600

- The adjustment to record the amount of deferred revenue earned in 2009 is:

Date	Account and Explanation	Debit	Credit
Dec. 31	Unearned Service Revenue	8,400	
	Service Revenue		8,400
	<i>(To recognize revenue earned)</i>		

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
		-8,400		+8,400

- The entry to record the accrual of salaries is:

Date	Account and Explanation	Debit	Credit
Dec. 31	Salaries Expense	1,500	
	Salaries Payable		1,500
	<i>(To recognize salary expense incurred but not paid)</i>		

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
		+1,500		-1,500

- Interest expense is \$1,600 ( $\$120,000 \times 8\% \times 2/12$ ). The entry to accrue interest expense is:

Date	Account and Explanation	Debit	Credit
Dec. 31	Interest Expense	1,600	
	Interest Payable		1,600
	<i>(To recognize interest expense incurred but not paid)</i>		

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
		+1,600		-1,600

f. The entry to record depreciation expense for the building is:

<b>Assets = Liabilities + Stockholders' Equity</b>
-12,000                      -12,000

Date	Account and Explanation	Debit	Credit
Dec. 31	Depreciation Expense	12,000	
	Accumulated Depreciation, Building		12,000
	<i>(To record depreciation expense)</i>		

g. The entry to record depreciation expense for the equipment is:

<b>Assets = Liabilities + Stockholders' Equity</b>
-24,000                      -24,000

Date	Account and Explanation	Debit	Credit
Dec. 31	Depreciation Expense	24,000	
	Accumulated Depreciation, Equipment		24,000
	<i>(To record depreciation expense)</i>		

h. The adjustment for income taxes expense is:

<b>Assets = Liabilities + Stockholders' Equity</b>
+5,200                      -5,200

Date	Account and Explanation	Debit	Credit
Dec. 31	Income Tax Expense	5,200	
	Income Taxes Payable		5,200
	<i>(To record accrual of income taxes)</i>		

2. The adjusted account balances for Kenny's Laundry are shown in Exhibit 3-21.

**Exhibit 3-21**

**Kenny's Laundry Adjusted Account Balances**

<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Cash</b></td></tr> <tr><td>4,800</td></tr> </table>	<b>Cash</b>	4,800	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Accounts Receivable</b></td></tr> <tr><td>26,000</td></tr> <tr><td>(a) 1,040</td></tr> <tr><td>27,040</td></tr> </table>	<b>Accounts Receivable</b>	26,000	(a) 1,040	27,040	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Supplies Inventory</b></td></tr> <tr><td>128,000</td></tr> <tr><td>106,600 (b)</td></tr> <tr><td>21,400</td></tr> </table>	<b>Supplies Inventory</b>	128,000	106,600 (b)	21,400		
<b>Cash</b>														
4,800														
<b>Accounts Receivable</b>														
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<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Land</b></td></tr> <tr><td>124,400</td></tr> </table>	<b>Land</b>	124,400	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Building</b></td></tr> <tr><td>249,000</td></tr> </table>	<b>Building</b>	249,000	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Accumulated Depreciation, Building</b></td></tr> <tr><td>36,000</td></tr> <tr><td>12,000 (f)</td></tr> <tr><td>48,000</td></tr> </table>	<b>Accumulated Depreciation, Building</b>	36,000	12,000 (f)	48,000				
<b>Land</b>														
124,400														
<b>Building</b>														
249,000														
<b>Accumulated Depreciation, Building</b>														
36,000														
12,000 (f)														
48,000														
<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Equipment</b></td></tr> <tr><td>122,000</td></tr> </table>	<b>Equipment</b>	122,000	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Accumulated Depreciation, Equipment</b></td></tr> <tr><td>24,000</td></tr> <tr><td>24,000 (g)</td></tr> <tr><td>48,000</td></tr> </table>	<b>Accumulated Depreciation, Equipment</b>	24,000	24,000 (g)	48,000	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Other Assets</b></td></tr> <tr><td>16,000</td></tr> </table>	<b>Other Assets</b>	16,000				
<b>Equipment</b>														
122,000														
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<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Accounts Payable</b></td></tr> <tr><td>8,000</td></tr> </table>	<b>Accounts Payable</b>	8,000	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Notes Payable (due 2015)</b></td></tr> <tr><td>120,000</td></tr> </table>	<b>Notes Payable (due 2015)</b>	120,000	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Interest Payable</b></td></tr> <tr><td>- 0 -</td></tr> <tr><td>1,600 (e)</td></tr> <tr><td>1,600</td></tr> </table>	<b>Interest Payable</b>	- 0 -	1,600 (e)	1,600				
<b>Accounts Payable</b>														
8,000														
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<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Salaries Payable</b></td></tr> <tr><td>- 0 -</td></tr> <tr><td>1,500 (d)</td></tr> <tr><td>1,500</td></tr> </table>	<b>Salaries Payable</b>	- 0 -	1,500 (d)	1,500	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Income Taxes Payable</b></td></tr> <tr><td>- 0 -</td></tr> <tr><td>5,200 (h)</td></tr> <tr><td>5,200</td></tr> </table>	<b>Income Taxes Payable</b>	- 0 -	5,200 (h)	5,200	<table border="1" style="width: 100%; text-align: center;"> <tr><td><b>Unearned Service Revenue</b></td></tr> <tr><td>12,000</td></tr> <tr><td>8,400 (c)</td></tr> <tr><td>3,600</td></tr> </table>	<b>Unearned Service Revenue</b>	12,000	8,400 (c)	3,600
<b>Salaries Payable</b>														
- 0 -														
1,500 (d)														
1,500														
<b>Income Taxes Payable</b>														
- 0 -														
5,200 (h)														
5,200														
<b>Unearned Service Revenue</b>														
12,000														
8,400 (c)														
3,600														

(Continued)

<table border="1"> <thead> <tr><th colspan="2">Common Stock</th></tr> </thead> <tbody> <tr><td></td><td style="text-align: right;">240,000</td></tr> </tbody> </table>	Common Stock			240,000	<table border="1"> <thead> <tr><th colspan="2">Retained Earnings, 12/31/2008</th></tr> </thead> <tbody> <tr><td></td><td style="text-align: right;">69,000</td></tr> </tbody> </table>	Retained Earnings, 12/31/2008			69,000	<table border="1"> <thead> <tr><th colspan="2">Service Revenue</th></tr> </thead> <tbody> <tr><td></td><td style="text-align: right;">874,200</td></tr> <tr><td></td><td style="text-align: right;">1,040 (a)</td></tr> <tr><td></td><td style="text-align: right;">8,400 (c)</td></tr> <tr><td></td><td style="text-align: right; border-top: 1px solid black;">883,640</td></tr> </tbody> </table>	Service Revenue			874,200		1,040 (a)		8,400 (c)		883,640						
Common Stock																										
	240,000																									
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<table border="1"> <thead> <tr><th colspan="2">Rent Expense</th></tr> </thead> <tbody> <tr><td style="text-align: right;">168,000</td><td></td></tr> </tbody> </table>	Rent Expense		168,000		<table border="1"> <thead> <tr><th colspan="2">Wages Expense</th></tr> </thead> <tbody> <tr><td style="text-align: right;">431,000</td><td></td></tr> </tbody> </table>	Wages Expense		431,000		<table border="1"> <thead> <tr><th colspan="2">Insurance Expense</th></tr> </thead> <tbody> <tr><td style="text-align: right;">14,000</td><td></td></tr> </tbody> </table>	Insurance Expense		14,000													
Rent Expense																										
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Salaries Expense																										
92,000																										
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Depreciation Expense, Building																										
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(h) 5,200																										
5,200																										

3. The income statement, statement of changes in retained earnings, and balance sheet for Kenny's Laundry are prepared from the adjusted account balances and appear in Exhibit 3-22 below.

Exhibit 3-22

**Financial Statements for Kenny's Laundry**

**Kenny's Laundry  
Income Statement  
For the Year Ended December 31, 2009**

Service revenue		\$883,640
Less expenses:		
Rent	\$168,000	
Wages	431,000	
Insurance	14,000	
Salaries	93,500	
Supplies	106,600	
Depreciation, building	12,000	
Depreciation, equipment	24,000	849,100
Income from operations		\$ 34,540
Interest expense		9,600
Income before income taxes		\$ 24,940
Income taxes expense		5,200
Net income		\$ 19,740

**Kenny's Laundry  
Statement of Changes in Retained Earnings  
For the Year Ended December 31, 2009**

Retained earnings, 12/31/2008		\$69,000
Add: Net income		19,740
		\$88,740
Less: Dividends		-0-
Retained earnings, 12/31/2009		\$88,740

(Continued)

Kenny's Laundry Balance Sheet December 31, 2009			
ASSETS			
Current assets:			
Cash	\$	4,800	
Accounts receivable		27,040	
Supplies		21,400	
Total current assets			\$ 53,240
Property, plant, and equipment:			
Land		\$124,400	
Building	\$249,000		
Less: Accumulated depreciation	48,000	201,000	
Equipment	\$122,000		
Less: Accumulated depreciation	48,000	74,000	
Total property, plant, and equipment			399,400
Other assets			16,000
Total assets			\$468,640
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Accounts payable	\$	8,000	
Salaries payable		1,500	
Interest payable		1,600	
Income taxes payable		5,200	
Unearned service revenue		3,600	
Total current liabilities			\$ 19,900
Long-term liabilities:			
Notes payable (due 2015)			120,000
Total liabilities			\$139,900
Stockholders' equity:			
Common stock	\$240,000		
Retained earnings		88,740	
Total stockholders' equity			328,740
Total liabilities and stockholders' equity			\$468,640

4. The entries to close the accounts are:

Date	Account and Explanation	Debit	Credit
Dec. 31	Service Revenue	883,640	
	Income Summary		883,640
	<i>(To close revenues)</i>		
	Income Summary	863,900	
	Rent Expense		168,000
	Wages Expense		431,000
	Insurance Expense		14,000
	Salaries Expense		93,500
	Supplies Expense		106,600
	Depreciation Expense, Building		12,000
	Depreciation Expense, Equipment		24,000
	Interest Expense		9,600
	Income Tax Expense		5,200
	<i>(To close expenses)</i>		
31	Income Summary	19,740	
	Retained Earnings		19,740
	<i>(To close Income Summary)</i>		

## Discussion Questions

---

1. How does accrual-basis net income differ from cash-basis net income?
2. Explain when revenue may be recognized in the accounting records.
3. What happens during the accounting cycle?
4. Provide two examples of transactions that begin and end at a particular point-in-time and two examples of continuous transactions.
5. Why are adjusting entries needed?
6. What accounting concepts require that adjusting entries be employed?
7. Describe the recording of transactions that begin and end at a particular point-in-time and continuous transactions. In your answer, be sure to refer to within-period journal entries and adjusting entries.
8. For each of the four categories of adjusting entries, describe the business activity that produces circumstances requiring adjustment.
9. What is the difference between an *accrual* and a *deferral*?
10. Which type of adjustment will (a) increase both assets and revenues, (b) increase revenues and decrease liabilities, (c) increase expenses and decrease assets, and (d) increase both expenses and liabilities?
11. How is the amount for an interest expense (or interest revenue) adjustment determined?
12. Describe the effect on the financial statements when an adjustment is prepared that records (a) unrecorded revenue and (b) unrecorded expense.
13. On the basis of what you have learned about adjustments, why do you think that adjusting entries are made on the last day of the accounting period rather than at several earlier times during the accounting period?
14. What is the purpose of closing entries?
15. Describe the four steps in the closing process.
16. Identify each of the following categories of accounts as temporary or permanent: assets, liabilities, equity, revenues, expenses, dividends. How is the distinction between temporary and permanent accounts related to the closing process?
17. Why are only the balance sheet accounts permanent?
18. List the seven steps in the accounting cycle in the order in which they occur.
19. (Appendix) What is the relationship between the accounting cycle and the worksheet?
20. (Appendix) Describe the structure of the worksheet and the accounting information it contains.

## Multiple-Choice Exercises

---

### 3-1 Which of the following statements is true?

- a. Under cash-basis accounting, revenues are recorded when earned and expenses are recorded when incurred.
- b. Generally accepted accounting principles require companies to use cash-basis accounting.
- c. The key elements of accrual-basis accounting are the revenue recognition principle, the matching principle, and the historical cost principle.
- d. Accrual-basis accounting records both cash and noncash transactions when they occur.

**3-2** In December 2009, Swanstrom, Inc., receives a cash payment of \$3,000 for services performed in December 2009 and a cash payment of \$10,000 for services to be performed in January 2010. Swanstrom also receives the December utility bill for \$800. For December 2009, under the accrual basis of accounting, Swanstrom would recognize:

- a. \$13,000 of revenue and \$800 of expense
- b. \$13,000 of revenue and \$0 of expense
- c. \$3,000 of revenue and \$800 of expense
- d. \$3,000 of revenue and \$0 of expense

**3-3 Which transaction would require adjustment at December 31?**

- The sale of merchandise for cash on December 30.
- A one-year insurance policy (which is immediately effective) was purchased on December 1.
- Common stock was issued on November 30.
- Salaries were paid to employees on December 31 for work performed in December.

**3-4 Which of the following statements is not true?**

- The cash account will always be affected by adjusting journal entries.
- Adjusting entries are necessary because timing differences exist between when a revenue or expense is recognized and cash is received or paid.
- Adjusting entries always affect one revenue or expense account and one asset or liability account.
- Adjusting entries can be classified as either accruals or deferrals.

**3-5 Dallas Company loaned \$10,000 to Ewing Company on December 1, 2009. Ewing will pay Dallas \$600 of interest (\$50 per month) on November 30, 2010. Dallas's adjusting entry at December 31, 2009 is:**

- |                  |    |    |
|------------------|----|----|
| Interest Expense | 50 |    |
| Cash             |    | 50 |
- |                     |    |    |
|---------------------|----|----|
| Interest Receivable | 50 |    |
| Interest Revenue    |    | 50 |
- |                  |    |    |
|------------------|----|----|
| Cash             | 50 |    |
| Interest Revenue |    | 50 |
- No adjusting entry is required.

**3-6 Ron's Diner received the following bills for December 2009 utilities:**

- Electricity: \$400 on December 29, 2009
- Telephone: \$150 on January 5, 2010

Both bills were paid on January 10, 2010. On the December 31, 2009 balance sheet, Ron's Diner will report accrued expenses of:

- \$550
- \$400
- \$150
- \$ 0

**3-7 In September 2009, GolfWorld Magazine obtained \$12,000 of subscriptions for one year of magazines and credited Unearned Subscription Revenue. The magazines will begin to be delivered in October 2009. At December 31, 2009, GolfWorld should make the following adjustment:**

- Debit Subscription Revenue by \$3,000 and credit Unearned Subscription Revenue by \$3,000.
- Debit Subscription Revenue by \$9,000 and credit Unearned Subscription Revenue by \$9,000.
- Debit Unearned Subscription Revenue by \$3,000 and credit Subscription Revenue by \$3,000.
- Debit Unearned Subscription Revenue by \$9,000 and credit Subscription Revenue by \$9,000.

**3-8 Hurd, Inc., prepays rent every three months on March 1, June 1, September 1, and December 1. Rent for the three months totals \$2,700. On December 31, 2009, Hurd, Inc., will report:**

- Prepaid Rent of \$2,700
- Prepaid Rent of \$1,800
- Prepaid Rent of \$ 900
- Prepaid Rent of \$ 0

**3-9 Which of the following statements is incorrect regarding preparing financial statements?**

- The adjusted trial balance is the primary source of information needed to prepare the financial statements.
- The financial statements are prepared in the following order: (1) the income statement; (2) the statement of retained earnings; (3) the balance sheet.
- The adjusted trial balance lists only the balance sheet accounts in a “debit” and “credit” format.
- The income statement and the balance sheet are related through the retained earnings account.

**3-10 Reinhardt Company reported revenues of \$110,000 and expenses of \$75,000 on its 2009 income statement. In addition, Reinhardt paid \$4,000 of dividends during the 2009. On December 31, 2009, Reinhardt prepared closing entries. The net effect of the closing entries on retained earnings was a(n):**

- Decrease of \$ 4,000
- Decrease of \$79,000
- Increase of \$35,000
- Increase of \$31,000

**3-11 Which of the following is true regarding the accounting cycle?**

- The temporary accounts are closed after the financial statements are prepared.
- The accounts are adjusted after preparing the financial statements.
- Journal entries are made prior to the transaction being analyzed.
- A trial balance is usually prepared after the accounts are closed.

## Cornerstone Exercises

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**Cornerstone Exercise 3-12 ACCRUAL- AND CASH-BASIS REVENUE**

McDonald Music sells used CDs for \$2.00 each. During the month of April, McDonald Music sold 21,200 CDs for cash and 7,300 CDs on credit. McDonald’s cash collections in April included the \$42,400 for the 21,200 CDs sold for cash, \$11,800 for CDs sold on credit during the previous month, and \$8,100 for CDs sold on credit during April.

**Required:**

Calculate the amount of revenue recognized in April under (a) the cash-basis of accounting and (b) the accrual-basis of accounting.

**OBJECTIVE** > 1**CORNERSTONE 3-1****Cornerstone Exercise 3-13 ACCRUAL- AND CASH-BASIS EXPENSES**

Speedy Delivery Company provides next-day delivery across the southeastern United States. During May, Speedy incurred \$120,000 in fuel costs. Speedy paid \$90,000 of the fuel cost in May, with the remainder paid in June. In addition, Speedy paid \$15,000 in May to another fuel supplier in an effort to build up its supply of fuel.

**Required:**

Calculate the amount of expense recognized in May under (a) the cash-basis of accounting and (b) the accrual-basis of accounting.

**OBJECTIVE** > 1**CORNERSTONE 3-1****Cornerstone Exercise 3-14 REVENUE AND THE RECOGNITION PRINCIPLE**

Heartstrings Gift Shoppe sells an assortment of gifts for any occasion. During October, Heartstrings started a Gift-of-the-Month program. Under the terms of this program, Heartstrings would select and deliver a random gift each month, over the next 12 months, to the person the customer selects as a recipient. During October, Heartstrings sold 20 of these packages for a total of \$8,400 in cash.

**OBJECTIVE** > 2**CORNERSTONE 3-1**

**Required:**

For the month of October, calculate the amount of revenue that Heartstrings will recognize.

**OBJECTIVE** > **2**  
**CORNERSTONE 3-1**

**Cornerstone Exercise 3-15 EXPENSES AND THE MATCHING PRINCIPLE**

The following information describes transactions for Morgenstern Advertising Company during July:

- On July 5, Morgenstern purchased and received \$21,500 of supplies on credit from Drexel Supply Inc. Morgenstern paid \$18,500 cash to Drexel and used \$16,200 of the supplies during July.
- Morgenstern paid \$9,600 to salespeople for salaries earned during July. An additional \$1,610 was owed to salespeople at July 31 for salary earned during the month.
- Paid \$1,900 to the local utility company for electric service. Electric service in July was \$1,650 of the \$1,900 total bill.

**Required:**

Calculate the amount of expense recognized in July under (a) the cash-basis of accounting and (b) the accrual-basis of accounting.

**OBJECTIVE** > **3**  
**CORNERSTONE 3-2**

**Cornerstone Exercise 3-16 IDENTIFICATION OF ADJUSTING ENTRIES**

Singleton, Inc., had the following transactions during the year.

- Merchandise was sold to customers on credit.
- Purchased equipment to be used in the operation of its business.
- A two-year insurance contract was purchased.
- Received cash for services to be performed over the next year.
- Paid monthly employee salaries.
- Borrowed money from First Bank by signing a note payable due in five years.

**Required:**

Identify and explain why each transaction may or may not require adjustment.

**OBJECTIVE** > **4**  
**CORNERSTONE 3-3**

**Cornerstone Exercise 3-17 ACCRUED REVENUE ADJUSTING ENTRIES**

Powers Rental Service had the following items that require adjustment at year-end.

- Earned \$6,420 of revenue from the rental of equipment for which the customer had not yet paid.
- Interest of \$400 on a note receivable has been earned but not yet received.

**Required:**

- Prepare the adjusting entries needed at December 31.
- What is the effect on the financial statements if these adjusting entries are not made?

**OBJECTIVE** > **4**  
**CORNERSTONE 3-4**

**Cornerstone Exercise 3-18 ACCRUED EXPENSE ADJUSTING ENTRIES**

Manning Manufacturing Inc. had the following items that require adjustment at year-end.

- Salaries of \$3,180 which were earned in December are unrecorded and unpaid.
- Used \$2,598 of utilities in December which are unrecorded and unpaid.
- Interest of \$1,200 on a note payable has not been recorded or paid.

**Required:**

- Prepare the adjusting entries needed at December 31.
- What is the effect on the financial statements if these adjusting entries are not made?

**OBJECTIVE** > **4**  
**CORNERSTONE 3-5**

**Cornerstone Exercise 3-19 DEFERRED REVENUE ADJUSTING ENTRIES**

Olney Cleaning Company had the following items that require adjustment at year-end.

- For one cleaning contract, \$14,000 cash was received in advance. The cash was credited to unearned revenue upon receipt. At year-end, \$3,750 of the service revenue was still unearned.
- For another cleaning contract, \$9,500 cash was received in advance and credited to unearned revenue upon receipt. At year-end, \$4,300 of the services had been provided.

**Required:**

- Prepare the adjusting journal entries needed at December 31.
- What is the effect on the financial statements if these adjusting entries are not made?
- What is the balance in unearned revenue at December 31 related to the two cleaning contracts?

**Cornerstone Exercise 3-20 DEFERRED EXPENSE ADJUSTING ENTRIES**

Best Company had the following items that require adjustment at year-end.

- Cash for equipment rental in the amount of \$4,200 was paid in advance. The \$4,200 was debited to prepaid equipment rent when paid. At year-end, \$3,150 of the prepaid rent had been used.
- Cash for insurance in the amount of \$6,500 was paid in advance. The \$6,500 was debited to prepaid insurance when paid. At year-end, \$1,300 of the prepaid insurance was still unused.

**Required:**

- Prepare the adjusting journal entries needed at December 31.
- What is the effect on the financial statements if these adjusting entries are not made?
- What is the balance in prepaid equipment rent and insurance expense at December 31?

**Cornerstone Exercise 3-21 ADJUSTMENT FOR SUPPLIES**

Pain-Free Dental Group, Inc., purchased dental supplies of \$15,500 during the year. At the end of the year, a physical count of supplies showed \$2,300 of supplies on hand.

**Required:**

- Prepare the adjusting entry needed at the end of year.
- What is the amount of supplies reported on Pain-Free's balance sheet at the end of the year and supplies expense reported on the income statement?

**Cornerstone Exercise 3-22 ADJUSTMENT FOR DEPRECIATION**

LaGarde Company has a machine that it purchased for \$125,000 on January 1. Annual depreciation on the machine is estimated to be \$11,400.

**Required:**

- Prepare the adjusting entry needed at the end of the year.
- What is the book value of the machine reported on LaGarde's balance sheet at the end of the year?

**Cornerstone Exercise 3-23 FINANCIAL STATEMENT EFFECTS OF ADJUSTING ENTRIES**

When adjusting entries were made at the end of the year, the accountant for Parker Company did not make the following adjustments.

- \$2,900 of wages had been earned but were unpaid
- \$3,750 of revenue had been earned but was uncollected and unrecorded.
- \$2,400 of revenue had been earned. The customer had prepaid for this service and the amount was originally recorded in the Unearned Revenue account.
- \$1,200 of insurance coverage had expired. Insurance had been initially recorded in the Prepaid Insurance account.

**Required:**

Identify the effect on the financial statements of the adjusting entries that were omitted.

**OBJECTIVE** > **4****CORNERSTONE 3-6****OBJECTIVE** > **4****CORNERSTONE 3-6****OBJECTIVE** > **4****CORNERSTONE 3-6****OBJECTIVE** > **4****CORNERSTONE 3-3****CORNERSTONE 3-4****CORNERSTONE 3-5****CORNERSTONE 3-6**

**OBJECTIVE** > **5** **Cornerstone Exercise 3-24 PREPARING AN INCOME STATEMENT**

Sparrow Company had the following adjusted trial balance at December 31, 2009.

	Debit	Credit
Cash	\$ 3,300	
Accounts Receivable	5,240	
Prepaid Insurance	4,400	
Equipment	40,000	
Accumulated Depreciation, Equipment		\$ 24,000
Accounts Payable		3,100
Salaries Payable		4,400
Unearned Revenue		3,750
Common Stock		8,000
Retained Earnings		2,130
Dividends	10,500	
Service Revenue		95,000
Salaries Expense	48,000	
Rent Expense	15,000	
Insurance Expense	2,200	
Depreciation Expense	4,000	
Income Tax Expense	7,740	
Total	<u>\$140,380</u>	<u>\$ 140,380</u>

**Required:**

Prepare a single-step income statement for Sparrow Company for 2009.

**OBJECTIVE** > **5** **Cornerstone Exercise 3-25 PREPARING A STATEMENT OF RETAINED EARNINGS**

Refer to the adjusted trial balance in **Cornerstone Exercise 3-24**.

**Required:**

Prepare a statement of retained earnings for Sparrow Company for 2009.

**OBJECTIVE** > **5** **Cornerstone Exercise 3-26 PREPARING A BALANCE SHEET**

Refer to the adjusted trial balance in **Cornerstone Exercise 3-24**.

**Required:**

Prepare a classified balance sheet for Sparrow Company at December 31, 2009.

**OBJECTIVE** > **6** **Cornerstone Exercise 3-27 PREPARING AND ANALYZING CLOSING ENTRIES**  
**CORNERSTONE 3-7**

Refer to the adjusted trial balance in **Cornerstone Exercise 3-24**.

**Required:**

1. Prepare the closing entries for Sparrow Company at December 31, 2009.
2. How does the closing process affect retained earnings?

**OBJECTIVE** > **7** **Cornerstone Exercise 3-28 THE ACCOUNTING CYCLE**

The following is a list of steps in the accounting cycle.

- a. Post to the ledger
- b. Close the accounts
- c. Analyze transactions
- d. Adjust the accounts
- e. Prepare financial statements
- f. Journalize transactions
- g. Prepare a trial balance

**Required:**

1. Arrange the steps of the accounting cycle in proper order.
2. Explain what occurs at each step of the accounting cycle.

## Exercises

### Exercise 3-29 ACCRUAL- AND CASH-BASIS EXPENSE RECOGNITION

OBJECTIVE > 1

The following information is taken from the accrual accounting records of Kroger Sales Company:

- During January, Kroger paid \$8,500 for supplies to be used in sales to customers during the next two months (February and March). The supplies will be used evenly over the next two months.
- Kroger pays its employees at the end of each month for salaries earned during that month. Salaries paid at the end of February and March amounted to \$4,750 and \$5,100, respectively.
- Kroger placed an advertisement in the local newspaper during March at a cost of \$700. The ad promoted the pre-Spring sale during the last week in March. Kroger did not pay for the newspaper ad until mid-April.

#### Required:

- Under cash-basis accounting, how much expense should Kroger report for February and March?
- Under accrual-basis accounting, how much expense should Kroger report for February and March?
- Which basis of accounting provides the most useful information for decision-makers? Why?

### Exercise 3-30 REVENUE RECOGNITION

OBJECTIVE > 2

Each of the following situations relates to the recognition of revenue:

- A store sells a gift card in December which will be given as a Christmas present. The card is not redeemed until January.
- A furniture store sells furniture in June with no payments and no interest for six months.
- An airline sells an airline ticket in February (and collects the fare in February) for a flight in March to a spring break destination.
- A theme park sells a season pass which allows entrance into the park for an entire year.
- A package delivery service delivers a package in October but doesn't bill the customer and receive payment until November.

#### Required:

For each situation, indicate when the company should recognize revenue.

### Exercise 3-31 REVENUE AND EXPENSE RECOGNITION

OBJECTIVE > 2

Electronic Repair Company repaired a high-definition television for Sarah Merrifield in December 2009. Sarah paid \$50 at the time of the repair and agreed to pay Electronic Repair Company \$50 each month for five months beginning on January 15, 2010. Electronic Repair Company used \$80 of supplies, which were purchased in November 2009, to repair the television.

#### Required:

- In what month or months should revenue from this service be recorded by Electronic Repair Company?
- In what month or months should the expense related to the repair of the television be recorded by Electronic Repair Company?
- Describe the accounting principles used to answer the above questions.

### Exercise 3-32 CASH-BASIS AND ACCRUAL-BASIS ACCOUNTING

OBJECTIVE > 1 2

The records of Summers Building Company reveal the following information for 2009.

- Cash receipts during 2009 (including \$50,000 paid by stockholders in exchange for common stock) were \$220,000.
- Cash payments during 2009 (including \$8,000 of dividends paid to stockholders) were \$132,000.

- c. Total selling price of services billed to customers during 2009 was \$183,000.
- d. Salaries earned by employees during 2009 was \$107,000.
- e. Cost of supplies used during 2009 in operation of the business was \$42,000.

**Required:**

1. Calculate Summers Building Company's net income for 2009 on an accrual basis.
2. Calculate Summers Building Company's net income for 2009 on a cash-basis.
3. Explain how the cash-basis of accounting allows for the management of income.

**OBJECTIVE** > **2****Exercise 3-33 REVENUE RECOGNITION AND MATCHING**

Omega Transportation Inc., headquartered in Atlanta, Georgia, engaged in the following transactions:

- billed customers \$2,387,000 for transportation services
- collected cash from customers in the amount of \$1,364,000
- purchased fuel supplies for \$1,262,000 cash
- used fuel supplies that cost \$1,253,000
- employees earned salaries of \$256,000
- paid employees \$25,000 cash for salaries

**Required:**

Determine the amount of sales revenue and total expenses for Omega's income statement.

**OBJECTIVE** > **2****Exercise 3-34 RECOGNIZING EXPENSES**

Treadway Dental Services gives each of its patients a toothbrush with the name and phone number of the dentist office and a logo imprinted on the brush. Treadway purchased 15,000 of the toothbrushes in October 2009 for \$3,000. The toothbrushes were delivered in November and paid for in December 2009. Treadway began to give the patients the toothbrushes in February 2010. By the end of 2010, 5,000 of the toothbrushes remained in the supplies account.

**Required:**

1. How much expense should be recorded for the 15,000 toothbrushes in 2009 and 2010 to properly match expenses with revenues?
2. Describe how the 5,000 toothbrushes that remain in the supplies account will be handled in 2011.

**OBJECTIVE** > **1** **2****Exercise 3-35 REVENUE RECOGNITION AND MATCHING**

Carrico Advertising Inc. performs advertising services for several Fortune 500 companies. The following information describes Carrico's activities during 2009.

- a. At the beginning of 2009, customers owed Carrico \$43,700 for advertising services performed during 2008. During 2009, Carrico performed an additional \$692,400 of advertising services on account. Carrico collected \$708,700 cash from customers during 2009.
- b. At the beginning of 2009, Carrico had \$15,000 of supplies on hand for which it owed suppliers \$8,150. During 2009, Carrico purchased an additional \$12,000 of supplies on credit. Carrico also paid \$19,300 cash owed to suppliers for goods previously purchased on credit. Carrico had \$2,800 of supplies on hand at the end of 2009.
- c. Carrico's 2009 operating and interest expenses were \$428,000 and \$137,000, respectively.

**Required:**

1. Calculate Carrico's 2009 income before taxes.
2. Calculate the amount of Carrico's accounts receivable, supplies, and accounts payable at December 31, 2009. Explain the underlying principles behind why these three accounts exist.

**OBJECTIVE** > **3****Exercise 3-36 IDENTIFICATION OF ADJUSTING ENTRIES**

Conklin Services prepares financial statements only once per year using an annual accounting period ending on December 31. Each of the following statements describes an entry made by Conklin on December 31 of a recent year.

- a. On December 31, Conklin completed a service agreement for Pizza Planet and recorded the related revenue. The job started in August.
- b. Conklin provides weekly service visits to the local C.J. Nickel department store to check and maintain various pieces of computer printing equipment. On December 31, Conklin recorded revenue for the visits completed during December. The cash will not be received until January.
- c. Conklin's salaried employees are paid on the last day of every month. On December 31, Conklin recorded the payment of December salaries.
- d. Conklin's hourly wage employees are paid every Friday. On December 31, Conklin recorded as payable the wages for the first three working days of the week in which the year ended.
- e. On December 31, Conklin recorded the receipt of a shipment of office supplies from Office Supplies, Inc. to be paid for in January.
- f. On December 31, Conklin recorded the estimated use of supplies for the year. The supplies were purchased for cash earlier in the year.
- g. Early in December, Conklin was paid in advance by Parker Enterprises for two months of weekly service visits. Conklin recorded the advance payment as a liability. On December 31, Conklin recorded revenue for the service visits to Parker Enterprises that were completed during December.
- h. On December 31, Conklin recorded depreciation expense on office equipment for the year.

**Required:**

Indicate whether each entry is an *adjusting entry* or a *regular journal entry*, and if it is an adjusting entry, identify it as one of the following types: (1) revenue recognized before collection, (2) expense recognized before payment, (3) revenue recognized after collection, or (4) expense recognized after payment.

**Exercise 3-37 IDENTIFICATION AND ANALYSIS OF ADJUSTING ENTRIES****OBJECTIVE**  **3**

Medina Motor Service is preparing adjusting entries for the year ended December 31, 2009. The following items describe Medina's continuous transactions during 2009:

- a. Medina's salaried employees are paid on the last day of every month.
- b. Medina's hourly employees are paid every other Friday for the preceding two weeks' work. The next payday falls on January 5, 2010.
- c. In November 2009, Medina borrowed \$600,000 from Bank One giving a 7.6 percent note payable with interest due in January 2010. The note was properly recorded.
- d. Medina rents a portion of its parking lot to the neighboring business under a long-term lease agreement that requires payment of rent six months in advance on April 1 and October 1 of each year. The October 1, 2009, payment was made and recorded as prepaid rent.
- e. Medina's service department recognizes the entire revenue on every auto service job when the job is complete. At December 31, several service jobs are in process.
- f. Medina recognizes depreciation on shop equipment annually at the end of each year.
- g. Medina purchases all of its office supplies from Office Supplies Inc. All purchases are recorded in the office supplies inventory account. Supplies expense is calculated and recorded annually at the end of each year.

**Required:**

Indicate whether or not each item requires an adjusting entry at December 31, 2009. If an item requires an adjusting entry, indicate which accounts are increased by the adjustment and which are decreased.

**Exercise 3-38 REVENUE ADJUSTMENTS****OBJECTIVE**  **4**

Sentry Transport, Inc., of Atlanta provides in-town parcel delivery services in addition to a full range of passenger services. Sentry engaged in the following activities during the current year:

- a. Sentry received \$1,200 cash in advance from Rich's Department Store for an estimated 200 deliveries during December 2009 and January and February of 2010.

The entire amount was recorded as unearned revenue when received. During December 2009, 60 deliveries were made for Rich's.

- b. Sentry operates several small buses that take commuters from suburban communities to the central downtown area of Atlanta. The commuters purchase, in advance, tickets for 50 one-way trips. Each 50-ride ticket costs \$180. At the time of purchase, Sentry credits the cash received to unearned revenue. At year-end, Sentry estimates that revenue from 1,800 one-way rides has been earned.
- c. Sentry operates several buses that provide transportation for the clients of a social service agency in Atlanta. Sentry bills the agency quarterly at the end of January, April, July, and October for the service performed that quarter. The contract price is \$900 per quarter. Sentry follows the practice of recognizing revenue from this contract in the period in which the service is performed.
- d. On December 23, Delta Airlines chartered a bus to transport its marketing group to a meeting at a resort in West Virginia. The meeting will be held during the last week in January 2010, and Delta agrees to pay for the entire trip on the day the bus departs. At year-end, none of these arrangements have been recorded by Sentry.

**Required:**

1. Prepare adjusting entries at December 31 for these four activities.
2. What would be the effect on revenue if the adjusting entries were not made?

**OBJECTIVE** > **4**

**Exercise 3-39 EXPENSE ADJUSTMENTS**

Faraday Electronic Service repairs stereos and DVD players. During a recent year, Faraday engaged in the following activities:

- a. On September 1, Faraday paid Wausau Insurance \$1,860 for its liability insurance for the next 12 months. The full amount of the prepayment was debited to prepaid insurance.
- b. At December 31, Faraday estimates that \$830 of utility costs are unrecorded and unpaid.
- c. Faraday rents its testing equipment from JVC. Equipment rent in the amount of \$1,440 is unpaid and unrecorded at December 31.
- d. In late October, Faraday agreed to become the sponsor for the sports segment of the evening news program on a local television station. The station billed Faraday \$3,300 for three months' sponsorship—November 2009, December 2009, and January 2010—in advance. When these payments were made, Faraday debited prepaid advertising expense. At December 31, two months' advertising expense has been used and one month remains unused.

**Required:**

1. Prepare adjusting entries at December 31 for these four activities.
2. What would be the effect on expenses if the adjusting entries were not made?

**OBJECTIVE** > **4**

**Exercise 3-40 PREPAYMENTS, COLLECTIONS IN ADVANCE**

Greensboro Properties, Inc., owns a building in which it leases office space to small businesses and professionals. During 2009, Greensboro Properties engaged in the following transactions:

- a. On March 1, Greensboro Properties paid \$14,400 in advance to Patterson Account Services for billing services for the entire year beginning March 1, 2009. The full amount of the prepayment was debited to prepaid rent.
- b. On May 1, Greensboro Properties received \$24,000 for one year's rent from Angela Cottrell, a lawyer and new tenant. Greensboro Properties credited unearned rental revenue for the full amount collected from Cottrell.
- c. On July 31, Greensboro Properties received \$480,000 for six months' rent on an office building that is occupied by Newnan and Calhoun, a regional accounting firm. The rental period begins on August 1, 2009. The full amount received was credited to unearned rental revenue.

- d. On November 1, Greensboro Properties paid \$3,300 to Pinkerton Security for three months' security services beginning on that date. The entire amount was debited to prepaid professional services.

**Required:**

1. Prepare the journal entry to record the receipt or payment of cash for each of the transactions.
2. Prepare the adjusting entries you would make at December 31, 2009, for each of these items.
3. What would be the effect on the income statement and balance sheet if these entries were not recorded?

**Exercise 3-41 PREPAYMENT OF EXPENSES****OBJECTIVE** > **4**

JDM, Inc., made the following prepayments for expense items during 2009:

- a. Prepaid building rent for one year on April 1. JDM paid \$6,300, debiting prepaid rent for the amount paid.
- b. Prepaid six months' insurance on October 1 by paying \$870. Prepaid insurance was debited.
- c. Purchased \$3,750 of office supplies on October 15, debiting office supplies inventory for the full amount. Office supplies costing \$385 remain unused at Dec. 31, 2009.
- d. Paid \$2,880 for a 12-month service contract for maintenance on a computer. The contract begins November 1. The full amount of the payment was debited to prepaid maintenance.

**Required:**

1. Prepare journal entries to record the payment of cash for each transaction.
2. Prepare adjusting entries for the prepayments at December 31, 2009.
3. For all of the above items, assume that the accountant failed to make the adjusting entries. What would be the effect on net income?

**Exercise 3-42 ADJUSTMENT FOR SUPPLIES****OBJECTIVE** > **4**

The downtown Chicago Nieman Marcus store purchases large quantities of supplies, including plastic garment bags and paper bags and boxes. At December 31, 2009, the following information is available concerning these supplies:

Supplies inventory, 1/1/2009	\$ 4,150
Supplies inventory, 12/31/2009	5,220
Supplies purchased for cash during 2009	15,700

All purchases of supplies during the year are debited to the supplies inventory.

**Required:**

1. What is the expense reported on the income statement associated with the use of supplies during 2009?
2. What is the proper adjusting entry at December 31, 2009?
3. By how much would assets and income be overstated or understated if the adjusting entry were not recorded?

**Exercise 3-43 ADJUSTING ENTRIES****OBJECTIVE** > **4**

Allentown Services, Inc., is preparing adjusting entries for the year ending December 31, 2009. The following data are available:

- a. Interest is owed at December 31, 2009, on a six-month, 9 percent note. Allentown borrowed \$100,000 from NBD on September 1, 2009.
- b. Allentown provides daily building maintenance services to Mack Trucks for a quarterly fee of \$2,400, payable on the fifteenth of the month following the end of each quarter. No entries have been made for the services provided to Mack Trucks during the quarter ended December 31, and the related bill will not be sent until January 15, 2010.

- c. At the beginning of 2009, the cost of office supplies on hand was \$1,220. During 2009, office supplies with a total cost of \$6,480 were purchased from Office Depot and debited to office supplies inventory. On December 31, 2009, Allentown determined the cost of office supplies on hand to be \$970.
- d. On September 23, 2009, Allentown received a \$6,300 payment from Bethlehem Steel for nine months of maintenance services beginning on October 1, 2009. The entire amount was credited to unearned revenue when received.

**Required:**

1. Prepare the appropriate adjusting entries at December 31, 2009.
2. What would be the effect on the balance sheet and the income statement if the accountant failed to make the above adjusting entries?

**OBJECTIVE** > **4****Exercise 3-44 ADJUSTING ENTRIES**

Reynolds Computer Service offers data processing services to retail clothing stores. The following data have been collected to aid in the preparation of adjusting entries for Reynolds Computer Service for 2009:

- a. Computer equipment was purchased from IBM in 2006 at a cost of \$540,000. Annual depreciation is \$72,500.
- b. A fire insurance policy for a two-year period beginning September 1, 2009, was purchased from Good Hands Insurance Company for \$10,320 cash. The entire amount of the prepayment was debited to prepaid insurance. (Assume that the beginning balance of prepaid insurance was \$0 and that there were no other debits or credits to that account during 2009.)
- c. Reynolds has a contract to perform the payroll accounting for Dayton's Department Stores. At the end of 2009, \$8,400 of services have been performed under this contract but are unbilled.
- d. Reynolds rents 12 computer terminals for \$40 per month per terminal from Extreme Terminals Inc. At December 31, 2009, Reynolds owes Extreme Terminals for half a month's rent on each terminal. The amount owed is unrecorded.
- e. Perry's Tax Service prepays rent for time on Reynolds' computer. When payments are received from Perry's Tax Service, Reynolds credits unearned revenue. At December 31, 2009, Reynolds has earned \$1,430 for computer time used by Perry's Tax Service during December 2009.

**Required:**

1. Prepare adjusting entries for each of the transactions.
2. What would be the effect on the balance sheet and the income statement if the accountant failed to make the above adjusting entries?

**OBJECTIVE** > **4****Exercise 3-45 EFFECT OF ADJUSTMENTS ON THE FINANCIAL STATEMENTS**

VanBrush Enterprises, a painting contractor, prepared the following adjusting entries at year-end:

a.	Wages Expense	3,700	
	Wages Payable		3,700
b.	Accounts Receivable	6,500	
	Service Revenue		6,500
c.	Unearned Revenue	5,245	
	Service Revenue,		
	Advertising		5,245
d.	Rent Expense	3,820	
	Prepaid Rent		3,820

**Required:**

Show the effect of these adjustments on (1) assets, liabilities, and equity and (2) revenues, expenses, and net income.

**Exercise 3-46 PREPARATION OF CLOSING ENTRIES**

OBJECTIVE &gt; 6

Grand Rapids Consulting, Inc., began 2009 with a retained earnings balance of \$38,100 and has the following accounts and balances at year-end:



Sales Revenue	\$155,000
Salaries Expense	83,000
Rent Expense	15,000
Utilities Expense	7,900
Office Supplies Expense	4,200
Income Taxes Expense	12,300
Dividends (declared and paid)	16,400

**Required:**

1. Prepare the closing entries made by Grand Rapids Consulting at the end of 2009.
2. Prepare Grand Rapids Consulting's statement of retained earnings for 2009.

**Exercise 3-47 PREPARATION OF CLOSING ENTRIES**

OBJECTIVE &gt; 6

James and Susan Morley recently converted a large turn-of-the-century house into a hotel and incorporated the business as Saginaw Enterprises. Their accountant is inexperienced and has made the following closing entries at the end of Saginaw's first year of operations:

Income Summary	210,000	
Service Revenue		177,000
Accumulated Depreciation		33,000
Depreciation Expense	33,000	
Income Taxes Expense	8,200	
Utilities Expense	12,700	
Wages Expense	66,000	
Supplies Expense	31,000	
Accounts Payable	4,500	
Income Summary		155,400
Income Summary	54,600	
Retained Earnings		54,600
Dividends	3,200	
Income Summary		3,200

**Required:**

1. Indicate what is wrong with the closing entries above.
2. Prepare the correct closing entries. Assume that all necessary accounts are presented above and that the amounts given are correct.
3. Explain why closing entries are necessary.

**Exercise 3-48 PREPARATION OF A WORKSHEET**

OBJECTIVE &gt; 8

Unadjusted account balances at December 31, 2009, for Rapisarda Company at the top of the next page.

The following data are not yet recorded:

- a. Depreciation on the equipment is \$25,000.
- b. Unrecorded wages owed at December 31, 2009: \$2,000.
- c. Prepaid rent at December 31, 2009: \$10,000.
- d. Income tax rate: 30 percent.

**Required:**

Prepare a completed worksheet for Rapisarda Company.

Account Titles	Debit	Credit
Cash	\$ 2,000	
Accounts Receivable	33,000	
Prepaid Rent	26,000	
Equipment	211,000	
Accumulated Depreciation, Equipment		\$ 75,000
Other Assets	24,000	
Accounts Payable		12,000
Note Payable (due in 10 years)		40,000
Common Stock		100,000
Retained Earnings, 12/31/2008		11,000
Service Revenue		243,000
Rent Expense	84,000	
Wages Expense	97,000	
Interest Expense	4,000	
Totals	<u>\$481,000</u>	<u>\$481,000</u>

## Problem Set A

### OBJECTIVE > 1 Problem 3-49A CASH-BASIS AND ACCRUAL-BASIS INCOME

George Hathaway, an electrician, entered into an agreement with a real estate management company to perform all maintenance of basic electrical systems and air-conditioning equipment in the apartment buildings under the company's management. The agreement, which is subject to annual renewal, provides for the payment of a fixed fee of \$6,000 on January 1 of each year plus amounts for parts and materials billed separately at the end of each month. Amounts billed at the end of one month are collected in the next month. During the first three months of 2009, George makes the following additional billings and cash collections:

	Billings for Parts and Materials	Cash Collected	Cash Paid for Parts and Materials	Cost of Parts and Materials Used
January	\$420	\$6,110*	\$310	\$320
February	0	420	290	250
March	330	0	300	300

\*Includes \$110 for parts and materials billed in December 2008.

#### Required:

1. Calculate the amount of cash-basis income reported for each of the first three months.
2. Calculate the amount of accrual-basis income reported for each of the first three months.
3. Why do decision-makers prefer the accrual basis of accounting?

### OBJECTIVE > 2 Problem 3-50A REVENUE RECOGNITION AND MATCHING

Security Specialists performs security services for local businesses. During 2009, Security Specialists performed \$900,000 of security services and collected \$930,000 cash from customers. Security Specialist's employees earned salaries of \$42,000 per month. During 2009, Security Services paid salaries of \$495,000 cash for work performed. At the beginning of 2009, Security Specialists had \$3,000 of supplies on hand. Supplies of \$80,000 were purchased during the year, and \$11,000 of supplies were on hand at the end of the year. Other general and administrative expenses incurred during the year were \$31,000.

#### Required:

1. Calculate revenue for 2009.
2. Calculate expenses for 2009.

3. Prepare the 2009 income statement.
4. Describe the accounting principles used to prepare the income statement.

### Problem 3-51A IDENTIFICATION AND PREPARATION OF ADJUSTING ENTRIES

OBJECTIVE > 3 4



Kuepper's Day Care is a large day-care center in South Orange, New Jersey. The day-care center serves several nearby businesses, as well as a number of individual families. The businesses pay \$6,180 per child per year for day-care services for their employees' children. The businesses pay in advance on a quarterly basis. For individual families, day-care services are provided monthly and billed at the beginning of the next month. The following transactions describe Kuepper's activities during December 2009:

- a. Day-care service in the amount of \$12,450 was provided to individual families during December 2009. These families will not be billed until January 2010.
- b. At December 1, 2009, the balance in unearned revenue was \$43,775. At December 31, 2009, Kuepper determined that \$3,090 of this revenue was still unearned.
- c. On December 31, the day-care center collected \$131,325 from businesses for services to be provided in 2010.
- d. On December 31, 2009, the center recorded depreciation of \$2,675 on a bus that it uses for field trips.
- e. The day-care center had prepaid insurance at December 1, 2009, of \$4,200. An examination of the insurance policies indicates that prepaid insurance at December 31, 2009, is \$2,200.
- f. On December 1, Kuepper borrowed \$60,000 by issuing a five-year, \$60,000, 9 percent note payable.
- g. Interest on the \$60,000 note payable is unpaid and unrecorded at December 31.
- h. Salaries of \$25,320 are owed but unpaid on December 31.
- i. The inventory of disposable diapers, on December 1 is \$4,400. At December 31, the cost of diapers in inventory is \$890.

#### Required:

1. Identify whether each entry is an adjusting entry or a regular journal entry. If the entry is an adjusting entry, identify it as an accrued revenue, accrued expense, deferred revenue, or deferred expense.
2. Prepare the entries necessary to record the above transactions.

### Problem 3-52A PREPARATION OF ADJUSTING ENTRIES

OBJECTIVE > 4

Bartow Photographic Services takes wedding and graduation photographs. At December 31, the end of Bartow's accounting period, the following information is available:

- a. All wedding photographs are paid for in advance, and all cash collected for them is credited to unearned revenue. Except for a year-end adjusting entry, no other entries are made for revenue from wedding photographs. During the year, Bartow received \$42,600 for wedding photographs. At year-end, \$33,900 of the \$42,600 had been earned. The beginning-of-the-year balance of unearned revenue was zero.
- b. During December, Bartow photographed 60 members of the next year's graduating class of Shaw High School. The school has asked Bartow to print one copy of a photograph of each student for the school files; Bartow delivers these photographs on December 28 and will bill the school \$5.00 per student in January of next year. Revenue from photographs ordered by students will be recorded as the orders are received during the early months of next year.
- c. Developing and printing equipment rent of \$18,000 for one year beginning on August 1 was paid on August 1 to Nikon. When made, the payment was debited to prepaid rent.
- d. Depreciation on the firm's building for the current year is \$14,400.
- e. Wages of \$4,170 are owed but unpaid and unrecorded at January 31.
- f. Supplies inventory at the beginning of the year was \$3,200. During the year, supplies costing \$19,600 were purchased from Kodak. When the purchases were made, their cost was debited to supplies inventory. At year-end a physical inventory indicated that supplies costing \$4,100 were on hand.

**Required:**

1. Prepare the adjusting entries for each of these items.
2. By how much would net income be overstated or understated if the accountant failed to make the adjusting entries?

**OBJECTIVE** > **4**



**Problem 3-53A EFFECTS OF ADJUSTING ENTRIES ON THE ACCOUNTING EQUATION**

Four adjusting entries are shown below.

a.	Wages Expense	2,490	
	Wages Payable		2,490
b.	Accounts Receivable	3,350	
	Service Revenue		3,350
c.	Rent Expense	1,760	
	Prepaid Rent		1,760
d.	Unearned Service Revenue	4,130	
	Service Revenue		4,130

**Required:**

Analyze the adjusting entries and identify their effects on the financial statement accounts. (Ignore any income tax effects.) Use the following format for your answer:

Transaction	Assets	Liabilities	Beginning Common Stock	Retained Earnings	Revenues	Expenses

**OBJECTIVE** > **4** **5**



**Problem 3-54A ADJUSTING ENTRIES AND FINANCIAL STATEMENTS**

You have the following unadjusted trial balance for Rogers Corporation at December 31, 2009:

Rogers Corporation Unadjusted Trial Balance December 31, 2009		
Account	Debit	Credit
Cash	\$ 3,100	
Accounts Receivable	15,900	
Office Supplies Inventory	4,200	
Prepaid Rent	9,500	
Equipment	625,000	
Accumulated Depreciation, Equipment		\$ 104,000
Other Assets	60,900	
Accounts Payable		9,400
Unearned Revenue		11,200
Note Payable (due 2012)		50,000
Common Stock		279,500
Retained Earnings, 12/31/2008		37,000
Service Revenue		598,000
Wages Expense	137,000	
Rent Expense	229,000	
Interest Expense	4,500	
Total	\$1,089,100	\$1,089,100

At year-end, you have the following data for adjustments:

- a. An analysis indicates that prepaid rent on December 31 should be \$7,900.
- b. A physical inventory shows that \$1,100 of office supplies is on hand.

- c. Depreciation for 2009 is \$85,000.
- d. An analysis indicates that unearned revenue should be \$8,400.
- e. Wages in the amount of \$2,800 are owed but unpaid and unrecorded at year-end.
- f. Six months' interest at 9 percent on the note was paid on September 30. Interest for the period from October 1 to December 31 is unpaid and unrecorded.
- g. Income taxes at 30 percent are owed but unrecorded and unpaid.

**Required:**

1. Prepare the adjusting entries.
2. Prepare an income statement, a statement of changes in retained earnings, and a balance sheet using adjusted account balances.
3. Why would you not want to prepare financial statements until after the adjusting entries are made?

**Problem 3-55A INFERRING ADJUSTING ENTRIES FROM ACCOUNT BALANCE CHANGES****OBJECTIVE** > **4**

The following schedule shows all the accounts of Fresno Travel Agency that received year-end adjusting entries:

Account	Unadjusted Account Balance	Adjusted Account Balance
Prepaid Insurance	\$ 23,270	\$ 4,550
Prepaid Rent	3,600	4,800
Accumulated Depreciation	156,000	(a)
Wages Payable	0	3,770
Unearned Revenue, service	3,620	(b)
Service Revenue	71,600	73,920
Insurance Expense	0	(c)
Rent Expense	29,700	(d)
Depreciation Expense	0	16,000
Wages Expense	44,200	(e)

**Required:**

1. Calculate the missing amounts identified by the numbers (a) through (e).
2. Prepare the five adjusting entries that must have been made to cause the account changes as indicated.

**Problem 3-56A PREPARATION OF CLOSING ENTRIES AND AN INCOME STATEMENT****OBJECTIVE** > **5** **6**

Round Grove Alarm Company provides security services to homes in northwestern Indiana. At year-end 2009, after adjusting entries have been made, the following list of account balances is prepared:

Accounts Receivable	\$ 37,000
Accounts Payable	23,000
Accumulated Depreciation, Equipment	124,000
Common Stock	150,000
Depreciation Expense, Equipment	42,000
Dividends	6,000
Equipment	409,500
Income Tax Expense	24,300
Income Taxes Payable	24,300
Interest Expense	4,800
Notes Payable (due in 2012)	34,000
Other Assets	7,700
Prepaid Rent	5,000
Rent Expense	30,000
Retained Earnings, 12/31/2008	29,400
Salaries Payable	12,600

(Continued)

Salaries Expense	\$144,000
Service Revenue	605,500
Supplies Expense	51,900
Supplies Inventory	12,700
Utilities Expense	48,800
Wages Expense	186,500
Wages Payable	7,400

**Required:**

1. Prepare closing entries for Round Grove Alarm Company.
2. Prepare an income statement for Round Grove Alarm Company.

**OBJECTIVE** > **4** **5** **6** **7****Problem 3-57A COMPREHENSIVE PROBLEM: REVIEWING THE ACCOUNTING CYCLE**

Tarkington Freight Service provides delivery of merchandise to retail grocery stores in the Northeast. At the beginning of 2009, the following account balances were available:

Cash	\$ 92,100
Accounts Receivable	361,500
Supplies	24,600
Prepaid Advertising	2,000
Building, Warehouse	2,190,000
Accumulated Depreciation, Warehouse	280,000
Equipment	795,000
Accumulated Depreciation, Equipment	580,000
Land	304,975
Accounts Payable	17,600
Wages Payable	30,200
Notes Payable (due in 2013)	1,000,000
Common Stock	1,400,000
Retained Earnings, 12/31/2008	462,375

During 2009 the following transactions occurred:

- a. Tarkington delivered merchandise to customers, all on credit, for \$2,256,700. Tarkington also made cash deliveries of merchandise for \$686,838.
- b. There remains \$286,172 of accounts receivable to be collected at December 31, 2009.
- c. Tarkington purchased advertising of \$138,100 during 2009 and debited the amount to prepaid advertising.
- d. Supplies of \$27,200 were purchased on credit and debited to the supplies account.
- e. Accounts payable at the beginning of 2009 were paid early in 2009. There remains \$5,600 of accounts payable unpaid at year-end.
- f. Wages payable at the beginning of 2009 were paid early in 2009. Wages were earned and paid during 2009 in the amount of \$666,142.
- g. During the year, Trish Hurd, a principle stockholder, purchased an automobile costing \$42,000 for her personal use.
- h. One-half year's interest at 6 percent was paid on the note payable on July 1, 2009.
- i. Property taxes were paid on the land and buildings in the amount of \$170,000.
- j. Dividends were declared and paid in the amount of \$25,000.

The following data are available for adjusting entries:

- Supplies in the amount of \$13,685 remained unused at year-end.
- Annual depreciation on the warehouse building is \$70,000.
- Annual depreciation on the warehouse equipment is \$145,000.
- Wages of \$60,558 were unrecorded and unpaid at year-end.
- Interest for six months at 6 percent per year on the note is unpaid and unrecorded at year-end.
- Advertising of \$14,874 remained unused at the end of 2009.
- The income tax rate is 30 percent.

**Required:**

1. Post the 2009 beginning balances to T-accounts. Prepare journal entries for transactions *a* through *k* and post the journal entries to T-accounts adding any new T-accounts you need.
2. Prepare the adjustments and post the adjustments to the T-accounts adding any new T-accounts you need.
3. Prepare an income statement.
4. Prepare a statement of changes in retained earnings.
5. Prepare a classified balance sheet
6. Prepare closing entries.
7. Did you include transaction *g* among Tarkington's 2009 journal entries? Why or why not?

**Problem 3-58A PREPARING A WORKSHEET**

**OBJECTIVE** > 4 5 6  
7 8

Marsteller Properties, Inc., owns apartments that it rents to university students. At December 31, 2009, the following unadjusted account balances were available:

Cash	\$ 4,600
Rent Receivable	32,500
Supplies	4,700
Prepaid Insurance	60,000
Buildings	4,560,000
Accumulated Depreciation, Buildings	1,015,000
Land	274,000
Other Assets	26,100
Accounts Payable	57,300
Mortgage Payable (due in 2011)	2,000,000
Common Stock	1,500,000
Retained Earnings, 12/31/2008	39,200
Rent Revenue	660,000
Maintenance Expense	73,200
Rent Expense	58,700
Wages Expense	84,300
Utilities Expense	3,400
Interest Expense	90,000

The following information is available for adjusting entries:

- a. An analysis of apartment rental contracts indicates that \$3,800 of apartment rent is unbilled and unrecorded at year-end.
- b. A physical count of supplies reveals that \$1,400 of supplies are on hand at December 31, 2009.
- c. Annual depreciation on the buildings is \$204,250
- d. An examination of insurance policies indicates that \$12,000 of the prepaid insurance applies to coverage for 2009.
- e. Six months' interest at 9 percent is unrecorded and unpaid on the mortgage payable.
- f. Wages in the amount of \$6,100 are unpaid and unrecorded at December 31.
- g. Utilities costs of \$300 are unrecorded and unpaid at December 31.
- h. Income taxes, 15 percent of income before taxes, is unrecorded and unpaid at December 31.

**Required:**

1. Prepare a worksheet for Marsteller Properties, Inc.
2. Prepare an income statement, a statement of changes in retained earnings, and a classified balance sheet for Marsteller Properties, Inc.
3. Prepare the closing entries.

## Problem Set B

### OBJECTIVE > 1 Problem 3-49B CASH-BASIS AND ACCRUAL-BASIS INCOME

Martin Sharp, who repairs lawn mowers, collects cash from his customers when the repair services are completed. He maintains an inventory of repair parts that are purchased from a wholesale supplier. Martin's records show the following information for the first three months of 2009.

	Cash Collected for Repair Work	Cost of Repair Parts Purchased	Cash Payments to Supplier	Cost of Parts Used in Repairs
January	\$2,100	\$820	\$710	\$605
February	1,500	0	440	275
March	1,950	675	0	390

#### Required:

1. Ignoring expenses other than repair parts, calculate net income for each of the three months on a cash basis.
2. Ignoring expenses other than repair parts, calculate net income for each of the three months on an accrual basis.
3. Why do decision-makers prefer the accrual basis of accounting?

### OBJECTIVE > 2 Problem 3-50B REVENUE RECOGNITION AND MATCHING

Aunt Bea's Catering Service provides catering service for special occasions. During 2009, Aunt Bea performed \$125,000 of catering services and collected \$118,500 of cash from customers. Salaries earned by Aunt Bea's employees during 2009 were \$38,500. Aunt Bea paid employees \$35,000 during 2009. Aunt Bea had \$1,200 of supplies on hand at the beginning of the year and purchased an additional \$8,000 of supplies during the year. Supplies on hand at the end of 2009 were \$1,800. Other selling and administrative expenses incurred during 2009 were \$5,800.

#### Required:

1. Calculate revenue for 2009.
2. Calculate expenses for 2009.
3. Prepare the 2009 income statement.
4. Describe the accounting principles used to prepare the income statement.

### OBJECTIVE > 3 4 Problem 3-51B IDENTIFICATION AND PREPARATION OF ADJUSTING ENTRIES



Morgan Dance Inc. provides ballet, tap, and jazz dancing instruction to promising young dancers. Morgan began operations in January 2010 and is preparing its monthly financial statements for January 2010. The following items describe Morgan's transactions in January 2010:

- a. Morgan requires that dance instruction be paid in advance—either monthly or quarterly. On January 1, Morgan received \$2,500 for dance instruction to be provided during 2010.
- b. On January 31, 2010, Morgan noted that \$400 of dance instruction revenue is still unearned.
- c. Morgan's hourly employees were paid \$1,200 for work performed in January.
- d. Morgan's insurance policy requires semi-annual premium payments. Morgan paid the \$6,000 insurance policy which covered the first half of 2010 in December 2009.
- e. When there are no scheduled dance classes, Morgan rents its dance studio for birthday parties for \$80 per two hour party. Three birthday parties were held during January. Morgan will not bill the parents until February.
- f. Morgan purchased \$250 of office supplies on January 10.
- g. On January 31, Morgan determined that office supplies of \$140 were unused.

- h. Morgan received a January utility bill for \$320. The bill will not be paid until it is due in February.

**Required:**

1. Identify whether each entry is an adjusting entry or a regular journal entry. If the entry is an adjusting entry, identify it as an accrued revenue, accrued expense, deferred revenue, or deferred expense.
2. Prepare the entries necessary to record the above transactions.

**Problem 3-52B PREPARATION OF ADJUSTING ENTRIES**

**OBJECTIVE** > **4**

West Beach Resort operates a resort complex that specializes in hosting small business and professional meetings. West Beach closes its fiscal year on January 31, a time when it has few meetings under way. At January 31, 2010, the following data are available:

- a. A training meeting is under way for 16 individuals from Fashion Design. Fashion Design paid \$2,500 in advance for each person attending the 10-day training session. The meeting began on January 27 and will end on February 5.
- b. Twenty-one people from Northern Publishing are attending a sales meeting. The daily fee for each person attending the meeting is \$180 (charged for each night a person stays at the resort). The meeting began on January 29, and guests will depart on February 2. Northern will be billed at the end of the meeting.
- c. Depreciation on the golf carts used to transport the guests' luggage to and from their rooms is \$13,000 for the year. West Beach records depreciation yearly.
- d. At January 31, Friedrich Catering is owed \$1,795 for food provided for guests through that date. This amount of food service expense is unrecorded.
- e. An examination indicates that the cost of office supplies on hand at January 31, 2010 is \$189. During the year, \$698 of office supplies was purchased from Supply Depot. The cost of supplies purchased was debited to office supplies inventory. No office supplies were on hand on January 31, 2009.

**Required:**

1. Prepare adjusting entries at January 31 for each of these items.
2. By how much would net income be overstated or understated if the accountant failed to make the adjusting entries?

**Problem 3-53B EFFECTS OF ADJUSTING ENTRIES ON THE ACCOUNTING EQUATION**

**OBJECTIVE** > **4**

Four adjusting entries are shown below:

- |    |                       |       |       |
|----|-----------------------|-------|-------|
| a. | Interest Expense      | 1,458 |       |
|    | Interest Payable      |       | 1,458 |
| b. | Interest Receivable   | 839   |       |
|    | Interest Revenue      |       | 839   |
| c. | Insurance Expense     | 3,160 |       |
|    | Prepaid Insurance     |       | 3,160 |
| d. | Unearned Rent Revenue | 5,721 |       |
|    | Rent Revenue          |       | 5,721 |



**Required:**

Analyze the adjusting entries and identify their effects on the financial statement accounts. (Ignore any income tax effects.) Use the following format for your answer:

Transaction	Assets	Liabilities	Beginning Common Stock	Retained Earnings	Revenues	Expenses

## OBJECTIVE &gt; 4 5

**Problem 3-54B ADJUSTING ENTRIES AND FINANCIAL STATEMENTS**

The unadjusted trial balance for Mitchell Pharmacy appears below.

Mitchell Pharmacy Unadjusted Trial Balance December 31, 2009		
Account	Debit	Credit
Cash	\$ 3,400	
Accounts Receivable	64,820	
Inventory	583,400	
Prepaid Insurance	11,200	
Building	230,000	
Accumulated Depreciation, Building		\$ 44,000
Land	31,200	
Other Assets	25,990	
Accounts Payable		47,810
Notes Payable (due 2011)		150,000
Common Stock		600,000
Retained Earnings, 12/31/2008		41,200
Service Revenue		950,420
Wages Expense	871,420	
Interest Expense	12,000	
Total	<u>\$1,833,430</u>	<u>\$1,833,430</u>

The following information is available at year-end for adjustments:

- An analysis of insurance policies indicates that \$1,400 of the prepaid insurance is coverage for 2010.
- Depreciation expense for 2009 is \$8,800.
- Four months' interest at 8 percent is owed but unrecorded and unpaid on the note payable.
- Wages of \$4,410 are owed but unpaid and unrecorded at December 31.
- Income taxes expense, computed at 30 percent of income before taxes, is owed but unrecorded and unpaid at December 31.

**Required:**

- Prepare the adjusting entries.
- Prepare an income statement, a statement of changes in retained earnings, and a balance sheet using adjusted account balances.
- Why would you not want to prepare financial statements until after the adjusting entries are made?

## OBJECTIVE &gt; 4

**Problem 3-55B INFERRING ADJUSTING ENTRIES FROM ACCOUNT BALANCE CHANGES**

The following schedule shows all the accounts of Eagle Imports that received year-end adjusting entries:

Account	Unadjusted Account Balance	Adjusted Account Balance
Prepaid Insurance	\$ 15,390	\$ (a)
Accumulated Depreciation	80,000	103,000
Interest Payable	0	(b)
Wages Payable	0	(c)
Unearned Revenue, Service	8,250	2,620
Service Revenue	122,500	(d)
Insurance Expense	0	12,746

(Continued)

Account	Unadjusted Account Balance	Adjusted Account Balance
Interest Expense	\$ 3,500	\$ 5,300
Depreciation Expense	0	(e)
Wages Expense	38,200	41,800

**Required:**

- Calculate the missing amounts identified by the numbers (a) through (e).
- Prepare the five adjusting entries that must have been made to cause the account changes as indicated.

**Problem 3-56B PREPARATION OF CLOSING ENTRIES AND AN INCOME STATEMENT****OBJECTIVE** > 5 6

Port Austin Boat Repair Inc. has entered and posted its adjusting entries for 2009. The following are the adjusted account balances:

Sales Revenue	\$578,500
Interest Revenue	8,100
Accounts Payable	8,330
Wages Expense	405,300
Accounts Receivable, 12/31/2009	65,000
Supplies Expense	65,000
Supplies, 12/31/2009	179,000
Prepaid Rent	7,200
Rent Expense	28,800
Unearned Revenue	12,200
Insurance Expense	94,300
Wages Payable	11,700
Utilities Expense	14,000
Interest Expense	9,500
Depreciation Expense, Equipment	20,000
Accumulated Depreciation, Equipment	75,000
Income Tax Expense	12,300
Income Tax Payable	8,300
Dividends	7,800

**Required:**

- Using the accounts and balances above, prepare the closing entries for 2009.
- Prepare an income statement for Port Austin Boat Repair Inc.

**Problem 3-57B COMPREHENSIVE PROBLEM: REVIEWING THE ACCOUNTING CYCLE****OBJECTIVE** > 4 5 6 7

Wilburton Riding Stables provides stables, care for animals, and grounds for riding and showing horses. The account balances at the beginning of 2009 were:

Cash	\$ 2,200
Accounts Receivable	4,400
Supplies, Feed	24,100
Supplies, Straw	3,700
Land	167,000
Buildings	115,000
Accumulated Depreciation, Buildings	36,000
Equipment	57,000
Accumulated Depreciation, Equipment	16,500
Accounts Payable	23,700
Income Taxes Payable	15,100
Interest Payable	2,700
Wages Payable	14,200

(Continued)

Notes Payable (due in 2013)	\$ 60,000
Common Stock	150,000
Retained Earnings	55,200

During 2009, the following transactions occurred:

- Wilburton provided animal care services, all on credit, for \$210,300. Wilburton rented stables to customers who cared for their own animals and paid cash of \$20,500. Wilburton rented its grounds to individual riders, groups, and show organizations for \$41,800 cash.
- There remains \$15,600 of accounts receivable to be collected at December 31, 2009.
- Feed in the amount of \$62,900 was purchased on credit and debited to the supplies, feed account.
- Straw was purchased for \$7,400 cash and debited to the supplies, straw account.
- Wages payable at the beginning of 2009 were paid early in 2009. Wages were earned and paid during 2009 in the amount of \$112,000.
- The income taxes payable at the beginning of 2009 were paid early in 2009. The accounts payable at the beginning of the year were also paid during the year. There remains \$13,600 of accounts payable unpaid at year-end.
- One year's interest at 9 percent was paid on the note payable on July 1, 2009.
- During 2009, Jon Wilburton, a principal stockholder, purchased a horse for his wife Jennifer to ride. The horse cost \$7,000, and Wilburton used his personal credit to purchase it. The horse is stabled at the Wilburtons' home rather than at the riding stables.
- Property taxes were paid on the land and buildings in the amount of \$17,000.
- Dividends were declared and paid in the amount of \$7,200.

The following data are available for adjusting entries:

- Feed in the amount of \$26,000 remained unused at year-end. Straw in the amount of \$4,400 remained unused at year-end.
- Annual depreciation on the buildings is \$6,000.
- Annual depreciation on the equipment is \$5,500.
- Wages of \$4,000 were unrecorded and unpaid at year-end.
- Interest for six months at 9 percent per year on the note is unpaid and unrecorded at year-end.
- The income tax rate is 30 percent.

#### Required:

- Post the 2009 beginning balances to T-accounts. Prepare journal entries for transactions *a* through *j* and post the journal entries to T-accounts adding any new T-accounts you need.
- Prepare the adjustments and post the adjustments to the T-accounts adding any new T-accounts you need.
- Prepare an income statement.
- Prepare a statement of changes in retained earnings.
- Prepare a classified balance sheet.
- Prepare closing entries.
- Did you include transaction *b* among Wilburton's 2009 journal entries? Why or why not?



#### Problem 3-58B PREPARING A WORKSHEET

Flint, Inc., operates a cable television system. At December 31, 2009, the following unadjusted account balances were available:

Cash	\$ 2,000
Accounts Receivable	89,000
Office Supplies	5,000

(Continued)

Land	\$ 37,000
Building	209,000
Accumulated Depreciation, Building	40,000
Equipment	794,000
Accumulated Depreciation, Equipment	262,000
Other Assets	19,700
Accounts Payable	29,500
Notes Payable (due in 2013)	250,000
Common Stock	300,000
Retained Earnings, 12/31/2008	14,700
Dividends	28,000
Service Revenue	985,000
Subscription Expense	398,000
Telephone Expense	10,500
Utilities Expense	34,000
Wages Expense	196,000
Miscellaneous Expense	44,000
Interest Expense	15,000

The following data are available for adjusting entries:

- At year-end \$1,500 of office supplies remain unused.
- Annual depreciation on the building is \$20,000.
- Annual depreciation on the equipment is \$150,000.
- The interest rate on the note is 8 percent. Four months' interest is unpaid and unrecorded at December 31, 2009.
- At December 31, 2009, service revenue of \$94,000 has been earned but is unbilled and unrecorded.
- Utility bills of \$2,800 are unpaid and unrecorded at December 31, 2009.
- The income tax rate is 25 percent.

**Required:**

- Prepare a worksheet for Flint.
- Prepare an income statement, a statement of changes in retained earnings, and a classified balance sheet for Flint.
- Prepare the closing entries.

## Cases

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### Case 3-59 CASH- OR ACCRUAL-BASIS ACCOUNTING

Katie Vote owns a small business that rents computers to students at the local university. Katie's typical rental contract requires the student to pay the year's rent of \$900 (\$100 per month) in advance. When Katie prepares financial statements at the end of December, her accountant requires that Katie spread the \$900 over the nine months that the computer is rented. Therefore, Katie can recognize only \$400 of revenue (four months) from each computer rental contract in the year the cash is collected and must defer (delay) recognition of the remaining \$500 (five months) to the next year. Katie argues that getting students to agree to rent the computer is the most difficult part of the activity so she ought to be able to recognize all \$900 as revenue when the cash is received from a student.

**Required:**

Why do you believe that generally accepted accounting principles require the use of accrual accounting rather than cash-basis accounting for transactions like the one described here? (Hint: You might find it helpful to read paragraphs 42–48 of *FASB Statement of Financial Accounting Concepts No. 1*, which can be found at <http://www.fasb.org>, as you formulate your answer).

**Case 3-60 RECOGNITION OF SERVICE CONTRACT REVENUE**

Jackson Dunlap is president of New Miami Maintenance Inc. which provides building maintenance services. On October 15, 2009, Mr. Dunlap signed a service contract with Western College. Under the contract, New Miami will provide maintenance services for all of Western's buildings for a period of two years, beginning on January 1, 2010, and Western will pay New Miami on a monthly basis, beginning on January 31, 2010. Although the same amount of maintenance services will be rendered in every month, the contract provides for higher monthly payments in the first year.

Initially, Mr. Dunlap proposed that some portion of the revenue from the contract should be recognized in 2009; however his accountant, Rita McGonigle, convinced him that this would be inappropriate. Then Mr. Dunlap proposed that the revenue should be recognized in an amount equal to the cash collected under the contract in 2009. Again, Ms. McGonigle argued against his proposal, saying that generally accepted accounting principles required recognition of an equal amount of contract revenue each month.

**Required:**

1. Give a reason that might explain Mr. Dunlap's desire to recognize contract revenue earlier rather than later.
2. Put yourself in the position of Rita McGonigle. How would you convince Mr. Dunlap that his two proposals are unacceptable and that an equal amount of revenue should be recognized every month?
3. If Ms. McGonigle's proposal is adopted, how would the contract be reflected in the balance sheets at the end of 2009 and at the end of 2010?

**Case 3-61 REVENUE RECOGNITION**

Beth Rader purchased North Shore Health Club in June 2009. Beth wanted to increase the size of the business by selling five-year memberships for \$5,000, payable at the beginning of the membership period. The normal yearly membership fee is \$1,500. Since few prospective members were expected to want to spend \$5,000 at the beginning of the membership period, Beth arranged for a local bank to provide a \$1,000 installment loan to prospective members. By the end of 2009, 250 customers had purchased the five-year memberships using the loan provided by the bank.

Beth prepared her income statement for 2009 and included \$1,250,000 ( $\$5,000 \times 250$  members) as revenue because the Club had collected the entire amount in cash. Beth's accountant objected to the inclusion of the entire \$1,250,000. The accountant argued that the \$1,250,000 should be recognized as revenue as the Club provides services for these members during the membership period. Beth countered with a quotation from generally accepted accounting principles:

*Profit is deemed to be realized when a sale in the ordinary course of business is effected, unless the circumstances are such that collection of the sale price is not reasonably assured.*

Beth notes that memberships have been sold and the collection of the selling price has occurred. Therefore, she argues that all \$1,250,000 is revenue in 2009.

**Required:**

1. Write a short statement supporting either Beth or the accountant in this dispute.
2. Would your answer change if the \$5,000 fee were nonrefundable? Why or why not?

**Case 3-62 APPLYING THE MATCHING CONCEPT**

Newman Properties Inc. completed construction of a new shopping center in July 2009. During the first six months of 2009, Newman spent \$750,000 for salaries, preparation of documents, travel, and other similar activities associated with securing tenants for the center. Newman was successful (Nordstrom, Best Buy, and Office Depot will be tenants) and the center will open on August 1 with all its stores rented on four-year leases. The rental revenue that Newman expects to receive from the current tenants is \$8,500,000 per year for four years. The leases will be renegotiated at

the end of the fourth year. The accountant for Newman wonders whether the \$750,000 should be expensed in 2009 or whether it should be initially recorded as an asset and matched against revenues over the four-year lease term.

**Required:**

Write a short statement indicating why you support expensing the \$750,000 in the current period or spreading the expense over the four-year lease term.

**Case 3-63 ADJUSTING ENTRIES FOR REFUND COUPONS**

Cal-Lite Products, Inc., manufactures a line of food products that appeals to persons interested in weight loss. To stimulate sales, Cal-Lite includes cash refund coupons in many of its products. Cal-Lite issues the purchaser a check when the coupon is returned to the company, which may be many months after the product is sold to stores and distributors. In addition, a significant number of coupons issued to customers are never returned. As cash distributions are made to customers, they are recorded in an expense account.

**Required:**

1. Explain the conceptual basis for the determination of refund expense in each year. Describe the information and calculations required to estimate the amount of expense for each year.
2. Describe the year-end adjusting entry required at the end of the first year of the program's existence.
3. Describe the adjusting entry at the end of the second year of the program's existence.

**Case 3-64 ADJUSTING ENTRIES FOR MOTION PICTURE REVENUES**

Link Pictures, Inc., sells (licenses) the rights to exhibit motion pictures to theaters. Under the sales contract, the theater promises to pay a license fee equal to the larger of a guaranteed minimum or a percentage of the box office receipts. In addition, the contract requires the guaranteed minimum to be paid in advance. Consider the following contracts entered by Link during 2009:

- a. Contract **A** authorizes a group of theaters in Buffalo, New York, to exhibit a film called *Garage* for two weeks ending January 7, 2010. Box office statistics indicate that first-week attendance has already generated licensing fees well in excess of the guaranteed minimum.
- b. Contract **B** authorizes a chain of theaters in Miami, Florida, to exhibit a film called *Blue Denim* for a period of two weeks ending January 20, 2010. In most first-run cities, the film has attracted large crowds, and the percentage of box office receipts has far exceeded the minimum.
- c. Contract **C** authorizes a chain of theaters in San Francisco to exhibit a film called *Toast Points* for a period of two weeks ending on January 5, 2010. The film is a "dog" and the theaters stopped showing it after the first few days. All prints of the film were returned by December 31, 2009.

The guaranteed minimum has been paid on all three contracts and recorded as unearned revenue. No other amounts have been received, and no revenue has been recorded for any of the contracts. Adjusting entries for 2009 are just about to be made.

**Required:**

Describe the adjusting entry you would make at December 31, 2009, to record each contract. (Hint: You may want to refer to FASB Statement No. 53, Financial Reporting by Producers and Distributors of Motion Picture Films.)

**Case 3-65 THE EFFECT OF ADJUSTING ENTRIES ON THE FINANCIAL STATEMENTS (A CONCEPTUAL APPROACH)**

Don Berthrong, the manager of the local Books-A-Million, is wondering whether adjusting entries will affect his financial statements. Don's business has grown steadily

for several years, and Don expects it to continue to grow for the next several years at a rate of 5 to 10 percent per year. Nearly all Don's sales are for cash. Other than cost of goods sold, which is not affected by adjusting entries, most of Don's expenses are for items that require cash outflows (e.g., rent on the building, wages, utilities, insurance).

**Required:**

1. Would Don's financial statement be affected significantly by adjusting entries?
2. Consider all businesses. What kinds of transactions would require adjustments that would have a significant effect on the financial statements? What kinds of businesses would be likely to require these kinds of adjustments?

**Case 3-66 INTERPRETING CLOSING ENTRIES**

Barnes Building Systems made the following closing entries at the end of a recent year:

a. Income Summary	384,300	
Retained Earnings		384,300
b. Retained Earnings	35,000	
Dividends		35,000
c. Sales Revenue	425,700	
Income Summary		425,700
d. Income Summary	104,100	
Interest Expense		104,100

**Required:**

1. What was Barnes's net income?
2. By how much did Barnes's retained earnings change?
3. If the sales revenue identified in entry *c* was Barnes's only revenue, what was the total amount of Barnes's expenses?

**Case 3-67 RESEARCH AND ANALYSIS USING THE ANNUAL REPORT**

Obtain **FedEx Corporation's** 2007 annual report either through the "Investor Relations" portion of their website (do a web search for FedEx investor relations) or go to <http://www.sec.gov> and click "Search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

Answer the following questions:

1. How does FedEx apply the revenue recognition principle?
2. With regard to the balance sheet and the income statement, what accounts may have required adjusting entries? Would these accounts require accruals or deferrals?
3. How much did FedEx owe its employees for services performed at the end of the 2007 fiscal year?
4. How much would FedEx credit to Income Summary for 2007? How much would be debited to Income Summary for 2007?
5. How much did FedEx report as income tax expense for 2007? How much did FedEx report as cash paid for taxes for 2007? Why are the amounts different and where does this difference get reported on FedEx's financial statements?

**Case 3-68 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

Answer the following questions:

1. Does each company apply the revenue recognition principle to sales to customers and to gift cards in the same manner?
2. Which accounts on the balance sheet and income statement of each company may require adjusting entries? Would these accounts require accruals or deferrals?
3. How much would Abercrombie & Fitch credit to Income Summary for the year ending February 3, 2007 (fiscal 2006)? How much would Aeropostale credit to Income Summary for the fiscal year ending February 3, 2007? How much would Abercrombie & Fitch debit to Income Summary for the year ending February 3, 2007 (fiscal 2006)? How much would Aeropostale debit to Income Summary for the fiscal year ending February 3, 2007?
4. How much did each company report as an accrued expense for gift cards for the most recent year? Explain why this amount is reported as a liability.
5. Compare how much each company reported as income tax expense and as cash paid for taxes for the most recent year. Why are the amounts different and where would this difference be reported on the financial statements?

# 4

## Internal Control and Cash

After studying Chapter 4,  
you should be able to:

- **1** Discuss the role of internal controls in managing a business.
- **2** Discuss the five elements of internal control.
- **3** Describe how businesses control cash.
- **4** Describe how businesses account and report cash.
- **5** Describe the cyclical nature of business activity.
- **6** Explain the principles of cash management.
- **7** (Appendix 4A) Describe the classification and accounting for investments.





# **E**xperience Financial Accounting with Initech

Peter Gibbons is a software engineer at Initech. He has an awful commute, an annoying boss, and a girlfriend he's pretty sure is cheating on him. Of course, Peter is the fictional star of the 1999 film *Office Space*. So, what do Peter and Initech have to do with accounting? In the movie, Initech is going through a downsizing and Peter finds out his best friends, Samir and (the unfortunately named) Michael Bolton, are about to be fired. To get back at Initech, the three friends decide to alter the company's software to take the fractions of a penny that are rounded off when calculating interest and deposit them into their personal account. Such schemes are real and go by various names such as "penny shaving" or "salami slicing." They believe their scheme is undetectable because nobody will notice the gradual theft of these miniscule amounts. However, over time the sheer number of transactions will accumulate to a large sum.

The morning after altering Initech's software, Peter checks the account balance and finds it contains over \$300,000. In a panic Peter calls his friends and Michael Bolton concedes he made a "small" mistake. In the movie the three friends attempt to repay the money and are "saved" by a fire that burns Initech's offices. You may think that this could never happen, but a mention of such a scheme appears over 30 years ago in Thomas

Whiteside's 1978 book, *Computer Capers: Tales of Electronic Thievery, Embezzlement and Fraud*. In this book, Whiteside documents how a programmer diverted money from the rounded down sales commissions for three years before he was caught.

In a somewhat related scheme, a hacker noticed that when opening online brokering accounts (such as through **Google** checkout, **PayPal**, and many brokerage houses), it is common practice for the companies to send a confirming payment of a few cents to ensure you have access to the bank account or credit card. He then wrote an automated program (known as a "bot") to open almost 60,000 such accounts, collecting many thousands of these small payments into a few personal bank accounts. This isn't obviously illegal; however, he did run afoul of mail and bank fraud laws because he used false names, addresses, and Social Security numbers when opening the accounts.

In this chapter we discuss the policies and procedures companies put in place to prevent unintentional error, theft, and fraud. These policies and procedures are referred to as the internal control system. For example, a commonly seen control that is designed to prevent use of bots to sign up or log in to web functions is a security check where the user must type in the distorted letters seen in a box (e.g., **Ticketmaster** does this to thwart scalpers).

**OBJECTIVE** > **1**

Discuss the role of internal controls in managing a business.

## Role of Internal Control

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Except in very small businesses, top management delegates responsibility for engaging in business activities and recording their effects in the accounting system to other managers and employees. Management wants to make sure that these employees: (1) operate within the scope of their assigned responsibility and (2) act for the good of the business. To control subordinates' activities, management puts in place procedures that collectively are called the **internal control system**.

Internal control systems include all the policies and procedures established by top management and the board of directors to provide reasonable assurance that the company's objectives are being met in three areas: (1) effectiveness and efficiency of operations, (2) reliability of financial reporting, and (3) compliance with applicable laws and regulations (The Committee of Sponsoring Organizations of the Treadway Commission [COSO], *Internal Control—Integrated Framework*, 1992). As such, internal control systems include many elements only indirectly related to our primary concern—the accounting system and financial statements. For example, policies and procedures concerning the extent and nature of research and development or advertising activities may have an important effect on the achievement of an entity's objectives but only indirectly affect its accounting system and financial statements.

Under the Sarbanes-Oxley Act of 2002, top management of publicly-traded corporations has an increased responsibility for a system of internal controls that ensures the reliability of the financial statements (#2 in the previous paragraph). For example, Section 404 of the Act requires management to produce an internal control report. This report must acknowledge that management is responsible for establishing and maintaining an adequate internal control system and procedures for financial reporting and also assess the effectiveness of these controls. Further, Section 302 of the Act requires the principal executive and financial officers to certify that they are responsible for establishing and maintaining the system of internal control over financial reporting (see Exhibit 4-1). This certification was designed to prevent top management from denying knowledge or understanding of deceptive financial reporting as was tried in court by executives of **WorldCom**, among others.

In this chapter, we will examine the elements of internal controls and demonstrate controls over cash, a company's most vulnerable asset. We will address the following questions:

- What are the five elements of internal control?
- How are those controls applied to cash?
- How do financing and operating cycles affect cash?
- Why is cash management so important to a company?

**OBJECTIVE** > **2**

Discuss the five elements of internal control.

## Elements of Internal Control

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The Committee of Sponsoring Organizations of the Treadway Commission (COSO) identified five elements of an internal control system (see Exhibit 4-2). Each element is crucial to the (1) effectiveness and efficiency of operations, (2) reliability of financial reporting, and (3) compliance with applicable laws and regulations. We will now discuss each of these five elements in turn.

### Control Environment and Ethical Behavior

The foundation of the internal control system is the **control environment**—the collection of environmental factors that influence the effectiveness of control procedures. The control environment includes the philosophy and operating style of management, the personnel policies and practices of the business, and the overall integrity, attitude, awareness, and actions of everyone in the business concerning the importance of control and is more commonly called the *tone at the top*.

An important feature of the control environment is recognizing that an individual employee's goals may differ from the goals of other individuals and the goals of the

**Section 302 Certification by Steven P. Jobs (CEO of Apple) Taken from SEC Filings for the Year Ended September 29, 2007**

I, Steven P. Jobs, certify that:

1. I have reviewed this annual report on Form 10-K of Apple Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize, and report financial information; and
  - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 15, 2007

By:

*Steven P. Jobs*  
Chief Executive Officer

## Exhibit 4-2

*Elements of Internal Control*

Source: COSO, *Internal Control—Integrated Framework*, 1992. Used with permission of COSO.

business. For example, managers may receive a bonus based on certain accounting numbers such as sales. In this case, managers have been known to ship a large quantity of merchandise to customers right before year end—even if the merchandise was not ordered (e.g., **Bausch and Lomb**, **IBM**, etc.). Although much of the merchandise was returned in the following year, sales targets for the current year were met and bonuses were paid. This practice was so prevalent that a term—channel stuffing—was coined to describe the practice. Of course, control procedures assume particular importance in the presence of conflicting goals, but they are not sufficient to prevent individuals from taking actions that are bad for the business.

Resolving these conflicting incentives in an ethical manner that promotes organizational objectives is highly dependent on the tone at the top. Studies suggest that a vast majority of U.S. accounting frauds, approximately 84 percent between 1987 and 1997, involve top management. Of course, top management can put mechanisms in place to promote ethical behavior. For example, hiring and firing practices that put zero tolerance on unethical behavior are increasingly common. Additionally, the Sarbanes-Oxley Act requires publicly-traded corporations to establish formal procedures to receive, retain, and address any information that may affect the company's accounting or auditing. To comply with this requirement companies have created ethics hotlines that allow employees to anonymously report unethical behavior. This was an important step in empowering subordinates to report unethical behavior by their superiors. However, hotlines only address procedures to receive the information. Additionally, companies must have procedures in place to make sure such information is never destroyed and that it is communicated to those with the power to resolve any issues, such as the board of directors and upper management.

**ETHICS** Donna Jones has just been hired as an accounting clerk at a large manufacturing company. One of her jobs is to summarize invoices presented for payment by various creditors. Once the summary has been inspected by Carmen Adams, the assistant controller to whom Donna reports, Donna presents the summary to the controller for approval. The controller's approval requires a simple signature on the summary form. Dick Stewart, of the controller's staff, then prepares and mails the checks.

During Donna's second week on the job, Carmen Adams tells her that City Consulting Services, Inc., will make trouble for the company unless paid immediately and that Donna shouldn't bother to secure the controller's authorization for the day's invoices, in order to speed payment. "Dick Stewart, who prepares the checks, is rarely

at his desk and never looks at signatures anyway. It would cost us at least another day to get the controller's signature. Just put the unsigned summary on Stewart's desk, and the check will be in the mail by the end of the day," says Carmen.

Donna knows that Carmen Adams will give her a low performance rating if she refuses to follow these instructions, and she wants to do well on her first job. Further, she is quite sure that Dick Stewart will not notice the omitted control procedure, particularly if he doesn't see Donna leave the summary on his desk. On the other hand, Donna knows that the controller's approval is viewed as an important control procedure. Consider two possible endings for this story:

1. *Donna decides to go along with Carmen.* Every month, Carmen tells Donna the same story about City Consulting Services, and Donna places the unauthorized summary on Dick Stewart's unoccupied desk. All goes well until the internal auditor runs a routine check on the credit ratings of the various entities with which the company does business and discovers that City Consulting Services is nothing more than a bank account established by Carmen Adams. Carmen is charged with fraud, and Donna's role in the fraud is exposed in the public trial that follows. Donna is not charged in the case, but she loses her job and has great difficulty finding another comparable position.
2. *Donna refuses to go along with Carmen.* Donna receives a negative review from Adams and is asked to leave the company. During an exit interview, Donna tells the controller why she believes Carmen gave her a negative review. The controller instructs the internal audit department to follow up on City Consulting Services at which time it is discovered to be nothing more than a bank account established by Carmen Adams. Carmen is charged with fraud. The controller contacts Donna saying, "Although I wasn't very encouraging during your exit interview, your comments led me to ask internal auditing to investigate Carmen Adams' activities. As a result, we have uncovered her scheme to defraud the company, and would like you to return to the company."

Like Donna Jones, most people in business face difficult ethical dilemmas from time to time. The "right thing to do" is an individual decision that must be approached thoughtfully and after careful consideration of the possible long-term as well as short-term consequences. The effectiveness of internal control systems depends on the ethical tone set by management and the ethical awareness of all company personnel. ♦

## Risk Assessment

Risk assessment procedures (also called Enterprise Risk Management or ERM) are designed to identify, analyze, and manage **strategic risks** and **business process risks**.

**Strategic Risks** Strategic risks are possible threats to the organization's success in accomplishing its objectives and are *external* to the organization. These risks are often classified around industry forces such as competitors, customers, substitute products or services, suppliers, and threat of new competitors (these are known as Porter's Five Forces) or macro factors such as Political, Economic, Social, and Technological (also known as PEST factors).

Although entire courses are devoted to management of these strategic risks, the general idea is simple to illustrate. Consider an industry that is affected by changes in lifestyles (this is a Social factor in PEST) such as restaurants. If a company in the restaurant industry fails to adequately identify and analyze, for example, dietary preferences such as low-saturated fats, the organization's objectives may be severely compromised. A more specific example can be made using **Barnes & Noble's** response to **Amazon**. When Amazon was formed in 1995, Barnes & Noble was in the midst of high growth and rollout of their cafes and music shops within supersized bookstores. Barnes & Noble was so deeply rooted in its "bricks-and-mortar" that it failed to respond to a technological factor: the Internet's transformation of the

industry. In fact, top management so feared that a web presence would harm sales at their stores, that it was more than two years before the rollout of Barnesandnoble.com. Near the time of the rollout Steve Riggio, creator of Barnesandnoble.com and brother of Barnes & Noble founder Len Riggio, said, “It’s better to cannibalize yourself than to be cannibalized.” Unfortunately for Barnes & Noble, the two year delay allowed Amazon to secure the leading web presence for booksellers—a lead that Barnes & Noble has been unable to erode.

**Business Process Risks** Business processes are the *internal* processes of the company—specifically, how the company allocates its resources to meet its objectives. There are many business processes, but some of the more common ones are materials acquisition, production, logistics and distribution, branding and marketing, and human resources. The nature and relative importance of the business processes will vary from company to company based on their specific objectives. For example, **Dell** has adopted a low-cost provider objective. As such, it has concentrated on achieving operating efficiencies in order processing, production, and distribution. **Apple**, on the other hand, has adopted a product differentiation objective. This objective has led to an emphasis on product quality and continual research to develop better products with more features. As such, the risk assessment controls for these two companies will differ. Dell will be focused on monitoring inventory levels and production times, while Apple will focus on quality control and product development.

## Control Activities

**Control activities** are the policies and procedures top management establishes to help insure that its objectives are met. The control activities most directly related to the accounting system and financial statements vary widely from one business to another, but generally can be identified with one of the following five categories:

**Clearly Defined Authority and Responsibility** The *authority* to perform important duties is delegated to specific individuals, and those individuals should be held *responsible* for the performance of those duties in the evaluation of their performance. Among the designated duties of an individual may be the authority to perform specified types of activities for the business or to authorize others to execute such transactions. The clear delegation of authority and responsibility motivates individuals to perform well because they know they are accountable for their actions. For example, when a cash register is short of money, the cashier signed into the register is clearly responsible for the error. If any cashier could use any cash register at any time, we would have no idea which cashier was responsible for the discrepancy.

**Segregation of Duties** Accounting record keeping responsibilities should be segregated from the duties of administering operations, engaging in operating activities, or overseeing assets. In other words, accounting and administrative duties should be performed by different individuals, so that no one person prepares all the documents and records for an activity. This **segregation of duties** (also called separation of duties) reduces the likelihood that records could be used to conceal *irregularities* (intentional misstatements, theft, or fraud) and increases the likelihood that irregularities will be discovered. Segregation of duties also reduces the likelihood that unintentional record-keeping errors will remain undiscovered. Although segregation of duties cannot eliminate the possibility of fraud, it does require people to work together. For example, if the same person was responsible for collecting the cash and admitting the customer at a movie theatre, this person could pocket the cash and let the customer in without issuing a ticket. In this case, the number of tickets issued would match up with the cash collected because no ticket was issued and the cash was pocketed. Instead, movie theatres have one person collect the cash and issue the ticket and a second person admits the customer only with a ticket. Obviously, cash paid by customers can still be pocketed, but the segregation of duties will require both employees to engage in the fraudulent scheme (we call this collusion) or the cash collected will not match the tickets collected.

Perhaps the most important aspect of segregation of duties is separating the record-keeping responsibility from the physical control of the assets. For example, if a customer pays \$1,000, the employee who collects the \$1,000 could easily steal some or all of the money if (s)he has access to the accounting records. In this case the employee could record that the money was paid and hide the fact that the money was not in the company or record that some or all of the money was not paid and the debt was “bad.”

**Adequate Documents and Records** Accounting records are the basis for the financial statements and other reports prepared for managers, owners, and others both inside and outside the business. Summary records and their underlying documentation must provide information about specific activities and help in the evaluation of individual performance. For example, prenumbered shipping documents provide a basis for monitoring shipments of goods to customers. When warehouse employees receive a shipping document, they ship the goods. If the shipping documents were not prenumbered, a shipping document could be sent to the warehouse and later destroyed. Without the missing number in the sequence to signal a missing document, nobody would realize that the document was missing.

**Safeguards over Assets and Records** Both assets and records must be secured against theft and destruction. **Safeguarding** requires physical protection of the assets through, for example, fireproof vaults, locked storage facilities, keycard access, and anti-theft tags on merchandise. An increasingly important part of safeguarding assets and records is access controls for computers. Not that long ago, access passwords were quite simple (e.g., spouse’s name), often written down, and never changed. Now access controls often mandate use of both alpha and numeric characters and require password changes every few months. Safeguards must be provided for computer programs and data files, which are more fragile and susceptible to unauthorized access than manual record-keeping systems.

**Checks on Recorded Amounts** Recorded amounts should be checked by an independent person to determine that amounts are correct and that they correspond to properly authorized activities. These procedures include clerical checks, reconciliations, comparisons of asset inspection reports with recorded amounts, computer-programmed controls, and management review of reports. For example, as discussed in the Segregation of Duties section, physical access to cash (e.g., writing checks and depositing cash at the end of the day) should be separated from maintaining the accounting records for cash. In this case, the accounting records should also be checked (or reconciled) to the bank statement with any discrepancies resolved immediately. Bank reconciliations are illustrated later in the chapter.

Such controls are effective at mitigating unintentional error, theft, and fraud. One of the elements typically cited in discussions of theft and fraud is opportunity. That is, persons committing theft or fraud believe they have the opportunity to “get away with it.” Control activities are designed to prevent and detect theft and fraud by reducing employees’ opportunity to conceal their actions. Yet, every year billions of dollars are lost to employee theft and fraud because effectively designed control activities are not followed.

## Information and Communication

An internal control system will be unable to help a company achieve its objective unless adequate information is identified and gathered on a timely basis. Further, this information must be communicated to the appropriate employees in the organization. For example, consider a company like **Mercedes** that has a strategy of providing high-quality products. This company may gather information on the percentage of production that is rejected by quality control. If that percentage rises, it signals the possibility of problems in production (e.g., inferior material being used, poor training of new personnel, etc.). If such information is gathered and communicated, these

problems can be addressed before the company's reputation for high quality is harmed; if, on the other hand, such information is not gathered and communicated, then management may not become aware of the problem until returns and complaints are made by dissatisfied customers. At this time, it may be too late to avoid damage to their reputation.

## Monitoring

Monitoring is the process of tracking potential and actual problems in the internal control system. Monitoring is accomplished through normal supervising activities such as when a manager asks a subordinate how things are going. However, best practices for larger organizations suggest that an internal audit group help monitor the effectiveness of the internal control system. Monitoring the system of internal controls allows the organization to identify potential and actual weaknesses that could, if uncorrected, produce problems.

In fact, the Sarbanes-Oxley Act also requires all publicly-traded corporations to have an internal audit function that reports to the audit committee of the board of directors. The Act allows companies to outsource internal audit, but precludes the business that provides the (external) financial-statement audit from performing internal audit services because it may impair the independence of the financial-statement audit.

## Relationship Between Control Activities and the Accounting System

The **accounting system** consists of the methods and records used to identify, measure, record, and communicate financial information about a business. Although we distinguish between the accounting system and the internal control system, the two are really one integrated system designed to meet the needs of a particular business. It is difficult to generalize about the relationship between internal control activities and accounting systems, because it directly depends on the objectives of a particular business. Consequently, the relationship is best explored through an example.

For our illustration we will consider Hendrickson Theaters, Inc. Hendrickson operates 10 movie theaters in a single city. All the theaters are rented, as are the projection equipment and concession facilities. Hendrickson's administrative offices, furnishings, and office equipment are also rented. The following chart of accounts indicates the general structure of Hendrickson's simple accounting system:

### Chart of Accounts for Hendrickson Theaters, Inc.

<i>Assets</i>	<i>Revenues</i>
Cash	Admissions revenue
Concessions inventory	Concessions revenue
Prepaid rent	<i>Expenses</i>
<i>Liabilities</i>	Salaries expense
Accounts payable	Wages expense
Salaries payable	Cost of concessions sold
Wages payable	Rent expense, movie
<i>Equity</i>	Rent expense, theater
Capital stock	Rent expense, equipment
Retained earnings	Rent expense, office
	Utilities expense
	Advertising expense
	Office supplies expense

Hendrickson's accountant makes journal entries daily for revenues, biweekly for wages, and monthly for the other expenses using general purpose accounting software. Because Hendrickson has a relatively small number of accounts, its accounting

system is quite simple, still a complete description would require many pages. Furthermore, a complete description is unnecessary to demonstrate the basic relationship between system elements and control procedures. The portion of Hendrickson's accounting system related to revenues and the associated control activities are described in Exhibit 4-3.

Internal controls are designed to protect all assets. But the more liquid an asset (the more "liquid" an asset, the more easily it is converted into cash), the more likely it is to be stolen. Therefore, the controls over cash (the most liquid asset) must be designed with special care. We now turn our attention to cash controls.

**Exhibit 4-3**
**Relationship Between the Accounting System and Control Procedures**
**HENDRICKSON THEATERS, INC.**

Illustrations from the Internal Control Structure for Revenue and Cash

Accounting System	Control Procedures
<p><i>Entries:</i> Admissions and concessions revenues are recorded daily by increasing both cash and the appropriate revenue accounts.</p> <p><i>Documentation:</i> The electronic cash register at each ticket booth and concession stand prepares a detailed list of cash transactions and a daily cash summary report. The daily summary reports from the 10 theaters are electronically transferred to the central office each night and are automatically summarized upon receipt. Each morning, the accountant generates a paper report and makes revenue entries in the computerized general ledger.</p> <p><i>Reports:</i> A variety of revenue analyses can be prepared on the computer system, including analyses by theater, movie, day of the week, and month.</p>	<p><i>Authority and responsibility:</i> Each theater manager is responsible for the control of cash in his or her theater, but the central office accountant makes all general ledger entries related to cash.</p> <p><i>Segregation of duties:</i> Maintenance of the general ledger is segregated from responsibility for local cash control. Ticket sellers and concession operators may assist in preparation of daily cash deposits, but the manager must check and sign deposit documents.</p> <p><i>Documentation:</i> Prenumbered admission tickets are dispensed by machine at each theater. The machine also prepares a report of the tickets issued each day, which is used by the theater manager to reconcile cash collected with the number of tickets sold.</p> <p><i>Safeguards:</i> The cash accumulates in each theater until the end of each day. When cash drawers reach a specified level, however, the cash register signals that a fixed amount of cash should be removed by the manager and placed in the theater's safe.</p> <p><i>Checks:</i> On an unannounced schedule, Hendrickson's accountant visits each theater and verifies cash receipts reported against the number of tickets issued. On these same visits, the accountant checks concession revenues against the amounts reported by inventorying concession supplies.</p>

## Cash Controls

**OBJECTIVE** 3

Describe how businesses control cash.

When controls over cash are poorly designed or are not being followed, employees are more likely to believe that they can steal cash without getting caught (i.e., they have the opportunity). The *Association of Certified Fraud Examiners' 2002* fraud study suggested that 80 percent of all workplace frauds involved employee theft of company assets (i.e., embezzlement) and 90 percent of these thefts involved cash.<sup>1</sup> For example, casinos take in huge amounts of cash. At one casino in Connecticut, employees who counted cash were required to wear jumpsuits with no pockets while counting the cash. Further, supervisors observed the counters through one-way mirrors. That sounds good; however, one employee shoved over \$200,000 under the elastic wristband of his jumpsuit over the course of a few months. He would take the

<sup>1</sup>The other 20 percent includes such things as fraudulent financial statements.

money out of his sleeve and put it in his pockets during bathroom breaks. Now the casino uses clear jumpsuits for its cash counters.

Of course, casinos operate in a particularly difficult environment to control cash. But all companies must use the internal control activities described in the previous section to effectively control cash. For example, the authority to collect, hold, and pay cash must be clearly assigned to specific individuals. As discussed earlier, whenever feasible, cash-handling activities and cash record-keeping activities should be assigned to *different* individuals. Moreover, cash records should be examined often by an objective party as a basis for evaluating the performance of cash-handling activities. These controls should be supported by an appropriately designed record-keeping system. Additionally, cash should be safeguarded in vaults and banks. The following Decision-Making & Analysis illustrates these activities in a student organization where segregation of duties is often difficult.

## DECISION-MAKING & ANALYSIS

### Internal Control over Cash in a Student Organization

Internal control is frequently a problem for student organizations (clubs, fraternities, sororities, etc.). Internal control over cash is likely to be weak in such organizations. Usually one individual, the treasurer, is given the responsibility for collecting dues, depositing cash in the bank, writing all checks, maintaining accounting records, and preparing bank reconciliations and financial statements. This is a clear violation of segregation of duties. Although some members may recognize the internal control advantages of segregation of duties, student organizations frequently face the reality that segregation of duties is not nearly as important as simply finding someone willing to perform the treasurer's tasks.

What steps can be taken by a typical student organization to strengthen its internal control system? The following list contains seven questions that should be answered by the leaders of a student organization. A "no" answer to any question indicates a potential internal control weakness.

1. *Is supporting documentation obtained from vendors whenever cash is paid or a liability is incurred?*

The use of appropriate documentation assures the proper payment of bills and facilitates the appropriate accrual of liabilities on the year end balance sheet.

2. *Is every vendor invoice and all supporting documentation cancelled (e.g., by writing "Paid by check number 841 on November 29, 2009") at the time the check is written?*

This action helps assure that duplicate payments are not made.

3. *Does the organization's faculty advisor initial all checks written for amounts greater than some specified minimum (say \$500)?*

This control reduces the possibility of unauthorized payments.

4. *Are receipts of members' fees and dues deposited promptly (at least once a week)?*

Prompt deposits help avoid misplacing receipts.

5. *Does the organization have procedures to assist in the collection of membership dues?*

Despite the mutual trust and friendship that are a part of most student organizations, uncollectible accounts can be a serious problem. The treasurer may need the assistance of formal procedures in collecting overdue accounts (e.g., placing sanctions on members who fail to pay).

6. *Does the organization have an accounting policies and procedures manual?*

Such a manual may be needed to prepare the year-end financial report in conformity with university and/or national governing body requirements.

7. *Are complete minutes of all officers' meetings maintained?*

The minutes should include (a) a listing of all changes in membership and officers, including the names of new members, (b) a schedule of dues that documents all financial obligations of members, (c) approval of payments, and (d) authorization of check signers. Including this information, along with descriptions of important decisions of the organization's governing body, documents all the important activities of the organization.

Although many of the cash controls with which you are most familiar (e.g., cash registers) might appear to be outside the accounting system, we will highlight three important areas where the accounting system interacts with the internal control system to strengthen cash controls: (1) bank reconciliations, (2) cash over and short, and (3) petty cash.

## Reconciliation of Accounting Records to Bank Statement

The use of a bank is one of the most important controls over cash. The bank duplicates the company's accounting by keeping their own accounting records of your account. Unfortunately, the bank's accounting records and company's accounting records rarely agree because the transactions are not recorded at the same time (e.g., a company writes a check on January 18 and credits cash immediately; however, the bank will not debit your account until the check is presented to the bank—typically many days later). Therefore, to ensure that the accounting records are consistent with the bank's accounting records, any differences must be “reconciled.” This process is called the **bank reconciliation**.

Periodically—usually once a month—the bank returns all checks processed during the period, together with a detailed record of the activity of the account. The document is a *bank statement*, which shows the beginning and ending account balance and the individual deposits and withdrawals recorded by the bank during the period. Basically, the bank statement is a copy of the bank's accounting records showing each customer the increases and decreases in their balances (see Exhibit 4-4). Remember, a checking account is a liability for the bank (i.e., the bank owes you the balance). Therefore, deposits and other events that increase your bank account balance are labeled “credits” on the bank statement (because they increase the bank's liability to you), and withdrawals and other events that decrease your bank account balance are labeled “debits” (because they decrease the bank's liability to you).

Reconciliation of these separately maintained records serves two purposes: First, it serves a control function by identifying errors and providing an inspection of detailed records that deters theft. Second, reconciliation serves a transaction detection function by identifying transactions performed by the bank, so the business can make the necessary entries in its records.

## Sources of Differences Between Cash Account and Bank Statement Balance

In general, differences between the cash account balance (see Exhibit 4-5) and the bank statement balance develop from three sources: (1) transactions recorded by the business, but not recorded by the bank in time to appear on the current bank statement, (2) transactions recorded by the bank, but not yet recorded by the business, and (3) errors in recording transactions on either set of records. Let us consider examples of each source of difference.

### Transactions Recorded by the Business but Not Recorded by the Bank in Time to Appear on the Current Bank Statement

One type of transaction in this category is an **outstanding check**. This is a check issued and recorded by the business that has not been “cashed” by the recipient of the check. The business has (properly) recorded the check as lowering its cash balance and the bank has (properly) not recorded the check as lowering the business' account balance because it has not been cashed. For example, when a check is written during December, but not cashed until January, the business' December 31 cash balance will be lower than its account balance on the December 31 bank statement.

Another transaction in this category is a **deposit in transit**, which is an amount received and recorded by the business, but which has not been recorded by the bank in time to appear on the current bank statement. Deposits in transit cause the bank balance to be smaller than the business's cash account balance. Deposits in transit arise because many banks post any deposit received after 2:00 or 3:00 p.m. into their

## Exhibit 4-4

## Bank Statement

<b>T N B</b>	THIRD NATIONAL BANK	Account Statement
	123 W. Main Street	Statement Date:
	Batavia, OH 45103	August 31, 2009
	Member FDIC	
OHIO ENTERPRISES, INC. 519 MAIN STREET BATAVIA, OH 45103		Account Number: 40056

Previous Balance	Checks and Debits	Deposits and Credits	Current Balance
\$7,675.20	\$10,685.26	\$7,175.10	\$4,165.04

Checks and Debits			Deposits and Credits		Daily Balance	
Date	No.	Amount	Date	Amount	Date	Amount
8/3/09	1883	182.00			8/3/09	7,493.20
8/4/09	1884	217.26	8/4/08	2,673.10	8/4/09	9,949.04
8/6/09	1885	1,075.00			8/6/09	8,874.04
8/7/09	1886	37.50	8/7/08	4,500.00	8/7/09	13,336.54
8/10/09	1887	826.00			8/10/09	12,510.54
8/11/09	1888	50.00			8/11/09	12,460.54
8/12/09	1889	2,670.00				
8/12/09	1890	67.90			8/12/09	9,722.64
8/13/09	1891	890.00			8/13/09	8,832.64
8/14/09	1892	27.50			8/14/09	8,805.14
8/17/09	1893	111.00			8/17/09	8,694.14
8/18/09	DM	380.00			8/18/09	8,314.14
8/19/09	1894	60.00				
8/19/09	1895	510.00			8/19/09	7,744.14
8/20/09	1896	30.00			8/20/09	7,714.14
8/21/09	1897	1,600.00			8/21/09	6,114.14
8/24/09	1898	78.00			8/24/09	6,036.14
8/25/09	NSF	200.00			8/25/09	5,836.14
8/26/09	1899	208.80			8/26/09	5,627.34
8/27/09	1900	1,250.00			8/27/09	4,377.34
8/28/09	1902	175.00			8/28/09	4,202.34
8/31/09	1903	25.30	8/31/08	INT 2.00		
8/31/09	SC	14.00			8/31/09	4,165.04

Symbols:	CM Credit Memo	EC Error Correction	NSF Non-sufficient funds
	DM Debit Memo	INT Interest Earned	SC Service Charge

Reconcile your account immediately

records on the next business day and because businesses often make deposits on weekends or holidays when the bank is not open for business, which could cause the deposit to appear on the next bank statement.

**Transactions Recorded by Bank, but Not Yet Recorded by the Business** Several types of transactions fall within this category. Bank **service charges** are fees charged by the bank for checking account services. The amount of the fee is not known to the business (and therefore cannot be recorded) until the bank statement is received. Bank service charges unrecorded by the business at the end of a month cause the bank balance to be smaller than the business's cash account balance.

## Exhibit 4-5

## T-Account for Cash, Prior to Reconciliation

OHIO ENTERPRISES, INC.					
Cash					
Balance, 7/31/09	\$6,200.94				
<i>Date</i>	<i>Amount Deposited</i>	<i>Check Number</i>	<i>Check Amount</i>	<i>Check Number</i>	<i>Check Amount</i>
8/1	\$2,673.10	1886	\$ 37.50	1896	\$ 30.00
8/5	4,500.00	1887	826.00	1897	1,600.00
8/31	300.00	1888	50.00	1898	87.00
Total deposits	<u>\$7,473.10</u>	1889	2,670.00	1899	208.80
		1890	67.90	1900	1,250.00
		1891	890.00	1901	93.00
		1892	27.50	1902	175.00
		1893	111.00	1903	25.30
		1894	60.00	1904	72.50
		1895	510.00	1905	<u>891.00</u>
			Total disbursements		<u>\$9,682.50</u>
Balance, 8/31/09	\$3,991.54				

A **Non-Sufficient Funds (NSF) check** is a check that has been returned to the depositor because funds in the issuer's account are not sufficient to pay the check (also called a "bounced" check). The amount of the check was added to the depositor's account when the check was deposited; however, since the check cannot be paid, the bank deducts the amount of the NSF check from the account. This deduction is recorded by the bank before it is recorded by the business. NSF, then, checks cause the bank balance to be smaller than the cash account balance.

Debit and credit memos are also recorded by the bank before they are recorded by the business. A debit memo might result, for example, if the bank makes a prearranged deduction from the business' account to pay a utility bill. Debit memos recorded by the bank but not yet recorded by the business cause the bank balance to be smaller than the cash account balance. A credit memo could result if the bank collected a note receivable for the business and deposited the funds in the business's account. Credit memos recorded by the bank, but not recorded by the business, cause the bank balance to be larger than the cash account balance.

After the reconciliation process, the business must make adjusting journal entries to record all the transactions that have been recorded by the bank but not yet recorded in the business's ledger cash account.

**Errors** The previous differences between the accounting records and bank account balances are the result of time lags between the recording of a transaction by the business and its recording by the bank. Errors in recording transactions represent yet another source of difference between a business' cash account balance and the bank balance. For example, a \$76.00 check may be erroneously entered into the business' cash account for \$67.00. Such errors are inevitable in any

## CONCEPT Q&amp;A

If a debit increases an asset and decreases a liability and a credit decreases an asset and increases a liability, why does the bank "credit" your account when you make a deposit and "debit" your account when you make a withdrawal?

Because the "credit" and "debit" are from the bank's point of view. When you make a deposit, it actually increases the bank's liability to you—the bank now owes you more. When you make a withdrawal, it decreases the bank's liability to you.

Possible Answer:

accounting system and should be corrected as soon as discovered. In addition, an effort should be made to determine the cause of any error as a basis for corrective action. Obviously, an intentional error designed to hide misappropriation of funds calls for quite different corrective action than does an error resulting from human fatigue or machine failure.

To begin the reconciliation you start with the “cash balance from the bank statement” and the “cash balance from company records.” These two balances are then adjusted as necessary to produce identical “adjusted cash balance” by following these steps:

1. Compare the deposits on the bank statement to the deposits debited to the cash account. Any deposits debited to the cash account, but not on the bank statement are likely deposits in transit. However, you should look at a deposit slip to ensure that these amounts were actually deposited. Deposits in transit should be added to the “cash balance from the bank statement.”
2. Compare the paid (often called “cancelled”) checks returned with the bank statement to the amounts credited to the cash account and the list of outstanding checks from prior months. Any checks credited to the cash account, but not on the bank statement are likely outstanding checks. These amounts should be subtracted from the “cash balance from the bank statement.”
3. Look for items on the bank statement that have not been debited or credited to the cash account. These include items such as bank service charges, interest payments, NSF checks, automatic payments (debit memos), and bank collections on behalf of the company (credit memos). Bank debits to our account should be subtracted from the “cash balance from company records,” while bank credits should be added to the “cash balance from company records.” Of course, all these amounts should be verified as correctly applied to your account.
4. If at this time the “adjusted cash balances” are not the same, you must search for errors. The most common error is a “transposition” error in which, for example, a check is written for \$823, but recorded as \$283 (the 8 and 2 are transposed). In this case, the accounting records will show a \$283 credit to the cash account, but the bank will show a \$823 debit to the company’s account. All errors made by the company must be added or subtracted from the “cash balance from company records.” All errors made by the bank must be added or subtracted from the “cash balance from the bank statement.”

The process is illustrated in **Cornerstone 4-1**.

Once the bank reconciliation is completed, some adjustments to the accounting records may be necessary. No adjustments are necessary for outstanding checks or deposits in transit because the accounting records have correctly recorded these amounts. However, adjustments are necessary for any company errors or items such as bank charges or interest that the company does not find out about until receiving the bank statement.



## CORNERSTONE 4-1



### HOW TO Perform a Bank Reconciliation

#### Concept:

The sources of difference between the cash account and bank account balances are determined by a comparison of the accounting records and the bank statement. In general, this procedure has three parts: (1) compare balances, (2) compare credits to the cash account to debits on the bank statement (you are looking for differences such as outstanding checks and debit memos), and (3) compare debits to the cash account to credits on the bank statement (you are looking for differences such as deposits in transit and credit memos).

**Information:**

Use the bank statement in Exhibit 4-4 and the cash account in Exhibit 4-5. Recognize that the beginning balance was reconciled at the end of last month (July). Assume that this was performed correctly and all outstanding checks (numbers 1883, 1884, and 1885) and deposits in transit from July cleared during August.

**CORNERSTONE**  
**4-1**  
*(continued)*

**Required:**

1. Determine the adjustments needed by comparing the bank statement to the cash account.
2. Using the following form, complete the bank reconciliation.

---

Cash balance from bank statement

Add:

Less:

**Adjusted cash balance**

Cash balance from company records

Add:

Less:

**Adjusted cash balance**

---

**Solution:**

1. The August 31 deposit debited to the cash account does not appear on the bank statement. It is still in transit. Comparison of the bank statement and the cash account reveals that checks 1901, 1904, and 1905 are outstanding. Also note that the amount posted to the cash account for check 1898 does not equal the amount cleared on the bank statement. By examining the cancelled check, you find that the error is on the company's records. The check was written for \$78.00, not \$87.00.

2. 

<hr/>		
Cash balance from bank statement		\$ 4,165.04
Add: Deposit in transit (8/31)		300.00
Less: Outstanding checks		
1901	\$ 93.00	
1904	72.50	
1905	891.00	(1,056.50)
<b>Adjusted cash balance</b>		<b><u>\$3,408.54</u></b>
Cash balance from company records		\$ 3,991.54
Add:		
Error in recording check 1898 (we recorded as \$87, should be \$78)	\$ 9.00	
Interest	2.00	11.00
Less:		
Service charge	\$ 14.00	
NSF check	200.00	
Electric bill (Debit Memo)	380.00	(594.00)
<b>Adjusted cash balance</b>		<b><u>\$3,408.54</u></b>
<hr/>		

The bank reconciliation typically produces adjusting entries like those shown in [Cornerstone 4-2](#). However, there are additional benefits when the reconciliation is performed by someone with no other responsibilities related to cash (the duties of reconciling cash and cash record keeping should be segregated). Specifically, if the person who writes the checks also performs the reconciliation, then it is easier for them to cover up theft and fraud.



## CORNERSTONE 4-2



### HOW TO Make Adjusting Entries as a Result of the Bank Reconciliation

#### Concept:

Adjusting journal entries are required for all transactions correctly recorded by the bank that have not yet been included in the accounting records.

#### Information:

Refer to the Bank Reconciliation performed in Cornerstone 4-1.

#### Required:

Provide the necessary adjusting journal entries.

#### Solution:

To correct error in recording check 1898:

Assets =	Liabilities +	Stockholders' Equity
+9	+9	

Date	Account and Explanation	Debit	Credit
	Cash	9	
	Accounts Payable		9

To record interest:

Assets =	Liabilities +	Stockholders' Equity
+2	+2	

Date	Account and Explanation	Debit	Credit
	Cash	2	
	Interest Income		2

To record bank service charge:

Assets =	Liabilities +	Stockholders' Equity
-14		-14

Date	Account and Explanation	Debit	Credit
	Bank Service Charge Expense	14	
	Cash		14

To record NSF check:

Assets =	Liabilities +	Stockholders' Equity
+200		
-200		

Date	Account and Explanation	Debit	Credit
	Accounts Receivable	200	
	Cash		200

To record debit memo for payment of electric bill:

Assets =	Liabilities +	Stockholders' Equity
-380		-380

Date	Account and Explanation	Debit	Credit
	Utilities Expense	380	
	Cash		380

### Cash Over and Short

Another important control activity requires that cash receipts be deposited in a bank daily. At the end of each day, the amount of cash received during the day is debited to the cash accounts to which it has been deposited. The amount deposited should equal the total of cash register tapes. If it does not (and differences will occasionally occur even when cash-handling procedures are carefully designed and executed), the discrepancy is recorded in an account called **cash over and short**.

To illustrate the use of the cash over and short account, suppose that on a certain day a business has prepared for a deposit total of \$20,671.12. However, the total of

cash register tapes and other documents supporting the receipt of cash on that day is \$20,685.14, including collections of accounts receivable of \$6,760.50. The \$14.02 difference is the amount of cash short, and the following journal entry records this amount along with the day's receipts:

Date	Account and Explanation	Debit	Credit
	Cash	20,671.12	
	Cash Over and Short	14.02	
	Sales Revenue (\$20,685.14 – \$6,760.50)		13,924.64
	Accounts Receivable		6,760.50

Assets	=	Liabilities	+	Stockholders' Equity
+20,671.12				-14.02
-6,760.50				+13,924.64

Observe that a cash *overage* requires a credit to cash over and short, whereas a cash *shortage* would require a debit.

One common source of cash over and short is errors in making change for cash sales. Significant amounts of cash over and short signal the need for a careful investigation of the causes and appropriate corrective action. Cash over and short is usually treated as an income statement account and is reported as a part of other expenses or other revenues.

## Petty Cash

Cash controls are more effective when companies pay with a check. For example, only certain people have the authority to sign the check. Further, these people do not keep the accounting records and they will only sign the check with the proper documentation supporting the payment (e.g., evidence that the goods being paid for were properly ordered and received). Additionally, upon signing the check the supporting documents are marked paid to avoid duplicate payment. Finally, checks are prenumbered, which makes it easy to identify any missing checks.

However, issuing checks to pay small amounts is usually more costly than paying cash.<sup>2</sup> To reduce such costs, a company may establish a **petty cash** fund to pay for small dollar amount items such as stamps or a cake for an employee birthday party. The petty cash fund is formed by giving a small amount of cash to a petty cash custodian. The custodian will then pay for small dollar amounts directly out of the fund. Also, employees will often use their own money to pay for an item, then bring the receipt to the custodian. The custodian will reimburse the employee for the amount shown on the receipt from the petty cash fund and keep the receipt. At the end of the month the custodian submits all the receipts (and any other supporting documentation) to the company. After ensuring the appropriateness of all the receipts, the custodian is given the total amount to replenish the petty cash fund. It is only at this time that the company records the amounts spent in the accounting records. However, because the custodian replenishes petty cash at the end of the month, the accounting records are appropriately updated each month. This process is illustrated in **Cornerstone 4-3**.

### HOW TO Account for Petty Cash

#### Concept:

A petty cash fund account is debited for the entire amount given to the custodian when the fund is established. When the custodian replenishes the fund at the end of the month the appropriate expenses are recorded. The petty cash fund account is not adjusted unless the total amount of the fund is changed.

#### Information:

On January 1, Oregon Industries establishes a petty cash fund of \$500. The petty cash custodian has been with the company for many years and has demonstrated an ability to maintain careful records. On January 31, the custodian



### CORNERSTONE 4-3



<sup>2</sup>Checks are costly to use. They cost money to print. They cost money to mail. They cost money to process. Some estimate the cost of processing a check to be over \$1. Therefore, banks have developed ways for businesses to transfer money without the use of paper checks. For example, most employees do not see an actual paycheck any longer; instead, the money is automatically deposited into their bank account. These are called electronic fund transfers (EFT). Use of EFTs is quite common and over the last 10 to 15 years has become commonplace at the individual level through the use of debit cards.

**CORNERSTONE**  
**4 - 3**  
*(continued)*

presents the following records of the month's transactions, together with related documents, and requests reimbursement:

Jan. 12	Hansen's Grocery (coffee)	\$ 30
15	U.S. Post Office (postage)	70
17	Northwest Messenger (package delivery)	25
19	Office Depot (Office supplies)	175
25	Mr. Strand, Controller (food for lunch meeting)	63
	<b>Total</b>	<b><u>\$363</u></b>

Company personnel (other than the petty cash custodian) examine the documents to determine that they are authentic and that each transaction is supported by appropriate documentation. The company then issues a check to the custodian for \$363.00 to replenish the fund.

**Required:**

1. Make the necessary journal entry to establish the petty cash fund on January 1.
2. Make the necessary journal entry to record the replenishment of the fund on January 31.
3. Make the necessary journal entry to record the replenishment of the fund on January 31 assuming that Oregon Industries also decided to increase the fund balance to \$600.

**Solution:**

1. *Establishment of petty cash fund on January 1:*

		Stockholders'
Assets =	Liabilities +	Equity
+500		
-500		

Date	Account and Explanation	Debit	Credit
	Petty Cash Fund	500.00	
	Cash		500.00

2. *Replenishment of petty cash fund and recognition of expense on January 31:*

		Stockholders'
Assets =	Liabilities +	Equity
-363		-175
		-70
		-25
		-93

Date	Account and Explanation	Debit	Credit
	Office Supplies Expense	175.00	
	Postage Expense	70.00	
	Delivery Expense	25.00	
	Miscellaneous Expense	93.00	
	Cash		363.00

Although the expenditures of petty cash require entries in the records maintained by the custodian, they are not recorded in Oregon Industries' accounting records until the fund is replenished. Also note that replenishment does not alter the balance of the petty cash fund on Oregon's records; the balance remains \$500.00.

3. *Replenishment of petty cash fund and recognition of expense on January 31 with an increase of the fund balance to \$600:*

		Stockholders'
Assets =	Liabilities +	Equity
-463		-175
+100		-70
		-25
		-93

Date	Account and Explanation	Debit	Credit
	Petty Cash Fund	100.00	
	Office Supplies Expense	175.00	
	Postage Expense	70.00	
	Delivery Expense	25.00	
	Miscellaneous Expense	93.00	
	Cash		463.00

Replenishment of petty cash may also occur during the month if the amount of petty cash available gets too low. At that time, the same steps described in Cornerstone 4-3 would be followed. However, to assure that all expenses are recorded in the appropriate accounting period, replenishment should occur at the end of the month or accounting period. As an additional control measure, a company should periodically verify its petty cash balances by counting the cash in the hands of custodians. The amount of cash held by each custodian should equal the balance shown in the custodian's petty cash record.

We have spent considerable time discussing internal controls both in general, and over cash, in particular, for two reasons. First, internal controls are an integral part of the accounting system and business. Second, the accounting and reporting of cash is not that difficult. Now, we will turn to accounting and reporting for cash.

## Accounting and Reporting Cash

### OBJECTIVE > 4

Describe how businesses account and report cash.

When cash is received, a cash account is increased by a debit; and when cash is paid out, a cash account is decreased by a credit. As discussed in the bank reconciliation section, receipt and payment of cash are frequently accomplished by a check sent through the mail, a process that may require several days, and additional time may pass between receipt of the check and its deposit in the bank by the payee. Despite the fact that there may be a time lag between the issuance of a check and the actual transfer of funds, the accounting system treats payment by check in exactly the same way that it treats the transfer of currency. The receipt of either a check or currency is recorded by a debit to cash. Conversely, either the issue of a check or the payment of currency is recorded by a credit to cash.

Cash is reported on both the balance sheet and the statement of cash flows. The balance sheet reports the amount of cash available at the balance sheet date. The statement of cash flows shows the sources and uses of cash during the year. The statement of cash flows will be discussed in more detail in Chapter 11. As shown in Exhibit 4-6, the balance sheet typically reports cash and cash equivalents.

As explained in the notes to Abercrombie & Fitch's financial statements, **cash equivalents** "include amounts on deposit with financial institutions and investments, primarily held in money market accounts, with original maturities of less than 90 days." This is a standard definition and indicates that cash equivalents are (1) easily convertible into known amounts of cash and (2) close enough to maturity that they are relatively insensitive to changes in interest rates.

But why do companies bother to invest their cash in such short-term investments? The answer is that such investments earn a greater rate of return than cash sitting in a bank account. Refer to Exhibit 4-6 and you'll see that Abercrombie & Fitch had almost \$82,000,000 in cash and equivalents at February 3, 2007. If their investment strategy earns a mere 1 percent more than a bank account, they would earn an

### Exhibit 4-6

#### Balance Sheet Reporting of Cash for Abercrombie & Fitch

Abercrombie & Fitch, Inc. Consolidated Balance Sheet (in thousands)		
	Feb. 3, 2007	Jan. 28, 2006
<b>ASSETS</b>		
Current assets:		
Cash and Equivalents	\$81,959	\$50,687

extra \$820,000 in interest for the year. We will consider cash management strategies, but first we discuss the financing and operating cycles because these affect the amount of cash needed.

## OBJECTIVE 5

Describe the cyclical nature of business activity.

## Financing and Operating Cycles

Business transactions form sequences of connected and regularly repeated patterns of activity. Although these patterns or cycles vary somewhat from one business to another, most are composed of the following activities:

1. **Receiving assets** (mainly cash) from owners (stockholders) and creditors (bankers and bondholders).
2. **Purchasing assets** from outside suppliers, including merchandise for resale or materials to produce salable goods or services.
3. **Selling goods or services** to customers.
4. **Collecting cash from customers** for goods and services sold.
5. **Repaying owners and creditors** the assets they invested plus appropriate compensation.

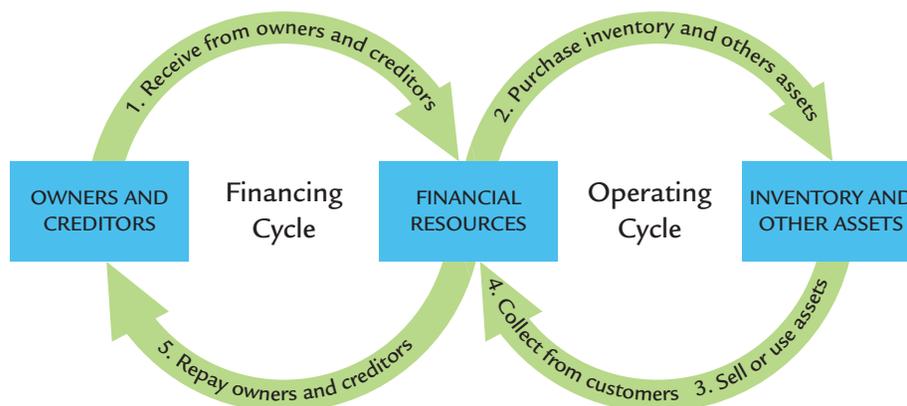
Exhibit 4-7 shows how these five activities are arranged in the *financing and operating cycles* of a typical business selling goods to its customers. The business receives financial resources from owners and creditors. These resources are used to purchase various assets, including goods that will be held in inventory until sold to customers. The business sells all goods on credit, creating accounts receivable, and cash is not replenished until the receivables are collected, which completes the operating cycle. At regular intervals, dividends are paid to stockholders (owners) and interest is paid to creditors, which completes the financing cycle. Ultimately, of course, the amount originally received from stockholders and creditors is repaid, although in the case of stockholders, it may not be repaid until the business is dissolved.

### Financing Cycle

The **financing cycle** is the elapsed time between the receipt of financial resources from owners and creditors and the repayment of the original amounts received. The length of the financing cycle varies with the type of financing used by the enterprise. Some borrowings may pass through the financing cycle in a year or less, whereas others may require 5 to 10 years or even longer. As noted above, the financing cycle for cash received from stockholders may be the entire lifetime of the business enterprise. Thus, the overall financing cycle for most businesses is likely to be many years.

Exhibit 4-7

The Financing and Operating Cycles



## Operating Cycle

The **operating cycle** is the elapsed time between the purchase of goods for resale (or the purchase of materials to produce salable goods or services) and the collection of cash from customers (presumably a larger amount of cash than was invested in the goods sold). Although typically a year or less, the operating cycle can be as short as a few days for perishable goods, or as long as many years for the production and sale of products such as timber or wine.

Let us illustrate the determination of an operating cycle. **H. H. Gregg** of Indianapolis is a large appliance retailer that provides long-term financing for customers. Appliances remain in inventory for an average of three months before being sold. Most are sold on credit, and it takes an average of 12 months to collect the full amount of a sale. Thus, Gregg's operating cycle is 15 months, representing the average purchase-to-collection interval (three months to sell plus 12 months to collect).

A business's operating cycle is usually much shorter than its financing cycle. Indeed, it is the opportunity to use outside resources to finance multiple operating cycles that enables a business to generate profit and to pay interest and dividends. *The length of the operating cycle influences the classification of assets and liabilities on balance sheets.* In addition, the operating cycle plays an important role in the measurement of income. The length of the operating cycle also affects the amount of capital a business needs and the policies that govern its sales of goods and services, as the Decision-Making & Analysis demonstrates.

## DECISION-MAKING & ANALYSIS

### Operating Cycle and Capital Requirements

Consider two companies named Long and Short that are engaged in selling the same product, called a Gismo. Each company sells, on credit, 1,000 Gismos per month (12,000 per year) to similar customers at \$10 per unit. Each company has in inventory of 200 Gismos that were purchased at a cost of \$6 per unit (a total inventory of \$1,200). Each company has \$1,000 in cash and no assets other than accounts receivable and inventory. Short collects its accounts receivable within one month, so that at any point in time one month's sales, or \$10,000, are in Short's accounts receivable. Long, on the other hand, collects its accounts receivable three months after a sale and therefore at any given time has three months' sales, or \$30,000, in accounts receivable. At present, the two companies have the following balance sheets:

Short		Long	
ASSETS		ASSETS	
Cash	\$ 1,000	Cash	\$ 1,000
Inventory	1,200	Inventory	1,200
Accounts receivable	10,000	Accounts receivable	30,000
Total	<u>\$12,200</u>	Total	<u>\$32,200</u>
LIABILITIES AND EQUITY		LIABILITIES AND EQUITY	
Equity	\$12,200	Loans payable	\$20,000
Total	<u>\$12,200</u>	Equity	12,200
		Total	<u>\$32,200</u>

1. What is the effect of the difference in operating cycle on the capital requirements of Long and Short, respectively?

A comparison of the two balance sheets shows that Long needs \$20,000 more capital than Short, because of Long's longer operating cycle. The \$20,000 needed is the difference between Short's \$12,200 in assets and Long's \$32,200 in assets.

2. What is the effect of the differences in the capital requirements of the two companies on their sales price?

Long's expenses will be higher than Short's expenses because the additional borrowing results in additional interest expense. Presumably, Long would not allow its customers to take three months to pay unless compensated for doing so. Thus, Long will probably charge a higher price because of the extended payment terms, making Long's revenue higher than Short's.

With an understanding of the financing and operating cycles, we now turn our attention to cash management strategies.

**OBJECTIVE** > **6**  
Explain the principles of cash management.

## Cash Management

---

As discussed in the previous section, the activities of the operating cycle transform cash into goods and services and then back, through sales, into cash. This sequence of activities includes a continual process of paying and receiving cash. A company can significantly increase its net income through its cash management policies. At a high level, cash management principles entail a delay in paying suppliers (so a company can earn as much interest on their cash as possible), speeding up collection from customers (in order to invest the cash sooner), and earning the greatest return on any excess cash. We can follow these principles through the operating cycle.

The first stage of the operating cycle is buying inventory. We have long recognized that money that is tied up in inventory sitting on the shelves is not earning any return. As such, an important aspect of cash management is to keep inventory levels low. This decreases the need for cash. Companies have made great strides in inventory management over the last few decades. In fact, many manufacturers have no more than a couple of days' sales in inventory.

The second stage of the operating cycle is paying for the inventory. As with all payments, a good cash management principle is to delay payments as long as possible while maintaining a good relationship with the payee. Keeping the cash in our hands for the longest time possible allows us to collect more interest on the money. This may seem trivial, but consider a company like **Microsoft**. Its 2007 SEC filings reveal approximately \$3.2 billion in accounts payable. If Microsoft can earn 5 percent on this money, it will earn close to \$450,000 per day in interest. You may practice this in your own lives if you wait until April 15 to pay any income taxes owed or pay your tuition on the last possible day.

The third stage is selling the inventory, which often produces receivables. As good cash management suggests delaying payments, it conversely suggests increasing the speed of receivable collections. This is an area that has become increasingly sophisticated over the last 20 years. In fact, many companies sell their receivables rather than wait for their customers to pay. Of course, they sell the receivables for less than they will receive (which represents interest and return for the buyer), but it also allows the company to receive the cash sooner and avoid hiring employees to service the receivables.

Beyond delaying payments and speeding up collections, businesses try to keep their bank cash balances to a minimum because most bank accounts earn relatively small amounts of interest. Accordingly, short-term investments are purchased with temporary cash surpluses. The value and composition of short-term investment portfolios change continually in response to seasonal factors and other shifts in the business environment. As for the accounting for short-term investments, this is discussed in the appendix.

These investments will usually be liquidated (i.e., converted to cash through selling or maturity) before the business undertakes any significant short-term borrowing because the interest expense on short-term borrowings usually exceeds the return on short-term investments. Nonetheless, temporary shortages can result from the day-to-day ups and downs in the inflows and outflows of cash, as well as unforeseen needs for cash. A business with a good credit rating can borrow funds to resolve a temporary cash shortage. Such borrowings frequently are made under a line of credit, an agreement between the company and its bank in which the bank promises to lend the company funds up to a specified limit and at specified interest rates. The use of short-term investments as part of cash management is illustrated in the following Decision-Making & Analysis.

## DECISION-MAKING & ANALYSIS

### Cash Management by Ohio Wire

Ohio Wire is a medium-size manufacturer of cable and wire used in the construction of bridges and buildings. Since most basic construction is seasonal, Ohio Wire tends to have surplus cash in the early months of each year. The company treasurer constructs a cash budget at the beginning of each year in an effort to determine, in advance, the periods in which cash will be available for short-term investment and the periods in which such investments will have to be liquidated. The budget shows that the treasurer anticipates the expenditure of cash at a steady rate of \$300,000 per quarter. Budgeted cash receipts vary, however, according to the following schedule:

First quarter 2010	\$452,000
Second quarter 2010	320,000
Third quarter 2010	155,000
Fourth quarter 2010	325,000
First quarter 2011	527,000

Ohio Wire begins the year with a cash balance of \$50,000, no short-term investments, and no short-term debt. The business operates under the policy that the end-of-quarter cash balance should equal \$50,000 plus the expected excess of disbursements over receipts, if any, during the next quarter. If receipts are expected to exceed disbursements during the next quarter, then the end-of-quarter balance should equal \$50,000. The following questions might be asked concerning Ohio Wire's cash management policy:

1. What addition to, or liquidation of, short-term investments should be made during each quarter in 2010? Will short-term borrowing be necessary?

Consider the calculation to be made at the beginning of the first quarter of 2010. The cash balance on January 1 is \$50,000, expected receipts for the first quarter are \$452,000, and expected expenditures are \$300,000, which will produce an end-of-first-quarter cash balance of \$202,000 ( $\$50,000 + \$452,000 - \$300,000$ ). Since receipts are expected to exceed expenditures during the second quarter, the end-of-first-quarter cash balance should equal \$50,000. To reduce the cash balance to the desired level of \$50,000, investments of \$152,000 ( $\$202,000 - \$50,000$ ) must be made during the first quarter. At the beginning of each quarter, the required investment, borrowing, or liquidation for the ensuing quarter is calculated in a similar way, as shown in the following schedule:

	<u>First Quarter 2010</u>	<u>Second Quarter 2010</u>	<u>Third Quarter 2010</u>	<u>Fourth Quarter 2010</u>
<b>Calculation of Ending Balance Before Adjustment for Investments, Borrowing, or Liquidations</b>				
Cash receipts	\$452,000	\$ 320,000	\$ 155,000	\$325,000
Cash disbursements	<u>300,000</u>	<u>300,000</u>	<u>300,000</u>	<u>300,000</u>
Excess (deficiency) of cash receipts	\$152,000	\$ 20,000	\$(145,000)	\$ 25,000
Beginning cash balance	<u>50,000</u>	<u>50,000</u>	<u>195,000</u>	<u>50,000</u>
Ending cash balance before adjustment	<u>\$202,000</u>	<u>\$ 70,000</u>	<u>\$ 50,000</u>	<u>\$ 75,000</u>
<b>Calculation of Required Ending Balance</b>				
Next quarter's deficiency of cash receipts	\$ 0	\$ 145,000	\$ 0	\$ 0
Minimum cash balance	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>
Required ending balance	<u>\$ 50,000</u>	<u>\$ 195,000</u>	<u>\$ 50,000</u>	<u>\$ 50,000</u>
<b>Short-Term Adjustment</b>				
Amount to invest (borrow or liquidate)	<u>\$152,000</u>	<u>\$(125,000)</u>	<u>\$ 0</u>	<u>\$ 25,000</u>

In sum, the business should plan to invest \$152,000 in short-term securities during the first quarter, liquidate securities in the amount of \$125,000 during the second quarter; neither buy nor sell securities during the third quarter, and invest \$25,000 in securities during the fourth quarter. No short-term borrowing is necessary.

2. How did Ohio Wire determine its minimum cash balance to be \$50,000?

Formal decision-making techniques and models are available to assist in making such judgments. But it is also possible that Ohio Wire simply established the \$50,000 minimum as a result of trial and error with a variety of cash management policies. Arrangements with banks also influence cash management policies. Banks sometimes require depositors to maintain a minimum balance.

Effective cash management ultimately requires some understanding of future cash flows. For example, if the company is planning to expand or pay off a loan, it must make sure it has the necessary cash on hand. If a company receives most of its cash for the year around the holidays, it must effectively manage the excess until the time it is needed. These projections are made as part of the budgeting process and are an integral part of managerial accounting courses.

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## Summary of Learning Objectives

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- LO1. Discuss the role of internal controls in managing a business.**
- Internal control systems provide reasonable assurance that the company's objectives are being met in three areas:
    - effectiveness and efficiency of operations
    - reliability of financial reporting
    - compliance with applicable laws and regulations
- LO2. Discuss the five elements of internal control.**
- The internal control system includes:
    - the control environment
    - risk assessment
    - control activities
    - information & communication
    - monitoring
  - Although we distinguish between the accounting system and the internal controls system, the two are really one integrated system designed to meet the needs of a particular business.
- LO3. Describe how businesses control cash.**
- Keeping control over cash is extremely difficult.
  - It is important to:
    - safeguard cash
    - adequately segregate the custody of cash from the authorization of payments and the accounting records.
  - Cash accounts include:
    - Cash in bank
    - Change funds
    - Petty cash
  - Controls over these cash accounts include:
    - Bank reconciliations
    - Daily deposits and recording cash over and short amounts
    - Accounting procedures for petty cash funds
- LO4. Describe how businesses account and report cash.**
- A cash account is debited when cash is received and credited when cash is paid out.
  - Cash is reported on the balance sheet as the amount of cash and cash equivalents available on the balance sheet date.
  - The statement of cash flows shows the sources and uses of cash during the accounting period.
  - Cash equivalents are amounts that are easily convertible into known amounts of cash and investments that are close to maturity.
- LO5. Describe the cyclical nature of business activity.**
- The financing and operating cycles of the business starts when the business receives financial resources from owners and creditors.
  - These resources are used to purchase various assets, including goods that will be held in inventory until sold to customers.

- When a business sells goods on credit, creating accounts receivable, cash is not replenished until the receivables are collected, which completes the operating cycle.
- At regular intervals, dividends are paid to stockholders (owners) and interest is paid to creditors, which completes the financing cycle.
- Ultimately, the amount originally received from stockholders and creditors is repaid, although in the case of stockholders, it may not be repaid until the business is dissolved.

**LO6. Explain the principles of cash management.**

- Cash management is an important function at all companies because business is really a continuous cycle of paying and receiving cash.
- Although aspects of cash management have become extremely sophisticated, basic strategies are:
  - keeping inventory levels low
  - delaying payment of liabilities as long as possible
  - speeding up collection of receivables
  - investing idle cash to earn the greatest possible return while still being available when needed

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**CORNERSTONE 4-2** How to make adjusting entries as a result of the bank reconciliation, page 192

**CORNERSTONE 4-3** How to account for petty cash, page 193



**CORNERSTONES  
FOR CHAPTER 4**

## Key Terms

Accounting system, 184	Non-Sufficient Funds (NSF) check, 189
Bank reconciliation, 187	Operating cycle, 197
Business process risks, 181	Outstanding check, 187
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## Appendix: Classification and Accounting for Investments

**OBJECTIVE** 7

Describe the classification and accounting for investments.

Although companies can invest excess cash in virtually any asset (e.g., land), in this section we will concentrate on the most common investments—buying equity or debt securities. An equity security represents an ownership interest in a corporation. Although most equity securities are common stock, preferred stock is also an equity security. A debt security exists when another entity owes the security holder some combination of interest and principal. Debt securities include corporate bonds, U.S. treasury securities, municipal bonds, etc.

Accounting for investments in equity securities differs depending upon the amount of common stock owned. The difference exists because of the nature of the ownership interest. If we own less than 20 percent of the common stock, the investment is generally considered to be “passive”; that is, we are not attempting to exert influence over the operating and financial policies of the corporation. In this case, the fair value method is used. This is discussed in more detail below.

If we own between 20 percent and 50 percent of the outstanding common stock, then we are assumed to possess “significant influence” over the operating and financial policies of the corporation. In this case, the equity method is used to account for the investment. The equity method is discussed in more advanced accounting courses.

Finally, if we own over 50 percent of the common stock, then we are assumed to “control” the operating and financial policies of the corporation (we are the parent and they are our subsidiary). In this case the subsidiary’s financial statements are “consolidated” with ours. Consolidation will also be discussed in more advanced accounting courses.

When we own less than 20 percent of the outstanding common stock of a corporation, the equity securities are classified as either (1) **trading securities** or (2) **available-for-sale securities**. Debt securities are also classified as trading or available-for-sale, but debt securities may also be classified in a third category—**held-to-maturity**. The distinction between these classifications is as follows:

1. **Trading securities** are equity or debt investments that management intends to sell in the near term. Trading securities are bought and sold frequently and typically are owned for under one month. Trading securities are always classified as current assets on the balance sheet.
2. **Available-for-sale securities** are equity and debt investments that management intends to sell in the future, but not necessarily in the near term. In reality, they are all investments that don’t warrant inclusion as trading securities or held-to-maturity securities. On the balance sheet, available-for-sale securities are classified as current or noncurrent assets depending on whether they will be sold within one year or one operating cycle, whichever is longer.
3. **Held-to-maturity securities** are debt investments (not equity, because stock does not mature) that management intends to hold until the debt contract requires the borrower to repay the debt in its entirety. On the balance sheet, held-to-maturity securities are classified as noncurrent assets unless the date of maturity is within one year or one operating cycle, whichever is longer.

Debt securities that are classified as “held-to-maturity” are valued at an amortized cost basis. This method is discussed in Chapter 9. Securities (both debt and equity) that are classified as “trading” or “available-for-sale” are valued at fair market value. An overview of the accounting for investments in debt and equity securities is shown in Exhibit 4-8.

## Accounting for Trading and Available-for-Sale Securities

Like other assets, trading and available-for-sale securities are recorded at cost, which is also fair value on the date of purchase. To illustrate, on August 1, Redbird Corporation made the following purchases of securities:

Security	Type	Classification	Amount
Illinois Enterprises	Equity	Trading	\$ 10,000
Metzler Design	Debt	Trading	6,000
IMG	Equity	Trading	4,100
<b>Total Trading Securities</b>			<b><u>\$20,100</u></b>
Alabama Co.	Debt	AFS	\$ 8,100
Mutare, Inc.	Debt	AFS	6,300
ABC	Equity	AFS	12,000
<b>Total Available-for-Sale Securities</b>			<b><u>\$26,400</u></b>

## Exhibit 4-8

## Accounting for Investments in Debt and Equity Securities

Investments in Equity Securities	Method	Reporting of Dividends	Reporting of Unrealized Gains and Losses	Where Discussed
1. Passive Investment—Own <20% of the Stock				
a. Trading	Fair Value	Net Income	Net Income	In this appendix
b. Available-for-sale	Fair Value	Net Income	Other Comprehensive Income	In this appendix
2. Significant Influence—Own 20% to 50% of the Stock	Equity	Reduces Investment Account	Not Recognized	Intermediate
3. Control—Own >50% of the Stock	Consolidation	Eliminated	Not Recognized	Advanced
<b>Investments in Debt Securities</b>		<b>Reporting of Interest Income</b>		
1. Trading	Fair Value	Net Income	Net Income	In this appendix
2. Available-for-sale	Fair Value	Net Income	Other Comprehensive Income	In this appendix
3. Held-to-maturity	Amortized Cost	Net Income	Not recognized	Chapter 9

The acquisitions are recorded by the following entry:

Date	Account and Explanation	Debit	Credit
	Investments—Trading Securities	20,100	
	Investments—Available-for-Sale Securities	26,400	
	Cash		46,500

Assets	=	Liabilities	+	Stockholders' Equity
+20,100				
+26,400				
-46,500				

On September 30, Redbird Corporation received cash dividends of \$300 from IMG and \$200 from ABC, which are recorded by the following entry:<sup>3</sup>

Date	Account and Explanation	Debit	Credit
	Cash	500	
	Dividend Income		500

Assets	=	Liabilities	+	Stockholders' Equity
+500				+500

On December 20, the market price of IMG stock had climbed to \$4,900, and Redbird decided to sell its entire holding. The following entry records the sale:

Date	Account and Explanation	Debit	Credit
	Cash	4,900	
	Investments—Trading Securities		4,100
	Gain on Sale of Investments		800

Assets	=	Liabilities	+	Stockholders' Equity
+4,900				+800
-4,100				

The \$800 gain will be included in Redbird Corporation's year-end net income, as will the \$300 dividend received on September 30. In summary, this investment yielded two forms of income—dividends (\$300) and a gain on sale (\$800)—giving Redbird Corporation additional net income of \$1,100.

<sup>3</sup>Dividend income should be recognized by investors at the dividend declaration date rather than the dividend payment date. When a cash dividend is declared in one year and paid in the following year, the investor should record the dividend declaration at year-end by a debit to dividends receivable and a credit to dividend income. In the following year, when the related cash is received, the investor should debit cash and credit dividends receivable.

## Exhibit 4-9

## Investment Portfolio Data

Redbird Corporation Investment Portfolio December 31, 2009			
Security	Classification	Acquisition Cost	Market Value at 12/31
Illinois Enterprises	Trading	\$ 10,000	\$ 8,800
Metzler Design	Trading	6,000	6,400
<b>Total Trading Securities</b>		<b><u>\$16,000</u></b>	<b><u>\$15,200</u></b>
Alabama Co.	AFS	\$ 8,100	\$ 8,600
Mutare, Inc.	AFS	6,300	6,500
ABC	AFS	12,000	13,500
<b>Total Available-for-Sale Securities</b>		<b><u>\$26,400</u></b>	<b><u>\$28,600</u></b>

In addition, Mutare, Metzler Design, and Alabama Co. (the three debt securities) pay interest totaling \$1,500 on December 31, which is recorded with the following entry:

Assets = Liabilities +	Stockholders' Equity
+1,500	+1,500

Date	Account and Explanation	Debit	Credit
	Cash	1,500	
	Interest Income		1,500

On the balance sheet, both trading and available-for-sale securities are recorded at fair value. Use of the fair value method results in “unrealized holding gains and losses” because the value of the securities must be written up or down to fair market value at the balance sheet date (this is often called “marking to market”). For example, consider the following securities shown in Exhibit 4-9.

On December 31, Redbird Corporation would make the following entries to “mark the investments to market”:

Assets = Liabilities +	Stockholders' Equity
+2,200	+2,200

Date	Account and Explanation	Debit	Credit
	Allowance to Adjust Available-for-Sales Securities to Market	2,200	
	Unrealized Gain on Available-for-Sale Securities		2,200*

\*Recognize that for Available-for-sale securities any unrealized Gain or loss goes to the “other comprehensive income” portion of stockholders’ equity—not to the income statement.

Assets = Liabilities +	Stockholders' Equity
-800	-800

Date	Account and Explanation	Debit	Credit
	Unrealized Loss on Trading Securities	800*	
	Allowance to Adjust Trading Securities to Market		800

\*Recognize that for trading securities any unrealized gain or loss goes to the income statement.

The allowance accounts (both Available-for-Sale and Trading) are valuation accounts containing the unrealized gains and losses on the short-term investment portfolio (Available-for-Sale and Trading, respectively). Valuation accounts are used to record changes in the fair values of the investments so that the investment accounts (both Available-for-Sale and Trading) reflect the original cost. At the balance sheet date, the allowance accounts are adjusted to reflect the current amount of unrealized gain or loss in the investment portfolio. On the balance sheet, the allowance accounts are netted with the respective investment accounts (i.e., added if the

allowance has a debit balance and subtracted if it has a credit balance) to report the investments at fair value as follows:

<b>Redbird Corporation</b>		
<b>Partial Balance Sheet</b>		
<b>December 31, 2009</b>		
<b>Current Assets:</b>		
Trading securities, at cost	\$16,000	
Less: Allowance to adjust trading securities to market	<u>800</u>	
Trading securities, at market		\$15,200*
<b>Noncurrent Assets:</b>		
Available-for-sale securities, at cost	\$26,400	
Add: Allowance to adjust available-for-sale securities to market	<u>2,200</u>	
Available-for-sale securities, at market		\$28,600*

\*While trading securities will always be classified as current assets, available-for-sale securities are classified as current or noncurrent assets depending on whether they will be sold within one year or one operating cycle, whichever is longer.

To summarize, the debits and credits for trading securities and available-for-sale securities are identical. The only difference is that unrealized gains and losses affect the financial statements differently. Specifically, unrealized gains and losses for trading securities are included on the income statement and, thus, flow into retained earnings. Unrealized gains and losses for available-for-sale securities, on the other hand, are *not* included on the income statement; instead, they are included as part of “other comprehensive income” a separate account in stockholders’ equity.

## Summary of Appendix Learning Objectives

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### LO7. Describe the classification and accounting for investments.

- Investments in equity securities are classified as:
  - trading securities
  - available-for-sale securities
- Investments in debt securities are classified as:
  - trading securities
  - available-for-sale securities
  - held-to-maturity (equity securities cannot be classified as held-to-maturity because equity does not have a maturity date)
- Held-to-maturity securities are accounted for at amortized cost, but this is discussed in Chapter 9.
- The debits and credits for trading and available-for-sale securities are identical.
- Both trading and available-for-sale securities are valued at fair market value on the balance sheet, which results in “unrealized gains and losses” (these are differences between the purchase price and fair market value at the balance sheet date).
- The only difference is that any unrealized gains or losses for trading securities go to the income statement while available-for-sale securities bypass the income statement and go to “other comprehensive income”—a separate category in stockholders’ equity.

## Appendix Key Terms

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Available-for-sale securities, 202  
Held-to-maturity, 202

Trading securities, 202

## Review Problem

### Bank Reconciliation

Fugazi Enterprises has the following information in its accounting records for their primary checking account:

Balance at April 30	\$ 18,350
Checks written during May	114,700
Deposits during May	112,200

Fugazi's May bank statement contained the following information:

Balance per bank at April 30		\$ 19,800
Credits during May:		
Deposits		109,600
Debits during May:		
Checks paid	\$107,400	
Debit memo (May utilities)	8,000	
Bank service charge	80	
		<u>115,480</u>
Balance per bank at May 31		<u>\$ 13,920</u>

The April bank reconciliation had deposits in transit of \$850 and outstanding checks of \$2,300. All these items cleared during May. These were the only reconciling items in April.

#### Required:

1. Prepare a bank reconciliation at May 31.
2. Prepare any adjusting entries necessary because of the bank reconciliation.

#### Solution:

1.	Cash Balance from Bank Statement		\$13,920
	Add: Deposits in Transit	\$112,200 – (\$109,600 – \$850)*	3,450
	Less: Outstanding Checks	\$114,700 – (\$107,400 – \$2,300)**	<u>(9,600)</u>
	<b>Adjusted Cash Balance</b>		<b><u>\$ 7,770</u></b>
	Cash Balance from Company Records	(\$18,350 + \$112,200 – \$114,700)	\$15,850
	Add:		
	Less:		
	Debit Memo (utilities)	\$8,000	
	Service Charge	<u>80</u>	<u>(8,080)</u>
	<b>Adjusted Cash Balance</b>		<b><u>\$ 7,770</u></b>

\*\$112,200 were deposited during May, but the account was only credited for \$109,600 during May. However, this \$109,600 included \$850 that was in transit at April 30, so only \$108,750 (\$109,600 – \$850) of the May deposits were credited to our account.

\*\*\$114,700 in checks were written in May and \$107,400 in checks cleared the bank during May. However, this \$107,400 included \$2,300 in checks that were outstanding from April, so only \$105,100 (\$107,400 – \$2,300) in checks cleared that were written in May.

2.

Date	Account and Explanation	Debit	Credit
May 31	Utilities Expense	8,000	
	Bank Service Charge Expense	80	
	Cash		8,080

<b>Assets = Liabilities +</b>	<b>Stockholders' Equity</b>
–8,080	–8,000 –80

## Discussion Questions

1. What is the purpose of an internal control system?
2. Internal control systems include policies and procedures to do what?

3. Section 404 of the Sarbanes-Oxley Act increased top management's responsibility for what?
4. What are the five elements of internal control?
5. What is meant by "tone at the top"? Why is it so important to an effective system of internal controls?
6. What are strategic risks?
7. What are business process risks?
8. What are the five categories of control activities?
9. How do these control activities help protect a company against error, theft, and fraud?
10. How do control activities relate to the accounting system?
11. Why does a company give particular attention to internal controls for cash?
12. Why is it important to segregate the duties for handling cash from the duties for keeping the accounting records for cash?
13. Describe two advantages of performing reconciliations of the cash account to the balances on the bank statements.
14. Describe the potential sources of difference between a cash account and its associated bank statement balance.
15. What kinds of bank reconciliation items require the firm to make adjusting entries?
16. Describe how cash over and short can be used for internal control purposes.
17. Why do most companies have petty cash funds?
18. What are cash equivalents?
19. Why do companies invest their cash in short-term investments?
20. What is the difference between the financing and operating cycles?
21. Describe the basic cash management principles.
22. Why do companies hold short-term investments?
23. How do available-for-sale securities differ from trading securities?
24. What is the allowance to adjust short-term investments to market and why is it used?

## Multiple-Choice Exercises

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### 4-1 What is the primary role of internal controls in managing a business?

- a. To ensure that no cash is stolen.
- b. To ensure that the financial statements are presented in such a manner as to provide relevant and reliable information for financial statement users and the company's creditors.
- c. To encourage theft and to ensure that segregation of duties does not take place.
- d. To constrain subordinates' activities in order to ensure that employees do not deviate from the scope of their responsibilities and that they act in the best interest of the business.

### 4-2 Which of the following is *not* one of the three areas for which internal control systems are intended to provide reasonable assurance?

- a. Effectiveness and efficiency of operations
- b. Certification that the financial statements are without error
- c. Reliability of financial reporting
- d. Compliance with applicable laws and regulations

### 4-3 Which of the following is *not* one of the five elements of internal control?

- a. Analysis of control procedures
- b. Control environment
- c. Risk assessment
- d. Information and communication

**4-4 Which of the following is not one of the five categories of control activities?**

- a. Segregation of duties
- b. Clearly defined authority and responsibility
- c. Defalcation and financial reporting
- d. Checks on recorded amounts

**4-5 The internal audit function is part of what element of the internal control system?**

- a. Control Activities
- b. Risk Assessment
- c. Control Environment
- d. Monitoring

**4-6 Which of the following is not generally an internal control activity?**

- a. Establishing clear lines of authority to carry out specific tasks
- b. Physically counting inventory in a perpetual inventory system
- c. Reducing the cost of hiring seasonal employees
- d. Limiting access to computerized accounting records

**4-7 Allowing only certain employees to order goods and services for the company is an example of what internal control procedure?**

- a. Segregation of duties
- b. Safeguarding of assets and records
- c. Independent verifications
- d. Proper authorizations

**4-8 Deposits made by a company but not yet reflected in a bank statement are called**

- a. Deposits in transit
- b. Credit memoranda
- c. Debit memoranda
- d. None of the above

**4-9 Which one of the following would not appear on a bank statement for a checking account?**

- a. Service charges
- b. Interest earned
- c. Outstanding checks
- d. Deposits

**4-10 Which one of the following is not a cash equivalent?**

- a. 30-day certificate of deposit
- b. 60-day corporate commercial paper
- c. 90-day U.S. Treasury bill
- d. 180-day note issued by a local or state government

**4-11 Business activity is best described as:**

- a. predictable
- b. lacking deviation
- c. cyclical
- d. noncyclical

**4-12 The five primary activities of a business generally consist of:**

- a. receiving assets, selling assets, issuing financial statements, collecting cash, and making cash disbursements
- b. receiving assets, purchasing assets, selling goods or services, collecting cash from customers, and repaying owners and creditors
- c. receiving cash, disbursing cash, buying assets, issuing dividends, and paying off liabilities
- d. making a profit, issuing financial statements, repaying debts, issuing dividends to shareholders, and complying with laws and regulations

**4-13 Effective cash management and control includes all of the following except:**

- a. The use of a petty cash fund
- b. Bank reconciliations
- c. Short-term investments of excess cash
- d. Purchase of stocks and bonds

**4-14 Cash management principles do not include:**

- a. paying suppliers promptly
- b. delaying payment of suppliers
- c. speeding up collection from customers
- d. earning the greatest return possible on excess cash

**4-15 Which one of the following statements is true?**

- a. Good cash management practices dictate that a company should maintain as large a balance as possible in its cash account.
- b. Sound internal control practice dictates that cash disbursements should be made by check, unless the disbursement is very small.
- c. The person handling the cash should also prepare the bank reconciliation.
- d. Petty cash can be substituted for a checking account to expedite the payment of all disbursements.

**4-16 (Appendix) Investments in equity securities are deemed to be "passive" if:**

- a. 100 percent of the firm's stock is owned
- b. between 50 percent and 100 percent of the firm's stock is owned
- c. between 20 percent and 50 percent of the firm's stock is owned
- d. less than 20 percent of the firm's stock is owned

**4-17 (Appendix) Equity and debt investments that management intends to sell in the future, but not necessarily in the near term, are called:**

- a. Trading securities
- b. Available-for-sale securities
- c. Debt securities
- d. Stock securities

**4-18 (Appendix) When the market value of a company's available-for-sale securities is lower than its cost, the difference should be:**

- a. shown as a liability
- b. shown as a valuation allowance subtracted from the historical cost of the investments
- c. shown as a valuation allowance added to the historical cost of the investments
- d. no entry is made, the securities are shown at historical cost

## Cornerstone Exercises

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**OBJECTIVE** > **1** **Cornerstone Exercise 4-19 ROLE OF INTERNAL CONTROL**

Internal controls play a crucial role in a business.

**Required:**

Discuss why internal controls are important. What are the potential consequences of an internal control failure?

**OBJECTIVE** > **2** **Cornerstone Exercise 4-20 ELEMENTS OF INTERNAL CONTROL**

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) discussed five elements of internal control.

**Required:**

Define and discuss these five elements of internal control.

**OBJECTIVE** > **3** **Cornerstone Exercise 4-21 BANK RECONCILIATION**

**CORNERSTONE 4-1**

Firebird Corp. prepares monthly bank reconciliations of its checking account balance. The bank statement for May 2009 indicated the following:

Balance, May 31, 2009	\$29,700
Service charge for May	80
Interest earned during May	120
NSF check from Valerie Corp. (deposited by Firebird)	230
Note (\$4,000) and interest (\$100) collected for Firebird from a customer of Firebird's	4,100

An analysis of canceled checks and deposits and the records of Firebird Corp. revealed the following items:

Checking account balance per Firebird's books	\$26,040
Outstanding checks as of May 31	2,950
Deposit in transit at May 31	3,110
Error in recording check #4456 issued by Firebird	90

The correct amount of check #4456 is \$760. It was recorded as a cash disbursement of \$670 by mistake. The check was issued to pay for merchandise purchases. The check appeared on the bank statement correctly.

**Required:**

Prepare a bank reconciliation schedule at May 31, 2009, in proper form.

**OBJECTIVE** > **3** **Cornerstone Exercise 4-22 ADJUSTING ENTRY FROM BANK RECONCILIATION**

**CORNERSTONE 4-2**

A customer paid for merchandise with a check that has been erroneously entered into Mutare's cash account for \$48 (it actually has been issued and paid for \$84).

**Required:**

Record the appropriate journal entry to correct the error.

**OBJECTIVE** > **3** **Cornerstone Exercise 4-23 ADJUSTING ENTRY FROM BANK RECONCILIATION**

**CORNERSTONE 4-2**

Pyramid Corporation is assessed a \$25 fee as the result of a \$62 NSF check. Neither the fee nor the NSF check has been accounted for on Pyramid's books.

**Required:**

Record the appropriate journal entry to update Pyramid's books.

**Cornerstone Exercise 4-24 BANK RECONCILIATION****OBJECTIVE** > **3**

The accountant for Bellows Corp. was preparing a bank reconciliation as of April 30, 2009. The following items were identified:

**CORNERSTONE 4-1**

Bellows' book balance	\$46,200
Outstanding checks	1,100
Interest earned on checking account	50
Customer's NSF check returned by the bank	500

In addition, Bellows made an error in recording a customer's check; the amount was recorded in cash receipts as \$150; the bank recorded the amount correctly as \$510.

**Required:**

What amount will Bellows report as its adjusted cash balance at April 30, 2009?

**Cornerstone Exercise 4-25 BANK RECONCILIATION****OBJECTIVE** > **3**

Tiny Corp. prepares monthly bank reconciliations of its checking account balance. The bank statement for October 2009 indicated the following:

**CORNERSTONE 4-1****CORNERSTONE 4-2**

Balance, October 31, 2009	\$7,920
Service charge for October	20
Interest earned during October	30
NSF check from Green Corp. (deposited by Tiny)	32
Note (\$1,000) and interest (\$40) collected for Tiny from a customer	1,040

An analysis of canceled checks and deposits and the records of Tiny revealed the following items:

Checking account balance per Tiny's books	\$7,170
Outstanding checks as of October 31	952
Deposit in transit at October 31	1,310
Error in recording a check issued by Tiny. (Correct amount of the check is \$450, but was recorded as a cash disbursement of \$540. The check was issued to pay for merchandise originally purchased on account.)	90

**Required:**

1. Prepare a bank reconciliation at October 31, 2009, in proper form.
2. Record any necessary adjusting journal entries.

**Cornerstone Exercise 4-26 CASH OVER AND SHORT****OBJECTIVE** > **3**

On a recent day, Pence Company obtained the following data from its cash registers:

	<b>Cash Sales per Register Tape</b>	<b>Cash in Register after Removing Opening Change</b>
Register 1	\$12,656.12	\$12,649.81
Register 2	11,429.57	11,432.16
Register 3	11,591.18	11,590.18

Pence deposits its cash receipts in its bank account daily.

**Required:**

Prepare a journal entry to record these cash sales.

**OBJECTIVE** > **3** **Cornerstone Exercise 4-27 CASH OVER AND SHORT**

Walker Department Store has one cash register. On a recent day, the cash register tape reported sales in the amount of \$2,247.63. Actual cash in the register (after deducting and removing the opening change amount of \$50) was \$2,238.48, which was deposited in the firm's bank account.

**Required:**

Prepare a journal entry to record these cash collections.

**OBJECTIVE** > **3** **Cornerstone Exercise 4-28 PETTY CASH FUND****CORNERSTONE 4-3**

Murphy, Inc., maintains a balance of \$1,000 in its petty cash fund. On December 31, 2009, Murphy's petty cash account has a balance of \$425. Murphy replenishes the petty cash account to bring it back up to \$1,000.

**Required:**

What entry is made to record the replenishment of the petty cash fund?

**OBJECTIVE** > **3** **Cornerstone Exercise 4-29 PETTY CASH WITH CHANGE IN FUND BALANCE****CORNERSTONE 4-3**

Basque, Inc., maintains a petty cash fund with a balance of \$500. On December 31, 2009, Basque's petty cash account has a balance of \$275. Murphy replenishes the petty cash account, as it does at the end of every month, but also decides to increase the balance to \$750.

**Required:**

What entry is made to record this activity?

**OBJECTIVE** > **4** **Cornerstone Exercise 4-30 CASH REPORTING**

Brown Industries has the following items:

Currency	\$20,000
Customer checks that have not been deposited	500
Cash in saving and checking accounts	80,000
Certificates of deposits that originally matured in 18 months	25,000
U.S. government bonds that originally matured in 3 months	12,000
U.S. government bonds that originally matured in 12 months	18,000

**Required:**

How much should Brown report as cash and equivalents on its balance sheet?

**OBJECTIVE** > **5** **Cornerstone Exercise 4-31 FINANCING AND OPERATING CYCLES**

Business activity is often described as being cyclical in nature.

**Required:**

Describe the cyclical nature of business activity. Make sure to discuss the operating and financing cycle.

**OBJECTIVE** > **5** **Cornerstone Exercise 4-32 OPERATING CYCLE**

Businesses must decide whether to issue credit to customers.

**Required:**

Describe how selling to customers on credit affects the operating cycle.

**OBJECTIVE** > **6** **Cornerstone Exercise 4-33 CASH MANAGEMENT**

Effective cash management is very important to the operating performance of a business.

**Required:**

Explain the principles of cash management. Why might it be advantageous to delay paying suppliers?

**Cornerstone Exercise 4-34 (APPENDIX) TRADING SECURITIES****OBJECTIVE** > 7

Franzen Finance began operations in 2009 and invests in securities classified as trading securities. During 2009, it entered into the following trading security transactions:

- Purchased 20,000 shares of ABC common stock at \$38 per share
- Purchased 32,000 shares of XYZ common stock at \$17 per share

At December 31, 2009, ABC common stock was trading at \$39.50 per share and XYZ common stock was trading at \$16.50 per share.

**Required:**

1. Provide the necessary adjusting entry to value the available-for-sale securities at fair market value.
2. What is the income statement effect of this adjusting entry?

**Cornerstone Exercise 4-35 (APPENDIX) AVAILABLE-FOR-SALE SECURITIES****OBJECTIVE** > 7

Tolland Financial began operations in 2010 and invests in securities classified as available for sale. During 2010, it entered into the following available-for-sale security transactions:

- Purchased 10,000 shares of DTR common stock at \$50 per share
- Purchased 44,000 shares of MJO common stock at \$22 per share

At December 31, 2010, DTR common stock was trading at \$62 per share and MJO common stock was trading at \$21 per share.

**Required:**

1. Provide the necessary adjusting entry to value the available-for-sale securities at fair market value.
2. What is the income statement effect of this adjusting entry?

**Exercises****Exercise 4-36 INTERNAL CONTROL SYSTEM****OBJECTIVE** > 1 2**Required:**

A list of terms and another list of definitions and examples are presented below. Make a list numbered 1 through 5 and match the letter of the most directly related definition or example with the number of each term.

Term	Definition or Example
1. Control environment	a. The internal audit group is testing the operating effectiveness of various internal control activities.
2. Strategic risk	b. A member of upper management was fired for violating the company's code of conduct.
3. Business process risk	c. Reports documenting problems with production are forwarded to management.
4. Monitoring	d. Competitors begin offering extended warranty coverage on products.
5. Information and communication	e. Problems with our suppliers have resulted in lost sales because our stores were out of stock.

**Exercise 4-37 INTERNAL CONTROL TERMINOLOGY****OBJECTIVE** > 1 2**Required:**

A list of terms and another list of definitions and examples are presented below. Make a list numbered 1 through 7 and match the letter of the most directly related definition or example with the number of each term.

Term	Definition or Example
1. Internal control structure	a. Company policy prevents accountants from handling cash.
2. Accounting controls	b. Company policy requires receiving reports to be made for all deliveries by suppliers.
3. Segregation of duties	c. Cash deposits are reconciled with cash register records at the end of every day.
4. Adequate documents and records	d. This includes the accounting system, all policies and procedures of the business, and the environment in which they operate.
5. Safeguards over assets and records	e. Every evening, a jewelry store removes all items of merchandise valued at over \$100 from its display cases.
6. Checks on recorded amounts	f. These are policies and procedures that govern the identification, measurement, recording, and communication of economic information.
7. Effective personnel policies	g. Every new employee is required to spend two days in training courses to learn company policies.

### OBJECTIVE 2 Exercise 4-38 CLASSIFYING INTERNAL CONTROL PROCEDURES

#### Required:

Match each of the control procedures listed below with the most closely related control procedures type. Your answer should pair each of the numbers 1 through 10 with the appropriate letter.

#### Control Procedure Types

- A. Clearly defined authority and responsibility
- B. Segregation of duties
- C. Adequate documents and records
- D. Safeguards over assets and records
- E. Checks on recorded amounts

#### Control Procedures

1. The controller is required to sign the daily summary of expenditures to authorize payment.
2. Division managers are evaluated annually on the basis of their division's profitability.
3. Invoices received from outside suppliers are filed with purchase orders.
4. Employees with access to the accounting records are not permitted to open the mail, because it contains many payments by check from customers.
5. The extent of access to the many segments of the company's computer system is tightly controlled by individual identification cards and passwords that change at regular intervals.
6. Each shipment to customers from inventory is recorded on a specially printed form bearing a sequential number; these forms are the basis for entries into the computer system, which makes entries to inventory records and produces periodic reports of sales and shipments.
7. At regular intervals, internal audit reviews a sample of expenditure transactions to determine that payment has been made to a bona fide supplier and that the related goods or services were received and appropriately used.
8. A construction company stores large steel girders in an open yard surrounded by a 5-foot fence and stores welding supplies in a controlled-access, tightly secured concrete building.
9. Cash registers display the price of each item purchased to the customer as it is recorded and produce a customer receipt that describes each item and gives its price.

10. The person in the controller's office who prepares and mails checks to suppliers cannot make entries in the general ledger system.

### Exercise 4-39 INTERNAL CONTROL OF CASH

OBJECTIVE > 2 3

Edward Thompson, a longtime employee of a small grocery wholesaler, is responsible for maintaining the company's cash records and for opening the daily mail, through which the company receives about 40 percent of its daily cash receipts. Virtually all cash received by mail is in the form of checks made payable to the company. Thompson is also responsible for preparing deposits of currency and checks for the bank at the end of each day.

#### Required:

1. Explain briefly how Thompson might be able to steal some of the company's cash receipts.
2. What internal control procedures would you recommend to prevent this theft?

### Exercise 4-40 CASH OVER AND SHORT

OBJECTIVE > 3

Miller Enterprises deposits the cash received during each day at the end of the day. Miller deposited \$12,730 on October 3 and \$15,610 on October 4. Cash register records and other documents supporting the deposits are summarized as follows:



	10/3	10/4
Cash sales	\$ 4,072	\$ 5,405
Collections on account	8,650	10,212
Total receipts	<u>\$12,722</u>	<u>\$15,617</u>

#### Required:

1. Calculate the amount of cash over or cash short for each day.
2. Prepare the journal entry to record the receipt and deposit of cash on October 3.
3. Prepare the journal entry to record the receipt and deposit of cash on October 4.

### Exercise 4-41 BANK RECONCILIATION

OBJECTIVE > 3

Johnson Corporation's bank statement for October reports an ending balance of \$6,248, whereas Johnson's cash account shows a balance of \$5,680 on October 31. The following additional information is available:

- a. A \$165 deposit made on October 31 was not recorded by the bank until November.
- b. At the end of October, outstanding checks total \$792.
- c. The bank statement shows bank service charges of \$20 not yet recorded by the company.
- d. The company erroneously recorded for \$397 a check actually written and paid by the bank for \$379.
- e. A \$57 check from a customer, deposited by the company on October 29, was returned with the bank statement for lack of funds.

#### Required:

Prepare the October bank reconciliation for Johnson Corporation.

### Exercise 4-42 BANK RECONCILIATION

OBJECTIVE > 3

The cash account for Fleming Company contains the following information for April:

Cash balance, 3/31	\$ 3,500
Cash received during April	<u>21,400</u>
	<u>\$24,900</u>

Cash disbursements during April:		
Check 7164	\$11,000	
Check 7165	1,800	
Check 7166	3,900	
Check 7167	<u>6,100</u>	<u>22,800</u>
Cash balance, 4/30		<u>\$ 2,100</u>

The bank statement for April contains the following information:

Bank balance, 3/31		\$11,800
Add: Deposits during April		<u>21,400</u>
		\$33,200
Less: Checks paid during April:		
Check 7162	\$ 5,200	
Check 7163	3,100	
Check 7164	11,000	
Check 7165	<u>1,800</u>	<u>21,100</u>
Bank balance, 4/30		<u>\$12,100</u>

**Required:**

1. Identify the outstanding checks at April 30.
2. Prepare the reconciliation of the bank and cash account balances at April 30.
3. Identify the outstanding checks at March 31.
4. Prepare the reconciliation of the bank and cash account balances at March 31.

**OBJECTIVE** > **3** **Exercise 4-43 BANK RECONCILIATION**

Valentine Investigations has the following information for its cash account:

Balance, 1/31	\$ 5,030
Deposits during February	93,160
Checks written during February	92,270

Valentine's bank statement for February contained the following information:

Balance per bank, 1/31		\$ 6,730
Add: February deposits		<u>90,190</u>
		\$96,920
Less: Checks paid in February	\$89,790	
Bank service charge	80	
Debit memo (electric bill)	<u>630</u>	<u>90,500</u>
Balance per bank, 2/28		<u>\$ 6,420</u>

A comparison of company records with the bank statement provided the following data:

	At 1/31	At 2/28
Deposits in transit	\$ 510	\$3,480
Outstanding checks	2,210	4,690

**Required:**

1. Prepare a bank reconciliation.
2. Prepare adjusting entries for Valentine based on the information developed in the bank reconciliation.

**Exercise 4-44 ADJUSTING ENTRIES FROM A BANK RECONCILIATION****OBJECTIVE** > **3**

Cooper Advisory Services identified the following items on its October reconciliation that may require adjusting entries:



- A deposit of \$260 was recorded in Cooper's accounting records, but not on the October 31 bank statement.
- A check for \$6,430 was outstanding at October 31.
- Included with the bank statement was a check for \$250 written by Hooper Advertising Services. The bank had, in error, deducted this check from Cooper's account.
- Bank service charges were \$120.
- An NSF check written by one of Cooper's customers in the amount of \$1,290 was returned by the bank with Cooper's bank statement.

**Required:**

For each of these five items, prepare an adjusting entry for Cooper's journal, if any is required.

**Exercise 4-45 RECORDING PETTY CASH ACCOUNT TRANSACTIONS****OBJECTIVE** > **3**

During March, Anderson Company engaged in the following transactions involving its petty cash fund:

- On March 1, Anderson Company established the petty cash fund by issuing a check for \$400 to the fund custodian.
- On March 4, the custodian paid \$176 out of petty cash for freight charges on new furniture.
- On March 12, the custodian paid \$87 out of petty cash for office supplies.
- On March 22, the custodian paid \$22 out of petty cash for express mail services for reports sent to the Environmental Protection Agency.
- On March 25, the custodian filed a claim for reimbursement of petty cash expenditures during the month totaling \$285.
- On March 31, Anderson issued a check for \$285 to the custodian, replenishing the fund for expenditures during the month.

**Required:**

Prepare the journal entries required to record the petty cash account transactions that occurred during the month of March.

**Exercise 4-46 COMPONENTS OF CASH****OBJECTIVE** > **4**

The office manager for Bullock Products had accumulated the following information at the end of a recent year:

Item	Amount
Accounts receivable	\$16,450
Change for cash registers (currency and coin)	2,500
Amount on deposit in checking account	9,280
Amount on deposit in savings account	25,000
Balance in petty cash	300
Checks received from customers, but not yet deposited in bank	430
Checks sent by Bullock to suppliers, but not yet presented at bank for payment	670
Deposits in transit	1,240
IOU from Gerry Bullock, company president	1,000
Notes receivable	10,000
NSF check written by Johnson Company	320
Prepaid postage	250

**Required:**

Calculate the amount for cash in Bullock's balance sheet.

**OBJECTIVE** > **5** **Exercise 4-47 OPERATING CYCLE**

A list of businesses is presented below:

Business	Operating-Cycle Description
1. Appliance store	a. Very short—customers typically pay cash, and inventory is often held less than one day.
2. Clothing store	b. A few months—merchandise is typically on hand for several weeks, and some customers may use credit.
3. Electric utility	c. More than one year—merchandise may be in inventory for several months, and most customers will pay for purchases after one or two years.
4. Tree nursery	d. Several years—a number of years are required to prepare merchandise for sale. Customers probably pay cash for most items.
5. Fast food restaurant	e. A few months—customers pay monthly. The current assets used to provide customer services are consumed within a few months.

**Required:**

Match each business with a description of the operating cycle for that business.

**OBJECTIVE** > **5** **Exercise 4-48 FINANCING AND OPERATING CYCLES**

Which of the following activities belong to the operating cycle, and which belong to the financial cycle?

- a. Collection of cash from customers
- b. Payment of dividends to stockholders
- c. Acquisition of goods for resale
- d. Borrowing of cash from a bank
- e. Receipt of cash from owners in exchange for capital stock
- f. Performance of services for customers
- g. Acquisition of raw materials for manufacture of salable products
- h. Repayment to a lender of an amount borrowed
- i. Delivery of goods to customers

**OBJECTIVE** > **5** **Exercise 4-49 OPERATING CYCLE AND CURRENT RECEIVABLES**

For each of the businesses described below, indicate the length of the operating cycle and the duration of the longest receivable that can be classified as current on the business's balance sheet.

- a. Dither and Sly are attorneys-at-law who specialize in federal income tax law. They complete their typical case in six months or less and collect from the typical client within one additional month.
- b. Johnston's Market specializes in fresh meat and fish. All merchandise must be sold within one week of purchase. Most sales are for cash, and any receivables are generally paid by the end of the following month.
- c. Mortondo's is a women's clothing store specializing in high-style merchandise. Merchandise spends an average of seven months on the rack following purchase. Most sales are on credit, and the typical customer pays within one month of sale.
- d. Trees, Inc., grows Christmas trees and sells them to various Christmas tree lots. Most receivables are paid within a month of delivery of the trees. It takes six years to grow a tree.

**OBJECTIVE** > **7** **Exercise 4-50 (APPENDIX) ALLOWANCE FOR AVAILABLE-FOR-SALE SECURITIES**

McCarthy Corporation's allowance to reduce available-for-sale securities to market is \$7,200 on December 31 (i.e., it is a credit balance), before the lower-of-cost-or-market adjustment. The cost and market value of the available-for-sale portfolio at December 31 are \$120,000 and \$117,000, respectively.

**Required:**

Prepare the adjusting entry, if any, to adjust the allowance at year-end.

**Exercise 4-51 (APPENDIX) ADJUSTING THE ALLOWANCE TO ADJUST TRADING SECURITIES TO MARKET****OBJECTIVE** > **7**

Perry Corporation has the following information for its portfolio of trading securities at the end of the past four years:

Date	Portfolio Cost	Portfolio Market Value
12/31/06	\$162,300	\$153,800
12/31/07	109,600	106,200
12/31/08	148,900	151,300
12/31/09	139,000	138,700

**Required:**

1. Prepare the journal entries, if necessary, to adjust the allowance account at the end of 2007, 2008, and 2009.
2. What is the income statement effect of the 2009 entry?
3. How would your answer to 2 change if this was an available-for-sale portfolio?

**Exercise 4-52 (APPENDIX) INVESTMENTS IN AVAILABLE-FOR-SALE SECURITIES****OBJECTIVE** > **7**

Williams Corporation acquired the following equity securities during 2009:

200 shares of Southwestern Company capital stock	\$14,600
500 shares of Montgomery Products capital stock	14,500

Williams's investment in both of these companies is passive and Williams classifies these securities as available-for-sale. During 2009, Southwestern paid a dividend of \$1.20 per share, and Montgomery paid a dividend of \$1.80 per share. At December 31, 2009, the Southwestern stock has a market value of \$75 per share, and the Montgomery stock has a market value of \$25 per share.

**Required:**

1. Prepare entries for Williams's journal to record these two investments and the receipt of the dividends.
2. Calculate the market value of Williams's investment portfolio at December 31, 2009.
3. Provide the necessary adjusting entry at December 31, 2009.
4. How would these securities be disclosed on the December 31, 2009, balance sheet?

**Problem Set A****Problem 4-53A ROLE OF INTERNAL CONTROL****OBJECTIVE** > **1** **2**

Internal control systems include policies and procedures designed to provide reasonable assurance that the corporation's objectives are being met in three areas:

- a. effectiveness and efficiency of operations
- b. reliability of financial reporting
- c. compliance with applicable laws and regulations

Like any other business, a grocery store uses internal control activities to meet their objectives in these three areas.

**Required:**

Attempt to name a control for each area and describe how the control helps accomplish the store's objectives in these areas.

**OBJECTIVE** > **2** **3** **Problem 4-54A INTERNAL CONTROL PROCEDURES FOR CASH RECEIPTS**

Corey and Dee Post are planning to open and operate a 24-hour convenience store near a university campus. Corey and Dee are concerned that part of the cash that customers pay for merchandise might be kept by some of the store's employees.

**Required:**

Identify some internal control procedures that could help ensure that all cash paid by customers is remitted to the business.

**OBJECTIVE** > **2** **3** **Problem 4-55A INTERNAL CONTROL FOR CASH**

After comparing cash register tapes with inventory records, the accountant for Benning Convenience Stores is concerned that someone at one of the stores is not recording some of that store's cash sales and is stealing the cash from the unreported sales.

**Required:**

1. Explain why a comparison of sales and inventory records would reveal a situation in which cash sales are not being recorded and cash from those sales is being stolen.
2. Describe how an employee might be able to steal cash from sales.
3. What internal control procedure would you recommend be employed to make the theft you described in 2 more difficult?

**OBJECTIVE** > **3** **Problem 4-56A BANK RECONCILIATION**

Shortly after July 31, Morse Corporation received a bank statement containing the following information:

Date	Checks			Deposits	Balance
6/30 Beg. balance					\$ 7,958
7/1				\$ 1,200	9,158
7/2	\$ 620	\$ 550	\$ 344	12,500	20,144
7/3	35	8,100			12,009
7/5	311	97	4,000	9,100	16,701
7/9	4,500	790	286		11,125
7/12	34	7,100			3,991
7/15	634	1,880		7,000	8,477
7/19	3,780	414			4,283
7/24	1,492	649			2,142
7/29	350	677*		4,620	5,735
7/31	575	18**			5,142

\*NSF check

\*\*Bank service charge

December cash transactions and balances on Morse's records are shown in the following T-account:

Cash					
Balance, 6/60	\$7,609				
Date	Amount Deposited	Check Number	Check Amount	Check Number	Check Amount
7/1	\$12,500	176	\$8,100	186	\$ 1,880
7/5	9,100	177	97	187	634
7/15	7,000	178	4,000	188	3,780
7/29	4,620	179	311	189	649
7/30	2,050	180	7,100	190	1,492
Total deposits	\$35,270	181	4,500	191	37
		182	790	192	350
		183	34	193	575
		184	286	194	227
		185	414	195	1,123
			Total disbursements		\$36,379
<b>Balance, 7/31</b>	<b>\$ 6,500</b>				

**Required:**

1. Prepare a bank reconciliation for July.
2. Prepare the adjusting entries made by Morse Corporation as a result of this reconciliation process.
3. What amount is reported as cash on the balance sheet at July 31?

**Problem 4-57A BANK RECONCILIATION****OBJECTIVE** 3

Raymond Corporation received the following bank statement for the month of October 2009:

Date	Checks			Deposits	Balance
9/30	Beg. balance				\$ 4,831.50
10/2	\$1,204.50			\$2,970.18	6,597.18
10/4	43.80	\$ 321.70			6,231.68
10/8	905.36				5,326.32
10/10	100.20	60.00	\$38.11		5,128.01
10/13				4,000.00	9,128.01
10/14	290.45*				8,837.56
10/17	516.11	309.24			8,012.21
10/19	106.39	431.15	21.72	2,850.63	10,303.58
10/21	3,108.42				7,195.16
10/23	63.89				7,131.27
10/25	290.00**	111.90			6,729.37
10/27	88.90				6,640.47
10/31	20.00***	1,308.77			5,311.70

\*NSF check

\*\*Debit memo

\*\*\*Service charge

The Cash in Bank account of Raymond Corporation provides the following information:

Date	Item	Debit	Credit	Balance
10/1	Balance from 9/30			\$ 6,553.38
10/2	Check #1908		\$ 321.70	6,231.68
10/5	Check #1909		905.36	5,326.32
10/6	Check #1910		100.20	5,226.12
10/6	Check #1911		60.00	5,166.12
10/7	Check #1912		38.11	5,128.01
10/12	Deposit #411	\$4,000.00		9,128.01
10/15	Check #1913		516.11	8,611.90
10/16	Check #1914		309.24	8,302.66
10/17	Check #1915		431.15	7,871.51
10/17	Check #1916		21.72	7,849.79
10/18	Deposit #412	2,850.63		10,700.42
10/18	Check #1917		106.39	10,594.03
10/20	Check #1918		63.89	10,530.14
10/20	Check #1919		3,108.42	7,421.72
10/23	Check #1920		111.90	7,309.82
10/25	Check #1921		88.90	7,220.92
10/29	Check #1922		1,803.77	5,417.15
10/30	Check #1923		284.77	5,132.38
10/31	Check #1924		628.32	4,504.06
10/31	Deposit #413	3,408.20		7,912.26

The items on the bank statement are correct. The debit memo is for the payment by the bank of Raymond's office furniture rent for October.

**Required:**

1. Prepare a bank reconciliation. (Hint: There is one transposition error in the cash account.)
2. Prepare adjusting entries based on the bank reconciliation.
3. What amount is reported for cash in bank in the balance sheet at October 31?

**OBJECTIVE** > **3****Problem 4-58A BANK RECONCILIATION**

The cash account of Dixon Products reveals the following information:

Cash			
Balance, 4/30	11,800		
Deposits during May	37,600	Checks written during May	41,620

The bank statement for May contains the following information:

Bank balance, 4/30		\$11,750
Add: Deposits during May		<u>37,250</u>
		\$49,000
Less: Checks paid during May	\$40,230	
NSF check from Frolin, Inc.	190	
Bank service charges	<u>40</u>	<u>40,460</u>
Bank balance, 5/31		<u>\$ 8,540</u>

A comparison of detailed company records with the bank statement indicates the following information:

	At 4/30	At 5/31
Deposit in transit	\$800	\$1,150
Outstanding checks	750	2,140

The bank amounts are determined to be correct.

**Required:**

1. Prepare a bank reconciliation for May.
2. Prepare the adjusting entries made by Dixon as a result of the reconciliation process.
3. What amount is reported for cash on the balance sheet at May 31?

**OBJECTIVE** > **3****Problem 4-59A RECORDING PETTY CASH TRANSACTIONS**

SCB, Inc., had a balance of \$600 in cash in its petty cash fund at the beginning of September. The following transactions took place in September:

- a. On September 4, the custodian paid \$34 out of petty cash for new stationery on which the company president's name appeared prominently.
- b. On September 11, the custodian paid \$167 out of petty cash for maintenance manuals for the firm's new jet aircraft.
- c. On September 15, the custodian paid \$37 out of petty cash for transportation-in.
- d. On September 23, the custodian paid \$46 out of petty cash to have documents delivered to the lawyers who were defending the firm in a lawsuit.
- e. On September 27, the custodian paid \$231 out of petty cash to reimburse the president for costs he had incurred when bad weather prevented the company jet from landing to pick him up after a meeting.
- f. On September 30, the custodian submitted receipts for the above expenditures and a check was drawn for the amount to replenish the fund.

**Required:**

Prepare the journal entries made by the corporation to record these transactions.

**Problem 4-60A (APPENDIX) RECORDING AVAILABLE-FOR-SALE SECURITIES TRANSACTIONS INCLUDING A SALE AFTER ADJUSTMENT TO THE ALLOWANCE ACCOUNT**

OBJECTIVE > 7

Morton Products had no investment in available-for-sale securities at January 1, 2009. During 2009, Morton engaged in the following marketable security transactions:

- a. Purchased 400 shares of Sterling Company stock for \$24 per share.
- b. Purchased 600 shares of Burt Corporation stock for \$32 per share.
- c. Received a \$2-per-share dividend on the Sterling stock.
- d. Sold 250 shares of the Sterling stock for \$27 per share.

At the end of 2009, the Sterling stock had a market value of \$26 per share, and the Burt stock had a market value of \$29 per share.

**Required:**

1. Prepare journal entries for each of the four transactions assuming they are classified as available-for-sale securities.
2. If necessary, prepare a journal entry to recognize the December 31, 2009, market values. What is the income statement effect of this entry?
3. How would these investments be reported on the December 31, 2009, balance sheet?

**Problem 4-61A (APPENDIX) INVESTMENTS IN TRADING SECURITIES**

OBJECTIVE > 7

Maxwell Company engaged in the following transactions involving short-term investments:

- a. Purchased 200 shares of Bartco stock for \$12,800.
- b. Received a \$1.60-per-share dividend on the Bartco stock.
- c. Sold 40 shares of the Bartco stock for \$61 per share.
- d. Purchased 380 shares of Newton stock for \$20,900.
- e. Received a dividend of \$1.00 per share on the Newton stock.

At December 31, the Bartco stock has a market value of \$60 per share, and the Newton stock has a market value of \$59 per share.

**Required:**

1. Prepare entries for Maxwell's journal to record these transactions assuming they are trading securities.
2. Calculate the market value of Maxwell's short-term investment portfolio at December 31.
3. Provide the necessary adjusting entry at December 31.
4. What is the income statement effect of the adjusting entry?
5. How would these investments be reported on the December 31 balance sheet?

## Problem Set B

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**Problem 4-53B ROLE OF INTERNAL CONTROL**

OBJECTIVE > 1 2

Internal control systems include policies and procedures designed to provide reasonable assurance that the corporation's objectives are being met in three areas:

- a. effectiveness and efficiency of operations
- b. reliability of financial reporting
- c. compliance with applicable laws and regulations

Like any other business, a bookstore uses internal control activities to meet its objectives in these three areas.

**Required:**

Attempt to name a control for each area and describe how the control helps accomplish the store's objectives in these areas.

**OBJECTIVE** > **2** **3**

**Problem 4-54B INTERNAL CONTROL PROCEDURES FOR CASH RECEIPTS**

Sean and Liz Kinsella are planning to open and operate a coffee shop on a university campus. Sean and Liz are concerned that part of the cash that customers pay for food might be kept by some of the store's employees.

**Required:**

Identify some internal control procedures that could help ensure that all cash paid by customers is remitted to the business.

**OBJECTIVE** > **2** **3**

**Problem 4-55B INTERNAL CONTROL FOR CASH**

After comparing cash register tapes with inventory records, the accountant for Good Times Music store is concerned that someone at one of the stores is not recording some of that store's cash sales and is stealing the cash from the unreported sales.

**Required:**

1. Explain why a comparison of sales and inventory records would reveal a situation in which cash sales are not being recorded and cash from those sales is being stolen.
2. Describe how an employee might be able to steal cash from sales.
3. What internal control procedure would you recommend be employed to make the theft you described in 2 more difficult?

**OBJECTIVE** > **3**

**Problem 4-56B BANK RECONCILIATION**

Shortly after July 31, Towanda Corporation received a bank statement containing the following information:



Date	Checks			Deposits	Balance
6/30	Beg. balance				\$ 6,500
7/1				\$ 300	6,800
7/2	\$ 270	\$ 150	\$ 330	4,500	10,550
7/3	25	7,025			3,500
7/5	150	450	1,400	10,000	11,500
7/9	1,500	25	325		9,650
7/12	500	100			9,050
7/15	1,600	2,700		3,500	8,250
7/19	75	425			7,750
7/24	650	550			6,550
7/29	275	525*			5,750
7/31	475	25**			5,250

\*NSF check

\*\*Bank service charge

December cash transactions and balances on Towanda's records are shown in the following T-account:

## Cash

<u>Date</u>	<u>Amount Deposited</u>	<u>Check Number</u>	<u>Check Amount</u>	<u>Check Number</u>	<u>Check Amount</u>
Balance, 6/30	\$5,550				
7/1	\$ 300	176	\$ 270	186	\$ 25
7/5	4,500	177	150	187	100
7/15	10,000	178	330	188	500
7/29	3,500	179	25	189	2,700
7/30	950	180	7,025	190	1,600
Total deposits	\$19,250	181	150	191	75
		182	450	192	425
		183	1,400	193	550
		184	1,500	194	650
		185	325	195	275
			Total disbursements		\$18,525
Balance, 7/31	\$ 6,275				

## Required:

1. Prepare a bank reconciliation for July.
2. Prepare the adjusting entries made by Towanda Corporation as a result of this reconciliation process.
3. What amount is reported as cash on the balance sheet at July 31?

## Problem 4-57B BANK RECONCILIATION

## OBJECTIVE 3

Donald Corporation received the bank statement shown below for the month of October 2009:

Date	Checks	Deposits	Balance
9/30 Beg. balance			\$ 5,205
10/2	\$1,200	\$2,950	6,955
10/4	50      \$ 300		6,605
10/8	900		5,705
10/10	100      60      \$35		5,510
10/13		4,000	9,510
10/14	300*		9,210
10/17	525      325		8,360
10/19	105      430      20	2,850	10,655
10/21	3,110		7,545
10/23	65		7,480
10/25	250**      110		7,120
10/27	90		7,030
10/31	25***      1,305		5,700

\*NSF check

\*\*Debit memo

\*\*\*Service charge

The Cash in Bank account of Donald Corporation provides the following information:

Date	Item	Debit	Credit	Balance
10/1	Balance from 9/30			\$ 6,905.00
10/2	Check #1908		\$ 300.00	6,605.00
10/5	Check #1909		900.00	5,705.00
10/6	Check #1910		100.00	5,605.00
10/6	Check #1911		60.00	5,545.00
10/7	Check #1912		35.00	5,510.00

Date	Item	Debit	Credit	Balance
10/12	Deposit #411	\$4,000.00		\$ 9,510.00
10/15	Check #1913		\$ 525.00	8,985.00
10/16	Check #1914		325.00	8,660.00
10/17	Check #1915		430.00	8,230.00
10/17	Check #1916		20.00	8,210.00
10/18	Deposit #412	2,850.00		11,060.00
10/18	Check #1917		105.00	10,955.00
10/20	Check #1918		65.00	10,890.00
10/20	Check #1919		3,110.00	7,780.00
10/23	Check #1920		110.00	7,670.00
10/25	Check #1921		90.00	7,580.00
10/29	Check #1922		1,350.00	6,230.00
10/30	Check #1923		250.00	5,980.00
10/31	Check #1924		650.00	5,330.00
10/31	Deposit #413	3,300.00		8,630.00

The items on the bank statement are correct. The debit memo is for the payment by the bank of Donald's office furniture rent for October.

**Required:**

1. Prepare a bank reconciliation. (Hint: There is one transposition error in the cash account.)
2. Prepare adjusting entries based on the bank reconciliation.
3. What amount is reported for cash in bank on the balance sheet at October 31?

**OBJECTIVE 3** Problem 4-58B BANK RECONCILIATION

The cash account of Mason Products reveals the following information:

Cash			
Balance, 4/30	10,100		
Deposits during May	39,600	Checks written during May	40,000

The bank statement for May contains the following information:

Bank balance, 4/30		\$10,100
Add: Deposits during May		<u>37,400</u>
		\$47,500
Less: Checks paid during May	\$38,500	
NSF check from Higgins, Inc.	140	
Bank service charges	<u>60</u>	<u>38,700</u>
Bank balance, 5/31		<u>\$ 8,800</u>

A comparison of detailed company records with the bank statement indicates the following information:

	At 4/30	At 5/31
Deposit in transit	\$900	\$2,200
Outstanding checks	550	1,500

The bank amounts are determined to be correct.

**Required:**

1. Prepare a bank reconciliation for May.
2. Prepare the adjusting entries made by Mason Products as a result of the reconciliation process.
3. What amount is reported for cash on the balance sheet at May 31?

**Problem 4-59B RECORDING PETTY CASH TRANSACTIONS****OBJECTIVE** > **3**

Chicago, Inc., had a balance of \$1,200 in cash in its petty cash fund at the beginning of September. The following transactions took place in September:



- On September 4, the custodian paid \$75 out of petty cash for new stationery on which the company president's name appeared prominently.
- On September 11, the custodian paid \$350 out of petty cash for maintenance manuals for the firm's new jet aircraft.
- On September 15, the custodian paid \$25 out of petty cash for transportation-in.
- On September 23, the custodian paid \$50 out of petty cash to have documents delivered to the lawyers who were defending the firm in a lawsuit.
- On September 27, the custodian paid \$175 out of petty cash to reimburse the president for costs he had incurred when bad weather prevented the company jet from landing to pick him up after a meeting.
- On September 30, the custodian submitted receipts for the above expenditures and a check was drawn for the amount to replenish the fund.

**Required:**

Prepare the journal entries made by the corporation to record these transactions.

**Problem 4-60B (APPENDIX) RECORDING AVAILABLE-FOR-SALE SECURITIES TRANSACTIONS INCLUDING A SALE AFTER ADJUSTMENT TO THE ALLOWANCE ACCOUNT****OBJECTIVE** > **7**

TommyBoy Products had no investment in available-for-sale securities at January 1, 2010. During 2010, TommyBoy engaged in the following marketable security transactions:

- Purchased 200 shares of Silver Company stock for \$12 per share.
- Purchased 300 shares of Gold Corporation stock for \$16 per share.
- Received a \$1-per-share dividend on the Silver stock.
- Sold 125 shares of the Silver stock for \$13.50 per share.

At the end of 2010, the Silver stock had a market value of \$13 per share, and the Gold stock had a market value of \$14.50 per share.

**Required:**

- Prepare journal entries for each of the four transactions assuming they are classified as available-for-sale securities.
- If necessary, prepare a journal entry to recognize the December 31, 2010, market values. What is the income statement effect of this entry?
- How would these investments be reported on the December 31, 2009, balance sheet?

**Problem 4-61B (APPENDIX) SHORT-TERM INVESTMENTS****OBJECTIVE** > **7**

Margie's Company engaged in the following transactions involving short-term investments:

- Purchased 200 shares of Softco stock for \$25,600.
- Received a \$3.20-per-share dividend on the Softco stock.
- Sold 80 shares of the Softco stock for \$122 per share.
- Purchased 380 shares of Kepler stock for \$41,800.
- Received a dividend of \$2.00 per share on the Kepler stock.

At December 31, the Softco stock has a market value of \$120 per share, and the Kepler stock has a market value of \$118 per share.

**Required:**

1. Prepare entries for Margie's journal to record these transactions assuming they are trading securities.
2. Calculate the market value of Margie's short-term investment portfolio at December 31.
3. Provide the necessary adjusting entry at December 31.
4. What is the income statement effect of the adjusting entry?
5. How would these investments be reported on the December 31 balance sheet?

## Cases

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### Case 4-62 ETHICS AND CASH CONTROLS

Suppose that you have just been hired as a part-time clerk in a large department store. Each week you work three evenings and all day Saturday. Without the income provided by this job, you would be unable to stay in college. Charles Riley, the manager in the clothing department to which you are assigned, has worked for the store for many years. Managers receive both a salary and a commission on their sales.

Late one afternoon, just as you begin work, Mr. Riley is ringing up a purchase. You observe that the purchase consists of two expensive suits, a coat, and several pairs of trousers and that the customer declines Mr. Riley's offer to have the store's tailor do the alterations. After the customer departs with his merchandise and as Mr. Riley is departing for the evening, you say, "See you tomorrow." Mr. Riley gives a brief, barely audible response and departs for the evening.

As you return to the sales counter, you glance at the paper tape displayed through a small opening in the cash register that records all sales on an item-by-item basis. You have just completed the store course in register operation, so you are quite familiar with the register and the tape it produces. To your surprise, you note that the last sale consisted of just a single pair of trousers.

**Required:**

1. What do you conclude about this transaction?
2. What are the possible consequences for the store, for Mr. Riley, and for you personally of reporting your observations to Mr. Riley's superiors?
3. What are the possible consequences for the store, for Mr. Riley, and for you personally of *not* reporting your observations to Mr. Riley's superiors?
4. What would your decision be?

### Case 4-63 THE OPERATING CYCLE

There are two retail stores in Millersburgh. One is a full-service store that typically sells on credit to its customers; the other is a discount store that usually sells for cash. Full-service stores typically charge higher prices than do discount stores for identical items.

**Required:**

1. Does the operating cycle suggest some economic reason for a portion of this price difference? Explain your answer.
2. Can you think of other reasons why a full-service store might charge more than a discount store for the same merchandise?

### Case 4-64 INTERNAL CONTROLS FOR CASH DISBURSEMENTS

Campus Supply Store purchases merchandise on credit from a large number of suppliers. During the past five years, Campus's annual sales have grown from \$100,000 to \$1,500,000. A recent article in the local newspaper disclosed that an employee of another firm had been arrested for embezzling funds from his employer by diverting payments for purchases to his own bank account. Because of that article, the

accountant for Campus has decided to examine Campus's procedures for purchases and payables.

Currently three different employees are authorized to order merchandise for the store. These employees normally complete paperwork provided by the suppliers' sales representatives, keeping a copy for their records. When the ordered merchandise arrives, whomever the delivery person can locate signs for the package. Bills are sent to the store by suppliers and are paid by Campus's accountant when due.

**Required:**

1. Indicate which general principles of internal control are violated by Campus's procedures for purchases and payables.
2. Recommend procedures that would incorporate the five general categories of internal control where possible.

**Case 4-65 INTERNAL CONTROLS FOR COLLECTION OF RECEIVABLES**

Carolyn Furniture Galleries sells traditional furniture from two stores in St. Louis. Carolyn's credit terms allow customers to pay for purchases over three months with no finance charges. Carolyn's accountant has been responsible for approving customers for credit, recording cash received from customers in the accounting records, depositing cash collections in the bank, and following up on customers who are behind in their payments. Each month the accountant has prepared a report for Carolyn's president, indicating the cash collected, outstanding receivables, and uncollectible accounts.

Carolyn's president has been concerned about a significant increase in uncollectible accounts that began about two years ago, shortly after the current accountant was hired. Recently, a personal friend of Carolyn's president called. The caller had moved from St. Louis to Denver about six months ago. A month ago, the caller's new bank had refused a loan because a credit rating bureau in St. Louis had indicated that the caller had left bills unpaid at Carolyn Furniture. Carolyn's president knew that the caller had paid his account before leaving the community.

Carolyn's president called a detective agency and arranged for an investigation. Two weeks later, Carolyn's president was informed that the accountant had been spending much more money than his salary would warrant. Carolyn then called its auditor and arranged to have the accounting records for receivables and uncollectible accounts examined. This examination indicated that about \$400,000 of cash had been stolen from the firm by the accountant. The accountant had identified customers who had moved and had recorded cash sales to continuing customers as credit sales in the accounts of the relocated customers. Carolyn's accountant had kept the cash received from the cash sales and had eventually written off the fictitious credit sales as uncollectible accounts. Without the accountant's knowledge, one of Carolyn's new employees had sent the names of the customers who had apparently defaulted on their accounts to the credit bureau.

**Required:**

Identify the internal control weaknesses that permitted the accountant to steal the \$400,000. Suggest internal control procedures that would make it difficult for someone else to repeat this theft.

**Case 4-66 CASH MANAGEMENT**

Hollis Corporation has the following budgeted schedule for expected cash receipts and cash disbursement.

Month	Expected Cash Receipts	Expected Cash Disbursements
July	\$210,000	\$200,000
August	280,000	210,000
September	230,000	190,000
October	160,000	180,000

Hollis begins July with a cash balance of \$20,000, \$15,000 of short-term debt, and no short-term investments. Hollis uses the following cash management policy:

- a. End-of-month cash should equal \$20,000 plus the excess of disbursements over receipts for the next month.
- b. If receipts are expected to exceed disbursements in the next month, the current month ending cash balance should be \$20,000.
- c. Excess cash should be invested in short-term investments unless there is short-term debt, in which case excess cash should first be used to reduce the debt.
- d. Cash deficiencies are met first by selling short-term investments and second by incurring short-term debt.

**Required:**

1. Calculate the expected buying and selling of short-term investments and the incurrence and repayment of short-term debt at the end of July, August, and September.
2. Discuss the general considerations that help accountants develop a cash management policy.

**Case 4-67 CASH AND INTERNAL CONTROLS**

Identify a business with which you are familiar.

**Required:**

1. Describe the ways in which it prevents theft of cash.
2. Can you think of a way in which dishonest employees could circumvent the internal controls and steal cash?

**Case 4-68 RESEARCHING AND ANALYSIS USING THE ANNUAL REPORT**

Obtain **Microsoft's** 2007 10-K through the "Investor Relations" portion of their website (do a search for Microsoft investor relations) or go to <http://www.sec.gov> and click "Search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

1. How much cash and equivalents and short-term investments did Microsoft hold as a percentage of total assets in 2006 and 2007?
2. What is Microsoft's definition of a cash equivalent (see Note 1)? Does this appear consistent with other companies' definitions?
3. Look at Note 3 and specify how much of Microsoft's cash and equivalent balance is actually cash. What is their largest (in dollar terms) cash equivalent?
4. Look at Note 3 and list Microsoft's three largest short-term investment categories for 2007.
5. Look at Microsoft's corporate notes and bonds at June 30, 2007, from Note 3. What is the amount of unrealized gains and unrealized losses for these holdings? How much is considered cash equivalents? How much is considered short-term investments? Why are some classified as cash equivalents and some as short-term investments?
6. Locate the certifications required by the CEO and CFO under Section 302 of the Sarbanes-Oxley Act. (Hint: It is in the exhibits at the end of the 10-K.) Who signed these certifications?

**Case 4-69 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

1. How much cash and equivalents and short-term investments (or marketable securities) did Aeropostale and Abercrombie & Fitch hold as a percentage of total assets at February 3, 2007, and January 28, 2006?

2. Speculate as to differences in cash management policies between the two companies.
3. Describe the change in the mix of cash and equivalents and marketable securities for Abercrombie & Fitch between 2006 and 2007. Speculate as to why this may have happened.
4. Locate the Audit Opinion and describe the criteria by which Abercrombie & Fitch's and Aeropostale's internal control systems were evaluated.

# 5

## Sales and Receivables

After studying this chapter, you should be able to:

- **1** Explain the criteria for revenue recognition.
- **2** Measure net sales revenue.
- **3** Describe internal control procedures for merchandise sales.
- **4** Describe the principal types of receivables.
- **5** Measure and interpret bad debt expense and the allowance for doubtful accounts.
- **6** Describe the cash flow implications of accounts receivable.
- **7** Account for notes receivable from inception to maturity.
- **8** Analyze profitability and asset management using sales and receivables.



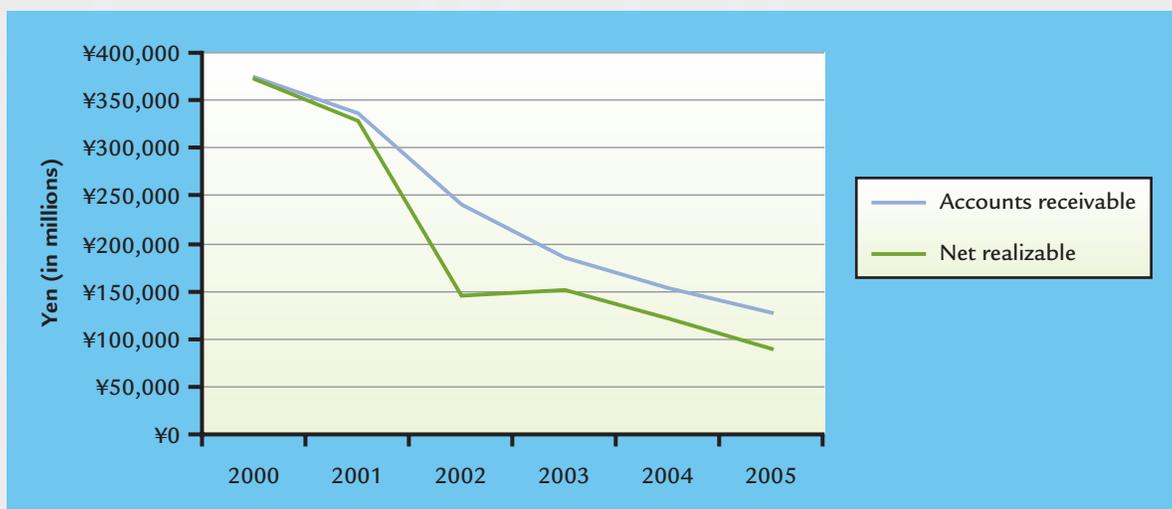
# E xperience Financial Accounting with Mitsubishi

**Mitsubishi's** U.S. sales increased from 191,000 cars in 1998 to 322,000 cars in 2001. This 68.5% sales growth made it the fastest growing auto brand in the U.S. Marketed toward Gen Y, Mitsubishi developed an "edgy" image with cross promotions such as Universal Film's *2 Fast 2 Furious*. They also offered a "0-0-0" finance offer—0 percent down, 0 percent interest, and \$0 monthly payments for 12 months.

Unfortunately, the economic downturn at the turn of the century hurt Mitsubishi's Gen Y target buyer particularly hard. Consequently, many buyers in the 0-0-0 financing program never made a single payment (some reports put this number as high as 50 percent or 60 percent of the buyers in this program), leaving Mitsubishi

with a year-old used car. This resulted in Mitsubishi taking a loss on bad debts of \$454 million during the first half of 2003. Since Mitsubishi operates on a fiscal year of April 1–March 31, this loss was reported in fiscal year 2002.

As you will learn in this chapter, net realizable value is the amount that a company expects to collect from its outstanding accounts receivable. Notice in the graph below, the drop in net realizable value in 2002, due to the loss on bad debts. A loss on bad debts is reported on the income statement, but as you can see here, the loss also impacts the balance sheet. This illustrates an important lesson. You have to be careful to whom you give credit.



## Sales Revenue

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There are two primary questions in revenue recognition. First, in which period (e.g., 2009 or 2010) should the revenue be recognized? Second, what amount of revenue should be recorded?

**OBJECTIVE** > **1**  
 Explain the criteria for revenue recognition.

### Timing of Revenue Recognition

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While cash-basis accounting recognizes revenue in the period payment is received (as on your tax return), accrual-basis accounting recognizes revenue when it is (1) **realized** or **realizable** and (2) **earned**. The term “realized” means that non-cash resources (i.e., inventory) have been exchanged for cash or near cash (e.g., accounts receivable). Obviously, this describes the typical sales transaction where a store exchanges, for example, a pair of shoes (its inventory and a non-cash resource) for cash or an account receivable. “Realizable” describes a situation where non-cash resources (i.e., inventory) are readily convertible into known amounts of cash. For example, after a gold mine extracts the gold, the gold (a non-cash resource) is readily convertible into cash because there is an active market for gold. Other examples of non-cash resources readily convertible to cash include wheat, corn, and soybeans.

As for the second criterion, revenues are considered “earned” when the earnings process is substantially complete. For most retail sales this occurs at the point of sale. That is, the store fulfills its obligation to you when it lets you walk out of the store with the pair of shoes you just bought. For service organizations, the earnings process is substantially complete when the service is performed. For example, if you pay \$1,200 for a year-long membership to a health club, the health club should recognize \$100 per month. Or, when you pay for a plane ticket in January to fly to Mexico during spring break, the airline will recognize the revenue after you fly.

Because sales transactions can be extremely complicated and businesses frequently attempt to recognize revenue too soon, the Securities and Exchange Commission (SEC) has issued further guidance on revenue recognition. Specifically, the SEC maintains that revenue is realized or realizable and earned when the following criteria are met [Staff Accounting Bulletin (SAB) 104]:

1. Persuasive evidence of an arrangement exists (e.g., a contract or other proof of the details of the exchange).
2. Delivery has occurred or services have been provided.
3. The seller’s price to the buyer is fixed and determinable.
4. Collectability is reasonably assured.

Although these criteria are easy to understand, they can be difficult to apply to complicated sales contracts. Such complicated transactions are best left to more advanced accounting courses. For now, recognize that the vast majority of sales transactions are straightforward and simple—service companies (e.g., airlines, accountants, lawyers, health clubs, lawn services, etc.) recognize revenue in the period they provide the services to the customer and sellers of goods recognize revenue in the period when title passes (e.g., the customer takes possession of the goods).

**ETHICS** Publicly-traded corporations are under tremendous pressure to meet analyst targets for key financial-statement data, such as sales (and earnings per share). Many corporations, when faced with the reality of sales not meeting analysts’ targets, resorted to a variety of practices to avoid such shortfalls. For example, **Bristol-Myers Squibb** was accused by the SEC of, among other things, “channel stuffing.” In channel stuffing companies ship more goods to a customer than the customer ordered near the end of a period. However, because sales are recognized at the time of shipment, all these sales are recorded in the current period. Of course, this practice

will result in lower sales in the subsequent period when the customer returns the unwanted goods. ♦

## Amount of Revenue Recognized

### OBJECTIVE 2

Measure net sales revenue.

The appropriate amount of revenue to recognize is generally the cash received or the cash equivalent of the receivable. However, companies often induce customers to buy by modifying the terms of the sale. In this section, we discuss three changes to sales revenues: discounts, returns, and allowances. Sales discounts are offered at the time of a sale to encourage the purchaser to pay promptly. Returns and allowances take place after the time of a sale. Let us begin our examination of these three changes to revenue by discussing sales discounts.

### Sales Discounts

To encourage prompt payment, businesses may offer a **sales discount**. This discount is a reduction of the normal selling price and is attractive to both the seller and the buyer. For the buyer, it is a reduction to the cost of the goods and services. For the seller, the cash is more quickly available and collection costs are reduced. For example, when cash is not available quickly, the seller may need to borrow money in order to pay its suppliers, employees, etc. The interest expense associated with borrowing money has a negative effect on net income.

Sales invoices use a standard notation to state discount and credit terms. For example, the invoice of a seller who expects payment in 30 days and offers a 2 percent discount if payment is made within 10 days would bear the notation 2/10, n/30 (which is read “2/10, net 30”). The notation n/30 indicates that the gross amount of the invoice (the full pre-discount amount) must be paid in 30 days. The notation 2/10 indicates that, if payment is made within the 10-day discount period, the amount owed is 2 percent less than the gross (pre-discount) amount of the invoice. Of course, if payment is made within the 20 days following the end of the discount period, then the amount owed is equal to the gross (pre-discount) amount of the invoice.

Most companies record the sale and the associated receivable at the gross (pre-discount) amount of the invoice. This is called the “gross method.”<sup>1</sup> If payment is received after the discount period, the cash received equals the associated receivable so no adjustment is needed. But when a discount is taken, the amount of the discount is recorded in a contra-revenue account (i.e., it reduces Gross Sales Revenue to Net Sales Revenue) called *sales discounts*, which balances the entry. This method is illustrated in **Cornerstone 5-1**.

#### HOW TO Record Receivables using the Gross Method

##### Concept:

Some businesses offer discounts off the full price for paying cash promptly. When the gross method is used, the receivable is recorded at the gross (pre-discount) amount of the invoice. Under the gross method, if the discount is taken, a debit is made to “Sales Discounts” at the time of payment.

##### Information:

On May 5, 2009, Bolt Manufacturing Company sold merchandise with a gross price of \$15,000 to Richardson’s Wholesale Hardware. Bolt offered terms of 2/10, n/30.



#### CORNERSTONE 5-1



<sup>1</sup> GAAP also allows the “net method” of accounting for receivables with sales discounts. This method is demonstrated in intermediate accounting courses.

**CORNERSTONE**  
**5 - 1**  
*(continued)*

**Required:**

1. Prepare the journal entry to record the sale using the gross method.
2. Prepare the journal entry assuming the payment is received on May 15, 2009 (within the discount period).
3. Prepare the journal entry assuming the payment is received on May 25, 2009 (after the discount period).
4. How would Sales Revenues be disclosed on the Income Statement assuming the payment is made within 10 days?

**Solution:**

1. Entry on May 5, 2009:

	Stockholders'
Assets = Liabilities +	Equity
+15,000	+15,000

Date	Account and Explanation	Debit	Credit
May 5, 2009	Accounts Receivable	15,000	
	Sales Revenue		15,000
	<i>(Record sale of merchandise)</i>		

2. Entry on May 15, 2009:

	Stockholders'
Assets = Liabilities +	Equity
+14,700	-300
-15,000	

Date	Account and Explanation	Debit	Credit
May 15, 2009	Cash (15,000 × 98%)	14,700	
	Sales Discounts	300	
	Accounts Receivable		15,000
	<i>(Record collection within the discount period)</i>		

3. Entry on May 25, 2009:

	Stockholders'
Assets = Liabilities +	Equity
+15,000	
-15,000	

Date	Account and Explanation	Debit	Credit
May 25, 2009	Cash	15,000	
	Accounts Receivable		15,000
	<i>(Record collection after the discount period)</i>		

4. Partial income statement:

Sales revenue	\$15,000
Less: Sales discounts	300
Net sales	<u>\$14,700</u>

It is also important to monitor changes in how customers use sales discounts. For example, customers who stop taking sales discounts may be experiencing cash flow problems and therefore are potential credit risks. On the other hand, failure of a large number of customers to take discounts may indicate that an increase in the discount percentage is needed.

Finally, sales discounts must be distinguished from both trade and quantity discounts. A *trade discount* is a reduction in the selling price granted by the seller to a particular class of customers, for example, to customers who purchase goods for resale rather than for use. A *quantity discount* is a reduction in the selling price granted by the seller because selling costs per unit are less when larger quantities are ordered. This is why, for example, a 32-ounce soft drink does not cost double what a 16-ounce one costs at a restaurant. For accounting purposes, the selling or invoice price is usually assumed to be the price after adjustment for the trade or quantity discounts; accordingly, trade and quantity discounts are not recorded separately in the accounting records.

## Sales Returns and Allowances

Occasionally, a customer will return goods as unsatisfactory. In other cases, a customer may agree to keep goods with minor defects if the seller is willing to make an “allowance” by reducing the selling price. The accounting for sales returns and allowances, which is described in the paragraphs that follow, has the effect of reversing all or part of a previously recorded sale.

Merchandise or goods returned by the customer to the seller are **sales returns**. A contra-revenue account called *sales returns and allowances* (allowances are discussed next) is used to record the selling price of returned goods. For example, on August 31, 2009, Bolt Manufacturing sold \$12,000 of house paint to Charlie’s Hardware. On October 15, 2009, Charlie’s returned \$4,000 of the paint because it had arrived after the painting season, as a result of a trucking strike. Bolt made the following entries to record these events:

Date	Account and Explanation	Debit	Credit
August 31, 2009	Accounts Receivable Sales Revenue <i>(Record sale of merchandise)</i>	12,000	12,000
October 15, 2009	Sales Returns & Allowances Accounts Receivable <i>(Record return of merchandise)</i>	4,000	4,000

Stockholders' Equity	
Assets = Liabilities +	Equity
+12,000	+12,000

Stockholders' Equity	
Assets = Liabilities +	Equity
-4,000	-4,000

In an example such as the preceding one, if the customer has already paid the account receivable, the seller might refund the purchase price and record a credit to cash. However, if the customer regularly purchases from the firm, the return can simply be applied as a credit to accounts receivable in anticipation of the customer’s next purchase.

When goods are only slightly defective, are shipped late, or in some other way are rendered less valuable, a customer may be induced to keep the goods if a price reduction, called a **sales allowance**, is offered by the seller. Companies also record these price reductions in *sales returns and allowances*. For example, on November 1, 2009, Bolt Manufacturing sold several snowblowers for \$9,800 to Johnson Home and Garden Store. The blowers shipped were larger than those Johnson had ordered and were therefore more difficult to sell. On November 15, Bolt offered, and Johnson accepted, a \$1,600 reduction in the total selling price as an allowance for the size difference. Bolt made the following accounting entries to record these events:

Date	Account and Explanation	Debit	Credit
November 1, 2009	Accounts Receivable Sales Revenue <i>(Record sale of merchandise)</i>	9,800	9,800
November 15, 2009	Sales Returns & Allowances Accounts Receivable <i>(Record allowance for incorrect merchandise)</i>	1,600	1,600

Stockholders' Equity	
Assets = Liabilities +	Equity
+9,800	+9,800

Stockholders' Equity	
Assets = Liabilities +	Equity
-1,600	-1,600

If the bill has already been paid, the firm can either refund a portion of the purchase price and record a credit to cash or apply the allowance against future purchases by the customer by recording a credit to accounts receivable.

On the income statement, as indicated in Chapter 2, sales returns and allowances, like sales discounts, are subtracted from gross sales revenue to produce **net sales revenue**, as shown here:

Sales revenue	\$752,000
Less: Sales returns and allowances	5,600
Net sales	<u>\$746,400</u>

In other words, sales returns and allowances is a contra-revenue account. Presenting both gross sales revenue and sales returns and allowances, rather than net sales revenue alone, permits financial-statement users to respond to unusual

## DECISION-MAKING & ANALYSIS

### Sales Returns and Allowances

Interplains, Inc., sells gears to heavy equipment manufacturers. Data for the past four years for sales revenue, sales returns and allowances, and net income are shown below.

	2007	2008	2009	2010
Sales revenue	\$624,000	\$653,000	\$671,000	\$887,000
Sales returns and allowances	6,100	6,400	6,300	14,800
Net income	30,000	29,000	31,500	12,200

The following questions raise issues that might provide some insight into the significant change in the relationship between sales revenue and sales returns and allowances in 2010:

1. *Have there been any significant changes in the quality of production?*

Sales revenue, which had been relatively stable, increased by 32 percent in 2010. Often, significant growth in output is accompanied by quality assurance problems, as might be indicated by the 135 percent growth in sales returns and allowances. A check of production data might reveal the use of less highly trained workers or supervisors, or might indicate that the current workforce is being worked heavily on overtime.

2. *Have there been any significant changes in the economic environment of the firm?*

Notice the significant decrease in net income despite the large increase in sales revenue. When this happens, you must attempt to discover why. For example, when a firm becomes significantly more or less profitable, the attitude of the employees toward their work can change, causing changes in the quality of output. Some key employees may leave a firm with declining profitability, thus causing quality difficulties.

behavior in either account. Careful users of financial statements look for unusual behavior in both sales revenue and sales returns and allowances in the income statement. Often, significant changes in these accounts help to explain other changes in income statement or balance sheet accounts, as we illustrate in the Decision-Making & Analysis above.

### OBJECTIVE > 3

Describe internal control procedures for merchandise sales.

### Internal Control for Sales

Since sales revenues have a significant effect on a company's net income, internal control procedures must be established to ensure that the amounts reported for these items are correct. For sales revenues, these controls normally involve the following documents and procedures:

1. Accounting for a sale begins with the receipt of a purchase order or some similar document from a customer. The order document is necessary for the buyer to be obligated to accept and pay for the ordered goods.
2. Shipping and billing documents are prepared based on the order document. Billing documents are usually called *invoices*.
3. A sale and its associated receivable are recorded only when the order, shipping, and billing documents are all present.

As illustrated in Exhibit 5-1, sales revenue should be recorded only when these three control documents are completed. When any of these three internal controls is not present, it is possible for valid sales to be unrecorded and for invalid sales to be recorded.

For sales returns and allowances, internal control procedures must be established that identify the conditions and documentation required before a sales return or a sales allowance can be recorded. These controls protect the firm from unwarranted reductions in revenues and receivables.

## Exhibit 5-1

## Internal Controls Recording Sales Revenue

PURCHASE ORDER No. R450 Richardson's Wholesale Hardware				SHIPPING REPORT No. B275 Bolt Manufacturing		INVOICE No. B100 Bolt Manufacturing			
Date: Sept. 1, 2008				Date: Sept. 1, 2008		Date: Sept. 1, 2008			
To: Bolt Manufacturing				To: Richardson's Wholesale Hardware		Sold to: Richardson's Wholesale Hardware Purchase order: R450			
QTY.	DESCRIPTION	PRICE	AMOUNT	QTY.	DESCRIPTION	QTY.	DESCRIPTION	PRICE	AMOUNT
30	Model No. SB100 snowblower	\$500	\$15,000	30	Model No. SB100 snowblower	30	Model No. SB100 snowblower	\$500	\$15,000
Ordered by: Jim Richardson <i>Jim Richardson</i>				Purchase order: R450		SUBTOTAL \$15,000			
Purchase order number must appear on all shipments and invoice						SALES TAX 0			
						SHIPPING & HANDLING 0			
						TOTAL DUE \$15,000			

Date	Account and Explanation	Debit	Credit
Sept. 1	Accounts Receivable	15,000	
	Sales Revenue		15,000

## Types of Receivables

A receivable is money due from another business or individual. Receivables are typically categorized along three different dimensions. First, a distinction is made between “accounts” receivable and “notes” receivable. A “note” is a legal document given by a borrower to a lender stating the timing of repayment and the amount (principal and/or interest) to be repaid. We discuss notes receivable later in the chapter. **Accounts receivable**, on the other hand, do not have a formal note. For example, while you likely signed a formal agreement to rent your apartment, you probably did not sign a formal agreement for your utilities. Another dimension on which receivables are distinguished is whether they are current or noncurrent. Although in practice both accounts and notes receivable are typically classified as current, we should note that accounts receivable are typically due in 30 to 60 days and do not have interest while notes receivable have interest and typically are due in anywhere from three to 12 months. Of course, if the due date is over one year, the note receivable typically will be classified as noncurrent. Finally, receivables are also distinguished by whether they are trade or non-trade receivables. **Trade receivables** are due from customers purchasing inventory in the ordinary course of business while **nontrade receivables** arise from transactions not involving inventory (e.g., interest receivable or cash advances to employees).

## Accounting for Bad Debts

We discussed the recognition of accounts receivable in the sales section, but an equally important concept is ensuring that the proper amount for accounts receivable is shown on the balance sheet. GAAP requires accounts receivable to be shown at their “net realizable value,” which is the amount of cash the company expects to collect. Unfortunately, the amount of cash collected will almost never equal the total amount

### OBJECTIVE > 4

Describe the principal types of receivables.

### OBJECTIVE > 5

Measure and interpret bad debt expense and the allowance for doubtful accounts.

recognized in accounts receivable because some customers will not pay (e.g., a customer declares bankruptcy and ceases operations). When customers do not pay their accounts receivable, bad debts result (also called uncollectible accounts). Although efforts are made to control bad debts, it is an expense of providing credit to customers (the hope is that the increased business associated with providing credit more than makes up for the bad debts). We discuss the accounting for bad debts below.

As we saw in the previous section, when sales revenues are reduced to reflect sales returns and allowances, the reductions are accomplished through a contra-revenue account. Although it might seem logical to reduce sales revenues in the same way when customers default on accounts receivable arising from credit sales, this treatment is inappropriate. Reductions in sales revenue should be recorded only for transactions that result from actions of the seller, such as acceptance of returned merchandise (a sales return) or price reductions offered to purchasers (a sales allowance). Since defaults on credit sales arise from actions of the purchaser rather than the seller, bad debts cannot be recorded as revenue reductions. If bad debts are not treated as negative revenues, then they must be treated as expenses. And if they are expenses, the question then arises as to when the expense should be recorded.

There are two methods to record bad debts (remember, bad debts are the receivables that are not paid). The allowance method estimates future bad debts related to the current accounts receivable or sales revenue balance and uses this estimate to record bad debt expense and to reduce accounts receivable to net realizable value (i.e., the amount of cash expected to be collected from these receivables). The direct write-off method, on the other hand, waits until a customer defaults on a payment and then records a bad debt expense and reduces accounts receivable. For reasons discussed in more detail below, the allowance method is GAAP. Nonetheless, the direct write-off method is frequently used when accounts receivable are not material because it is easier. We will discuss both of these methods, but we'll look at the direct write-off method first.

### Direct Write-Off Method

The simplest method is to record the expense in the period of default. This is called the direct write-off method. Under this method **bad debt expense** is increased and accounts receivable is decreased only at the time an account is determined to be uncollectible. For example, suppose ABC, Inc., owes Hawthorne Company \$10,000 on account. On March 20, 2009, Hawthorne learns that ABC has gone out of business. Hawthorne would make the following entry:

Date	Account and Explanation	Debit	Credit
March 20, 2009	Bad Debt Expense	10,000	
	Accounts Receivable		10,000
	<i>(Record write-off of ABC, Inc., account)</i>		

As you remember, the matching concept requires that expenses be matched with the related revenues in the period in which the revenues are recognized on the income statement. Therefore, bad debt expense is properly matched with revenues only if it is recorded in the period of sale. Since accounts are often determined to be uncollectible in accounting periods subsequent to the sale period, the direct write-off method is inconsistent with the matching concept and can only be used if bad debts are immaterial. Further, the accounts receivable balance is shown on the balance sheet as the total amount owed by customers, rather than the net realizable value of amounts owed by customers.

### Allowance Method

To be consistent with the matching principle, bad debt expense must be recorded in the period of the related sale. But most likely it is unknown that a specific account will become uncollectible (default) until after the period of the sale. Therefore, bad debt expense related to the sales for the period must be estimated in order to record it in the period of the sale.

The result is that bad debt expense is recognized before the actual default. Because defaults for the current period's sales have not actually occurred, the specific accounts

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-10,000				-10,000

receivable are not lowered; instead, an account is established to “store” the estimate until specific accounts are identified as uncollectible. This account is called **Allowance for Doubtful Accounts**. For example, assume at the end of the first year of operations Hawthorne has an accounts receivable balance of \$1,000,000. Although no customers have defaulted, Hawthorne estimates that \$25,000 of that balance is uncollectible. At the end of the first year Hawthorne would make the following adjusting entry:

Date	Account and Explanation	Debit	Credit
December 31, 2008	Bad Debt Expense	25,000	
	Allowance for Doubtful Accounts		25,000
	<i>(Record estimate of uncollectible accounts)</i>		

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-25,000				-25,000

Admittedly, this entry looks very similar to the entry shown in the direct write-off method section. The major difference is the timing of the entry. The direct write-off method makes the entry in the period the customer defaults, while the allowance method makes the entry in the period of sale. Hawthorne's balance sheet would report accounts receivable on the balance sheet as follows:

Accounts Receivable	\$1,000,000
Less: Allowance for Doubtful Accounts	25,000
Accounts Receivable (net)	<u>\$ 975,000</u>

However, it is important to recognize that Hawthorne's balance sheet would report the full \$1,000,000 as accounts receivable under the direct write-off method at the end of the first year.

When a specific account is ultimately determined to be uncollectible under the allowance method, it is *written off* by a debit to the allowance account and a credit to accounts receivable. This write-off removes the defaulted balance from the accounts receivable balance and also removes it from the estimate “storage” account.

Under the allowance procedure, two methods commonly used to estimate bad debt expense are the *percentage of credit sales method* and the *aging method*.

**Percentage of Credit Sales Method** The simpler of the two methods for determining bad debt expense is the **credit sales method**. Using past experience and management's views of how the future may differ from the past (e.g., if credit policies change), it is possible to estimate the percentage of the current period's credit sales that will eventually become uncollectible. This percentage is multiplied by the total credit sales for the period to calculate the estimated bad debt expense for the period. The adjusting entry is then prepared to recognize the bad debt expense as shown in **Cornerstone 5-2**.

## CONCEPT Q&A

Why is the direct write-off method not GAAP?

Because the direct write-off method fails to “match” the bad debt expense to the sales revenue that it helped generate and does not show accounts receivable at net realizable value on the balance sheet.

Possible Answer:

### HOW TO Estimate Bad Debt Expense with the Percentage of Credit Sales Method

#### Concept:

Bad debt expense should be recorded in the period of the sale to match the expense with the revenue. The bad debt expense amount can be calculated as a percentage of credit sales. The percentage is determined from past experience with credit sales. The adjusting entry records bad debt expense and adjusts the balance in allowance for doubtful accounts.

#### Information:

Crimson Company has credit sales of \$620,000 during 2009 and estimates at the end of 2009 that 1.43 percent of these credit sales will eventually default. Also,



**CORNERSTONE**  
**5 - 2**



**CORNERSTONE**  
**5 - 2**  
*(continued)*

during 2009 a customer defaults on a \$524 balance related to goods purchased in 2008. Prior to the adjusting entries, Crimson's accounts receivable and allowance for doubtful accounts balances were \$304,000 and \$134 (credit), respectively.

**Required:**

1. Estimate the bad debt expense for the period.
2. Prepare the journal entry to record the write off of the defaulted \$524 balance.
3. Prepare the adjusting entry to record the bad debt expense for 2009.
4. What is the net accounts receivable balance at the end of the year? How would this balance have changed if Crimson had not written off the \$524 balance during 2009?

**Solution:**

1.  $\$620,000 \times 0.0143 = \$8,866$
- 2.

	Stockholders'
Assets = Liabilities +	Equity
+524	
-524	

Date	Account and Explanation	Debit	Credit
December 31, 2009	Allowance for Doubtful Accounts	524	
	Accounts Receivable		524
	<i>(Record write-off of defaulted account)</i>		

3. The calculation in part 1 estimated the *ending* balance of bad debt expense. This amount is also the adjustment because the balance before the adjustment is zero. Of course, this is usually the case for income statement accounts because they were closed at the end of the prior year.

	Stockholders'
Assets = Liabilities +	Equity
-8,866	-8,866

Date	Account and Explanation	Debit	Credit
December 31, 2009	Bad Debt Expense	8,866	
	Allowance for Doubtful Accounts		8,866
	<i>(Record adjusting entry for bad debt expense estimate)</i>		

Bad Debt Expense	
Preadjustment Balance, 12/31/09	0
<b>Adjustment</b>	<b>8,866</b>
Ending Balance	8,866

Allowance for Doubtful Accounts		
Write-offs during 2009	524	134      Beginning Balance
Preadjustment Balance, 12/31/09	390	
	<b>8,866</b>	<b>Adjustment</b>
	8,476	Ending Balance

	Year End	Assuming No Write-Off
Accounts receivable	\$303,476	\$304,000
Less: Allowance for doubtful accounts	8,476*	9,000**
Net accounts receivable	<u>\$295,000</u>	<u>\$295,000</u>

\*See T-account in part 3.

\*\*T-account from part 3 without the \$524 debit for the write-off.

Part 4 illustrates that under the allowance method the write-off of a specific account does not affect net accounts receivable.

Occasionally, accounts receivable that are written off are later partially or entirely collected. Suppose on February 5, 2010, Crimson receives \$25 of the \$524 that was written off at the end of the previous year (see Part 2 of Cornerstone 5-2). Crimson would make the following entries:

Date	Account and Explanation	Debit	Credit
February 5, 2010	Accounts Receivable	25	
	Allowance for Doubtful Accounts (Reverse portion of write-off)		25
	Cash	25	
	Accounts Receivable (Record collection of account receivable)		25

Assets	=	Liabilities	+	Stockholders' Equity
+25				
-25				
+25				
-25				

Crimson's first entry reverses the appropriate portion of the write-off; it restores the appropriate portion of the accounts receivable and allowance for doubtful accounts balances. The second entry records the cash collection in the typical manner.

The credit sales method takes an income statement approach. That is, it uses an income statement number (credit sales) to estimate the ending balance of an income statement account (bad debt expense). This method is primarily concerned with reflecting the estimate of bad debt expense appropriately on the income statement. Because of the focus on the expense account, any existing balance in the allowance account is ignored when determining the amount of the adjusting entry. This is the underlying difference between the percentage of credit sales method and the aging method.

**Aging Method** Under the **aging method**, bad debt expense is estimated by determining the collectability of the accounts receivable rather than by taking a percentage of total credit sales. At the end of each accounting period, the individual accounts receivable are categorized by age. Then an estimate is made of the amount expected to default in each age category based on past experience and expectations about how the future may differ from the past. As you may expect, the overdue accounts are more likely to default than the currently due accounts, as shown in the example below:

Accounts Receivable Age	Amount	Proportion Expected to Default	Amount Expected to Default
Less than 15 days	\$190,000	0.01	\$1,900
16–30 days	40,000	0.04	1,600
31–60 days	10,000	0.10	1,000
Over 61 days	9,000	0.30	2,700
	<u>\$249,000</u>		<u>\$7,200</u>

The total amount expected to default on year-end accounts receivable, \$7,200 in the above example, is the amount that should be the ending balance in the allowance for doubtful accounts. Since the objective of the aging method is to estimate the ending balance in the allowance for doubtful accounts, any existing balance in the allowance account must be considered when determining the amount of the adjusting entry as shown in **Cornerstone 5-3**.

## HOW TO Estimate the Allowance for Doubtful Accounts with the Aging Method

### Concept:

An aging of the accounts receivable balance will determine the appropriate value of net accounts receivable to be presented on the balance sheet. This results in an estimate of the appropriate balance for the allowance for doubtful accounts. The adjusting entry brings allowance for doubtful accounts to the appropriate balance and records bad debt expense.



## CORNERSTONE 5-3



**CORNERSTONE**  
**5 - 3**  
*(continued)*

**Information:**

On January 1, 2009, Sullivan, Inc., has the following balances for accounts receivable and allowance for doubtful accounts:

Accounts receivable	\$224,000 (debit)
Allowance for doubtful accounts	6,700 (credit)

During 2009, Sullivan had \$3,100,000 of credit sales, collected \$3,015,000 of accounts receivable, and wrote off \$60,000 of accounts receivable as uncollectible.

**Required:**

1. What is Sullivan's preadjustment balance in accounts receivable on December 31, 2009?
2. What is Sullivan's preadjustment balance in allowance for doubtful accounts on December 31, 2009?
3. Assuming Sullivan's analysis of the accounts receivable balance indicates that \$7,200 of the current accounts receivable balance is uncollectible, by what amount will the allowance for doubtful accounts need to be adjusted?
4. What will be the ending balance in bad debt expense?
5. Prepare the necessary adjusting entry for 2009.

**Solution:**

1.

Accounts Receivable			
Beginning Balance	224,000		
Sales	3,100,000	3,015,000	Collections
		60,000	Write-offs
Preadjustment Balance	249,000		

2.

Allowance for Doubtful Accounts			
		6,700	Beginning Balance
Write-offs	60,000		
Preadjustment Balance	53,300		

3.

Allowance for Doubtful Accounts			
Preadjustment Balance, 12/31/09	53,300		
		<b>60,500*</b>	<b>Adjusting Entry</b>
		7,200**	Adjusted Balance

\*Necessary adjustment to end up with an ending balance of \$7,200.

\*\*Estimate of ending balance determined by analyzing the receivables aging. This information was given in part 3 of the "Required" section.

4.

Bad Debt Expense			
Preadjustment Balance, 12/31/09	0		
<b>Adjustment</b>	<b>60,500</b>		
Ending Balance	60,500		

5.

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Bad Debt Expense	60,500	
	Allowance for Doubtful Accounts		60,500
	<i>(Record adjusting entry for bad debt expense estimate)</i>		

<b>Assets = Liabilities +</b>	<b>Stockholders' Equity</b>
-60,500	-60,500

In summary, GAAP requires companies to show accounts receivable at net realizable value on the balance sheet and match bad debt expense to the period of sale (i.e., the allowance method) rather than waiting until specific accounts are written off to record the bad debt expense (i.e., the direct write-off method), unless accounts receivable are immaterial. Under the allowance method there are two approaches for estimating bad debt expense. Percentage of credit sales is an income statement approach that focuses on estimating the proper bad debt expense to match with that period's credit sales on the income statement. The aging method, on the other hand, is a balance sheet approach that analyzes the accounts receivable to estimate its net realizable value. This estimate provides the necessary ending allowance for doubtful accounts balance to report net accounts receivable at net realizable value.

Although bad debts result from actions of the purchaser (nonpayment), the amount of bad debt expense is influenced by the credit policies of the seller, as the following analysis illustrates.

## CONCEPT Q&A

What are the conceptual and practical differences between the credit sales and aging methods?

The credit sales method estimates the amount to be shown as bad debt expense on the income statement. The aging method estimates the amount to be shown as the allowance for doubtful accounts on the balance sheet. The preadjustment balance in these accounts must be adjusted so that the ending balance equals the respective estimates. However, because bad debt expense is an income statement account that is closed to retained earnings at the end of every period, its preadjustment balance should be zero. As such, the adjustment is equal to the estimate of the ending balance. The allowance for doubtful accounts, on the other hand, is a balance sheet account and will typically have an existing balance.

**Possible Answer:**

## DECISION-MAKING & ANALYSIS

### Are Bad Debts Always Bad?

"In God we trust. All others pay cash." Thus reads a sign prominently situated on the counter of the Mt. Sterling Drug Company. For many years, Andy Forsythe, the owner of Mt. Sterling Drug, has been a pharmaceutical wholesaler. An outgoing and friendly individual who believes that the "personal touch" is an important ingredient in any successful business, Andy has always been very popular among pharmacists in the local community. However, recently Mt. Sterling Drug hasn't grown as much as Andy had hoped. He observes that the amount of sales to a group of longtime, loyal, and reliable customers has been steadily dwindling.

Andy has steadfastly maintained his "cash only" sales terms. "A bad debt is like money down the drain," he says. "Short of costly legal action, there's nothing you can do to recover your money. I refuse to have my company's future jeopardized by getting involved in bad debts."

Some of Andy's competitors, affiliates of large corporate conglomerates, have been attempting to lure business away from smaller wholesalers like Mt. Sterling by offering retail pharmacies various incentives. Among these are credit terms whereby a customer typically has 30 to 60 days to pay for a purchase and receives a 1 to 2 percent discount for prompt payment (usually within 10 days of sale). Although he is concerned about losing business to these larger companies, Andy fears bad debts even more.

*Is Andy correct? Should bad debts be avoided at all costs?*

There is no question that the inability to collect an account receivable is a serious problem. However, most wholesalers have come to accept bad debts as just another business expense. Certainly no company would grant credit knowing that the specific customer will not pay for the goods purchased. Nonetheless, granting credit is a "necessary evil"—something that must be done to generate repeat business and maintain a competitive position.

Andy's friendship with the local pharmacists does not guarantee that he will receive their business, especially if they can get a better deal elsewhere. Further, prudent screening of each customer's credit history should enable him to identify at least some of those who may have difficulty paying their accounts. Placing such restrictions as relatively low credit limits on these risky accounts or, in some cases, denying credit altogether should help Andy keep bad debts to a minimum. Suppose Mt. Sterling's gross margin is 30 percent of sales and that, as a result of the more liberal credit policy, sales increase by \$100,000 and bad debts are limited to 3 percent of the new credit sales. Then Mt. Sterling's income from operations should increase by \$27,000 (increased gross margin of \$30,000 less bad debt expense of \$3,000), rather than decreasing as Andy fears.

We now will focus on the cash management principles associated with accounts receivable.

**OBJECTIVE** > **6**

Describe the cash flow implications of accounts receivable.

## Cash Management Principles Related to Accounts Receivable

In Chapter 4 we mentioned that a principle of cash management is increasing the speed of cash collection for receivables. An increasingly common practice is to **factor**, or sell, receivables. When receivables are factored, the seller receives an immediate cash payment reduced by the factor's fees. The factor, the buyer of the receivables, acquires the right to collect the receivables and the risk of uncollectibility. In a typical factoring arrangement, the sellers of the receivables have no continuing responsibility for their collection.

Factoring arrangements vary widely, but typically the factor charges a fee ranging from 1 percent to 3 percent. This fee compensates the factor for the time value of money (i.e., interest), the risk of uncollectibility, and the tasks of billing and collection. For example, if Bolt Manufacturing factors \$1,000,000 of receivables with a 1 percent fee, they would make the following entry:

		<b>Stockholders'</b>
	<b>Assets = Liabilities +</b>	<b>Equity</b>
	+990,000	-10,000
	-1,000,000	

Account and Explanation	Debit	Credit
Cash	990,000	
Factoring Fee Expense	10,000	
Accounts Receivable		1,000,000
<i>(Record factoring of receivables)</i>		

Large businesses and financial institutions frequently package factored receivables as financial instruments or securities and sell them to investors. This process is known as **securitization**. For example, **General Motors Acceptance Corporation (GMAC)** sells car loans to special financial institutions set up by investment banks. The financial institutions pay GMAC with funds raised from the sale of securities or notes, called certificates for automobile receivables (CARs). Banks use similar arrangements to package their credit card receivables into securities called certificates for amortizing revolving debts (CARDs).

### Credit and Debit Cards

Bank **credit cards**, such as **Visa** and **MasterCard**, are really just a special form of factoring. The issuer of the credit card (i.e., the bank) pays the seller the amount of each sale less a service charge (on the date of purchase) and then collects the full amount of the sale from the buyer (at some later date).<sup>2</sup> For example, if a retail customer uses a **Citi-bank** Visa Card to purchase \$100 of merchandise from Bolt Manufacturing, Bolt would make the following entry assuming Citibank charges a 1.55 percent service charge:

		<b>Stockholders'</b>
	<b>Assets = Liabilities +</b>	<b>Equity</b>
	+98.45	-1.55
		+100.00

Account and Explanation	Debit	Credit
Cash	98.45	
Service Charge Expense	1.55	
Sales Revenue		100.00
<i>(Record sales)</i>		

Although a 1.55 percent service charge may seem expensive, credit card sales provide sellers with a number of advantages over supplying credit directly to customers. First, sellers receive the money immediately. Second, they avoid bad debts because as long as the credit card verification procedures are followed, the credit card company absorbs the cost of customers who do not pay. Third, recordkeeping costs lessen because employees are not needed to manage these accounts. Fourth, sellers believe that by accepting credit cards, their sales will increase. For example, how many of you have ever driven away from a gas station that does not accept credit cards or even one that merely does not allow you to pay at the pump?

<sup>2</sup>The bank may also pay the full amount of the sale to the seller and then bill the service charge at the end of the period.

Of course, many large retailers are willing to take on these costs to avoid the credit card service charge. For example, **Sears, Kohls, Target, Macy's**, and most other large retailers have internal credit cards. When these cards are used the seller records it like any other accounts receivable and no service charge expense is incurred; however, they are accepting the risk of uncollectible accounts and the cost of servicing these accounts.

Non-bank credit cards, such as **American Express**, also result in a receivable for the seller because the issuer of the credit card (e.g., American Express) does not immediately pay the cash to the seller. American Express also charges a higher service charge to the seller. Consequently, sellers find American Express to be more costly than bank cards, such as Visa or MasterCard, which explains why many businesses do not accept American Express.

A **debit card** authorizes a bank to make an immediate electronic withdrawal (debit) from the holder's bank account. The debit card is used like a credit card except that a bank electronically reduces (debits) the holder's bank account and increases (credits) the merchant's bank account for the amount of a sale made on a debit card.

Debit cards appear to be somewhat disadvantageous to the card holder as transactions cannot be rescinded by stopping payment. Further, a purchase using a debit card causes an immediate reduction in a bank account balance, while a check written at the same time will require at least one or two days to clear, allowing the depositor to benefit from the additional money in the account until the check is presented at the bank for payment. However, debit cards offer significant advantages to banks and merchants in reduced transaction-processing costs. Thus, banks and merchants have incentive to design debit cards that minimize or eliminate the disadvantages and costs to card users.

## Notes Receivable

### OBJECTIVE 7

Account for notes receivable from inception to maturity.

**Notes receivable** are receivables that generally specify an interest rate and a maturity date at which any interest and principal must be repaid. Our discussion here is limited to simple notes that specify the repayment of interest and principal in a single payment on a given day (more complicated notes are described in Chapter 10).

The excess of the total amount of money paid to a lender over the amount borrowed is called **interest**. The amount borrowed is the **principal**. In other words, the total amount paid to the lender equals the sum of the interest and the principal for the note.

Interest can be considered compensation paid to the lender for giving up the use of resources for the period of a note (i.e., the time value of money). The interest rate specified in the note is an annual rate. Therefore, when calculating interest, you must consider the duration of the note using the following formula:

$$\text{Interest} = \text{Principal} \times \text{Annual interest rate} \times \text{Fraction of one year}$$

Further, you will recall from Chapter 2 that the matching concept and the revenue recognition concept require that expenses and revenues be identified with specific accounting periods. If only one month of interest has been incurred by year-end, an adjusting entry is required to recognize interest revenue and a corresponding interest receivable. Any remaining interest is recognized in subsequent periods.<sup>3</sup>

<sup>3</sup>Interest is, in fact, often computed in terms of days rather than months. Suppose, for example, that the three-month note runs for 92 days (two 31-day months and one 30-day month). The total interest on the 92-day note would be \$302.47 [(\$10,000)(0.12)(92/365)], and the first 31-day month's interest would be \$101.92 [(\$10,000)(0.12)(31/365)]. Observe that daily interest complicates the arithmetic associated with interest calculations but does not alter the basic form of the calculations. To simplify interest computations, we will use monthly interest throughout this chapter. The accounting for notes receivable is demonstrated in **Cornerstone 5-4**.



$$\begin{aligned}
 6. \text{ Interest} &= \text{Principal} \times \text{Annual Interest Rate} \times \text{Fraction of One Year} \\
 &= \$50,000 \times 10\% \times (15/12) \\
 &= \$6,250
 \end{aligned}$$

**CORNERSTONE**  
**5-4**  
*(continued)*

7.

Date	Account and Explanation	Debit	Credit
December 31, 2008	Interest Receivable	5,000	
	Interest Revenue		5,000
	<i>(Record accrual of interest)</i>		

Stockholders' Equity	
Assets = Liabilities +	Equity
+5,000	+5,000

Date	Account and Explanation	Debit	Credit
March 31, 2009	Cash	56,250	
	Notes Receivable		50,000
	Interest Receivable		5,000
	Interest Revenue		1,250
	<i>(Record collection of note receivable)</i>		

Stockholders' Equity	
Assets = Liabilities +	Equity
+56,250	+1,250
-5,000	
-50,000	

## Analyzing Sales and Receivables

### OBJECTIVE 8

Analyze profitability and asset management using sales and receivables.

Analysts of the financial statements are extremely concerned with both sales and receivables.

### Sales

Because sales revenue is such a key component of a company's success, analysts are interested in a large number of ratios that incorporate sales. Many of these ratios attempt to measure the return the company is earning on sales. These are called profitability ratios. For example, the ratio of income statement subtotals such as gross margin, operating income, and net income to sales are examined, but really any income statement subtotal deemed important can be of interest. The three most common ratios are the gross profit ratio (gross profit  $\div$  net sales), the operating margin ratio (operating income  $\div$  net sales), and the net profit margin ratio (net income  $\div$  net sales).

Each of these ratios reveals information about a company's strategy and the competition it faces. For example, consider two large players in the retail industry—**Wal-Mart** and Macy's. Information available indicates that these two stores possess the following five-year averages for these ratios:

	Wal-Mart	Macy's	Industry
Gross Margin Ratio	23.14%	40.51%	26.16%
Operating Margin Percentage	3.59%	8.69%	6.05%
Net Profit Margin	3.49%	4.56%	3.62%

Macy's higher gross margin percentage suggests that Macy's is able to charge a premium on its merchandise. That is, Macy's follows a product differentiation strategy in which it tries to convince customers that its products are superior, distinctive, etc. Wal-Mart, on the other hand, is a low-cost provider, who attempts to convince customers that it offers the lowest prices.

Analysts also like to look at the operating margin percentage and net profit margin to see how much is left from a sales dollar after paying for the product and all its operations. For these ratios Macy's still retains a larger percentage of each sales dollar than Wal-Mart. How is it, then, that Wal-Mart makes so much money? It has a lot of sales dollars—its total revenue of almost \$375 billion in 2008 is approximately 14 times greater than Macy's \$27 billion.

## Receivables

Analysts are also concerned with asset management. Asset management refers to how efficiently a company is using the resources at its disposal. One of the most widely-used asset management ratios is accounts receivable turnover, which is net sales  $\div$  average net accounts receivable.

This ratio provides a measure of how many times average trade receivables are collected during the period. In theory, net credit sales would be a much better numerator, but that figure is not normally disclosed. A higher number is better because it indicates that the company is more quickly collecting cash (through sales) from its inventory. As discussed in Chapter 4's section on cash management, this holds down borrowing costs and allows for a greater investment. Changes in this ratio over time are also very important. For example, a significant reduction in receivables turnover may indicate that management is extending credit to customers who are not paying.

Accounts receivable turnover for Wal-Mart and Macy's are:

	Wal-Mart	Macy's	Industry
Accounts Receivable Turnover	115.35	53.70	29.11

As expected, Wal-Mart is extremely efficient with its asset management because effective cash management is necessary for low cost providers. Of course, it is difficult to compare Macy's to Wal-Mart because they likely engage in different financing practices. For example, a greater proportion of Wal-Mart sales are made using cash or external credit cards (e.g., Visa), while Macy's has a larger proportion of sales using internal credit cards (i.e., a Macy's card). The internal credit cards result in lower accounts receivable turnover. **Cornerstone 5-5** illustrates the calculation of these ratios for Wal-Mart.



### CORNERSTONE 5-5



## HOW TO Calculate the Gross Profit, Operating Margin, Net Profit Margin, and Accounts Receivable Turnover Ratios

### Concept:

The gross profit, operating margin, and net profit margin ratios provide measures of the return the company is earning on sales. The accounts receivable turnover ratio provides a measure of how many times average accounts receivables are collected during the period.

### Information:

The following information (in millions) is available for Wal-Mart for its fiscal year ending January 31, 2008:

Net Sales	\$374,526	Accounts Receivable, 1/31/08	\$3,654
Gross Profit	88,011	Accounts Receivable, 1/31/07	2,840
Operating Income	12,884		
Net Income	12,731		

### Required:

1. Compute the gross profit ratio for Wal-Mart for 2008.
2. Compute the operating margin ratio for Wal-Mart for 2008.
3. Compute the net profit margin ratio for Wal-Mart for 2008.
4. Compute the accounts receivable turnover for Wal-Mart for 2008.

### Solution:

1. Wal-Mart's gross profit ratio is:

$$\begin{aligned} \text{Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Net Sales}} \\ &= \frac{\$88,011}{\$374,526} = 0.235, \text{ or } 23.50\% \end{aligned}$$

2. Wal-Mart's operating margin ratio is:

$$\begin{aligned}\text{Operating Margin Ratio} &= \frac{\text{Operating Income}}{\text{Net Sales}} \\ &= \frac{\$12,884}{\$374,526} = 0.0344, \text{ or } 3.44\%\end{aligned}$$

**CORNERSTONE**  
**5-5**  
*(continued)*

3. Wal-Mart's net profit ratio is:

$$\begin{aligned}\text{Net Profit Margin Ratio} &= \frac{\text{Net Income}}{\text{Net Sales}} \\ &= \frac{\$12,731}{\$374,526} = 0.0340, \text{ or } 3.40\%\end{aligned}$$

4. Wal-Mart's accounts receivable turnover is:

$$\begin{aligned}\text{Accounts Receivable Turnover Ratio} &= \frac{\text{Net Sales}}{\text{Average Net Accounts Receivable}} \\ &= \frac{\$374,526}{(\$3,654 + \$2,840) \div 2} = 115.35\end{aligned}$$

## Summary of Learning Objectives

### LO1. Explain the criteria for revenue recognition.

- Revenue is recognized when it is:
  - realized or realizable
  - earned
- The terms “realized” and “realizable” mean that the selling price is fixed and determinable and collectibility is reasonably assured.
- Revenue is considered earned when delivery has occurred or services have been provided.

### LO2. Measure net sales revenue.

- The appropriate amount of revenue to recognize is generally the cash received or the cash equivalent of accounts receivable.
- However, companies often induce customers to buy by offering:
  - sales discounts
  - sales returns
  - sales allowances
- Sales discounts are reductions of the normal selling price to encourage prompt payment.
- Sales returns occur when a customer returns goods as unsatisfactory.
- Sales allowances occur when a customer agrees to keep goods with minor defects if the seller reduces the selling price.
- These events are recorded in contra-revenue accounts that reduce gross sales to net sales.

### LO3. Describe internal control procedures for merchandise sales.

- Since sales revenues have a significant effect on a company's net income, internal control procedures must be established to ensure that the amounts reported are correct.
- Typically sales are not recorded until a three-way match is performed between the:

- customer purchase order (which indicates that the customer wants the goods)
- the shipping document (which indicates that the goods have been shipped to the customer)
- the invoice (which indicates that the customer has been billed)

**LO4. Describe the principal types of receivables.**

- Receivables are classified along three different dimensions:
  - accounts and notes receivable
  - trade and non-trade receivables
  - current and noncurrent receivables

**LO5. Measure and interpret bad debt expense and the allowance for doubtful accounts.**

- The primary issues in accounting for accounts receivable are when and how to measure bad debts (i.e., accounts that will not be paid).
- GAAP requires receivables to be shown at net realizable value on the balance sheet.
- Further, the matching principle says that an expense should be recognized in the period in which it helps generate revenues.
- Consequently, we must estimate and recognize bad debt expense in the period the sale is made—even though we do not know which accounts will be uncollectible.
- The estimate is made by using either:
  - the credit sales method or
  - the aging method
- The credit sales method estimates the bad debt expense directly.
- The aging method estimates the ending balance needed in the allowance for doubtful accounts, and bad debt expense follows.

**LO6. Describe the cash flow implications of accounts receivable.**

- Companies can increase the speed of cash collection on receivables by factoring, or selling, their receivables.
- The buyer of the receivables will charge a fee to compensate themselves for the time value of money, the risk of uncollectability, and the tasks of billing and collection.
- Receivables may also be packaged as financial instruments or securities and sold to investors. This is referred to as securitization.
- A special case of selling receivables is accepting credit cards like MasterCard and Visa.

**LO7. Account for notes receivable from inception to maturity.**

- Notes receivable are recognized for the amount of cash borrowed or goods/services purchased.
- This is the principal amount of the note receivable.
- Any excess of amount repaid over principal is recognized as interest revenue in the period the interest was earned.

**LO8. Analyze profitability and asset management using sales and receivables.**

- Because sales revenue is such a key component of a company's success, analysts are interested in a large number of ratios that incorporate sales.
- Many of these ratios attempt to measure how much the company is making on sales. These are called profitability ratios.
  - Gross profit percentage
  - Operating margin percentage
  - Net profit margin
- Analysts are also concerned with asset management. Asset management refers to how efficiently a company is using the resources at its disposal.
- One of the most widely-used asset management ratios is accounts receivable turnover.

- CORNERSTONE 5-1** How to record receivables using the gross method, page 235
- CORNERSTONE 5-2** How to estimate bad debt expense with the percentage of credit sales method, page 241
- CORNERSTONE 5-3** How to estimate the allowance for doubtful accounts with the aging method, page 243
- CORNERSTONE 5-4** How to account for notes receivable, page 248
- CORNERSTONE 5-5** How to calculate the gross profit, operating margin, net profit margin, and accounts receivable turnover ratios, page 250



## CORNERSTONES FOR CHAPTER 5

## Key Terms

Accounts receivable, 239	Net sales revenue, 237
Aging method, 243	Nontrade receivables, 239
Allowance for Doubtful Accounts, 241	Notes receivable, 247
Bad debt expense, 240	Principal, 247
Credit cards, 246	Realized/Realizable, 234
Credit sales method, 241	Sales allowance, 237
Debit card, 247	Sales discount, 235
Earned, 234	Sales returns, 237
Factor, 246	Securitization, 246
Interest, 247	Trade receivables, 239

## Review Problem

### Recording Sales and Receivables

Qwurk Productions performs graphic design services including designing and maintaining websites. The following activities occurred during 2009 and 2010:

- 11/1/09 Qwurk delivers a new logo to GDC Advisors and submits a bill for \$2,000 with terms 2/10, n/30.
- 11/15/09 Qwurk delivers an overall web concept to Mutare, which Mutare approves. Qwurk submits a bill for \$1,000 with terms 2/10, n/30.
- 11/20/09 Qwurk delivers paper and envelopes incorporating the new logo to GDC Advisors and submits a bill for \$200.
- 11/22/09 Mutare pays for the 11/15 bill related to a new overall web concept.
- 11/25/09 GDC complains that the printing on much of the paper and envelopes is unacceptable. Qwurk offers to reduce the bill from \$200 to \$75. GDC accepts.
- 11/29/09 GDC pays for the 11/1 bill for a new logo and \$75 for the 11/20 bill for paper and envelopes.
- 12/1/09 Qwurk installs a new website incorporating order fulfillment applications for Redbird Enterprises. Redbird signs a note to pay \$20,000 plus 6 percent interest due on 7/1/19.
- 12/15/09 Qwurk writes off a \$600 account receivable.
- 12/31/09 After performing an aging of its accounts receivable, Qwurk estimates that \$2,000 of its accounts receivable will be uncollectible on a total balance of \$600,000. The allowance for doubtful accounts has a credit balance of \$300 prior to adjustment.



6.

Date	Account and Explanation	Debit	Credit
Nov. 29, 2009	Cash [\$2,000 (from 11/1) + \$75 (from 11/20 and 11/25)]	2,075	
	Accounts Receivable		2,075
	*Gross amount	\$2,000	
	Less: Discount (not allowed; paid after 10 days)	<u>0</u>	
	Total paid	<u>\$2,000</u>	

Assets = Liabilities +	Stockholders' Equity
+2,075	
-2,075	

7.

Date	Account and Explanation	Debit	Credit
Dec. 1, 2009	Notes Receivable	20,000	
	Sales		20,000

Assets = Liabilities +	Stockholders' Equity
+20,000	+20,000

8.

Date	Account and Explanation	Debit	Credit
Dec. 15, 2009	Allowance for Doubtful Accounts	600	
	Accounts Receivable		600

Assets = Liabilities +	Stockholders' Equity
+600	
-600	

9. To record one month's interest on the December 1, 2009 note receivable:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Interest Receivable (20,000 × 6% × 1/12)	100	
	Interest Income		100

Assets = Liabilities +	Stockholders' Equity
+100	+100
-1,700	-1,700

*To adjust the allowance for doubtful accounts to reflect Qwurk's estimate:*

Bad Debt Expense	1,700	
Allowance for Doubtful Accounts		1,700*

\*Qwurk's estimate warrants a \$2,000 credit balance. Because the account already has a \$300 credit balance, a \$1,700 credit is needed.

10.

December 31, 2009	Accounts receivable	\$600,000
	Less: Allowance for doubtful accounts	<u>2,000</u>
	Net accounts receivable	<u>\$598,000</u>

Net Accounts Receivable are shown at net realizable value.

11. July 1, 2010:

$$\begin{aligned} \text{Interest paid} &= \$20,000 \times 6\% \times 7/12 \\ &= \$700 \end{aligned}$$

However, interest income recognized for Qwurk is for the period January 1, 2010 through July 1, 2010. The interest for December 2009 was recognized in 2009 (see journal entry in 8).

Cash	20,700	
Interest Income		600
Interest Receivable (from 8)		100
Notes Receivable		20,000

Assets = Liabilities +	Stockholders' Equity
+20,700	+600
-100	
-20,000	

12.	Gross sales revenue	\$6,000,000
	Less: Sales discounts	15,000
	Less: Sales returns and allowances	20,000
	Net sales revenue	<u>\$5,965,000</u>

## Discussion Questions

- When is revenue recognized?
- Explain the criteria for revenue recognition.
- When is revenue generally considered earned?
- What four criteria has the SEC issued as further guidance for revenue recognition?
- How is net sales revenue calculated?
- Why might users of financial statements prefer the separate disclosure of gross sales revenue and sales returns and allowances to the disclosure of a single net sales revenue amount?
- Why are sales discounts offered?
- What are sales returns?
- What are sales allowances? How do sales allowances differ from sales discounts?
- What are trade discounts and quantity discounts? From an accounting viewpoint, how does the effect of trade and quantity discounts on selling (or invoice) price differ from the effect of sales discounts?
- What documents must be present to trigger the recording of a sale (and associated receivable) in the accounting records?
- Describe the documents that underlie the typical accounting system for sales. Give an example of a failure of internal control that might occur if these documents were not properly prepared.
- What are the principal types of receivables?
- Under the allowance method, why do we make an entry to record bad debt expense in the period of sale rather than in the period in which an account is determined to be uncollectible?
- Why is the direct write-off method not GAAP?
- What is the conceptual difference between the (1) percentage of credit sales and (2) aging methods of estimating bad debts?
- What kind of account is *allowance for doubtful accounts*? What does it represent?
- Why do companies issue credit when their past experience indicates that some customers will not pay?
- How much interest will be due at maturity for each of the following interest-bearing notes?

	Principal	Months to Maturity	Annual Interest Rate
a.	\$10,000	2	12%
b.	42,000	5	14
c.	18,000	4	13
d.	37,000	6	11

- A business borrows \$1,000, giving a note that requires repayment of the amount borrowed in two payments of \$600 each, one at the end of each of the next two six-month periods. Calculate the total interest on the note. What is the principal amount of the note?
- A business borrows \$1,000, giving a note that requires an interest rate of 12 percent per year and repayment of principal plus interest in a single payment at the end of one year. Calculate the total interest on the note. What is the amount of the single payment?
- Describe what happens when receivables are factored.
- Accepting major credit cards requires the seller to pay a service charge. What advantages does the seller obtain by accepting major credit cards?
- Why is interest typically charged on notes receivable, but not on accounts receivable?

25. How may analyzing sales and receivables provide information about a firm's profitability?
26. How may analyzing sales and receivables provide information about a firm's asset management?

## Multiple-Choice Exercises

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### 5-1 Which of the following is *not* one of the criteria for revenue recognition?

- a. Delivery has occurred or services have been provided.
- b. The seller's price to the buyer is fixed and determinable.
- c. Collectability is certain.
- d. Persuasive evidence of an arrangement exists.

### 5-2 Food To Go is a local catering service. Conceptually, when should Food To Go recognize revenue from its catering service?

- a. at the date the customer places the order
- b. at the date the meals are served
- c. at the date the invoice is mailed to the customer
- d. at the date the customer's payment is received

### 5-3 When is revenue from the sale of merchandise normally recognized?

- a. when the customer takes possession of the merchandise
- b. when the customer pays for the merchandise
- c. either on the date the customer takes possession of the merchandise or the date on which the customer pays
- d. when the customer takes possession of the merchandise, if sold for cash, or when payment is received, if sold on credit

### 5-4 What does the phrase, "Revenue is recognized at the point of sale" mean?

- a. Revenue is recorded in the accounting records when the cash is received from a customer, and reported on the income statement when sold to the customer.
- b. Revenue is recorded in the accounting records and reported on the income statement when the cash is received from the customer.
- c. Revenue is recorded in the accounting records when the goods are sold to a customer, and reported on the income statement when the cash payment is received from the customer.
- d. Revenue is recorded in the accounting records and reported on the income statement when goods are sold and delivered to a customer.

### 5-5 On August 31, 2009, Montana Corporation signed a four-year contract to provide services for Minefield Company at \$30,000 per year. Minefield will pay for each year of services on the first day of each service year, starting with September 1, 2009. Using the accrual basis of accounting, when should Montana Corporation recognize revenue?

- a. on the first day of each year when the cash is received
- b. on the last day of each year after the services have been provided
- c. equally throughout the year as services are earned
- d. only at the end of the entire contract

### 5-6 Under the gross method, the seller records discounts taken by the buyer

- a. at the end of the period in question
- b. never; discounts are irrelevant under the gross method
- c. after the receivable is collected
- d. in a contra-revenue account

**5-7** On April 20, McLean Company sells merchandise on account to Tazwell Corporation for \$3,000 with terms 1/10, n/30. On April 28, Tazwell pays for half of the merchandise and on May 19 it pays for the other half. What is the total amount of cash McLean received?

- a. \$3,000
- b. \$2,985
- c. \$2,970
- d. \$2,700

**5-8** Which of the following statements concerning internal control procedures for merchandise sales is *not* correct?

- a. A sale and its associated receivable are recorded only when the order, shipping, and billing documents are all present.
- b. Shipping and billing documents are prepared based on the order document.
- c. The order document is not necessary for the buyer to be obligated to accept and pay for the ordered goods.
- d. Accounting for a sale begins with the receipt of a purchase order or some similar document from a customer.

**5-9** All of the following are ways in which receivables are distinguished except:

- a. accounts or notes receivable
- b. collectible or uncollectible
- c. trade or nontrade receivable
- d. current or noncurrent

**5-10** Which one of the following best describes the allowance for doubtful accounts?

- a. contra account
- b. liability account
- c. income statement account
- d. cash flow account

**5-11** If a company uses the direct write-off method of accounting for bad debts,

- a. it is applying the matching principle.
- b. it will record bad debt expense only when an account is determined to be uncollectible.
- c. it will reduce the accounts receivable account at the end of the accounting period for estimated uncollectible accounts.
- d. it will report accounts receivable in the balance sheet at their net realizable value.

**5-12** Which of the following best describes the objective of estimating bad debt expense with the credit sales method?

- a. to determine the amount of actual bad debt during a given period
- b. to estimate the amount of bad debt expense based on an aging of accounts receivable
- c. to estimate bad debt expense based on a percentage of credit sales made during the period
- d. to facilitate the use of the direct write-off method

**5-13** Which of the following best describes the concept of the aging method of receivables?

- a. An accurate estimate of bad debt expense may be arrived at by multiplying historical bad debt rates by the amount of credit sales made during a period.
- b. The precise amount of bad debt expense may be arrived at by multiplying historical bad debt rates by the amount of credit sales made during a period.
- c. Accounts receivable should be directly written off when the due date arrives and the customers have not paid the bill.
- d. Estimating the appropriate balance for the allowance for doubtful accounts results in the appropriate value for net accounts receivable on the balance sheet.

**5-14** The aging method is closely related to the:

- a. income statement
- b. balance sheet
- c. statement of cash flows
- d. statement of retained earnings

**5-15** The credit sales approach is closely related to the:

- a. income statement
- b. balance sheet
- c. statement of cash flows
- d. statement of retained earnings

**5-16** The process by which firms package factored receivables as financial instruments or securities and sell them to investors is known as:

- a. credit extension
- b. aging of accounts receivable
- c. bundling
- d. securitization

**5-17** Which one of the following statements is true if a company's collection period for accounts receivable is unacceptably long?

- a. The company may need to borrow to acquire operating cash.
- b. The company may offer trade discounts to lengthen the collection period.
- c. Cash flows from operations may be higher than expected for the company's sales.
- d. The company should expand operations with its excess cash.

**5-18** Zenephia Corp. accepted a nine-month note receivable from a customer on October 1, 2008. If Zenephia has an accounting period which ends on December 31, 2008, when would it most likely recognize interest revenue from the note?

- a. on December 31, 2008 only
- b. on July 1, 2009 only
- c. on December 31, 2008 and June 30, 2009
- d. on October 1, 2008

**5-19** The "principal" of a note receivable refers to:

- a. the amount of interest due
- b. the present value of the note
- c. the financing company that is lending the money
- d. the amount of cash borrowed

**5-20 Net profit margin percentage is calculated by:**

- dividing net income by (net) sales
- dividing operating income by (net) sales
- subtracting operating income from (net) sales
- subtracting net income from (net) sales

## Cornerstone Exercises

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**OBJECTIVE** > **1** **Cornerstone Exercise 5-21 SERVICE REVENUE**

Kibitz Fitness received \$12,000 from customers on September 30, 2009. These payments were advance payments of yearly membership dues.

**Required:**

At December 31, 2009, calculate what the balances in the Unearned Service Revenue and Service Revenue accounts will be.

**OBJECTIVE** > **1** **Cornerstone Exercise 5-22 SERVICE REVENUE**

Softball Magazine Company received advance payments of \$5,000 from customers during 2009. At December 31, 2009, \$1,200 of the advance payments still had not been earned.

**Required:**

After the adjustments are recorded and posted at December 31, 2009, calculate what the balances will be in the Unearned Magazine Revenue and Magazine Revenue accounts?

**OBJECTIVE** > **2** **Cornerstone Exercise 5-23 SALES DISCOUNTS TAKEN**

**CORNERSTONE 5-1** Bolton Garage Doors Corporation sold merchandise with a price of \$22,500 to Sammy's Wholesale Company. Bolton offered terms of 2/10, n/30.

**Required:**

Prepare the journal entry to record the sale using the gross method. Also, prepare the journal entry assuming the payment is made within 10 days (within the discount period).

**OBJECTIVE** > **2** **Cornerstone Exercise 5-24 SALES DISCOUNTS NOT TAKEN**

**CORNERSTONE 5-1** Bolton Garage Doors Corporation sold merchandise with a gross price of \$22,500 to Sammy's Wholesale Company. Bolton offered terms of 2/10, n/30 and uses the gross method.

**Required:**

Prepare the journal entry assuming the payment is made after 10 days (after the discount period).

**OBJECTIVE** > **2** **Cornerstone Exercise 5-25 SALES DISCOUNTS**

**CORNERSTONE 5-1** Ramsden Manufacturing sold merchandise with a gross price of \$25,000 to Garner's Hardware Store. Ramsden offered terms of 3/10, n/30.

**Required:**

Prepare the necessary journal entries to record the sale under the gross method.

**OBJECTIVE** > **5** **Cornerstone Exercise 5-26 PERCENTAGE OF CREDIT SALES**

**CORNERSTONE 5-2** Clarissa Company has credit sales of \$400,000 during 2010 and estimates at the end of 2010 that 2 percent of these credit sales will eventually default. Also, during 2010 a customer defaults on a \$775 balance related to goods purchased in 2009. Prior to the write off for the \$775 default, Clarissa's accounts receivable and allowance for doubtful accounts balances were \$402,000 and \$129 (credit), respectively.

**Required:**

Estimate the appropriate balance for bad debt expense and prepare the adjusting entry to record the bad debt expense for 2010.

**Cornerstone Exercise 5-27 WRITE-OFF OF UNCOLLECTIBLE ACCOUNTS****OBJECTIVE** > **5**

The Rock has credit sales of \$650,000 during 2010 and estimates at the end of 2010 that 3 percent of these credit sales will eventually default. Also, during 2010 a customer defaults on a \$1,225 balance related to goods purchased in 2009.

**CORNERSTONE 5-2****Required:**

Prepare the journal entry to record the write-off of the defaulted \$1,225 balance.

**Cornerstone Exercise 5-28 AGING METHOD****OBJECTIVE** > **5**

On January 1, 2009, Hungryman, Inc., has the following balances for accounts receivable and allowance for doubtful accounts:

**CORNERSTONE 5-3**

Accounts Receivable	\$363,000
Allowance for Doubtful Accounts (a credit balance)	44,000

During 2009, Hungryman had \$3,100,000 of credit sales, collected \$2,915,000 of accounts receivable, and wrote off \$50,000 of accounts receivable as uncollectible. At year end, Hungryman performs an aging of its accounts receivable balance and estimates that \$15,000 will be uncollectible.

**Required:**

1. Calculate Hungryman's preadjustment balance in accounts receivable on December 31, 2009.
2. Calculate Hungryman's preadjustment balance in allowance for doubtful accounts on December 31, 2009.
3. Prepare the necessary adjusting entry for 2009.

**Cornerstone Exercise 5-29 AGING METHOD****OBJECTIVE** > **5**

On January 1, 2010, Smith, Inc., has the following balances for accounts receivable and allowance for doubtful accounts:

**CORNERSTONE 5-3**

Accounts Receivable	\$273,000
Allowance for Doubtful Accounts (a credit balance)	4,600

During 2010, Smith had \$2,175,000 of credit sales, collected \$2,235,000 of accounts receivable, and wrote off \$4,000 of accounts receivable as uncollectible. At year end, Smith performs an aging of its accounts receivable balance and estimates that \$4,500 will be uncollectible.

**Required:**

1. Calculate Smith's preadjustment balance in accounts receivable on December 31, 2010.
2. Calculate Smith's preadjustment balance in allowance for doubtful accounts on December 31, 2010.
3. Prepare the necessary adjusting entry for 2010.

**Cornerstone Exercise 5-30 PERCENTAGE OF CREDIT SALES METHOD****OBJECTIVE** > **5**

At December 31, 2009, Garner has a \$1,000 credit balance in its allowance for doubtful accounts. Garner estimates that 1.5 percent of its 2010 credit sales will eventually default. During 2010, Garner had credit sales of \$575,000.

**CORNERSTONE 5-2****Required:**

Estimate the bad debt expense under the percentage of credit sales method.

**Cornerstone Exercise 5-31 COLLECTION OF AMOUNTS PREVIOUSLY WRITTEN OFF****OBJECTIVE** > **5**

Customer A owes XYZ Corp. \$524. XYZ determines that the total amount is uncollectible and writes off all of Customer A's debt. Customer A later pays \$260 to XYZ Corp.

**Required:**

Make the appropriate journal entries (if any) to record the receipt of the \$260 by XYZ Corp. assuming XYZ uses the allowance method.

**OBJECTIVE** > **6** **Cornerstone Exercise 5-32 FACTORING RECEIVABLES**

On July 1, Wilson, Inc., factors \$200,000 of accounts receivable. The factor charges a 1.5 percent fee.

**Required:**

Prepare the journal entry to record the factoring of the accounts receivable on July 1.

**OBJECTIVE** > **6** **Cornerstone Exercise 5-33 ACCOUNTS RECEIVABLE BALANCE****CORNERSTONE 5-3**

Beginning accounts receivable were \$10,000. All sales were on account and totaled \$700,000. Cash collected from customers totaled \$650,000.

**Required:**

Calculate the ending accounts receivable balance.

**OBJECTIVE** > **5** **Cornerstone Exercise 5-34 ACCOUNTS RECEIVABLE BALANCE****CORNERSTONE 5-3**

Beginning accounts receivable were \$50,000 and ending accounts receivable were \$70,000. \$300,000 cash was collected from customers' credit sales.

**Required:**

Calculate the amount of sales on account during the period.

**OBJECTIVE** > **6** **Cornerstone Exercise 5-35 ACCOUNTS RECEIVABLE BALANCE****CORNERSTONE 5-3**

Beginning accounts receivable were \$11,000 and ending accounts receivable were \$14,000. All sales were on credit and totaled \$559,000.

**Required:**

Determine how much cash was collected from customers.

**OBJECTIVE** > **6** **Cornerstone Exercise 5-36 ACCOUNTING FOR CREDIT CARD SALES**

Judy's College Shirts sells sweatshirts with imprinted college logos in Honey Creek Mall. At the end of a recent day, Judy's cash register included credit card documents for the following sales amounts:

MasterCard	\$493.56
Visa	371.93

The merchant's charges are 2.3 percent for MasterCard and 2.8 percent for Visa. Judy's also had cash sales of \$2,390.41 and \$1,300.50 of sales on credit to Rampdan Services, a local business.

**Required:**

Prepare a journal entry to record these sales.

**OBJECTIVE** > **7** **Cornerstone Exercise 5-37 NOTES RECEIVABLE****CORNERSTONE 5-4**

Portuguese, Inc., a truck dealership, sells a truck costing \$18,000 to Undervalued Company on January 1, 2009, in exchange for a \$40,000 note bearing 9 percent interest.

**Required:**

1. Prepare the journal entry to record the sale on January 1, 2009.
2. Determine how much interest Portuguese will receive if the note is repaid on July 1, 2009.
3. Provide Portuguese's journal entry to record the cash received to pay off the note and interest on July 1, 2009.

**OBJECTIVE** > **7** **Cornerstone Exercise 5-38 NOTES RECEIVABLE****CORNERSTONE 5-4**

Frenchie, Inc., a truck dealership, sells a truck costing \$15,000 to Overvalued Company on January 1, 2009, in exchange for a \$30,000 note bearing 12 percent interest.

**Required:**

1. Prepare the journal entry to record the sale on January 1, 2009.
2. Determine how much interest Frenchie will receive if the note is repaid on December 31, 2009.
3. Prepare Frenchie's journal entry to record the cash received to pay off the note and interest on December 31, 2009.

**Cornerstone Exercise 5-39 RATIO ANALYSIS****OBJECTIVE** > 8

The following information pertains to Cobb Corporation's financial results for the past year.

Net sales	\$100,000
CGS	35,000
Other expenses	12,000
Net income	53,000

**CORNERSTONE 5-5****Required:**

1. Calculate Cobb's gross profit ratio.
2. Calculate Cobb's net profit margin ratio.

**Cornerstone Exercise 5-40 RATIO ANALYSIS****OBJECTIVE** > 8

ABC Corporation's 2008 net sales and average net trade accounts receivable were \$4,300,000 and \$975,000, respectively.

**CORNERSTONE 5-5****Required:**

Calculate ABC's accounts receivable turnover.

**Cornerstone Exercise 5-41 RATIO ANALYSIS****OBJECTIVE** > 8

Bo Sports' 2008 net sales, average net trade accounts receivable, and net income were \$7,300,000, \$1,655,000, and \$745,000, respectively.

**CORNERSTONE 5-5****Required:**

Calculate Bo's:

1. accounts receivable turnover
2. net profit margin ratio

## Exercises

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**Exercise 5-42 CALCULATION OF REVENUE****OBJECTIVE** > 1

Wallace Motors, which began business on December 31, 2009, buys and sells used cars. All its sales are to other car dealers. Four cars were purchased during January and none were purchased during February. The cars were sold under the following terms:

- a. Three of the four cars were sold to Russell Auto Sale for a total of \$75,000; the cars were delivered to Russell on January 18. Russell paid Wallace \$20,000 on January 18 and the remaining \$55,000 on February 12.
- b. The fourth car purchased during January was sold to Hastings Classics for \$28,000. The car was delivered to Hastings on January 25. Hastings paid Wallace on January 30.

**Required:**

Calculate the monthly revenue for Wallace Motors for January and February 2010.

**Exercise 5-43 REVENUE RECOGNITION****OBJECTIVE** > 1

Volume Electronics sold a television to Sarah Merrifield on December 15, 2009. Sarah paid \$100 at the time of the purchase and agreed to pay \$100 each month for five months beginning January 15, 2010. The television had been purchased by Volume Electronics at a cost of \$450 in June 2009. Volume had paid the \$450 in August 2009.

**Required:**

Determine in what month or months revenue from this sale should be recorded by Volume Electronics to ensure proper application of accrual accounting.

**OBJECTIVE** > **1****Exercise 5-44 CALCULATION OF REVENUE FROM CASH COLLECTION**

Anderson Lawn Service provides mowing, weed control, and pest management services for a flat fee of \$60 per lawn per month. During July, Anderson collected \$4,980 in cash from customers, which included \$420 for lawn care provided in June. At the end of July, Anderson had not collected from 11 customers who had promised to pay in August when they returned from vacation.

**Required:**

Calculate the amount of Anderson's revenue for July.

**OBJECTIVE** > **2****Exercise 5-45 EFFECTS OF SALES DISCOUNTS**

Citron Mechanical Systems makes all sales on credit, with terms 2/10, n/30. During 2009, the list price (prediscount) of goods sold was \$498,500. Customers paid \$350,000 (list price) of these sales within the discount period and the remaining \$148,500 (list price) after the discount period. Citron uses the gross method of recording sales.

**Required:**

1. Compute the amount of sales that Citron recorded for 2009.
2. Compute the amount of cash that Citron collected from these sales.
3. Prepare a summary journal entry to record these sales and a second summary entry to record the cash collected.

**OBJECTIVE** > **2****Exercise 5-46 SALES DISCOUNT RECORDED AT GROSS**

Nevada Company sold merchandise with a list price of \$12,500 to Small Enterprises with terms 3/15, n/30. Nevada records sales at gross.

**Required:**

1. Prepare the entries to record this sale in Nevada's journal.
2. Prepare the entry for Nevada's journal to record receipt of cash in payment for the sale *within* the discount period.
3. Prepare the entry for Nevada's journal to record receipt of cash in payment for the sale *after* the discount period.

**OBJECTIVE** > **2****Exercise 5-47 SALES, SALES RETURNS, AND SALES ALLOWANCES**

Rubin Enterprises had the following sales-related transactions on a recent day:

- a. List price of goods sold on credit was \$14,700; terms 3/15, n/45.
- b. Cash sales were \$1,150.
- c. Goods with a list price of \$1,200 were returned. The goods had been sold last week on credit with terms 3/15, n/45, and the customer had not yet paid for the merchandise.
- d. Rubin provided an allowance of \$250 to a customer because the goods were delivered after the promised date. The customer had paid cash at the time of the sale, so Rubin paid the \$250 allowance in cash.

**Required:**

Prepare a journal entry for each of these transactions assuming Rubin uses the gross method.

**OBJECTIVE** > **2****Exercise 5-48 SALES RETURNS**

Swan and Bloom, Inc., is a wholesaler of novelty items to small stores. All sales are on credit with no discount offered. During March, Swan and Bloom accepted the following sales returns:

- a. Johnson Company returned merchandise with a list price of \$600. Johnson had not yet paid for the returned merchandise.
- b. Becker Bargains returned merchandise with a list price of \$750. Becker had paid for the merchandise.

- c. Fifth Avenue Market returned merchandise with a list price of \$200. The bill for the returned merchandise had been paid.
- d. Thorn Catering returned merchandise with a list price of \$600. Thorn had paid for the merchandise.

**Required:**

1. Record the returns, assuming that cash refunds are paid to customers who had paid for their purchases.
2. Record the returns, assuming that Swan and Bloom makes a credit to accounts receivable for all customers.
3. Determine under what circumstances Swan and Bloom might credit accounts receivable even though the customer has paid for the merchandise.

**Exercise 5-49 INTERNAL CONTROL FOR SALES****OBJECTIVE** > 3

Arrow Products is a mail-order computer software sales outlet. Most of Arrow's customers call on its toll-free phone line and order software, paying with a credit card.

**Required:**

Explain why the shipping and billing documents are important internal controls for Arrow.

**Exercise 5-50 AVERAGE UNCOLLECTIBLE ACCOUNT LOSSES AND BAD DEBT EXPENSE****OBJECTIVE** > 5

The accountant for Porile Company prepared the following data for sales and losses from uncollectible accounts:

Year	Credit Sales	Losses from Uncollectible Accounts*
2005	\$514,000	\$ 7,710
2006	582,000	9,312
2007	670,000	10,385
2008	772,000	11,966

\*Losses from uncollectible accounts are the actual losses related to sales of that year (rather than write-offs of that year).

**Required:**

1. Calculate the average percentage of losses from uncollectible accounts for 2005 through 2008.
2. Assume that the credit sales for 2009 are \$874,000 and that the weighted average percentage calculated in (1) is used as an estimate of losses from uncollectible accounts for 2009 credit sales. Determine the bad debt expense for 2009 using the credit sales method.

**Exercise 5-51 BAD DEBT EXPENSE: PERCENTAGE OF CREDIT SALES METHOD****OBJECTIVE** > 5

Gilmore Electronics had the following data for a recent year:

Cash sales	\$ 26,700
Credit sales	428,600
Accounts receivable determined to be uncollectible	6,300

Gilmore uses the allowance procedure to record bad debt expense. The firm's estimated rate for bad debts is 2.15 percent of credit sales.

**Required:**

1. Prepare the journal entry to write off the uncollectible accounts.
2. Prepare the journal entry to record bad debt expense.

**OBJECTIVE** > **5** **Exercise 5-52 BAD DEBT EXPENSE: PERCENTAGE OF CREDIT SALES METHOD**

Bradford Plumbing had the following data for a recent year:

Credit sales	\$289,000
Allowance for doubtful accounts, 1/1 (a credit balance)	4,120
Accounts receivable, 1/1	38,700
Collections on account receivable	291,000
Accounts receivable written off	4,620

Bradford estimates that 2.2 percent of credit sales will eventually default.

**Required:**

1. Compute bad debt expense for the year.
2. Determine the ending balances in accounts receivable and allowance for doubtful accounts.

**OBJECTIVE** > **5** **Exercise 5-53 BAD DEBT EXPENSE: AGING METHOD**

Glencoe Supply had the following accounts receivable aging schedule at the end of a recent year.

Accounts Receivable Age	Amount	Proportion Expected to Default	Allowance Required
Current	\$310,500	0.004	\$ 1,242
1–30 days past due	47,500	0.02	950
31–45 days past due	25,000	0.08	2,000
46–90 days past due	12,800	0.20	2,560
91–135 days past due	6,100	0.25	1,525
Over 135 days past due	4,200	0.60	2,520
			<u>\$10,797</u>

The balance in Glencoe's allowance for doubtful accounts at the beginning of the year was \$49,620 (credit). During the year, accounts in the total amount of \$51,232 were written off.

**Required:**

1. Determine bad debt expense.
2. Prepare the journal entry to record bad debt expense.

**OBJECTIVE** > **5** **Exercise 5-54 AGING RECEIVABLES AND BAD DEBT EXPENSE**

Perkinson Corporation sells paper products to a large number of retailers. Perkinson's accountant has prepared the following aging schedule for its accounts receivable at the end of the year.

Accounts Receivable Category	Amount	Proportion Expected to Default
Within discount period	\$384,500	0.004
1–30 days past discount period	187,600	0.015
31–60 days past discount period	41,800	0.085
Over 60 days past discount period	21,400	0.200

Before adjusting entries are entered, the balance in the allowance for doubtful accounts is a *debit* of \$7,213.

**Required:**

1. Calculate the desired postadjustment balance in Perkinson's allowance for doubtful accounts.
2. Determine bad debt expense for the year.

**Exercise 5-55 ALLOWANCE FOR DOUBTFUL ACCOUNTS****OBJECTIVE** > **5**

At the beginning of the year, Kullerud Manufacturing had a credit balance in its allowance for doubtful accounts of \$6,307. During the year Kullerud made credit sales of \$890,000, collected receivables in the amount of \$812,000, wrote off receivables in the amount of \$31,425, and recorded bad debt expense of \$33,750.

**Required:**

Compute the ending balance in Kullerud's allowance for doubtful accounts.

**Exercise 5-56 CORRECTING AN ERRONEOUS WRITE-OFF****OBJECTIVE** > **5**

The new bookkeeper at Karlin Construction Company was asked to write off two accounts totaling \$1,710 that had been determined to be uncollectible. Accordingly, he debited accounts receivable for \$1,710 and credited bad debt expense for the same amount.

**Required:**

1. Determine what was wrong with the bookkeeper's entry assuming Karlin uses the allowance method.
2. Give both the entry he should have made and the entry required to correct his error.

**Exercise 5-57 FACTORING ACCOUNTS RECEIVABLE****OBJECTIVE** > **6**

On February 1, Anderson, Inc., factors \$1,200,000 of accounts receivable. The factor charges a 2 percent fee.

**Required:**

Prepare the journal entry to record the factoring of the accounts receivable on February 1.

**Exercise 5-58 ACCOUNTING FOR NOTES RECEIVABLE****OBJECTIVE** > **7**

Tucker Products sold inventory costing \$20,000 to Thomas, Inc., in exchange for a five-month, \$50,000, 12 percent note receivable. Thomas, Inc., paid Tucker the full amount of interest and principal on April 30, 2010.

**Required:**

Prepare the necessary entries for Tucker to record the transaction described above.

**Exercise 5-59 RECORDING NOTES RECEIVABLE: ISSUANCE, PAYMENT, AND DEFAULT****OBJECTIVE** > **7**

Marydale Products permits its customers to defer payment by giving personal notes instead of cash. All the notes bear interest and require the customer to pay the entire note in a single payment six months after issuance. Consider the following transactions, which describe Marydale's experience with two such notes:

- a. On October 31, Marydale accepts a six-month, 12 percent note from customer A in lieu of a \$3,600 cash payment for merchandise delivered on that day.
- b. On February 28, Marydale accepts a six-month, \$2,400, 12 percent note from customer B in lieu of a \$2,400 cash payment for merchandise delivered on that day.
- c. On April 30, customer A pays the entire note plus interest in cash.
- d. On August 31, customer B pays the entire note plus interest in cash.

**Required:**

Prepare the necessary journal and adjusting entries required to record transactions *a* through *d* in Marydale's records.

**Exercise 5-60 RATIO ANALYSIS****OBJECTIVE** > **8**

The following information was taken from Nash, Inc.'s trial balances as of December 31, 2008, and December 31, 2009.

	12/31/2009	12/31/2008
Accounts receivable	\$ 32,000	\$ 39,000
Accounts payable	47,000	36,000
Sales	219,000	128,000
Sales returns	4,000	2,300
Retained earnings	47,000	16,000
Dividends	5,000	1,000
Net income	36,000	9,000

**Required:**

Calculate the net profit margin and accounts receivable turnover for 2009.

**OBJECTIVE** > **8** **Exercise 5-61 RATIO ANALYSIS**

The following information was taken from Logsdon Manufacturing's trial balances as of December 31, 2008, and December 31, 2009.

	12/31/2009	12/31/2008
Accounts receivable	\$ 13,000	\$ 17,000
Accounts payable	22,000	15,000
CGS	140,000	119,000
Sales	274,000	239,000
Sales returns	12,000	11,000
Retained earnings	47,000	16,000
Dividends	5,000	1,000
Income from operations	25,000	16,000
Net income	21,000	18,000

**Required:**

Calculate the gross profit ratio and operating margin ratio for 2009.

## Problem Set A

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**OBJECTIVE** > **1** **Problem 5-62A REVENUE RECOGNITION**

Katie Vote owns a small business that rents computers to students at the local university for the nine month school year. Katie's typical rental contract requires the student to pay the year's rent of \$900 (\$100 per month) in advance. When Katie prepares financial statements at the end of December, her accountant requires that Katie spread the \$900 over the nine months that a computer is rented. Therefore, Katie can recognize only \$400 revenue (four months) from each computer rental contract in the year the cash is collected and must defer recognition of the remaining \$500 (five months) to next year. Katie argues that getting students to agree to rent the computer is the most difficult part of the activity so she ought to be able to recognize all \$900 as revenue when the cash is received from a student.

**Required:**

Explain why you believe that generally accepted accounting principles require the use of accrual accounting rather than cash-basis accounting for transactions like the one described here.

**OBJECTIVE** > **2** **Problem 5-63A DISCOUNT POLICY AND GROSS MARGIN**

Compton Audio sells MP3 players. During 2008, Compton sold 1,000 units at an average of \$300 per unit. Each unit cost Compton \$180. At present, Compton offers no sales discounts. Compton's controller suggests that a generous sales discount policy would increase annual sales to 1,400 units and also improve cash flow. She proposes 7/10, n/30 and believes that 80 percent of the customers will take advantage of the discount.

**Required:**

1. If the controller is correct, determine how much the new sales discount policy would add to net sales.
2. Explain why the sales discount policy might improve cash flow.

**Problem 5-64A EFFECTS OF DISCOUNTS ON SALES AND PURCHASES****OBJECTIVE** > **2**

Helmkamp Products sells golf clubs and accessories to pro shops. Gross sales in 2009 were \$1,150,200 (Helmkamp's list price) on terms 3/15, n/45. Customers paid for \$822,800 (Helmkamp's list price) of the merchandise within the discount period and the remaining \$327,400 after the end of the discount period. Helmkamp records purchases and sales using the gross method to account for sales discounts.

**Required:**

1. Compute the amount of net sales.
2. Determine how much cash was collected from sales.

**Problem 5-65A SALES DISCOUNTS****OBJECTIVE** > **2**

Sims Company regularly sells merchandise to Lauber Supply on terms 3/15, n/20 and records sales at gross. During a recent month, the two firms engaged in the following transactions:

- a. Sims sold merchandise with a list price of \$33,000.
- b. Sims sold merchandise with a list price of \$48,000.
- c. Lauber paid for the purchase in transaction *a* within the discount period.
- d. Lauber paid for the purchase in transaction *b* after the discount period.

**Required:**

1. Provide the journal entries for Sims to record the sales in *a* and *b*.
2. Provide the journal entry to record Lauber's payment in *c*.
3. Provide the journal entry to record Lauber's payment in *d*.

**Problem 5-66A RECORDING SALES****OBJECTIVE** > **1**

Sullivan Company sells industrial cleaning supplies and equipment to other businesses. During the first quarter of 2009, the following transactions occurred:

- a. On January 10, Sullivan sold on credit 50 cases of paper towels to the WMT Manufacturing Company at a list price of \$800 for the entire lot of 50 cases.
- b. On January 14, West Side Mall Corporation purchased on credit from Sullivan two floor polishers at a list price of \$150 each and 10 cases of nonskid wax at a list price of \$50 per case.
- c. On January 16, West Side Mall returned to Sullivan four cases of the wax purchased on January 14.
- d. On January 24, WMT paid Sullivan for its purchase of January 10.
- e. Tom's Cleaning Service purchased on credit from Sullivan three cases of carpet shampoo at a list price of \$64 per case on January 31.
- f. On February 3, West Side Mall paid Sullivan for its purchase less the wax returned on January 16.
- g. Tom's Cleaning Service paid Sullivan for its purchase of January 31 on February 10.
- h. WMT returned to Sullivan a case of oversize paper towels on February 16. Sullivan credited WMT's account.

**Required:**

Prepare Sullivan's journal entries to record each of these transactions.

**Problem 5-67A SALES AND SALES RETURNS WITH DISCOUNTS****OBJECTIVE** > **1** **2**

Fuente Office Supply sells all merchandise on credit with terms 2/10, n/30 using the gross method to record sales. Fuente engaged in the following transactions:

- a. May 1: Fuente sold 50 staplers to Aaron Enterprises at a list price of \$12 per stapler.
- b. May 5: Fuente accepted four staplers returned by Aaron Enterprises.
- c. May 10: Aaron paid for the 46 staplers they kept.

- d. May 11: Fuente sold 25 filing cabinets to Buckles Corporation at a list price of \$70 per cabinet.
- e. May 23: Buckles returned five filing cabinets that it did not need.
- f. June 4: Buckles paid for the 20 filing cabinets they kept.

**Required:**

Prepare journal entries for each of these transactions assuming Fuente records sales using the gross method.

**OBJECTIVE > 3 Problem 5-68A INTERNAL CONTROL FOR SALES**

Yancy's Hardware has three stores. Each store manager is paid a salary plus a bonus on the sales made by his or her store. On January 5, 2010, Bill Slick, manager of one of the stores, resigned. Bill's store had doubled its expected December 2009 sales, producing a bonus for Bill of \$8,000 in December alone. Charles Brook, an assistant manager at another store, was assigned as manager of Bill Slick's store. Upon examination of the store's accounting records, Charles reports to Yancy that the store's records indicated sales returns and allowances of \$110,000 in the first four days of January 2010, an amount equal to about half of December 2009 sales.

**Required:**

1. Explain what the large amount of sales returns and allowances suggest that Bill Slick might have done.
2. Determine how Yancy could protect itself from a manager who behaved as Bill Slick did.

**OBJECTIVE > 5 Problem 5-69A BAD DEBT EXPENSE: PERCENTAGE OF CREDIT SALES METHOD**

The Glass House, a glass and china store, sells nearly half its merchandise on credit. During the past four years, the following data were developed for credit sales and losses from uncollectible accounts:

Year of Sales	Credit Sales	Losses from Uncollectible Accounts*
2006	\$197,000	\$12,608
2007	202,000	13,299
2008	212,000	13,285
2009	<u>273,000</u>	<u>22,274</u>
Total	<u>\$884,000</u>	<u>\$61,466</u>

\*Losses from uncollectible accounts are the actual losses related to sales of that year (rather than write-offs of that year).

In 2010, The Glass House expanded its line significantly and began to sell to new kinds of customers.

**Required:**

1. Calculate the loss rate for each year from 2006 through 2009.
2. Determine whether there appears to be a significant change in the loss rate over time.
3. If credit sales for 2010 are \$392,000, determine what loss rate you would recommend to estimate bad debts.
4. Using the rate you recommend, record bad debt expense for 2010.

**OBJECTIVE > 5 Problem 5-70A AGING METHOD BAD DEBT EXPENSE**

Cindy Bagnal, the manager of Cayce Printing Service, has provided you with the following aging schedule for Cayce's accounts receivable:

Accounts Receivable Category	Amount	Proportion Expected to Default
0–20 days	\$ 88,200	0.02
21–40 days	21,500	0.08
41–60 days	11,700	0.15
Over 60 days	<u>5,300</u>	0.30
	<u>\$126,700</u>	

Cindy indicates that the \$126,700 of accounts receivable identified in the table does not include \$8,900 of receivables that should be written off.

**Required:**

1. Journalize the \$8,900 write-off.
2. Determine the desired postadjustment balance in allowance for doubtful accounts.
3. If the balance in allowance for doubtful accounts before the \$8,900 write-off was a debit of \$450, compute bad debt expense.

**Problem 5-71A DETERMINING BAD DEBT EXPENSE USING THE AGING METHOD**

**OBJECTIVE** > **5**



At the beginning of the year, Tennyson Auto Parts had an accounts receivable balance of \$31,800 and a balance in the allowance for doubtful accounts of \$2,980 (credit). During the year Tennyson had credit sales of \$624,300, collected accounts receivable in the amount of \$602,700, wrote off \$18,600 of accounts receivable, and had the following data for accounts receivable at the end of the period:

Accounts Receivable Age	Amount	Proportion Expected to Default
Current	\$20,400	0.01
1–15 days past due	5,300	0.02
16–45 days past due	3,100	0.08
46–90 days past due	3,600	0.15
Over 90 days past due	2,400	0.30
	\$34,800	

**Required:**

1. Determine the desired postadjustment balance in allowance for doubtful accounts.
2. Determine the balance in allowance for doubtful accounts before the bad debt expense adjusting entry is posted.
3. Compute bad debt expense.
4. Prepare the adjusting entry to record bad debt expense.

**Problem 5-72A ACCOUNTING FOR NOTES RECEIVABLE**

**OBJECTIVE** > **7**

Yarnell Electronics sells computer systems to small businesses. During 2009, Yarnell engaged in the following activities involving notes receivable:

- a. On November 1, Yarnell sold a \$5,000 system to Ross Company. Ross gave Yarnell a six-month, 11 percent note as payment.
- b. On December 1, Yarnell sold an \$8,000 system to Searfoss, Inc. Searfoss gave Yarnell a nine-month, 10 percent note as payment.
- c. On April 30, 2010, Ross paid the amount due on its note.
- d. On August 31, 2010, Searfoss paid the amount due on its note.

**Required:**

Prepare entries for Yarnell Electronics to record these transactions.

**Problem 5-73A RATIO ANALYSIS**

**OBJECTIVE** > **8**

Selected information from Bigg Company's financial statements follows.

	Fiscal Year Ended December 31		
	2010	2009 (in thousands)	2008
Gross sales	\$2,004,719	\$1,937,021	\$1,835,987
Less: Sales discounts	4,811	4,649	4,406
Less: Sales returns and allowances	2,406	2,324	2,203
Net sales	<u>\$1,997,502</u>	<u>\$1,930,048</u>	<u>\$1,829,378</u>
Cost of goods sold	621,463	619,847	660,955
Gross profit	<u>\$1,376,039</u>	<u>\$1,310,201</u>	<u>\$1,168,423</u>
Operating expenses	577,369	595,226	583,555
Operating income	<u>\$ 798,670</u>	<u>\$ 714,975</u>	<u>\$ 584,868</u>
Other income (expenses)	15,973	(5,720)	(8,773)
Net income	<u><u>\$ 814,643</u></u>	<u><u>\$ 709,255</u></u>	<u><u>\$ 576,095</u></u>

	At December 31		
	2010	2009 (in thousands)	2008
Accounts receivable	\$201,290	\$195,427	\$182,642
Less: Allowance for doubtful accounts	2,516	2,736	2,192
Net accounts receivable	<u><u>\$198,774</u></u>	<u><u>\$192,691</u></u>	<u><u>\$180,450</u></u>

**Required:**

- Calculate the following ratios for 2009 and 2010:
  - gross profit ratio
  - operating margin ratio
  - net profit margin ratio
  - accounts receivable turnover
- For each of the first three ratios listed above, provide a plausible explanation for any differences that exist (e.g., Why is the net profit margin higher or lower than it was the previous year?, etc.).
- Explain what each ratio attempts to measure. Make an assessment about Bigg Company based upon the ratios you have calculated. Are operations improving or worsening?

## Problem Set B

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**OBJECTIVE** > 1
**Problem 5-62B REVENUE RECOGNITION**

Mary Wade owns a small business that rents parking spaces to students at the local university. Mary's typical rental contract requires the student to pay the year's rent of \$720 (\$60 per month) in advance. When Mary prepares financial statements at the end of December, her accountant requires that Mary spread the \$720 over the 12 months that a parking space is rented. Therefore, Mary can recognize only \$240 revenue (four months) from each contract in the year the cash is collected and must defer recognition of the remaining \$480 (eight months) to next year. Mary argues that getting students to agree to rent the parking space is the most difficult part of the activity so she ought to be able to recognize all \$720 as revenue when the cash is received from a student.

**Required:**

Explain why you believe that generally accepted accounting principles require the use of accrual accounting rather than cash-basis accounting for transactions like the one described here.

**Problem 5-63B DISCOUNT POLICY AND GROSS MARGIN**

OBJECTIVE &gt; 2

Parker Electronics sells cell phones. During 2008, Parker sold 1,500 units at an average of \$250 per unit. Each unit cost Parker \$120. At present, Parker offers no sales discounts. Parker's controller suggests that a generous sales discount policy would increase annual sales to 2,000 units and also improve cash flow. She proposes 6/15, n/20 and believes that 75 percent of the customers will take advantage of the discount.

**Required:**

1. If the controller is correct, determine how much the new sales discount policy would add to net sales.
2. Explain why the sales discount policy might improve cash flow.

**Problem 5-64B EFFECTS OF DISCOUNTS ON SALES AND PURCHASES**

OBJECTIVE &gt; 2

Smithson Products sells shoes and accessories to retail stores. Gross sales in 2009 were \$1,500,250 (Smithson's list price) on terms 2/10, n/30. Customers paid for \$925,500 (Smithson's list price) of the merchandise within the discount period and the remaining \$574,750 after the end of the discount period. Smithson records purchases and sales using the gross method to account for sales discounts.

**Required:**

1. Compute the amount of net sales.
2. Determine how much cash was collected from sales.

**Problem 5-65B SALES DISCOUNTS**

OBJECTIVE &gt; 2

Spartan, Inc., regularly sells chemicals to Grieder Supply on terms 4/10, n/30 and records sales at gross. During a recent month, the two firms engaged in the following transactions:

- a. Spartan sold merchandise with a list price of \$37,000.
- b. Spartan sold merchandise with a list price of \$52,000.
- c. Grieder paid for the purchase in transaction *a* within the discount period.
- d. Grieder paid for the purchase in transaction *b* after the discount period.

**Required:**

1. Provide the journal entries for Spartan to record the sales in *a* and *b*.
2. Provide the journal entry to record Grieder's payment in *c*.
3. Provide the journal entry to record Grieder's payment in *d*.

**Problem 5-66B RECORDING SALES**

OBJECTIVE &gt; 1

Marvel Company sells industrial cleaning supplies and equipment to other businesses. During the first quarter of 2009, the following transactions occurred:

- a. On January 10, Marvel sold on credit 25 cases of paper towels to the Ramsden Manufacturing Company at a list price of \$1,000 for the entire lot of 25 cases.
- b. On January 14, Jackson Corporation purchased on credit, two floor polishers at a list price of \$200 each and 15 cases of nonskid wax at a list price of \$40 per case.
- c. On January 16, Jackson returned three cases of the wax purchased on January 14.
- d. On January 24, Ramsden paid for its purchase on January 10.
- e. Stella's Cleaning Company purchased on credit, four cases of carpet shampoo at a list price of \$75 per case on January 31.
- f. On February 3, Jackson paid for its purchase less the wax returned on January 16.
- g. Stella's Cleaning Company paid for its purchase of January 31 on February 10.
- h. Ramsden returned a case of oversize paper towels on February 16. Marvel credited Ramsden's account.

**Required:**

Prepare journal entries to record each of these transactions.

**OBJECTIVE** > **1** **2** **Problem 5-67B SALES AND SALES RETURNS WITH DISCOUNTS**

Callaway Supply sells all merchandise on credit with terms 3/15, n/30. Callaway engaged in the following transactions:

- May 1: Callaway sold 40 staplers to Logsdon Enterprises at a list price of \$15 per stapler.
- May 5: Callaway accepted six staplers returned by Logsdon Enterprises.
- May 10: Logsdon paid for the 34 staplers they kept.
- May 11: Callaway sold 32 filing cabinets to Jett, Inc., at a list price of \$55 per cabinet.
- May 23: Jett returned five filing cabinets that it did not need.
- June 4: Jett paid for the 27 filing cabinets they kept.

**Required:**

Prepare journal entries for each of these transactions assuming Callaway records sales using the gross method.

**OBJECTIVE** > **3** **Problem 5-68B INTERNAL CONTROL FOR SALES**

Johnson Tires has three stores. Each store manager is paid a salary plus a bonus on the sales made by his or her store. On January 5, 2010, Kevin Sampson, manager of one of the stores, resigned. Kevin's store had doubled its expected December 2009 sales, producing a bonus for Kevin of \$7,000 in December alone. Jason Jones, an assistant manager at another store, was assigned as manager of Kevin Sampson's store. Upon examination of the store's accounting records, Jason reports to Johnson that the store's records indicated sales returns and allowances of \$124,000 in the first four days of January 2010, an amount equal to about half of December 2009 sales.

**Required:**

- Explain what the large amount of sales returns and allowances suggest that Kevin Sampson might have done.
- Determine how Johnson could protect itself from a manager who behaved as Kevin Sampson did.

**OBJECTIVE** > **5** **Problem 5-69B BAD DEBT EXPENSE: PERCENTAGE OF CREDIT SALES METHOD**

Kelly's Collectibles sells nearly half its merchandise on credit. During the past four years, the following data were developed for credit sales and losses from uncollectible accounts:

Year of Sales	Credit Sales	Losses from Uncollectible Accounts*
2006	\$205,000	\$15,527
2007	185,000	11,692
2008	209,000	14,184
2009	253,000	21,933
Total	<u>\$852,000</u>	<u>\$63,336</u>

\*Losses from uncollectible accounts are the actual losses related to sales of that year (rather than write-offs of that year).

In 2010, Kelly's Collectibles expanded its line significantly and began to sell to new kinds of customers.

**Required:**

- Calculate the loss rate for each year from 2006 through 2009.
- Determine if there appears to be a significant change in the loss rate over time.
- If credit sales for 2010 are \$373,000, explain what loss rate you would recommend to estimate bad debts.
- Using the rate you recommend, record bad debt expense for 2010.

**Problem 5-70B AGING METHOD BAD DEBT EXPENSE****OBJECTIVE** > **5**

Carol Simon, the manager of Handy Plumbing has provided you with the following aging schedule for Handy's accounts receivable:

Accounts Receivable Category	Amount	Proportion Expected to Default
0–20 days	\$ 92,600	0.03
21–40 days	12,700	0.09
41–60 days	17,800	0.14
Over 60 days	2,100	0.30
	<u>\$125,200</u>	

Carol indicates that the \$125,200 of accounts receivable identified in the table does not include \$9,400 of receivables that should be written off.

**Required:**

1. Journalize the \$9,400 write-off.
2. Determine the desired postadjustment balance in allowance for doubtful accounts.
3. If the balance in allowance for doubtful accounts before the \$9,400 write-off was a debit of \$550, compute bad debt expense.

**Problem 5-71B DETERMINING BAD DEBT EXPENSE USING THE AGING METHOD****OBJECTIVE** > **5**

At the beginning of the year, Lennon Electronics had an accounts receivable balance of \$29,800 and a balance in the allowance for doubtful accounts of \$2,425 (credit). During the year, Lennon had credit sales of \$752,693, collected accounts receivable in the amount of \$653,800, wrote off \$20,400 of accounts receivable, and had the following data for accounts receivable at the end of the period:



Accounts Receivable Age	Amount	Proportion Expected to Default
Current	\$22,700	0.01
1–15 days past due	8,600	0.04
16–45 days past due	4,900	0.09
46–90 days past due	3,200	0.17
Over 90 days past due	2,100	0.30
	<u>\$41,500</u>	

**Required:**

1. Determine the desired postadjustment balance in allowance for doubtful accounts.
2. Determine the balance in allowance for doubtful accounts before the bad debt expense adjusting entry is posted.
3. Compute bad debt expense.
4. Prepare the adjusting entry to record bad debt expense.

**Problem 5-72B ACCOUNTING FOR NOTES RECEIVABLE****OBJECTIVE** > **7**

Sloan Systems sells voice mail systems to small businesses. During 2009, Sloan engaged in the following activities involving notes receivable:

- a. On November 1, Sloan sold an \$8,000 system to Majors Company. Majors gave Sloan a six-month, 9 percent note as payment.
- b. On December 1, Sloan sold a \$6,000 system to Hadley, Inc. Hadley gave Sloan a nine-month, 12 percent note as payment.
- c. On April 30, 2010, Majors paid the amount due on its note.
- d. On August 31, 2010, Hadley paid the amount due on its note.

**Required:**

Prepare entries for Sloan Systems to record these transactions.

**OBJECTIVE** > **8****Problem 5-73B RATIO ANALYSIS**

Selected information from Small Company's financial statements follows.

	Fiscal Year Ended December 31		
	2010	2009 (in thousands)	2008
Gross sales	\$1,663,917	\$1,697,195	\$1,714,167
Less: Sales discounts	2,995	3,055	3,086
Less: Sales returns and allowances	2,496	2,546	2,571
Net sales	<u>\$1,658,426</u>	<u>\$1,691,594</u>	<u>\$1,708,510</u>
Cost of goods sold	881,876	891,027	860,512
Gross profit	\$ 776,550	\$ 800,567	\$ 847,998
Operating expenses	482,050	496,958	487,214
Operating income	\$ 294,500	\$ 303,609	\$ 360,784
Other income (expenses)	3,534	(3,036)	(1,804)
Net income	<u>\$ 298,034</u>	<u>\$ 300,573</u>	<u>\$ 358,980</u>

	At December 31		
	2010	2009 (in thousands)	2008
Accounts receivable	\$376,062	\$365,109	\$341,223
Less: Allowance for doubtful accounts	8,461	71,926	5,971
Net accounts receivable	<u>\$367,601</u>	<u>\$293,183</u>	<u>\$335,252</u>

**Required:**

- Calculate the following ratios for 2009 and 2010:
  - gross profit ratio
  - operating margin ratio
  - net profit margin ratio
  - accounts receivable turnover
- For each of the first three ratios listed above provide a plausible explanation for any differences that exist (e.g., Why is the net profit margin higher or lower than it was the previous year? etc.).
- Explain what each ratio attempts to measure. Make an assessment about Small Company based upon the ratios you have calculated. Are operations improving or worsening?

## Cases

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**Case 5-74 ETHICS AND REVENUE RECOGNITION**

Alan Dunlap is CEO of a large appliance wholesaler. Alan is under pressure from Wall Street Analysts to meet his aggressive sales revenue growth projections. Unfortunately, near the end of the year he realizes that sales must dramatically improve if his projections are going to be met. To accomplish this objective he orders his sales force to contact their largest customers and offer them price discounts if they buy by the

end of the year. Mr. Dunlap also offered to deliver the merchandise to a third-party warehouse with whom the customers could arrange delivery when the merchandise was needed.

**Required:**

1. Do you believe that revenue from these sales should be recognized in the current year? Why or why not?
2. What are the probable consequences of this behavior for the company in future periods?
3. What are the probable consequences of this behavior for investors analyzing the current year financial statements?

**Case 5-75 RECOGNITION OF SERVICE CONTRACT REVENUES**

Jackson Dunlap is president of New Miami Maintenance, Inc., which provides building maintenance services. On October 15, 2008, Mr. Dunlap signed a service contract with Western College. Under the contract, New Miami will provide maintenance services for all Western's buildings for a period of two years, beginning on January 1, 2009, and Western will pay New Miami on a monthly basis, beginning on January 31, 2009. Although the same amount of maintenance services will be rendered in every month, the contract provides for higher monthly payments in the first year.

Initially, Mr. Dunlap proposed that some portion of the revenue from the contract should be recognized in 2008; however, his accountant, Rita McGonigle, convinced him that this would be inappropriate. Then Mr. Dunlap proposed that the revenue should be recognized in an amount equal to the cash collected under the contract in 2008. Again, Ms. McGonigle argued against his proposal, saying that generally accepted accounting principles required recognition of an equal amount of contract revenue each month.

**Required:**

1. Give a reason that might explain Mr. Dunlap's desire to recognize contract revenue earlier rather than later.
2. Put yourself in the position of Rita McGonigle. How would you convince Mr. Dunlap that his two proposals are unacceptable and that an equal amount of revenue should be recognized every month?
3. If Ms. McGonigle's proposal is adopted, how would the contract be reflected in the balance sheets at the end of 2008 and at the end of 2009?

**Case 5-76 REVENUE RECOGNITION**

Beth Rader purchased North Shore Health Club in June 2009. Beth wanted to increase the size of the business by selling five-year memberships for \$2,000, payable at the beginning of the membership period. The normal yearly membership fee is \$500. Since few prospective members were expected to have \$2,000, Beth arranged for a local bank to provide a \$2,000 installment loan to prospective members. By the end of 2009, 250 customers had purchased the five-year memberships using the loan provided by the bank.

Beth prepared her income statement for 2009 and included \$250,000 as revenue because the Club had collected the entire amount in cash. Beth's accountant objected to the inclusion of the entire \$250,000. The accountant argued that the \$250,000 should be recognized as revenue as the Club provides services for these members during the membership period. Beth countered with a quotation from a part of "Generally Accepted Accounting Principles," *Accounting Research Bulletin 43, Chapter I, Section A, No. 1*:

"Profit is deemed to be realized when a sale in the ordinary course of business is effected, unless the circumstances are such that collection of the sale price is not reasonably assured."

Beth notes that the memberships have been sold and that collection of the selling price has occurred. Therefore, she argues that all \$250,000 is revenue in 2009.

**Required:**

Write a short statement supporting either Beth or the accountant in this dispute.

**Case 5-77 SALES DISCOUNT POLICIES**

Consider three businesses, all of which offer price reductions to their customers. The first is an independently owned gas station located at a busy intersection in Cincinnati, Ohio, that offers a 3 percent discount for cash purchases of gasoline. The second is a large home improvement store located near an interstate exit in suburban Cleveland that offers building contractors terms of 3/10, n/45. And third is a clothing manufacturer and catalog retailer located in Columbus. Several times during each year, a catalog is distributed in which men's dress shirts are heavily discounted if purchased in lots of four or more.

**Required:**

1. What are the main objectives of the discount policies in each of the three businesses?
2. How does accounting information assist each business in achieving its discount policy objectives?

**Case 5-78 FINANCIAL ANALYSIS OF RECEIVABLES**

A chain of retail stores located in Kansas and Nebraska has requested a loan from the bank at which you work. The balance sheet of the retail chain shows significant accounts receivable related to its in-house credit card. You have been assigned to evaluate these receivables.

**Required:**

1. What questions concerning the quality of these receivables can you answer by analyzing the retailer's financial statements?
2. What additional questions would you raise, and what information would you request from the retailer to answer these questions?

**Case 5-79 INCOME EFFECTS OF UNCOLLECTIBLE ACCOUNTS**

The credit manager and the accountant for Goldsmith Company are attempting to assess the effect on net income of writing off \$100,000 of receivables. Goldsmith uses the aging method of determining bad debt expense and has the following aging schedule for its accounts receivable at December 31, 2009:

Accounts Receivable Category	Amount	Proportion Expected to Default
Current	\$2,980,400	0.004
1–30 days past due	722,600	0.035
31–60 days past due	418,500	0.095
Over 60 days past due	322,800	0.250
	\$4,444,300	

The receivables being considered for write-off are all over 60 days past due.

**Required:**

1. Assume that the tax rate is 30 percent. What will be the effect on net income if the \$100,000 is written off?
2. What data would you examine to provide some assurance that a company was not holding uncollectible accounts in its accounts receivable rather than writing them off when they are determined to be uncollectible?

**Case 5-80 RESEARCH AND ANALYSIS USING THE ANNUAL REPORT**

Obtain **Under Armour's** 2007 10-K through the "Investor Relations" portion of their website. (Using a search engine, search for: Under Armour investor relations.) Once at the Investor Relations section of the website, look for "SEC Filings." When

you see the list of all the filings either filter for the “Annual Filings” or search for “10-K.” Another option is to go to <http://www.sec.gov> and click “Search for company filings” under “Filings & Forms (EDGAR).”

**Required:**

1. What was Under Armour’s allowance for doubtful accounts in 2006 and 2007?
2. Look at under the “Accounts Receivable” heading to Note 2 (Summary of Significant Accounting Policies). Does Under Armour use the percentage of credit sales method or the aging method to estimate bad debt expense?
3. Was a larger percentage of the gross accounts receivable considered uncollectible at December 31, 2006 or 2007?
4. Calculate Under Armour’s receivables turnover for 2006 and 2007 (Accounts Receivable, net, was \$53,132 at December 31, 2005). If the industry average for receivables turnover is 9.81, how do you evaluate their efficiency with receivables?
5. Calculate Under Armour’s gross profit ratio, operating margin ratio, and net profit margin ratio for 2006 and 2007.
6. If the industry average for gross profit ratio is 24.88 percent, what sort of strategy do you think Under Armour is pursuing?
7. Evaluate the trend of Under Armour’s operating margin ratio and net profit margin ratio and relate the trend to the industry averages of 7.65 percent and 5.99 percent, respectively.

**Case 5-81 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aerostale** that are supplied with this text.

**Required:**

1. Look at Abercrombie & Fitch’s Note 2 (Summary of Significant Accounting Policies) under the headings (1) Credit Card Receivables and (2) Fair Value of Financial Instruments. Based on these disclosures, describe the nature of A&F’s receivables reported on the balance sheet. What is the balance in their allowance for doubtful accounts?
2. Look at Aeropostale’s Note 1 (Summary of Significant Accounting Policies) under the headings (1) Cash Equivalents and (2) Fair Value of Financial Instruments. Based on these disclosures how does Aeropostale’s receivables differ from Abercrombie & Fitch’s receivables? Why isn’t there a receivables balance on Aeropostale’s balance sheet?
3. Using the balances reported on the balance sheets, what is Abercrombie & Fitch’s receivables turnover for the year ended February 3, 2007?
4. Calculate Abercrombie & Fitch’s and Aeropostale’s gross profit ratio for the years ended February 3, 2007 and January 28, 2006. What can you infer about the strategy pursued by these two companies based on these measures assuming the industry average is around 38 percent?
5. Calculate Abercrombie & Fitch’s and Aeropostale’s operating margin ratio for the years ended February 3, 2007 and January 28, 2006. Comment on these measures assuming the industry average is around 10 percent.
6. Calculate Abercrombie & Fitch’s and Aeropostale’s net profit margin ratio for the years ended February 3, 2007 and January 28, 2006. Comment on these measures assuming the industry average is around 6.5 percent.

# 6

## Cost of Goods Sold and Inventory

After studying Chapter 6, you should be able to:

- **1** Describe the types of inventories held by merchandisers and manufacturers, and understand how inventory costs flow through a company.
- **2** Explain how to record purchases and sales of inventory using a perpetual inventory system.
- **3** Apply the four inventory costing methods to compute ending inventory and cost of goods sold under a perpetual inventory system.
- **4** Analyze the financial reporting and tax effects of the various inventory costing methods.
- **5** Apply the lower of cost or market rule to the valuation of inventory.
- **6** Evaluate inventory management using the gross profit and inventory turnover ratios.
- **7** Describe how errors in ending inventory affect income statements and balance sheets.
- **8** (Appendix 6A) Explain how to record purchases of inventory using a periodic inventory system.
- **9** (Appendix 6B) Compute ending inventory and cost of goods sold under a periodic inventory system.

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# E xperience Financial Accounting with Wal-Mart

**Wal-Mart Stores Inc.**, based in Bentonville, Arkansas, is the world's largest public corporation with \$345 billion in sales for their 2007 fiscal year. With over 127 million customers visiting over 4,000 Wal-Mart stores per week, Wal-Mart is the largest grocery retailer and toy seller in the United States. In addition, Wal-Mart operates over 2,800 facilities in 12 different countries. Given the large volume of merchandise that is sold, Wal-Mart's profits depend heavily on the control and management of its inventory. After all, inventory does make up 72 percent of Wal-Mart's current assets!

For many companies, inventory is at the heart of the operating cycle and must be carefully managed and controlled. Managing and controlling inventory involves keeping enough inventory on the shelves to meet the customers' demands while minimizing the cost of carrying inventory. If a company doesn't have enough inventory on its shelves, it will lose sales. On the other hand, too much inventory will increase carrying costs such as storage and interest costs as well as increase the risk of obsolescence. Wal-Mart has long been recognized as a

Exhibit 6-1

## Composition of Wal-Mart's Current Assets

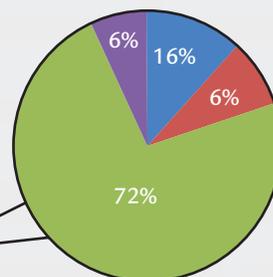
Wal-Mart Stores, Inc.  
Consolidated Balance Sheets (partial)  
January 31, 2007

(in millions) 2007

### ASSETS:

#### Current assets:

Cash and cash equivalents	\$ 7,373
Receivables	2,840
<b>Inventories</b>	<b>33,685</b>
Prepaid expenses and other	2,690
Total current assets	<u>\$46,588</u>



world leader in its effective use of technology to manage and control its inventory and distribution.

As you will see in this chapter, even though inventory is an asset, it can have a major impact on net income. That is because all inventory accounting systems allocate the cost of inventory between ending inventory and cost of goods

sold. Therefore, the valuation of inventory affects cost of goods sold, which in turn, affects net income. By managing and controlling its inventory, Wal-Mart has been able to tie up less of its money in inventory than its competitors, resulting in greater profits. This focus on inventory allows Wal-Mart to sell its merchandise at “always low prices. Always.”

### OBJECTIVE > 1

Describe the types of inventories held by merchandisers and manufacturers, and understand how inventory costs flow through a company.

## Nature of Inventory and Cost of Goods Sold

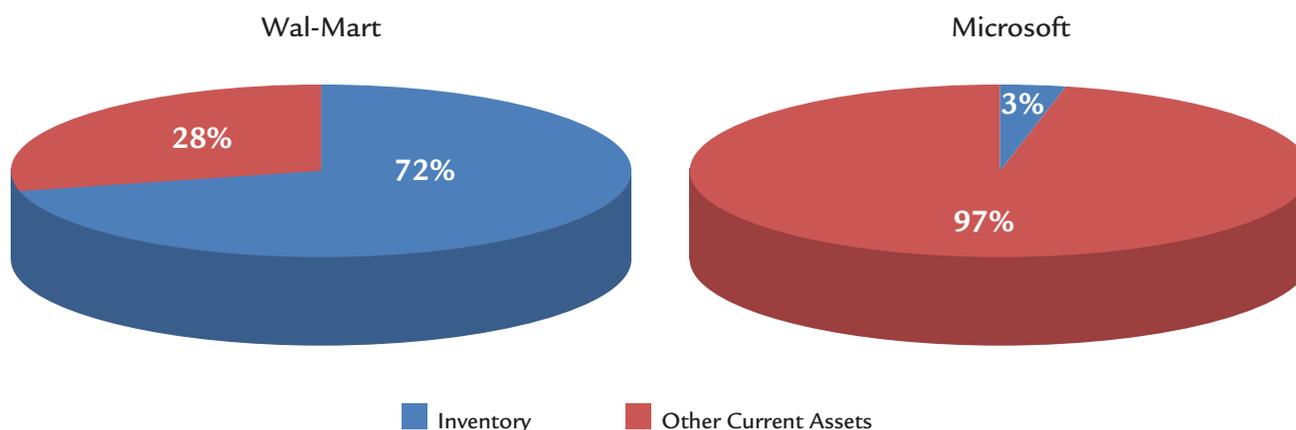
**Inventory** represents products held for resale and is classified as a current asset on the balance sheet. The inventories of large companies like **General Electric, Procter and Gamble**, and Wal-Mart are composed of thousands of different products or materials and millions of individual units that are stored in hundreds of different locations. For other companies, inventories are a much less significant portion of their total assets. Exhibit 6-2 shows the relative composition of inventory for Wal-Mart and **Microsoft**.

For companies like Wal-Mart, these vast and varied inventories are at the heart of company operations and must be carefully controlled and accounted for. For example, one of Wal-Mart’s key performance measures is the comparison of inventory growth to sales growth. For its 2007 fiscal year, Wal-Mart’s inventory growth was 5.6 percent while sales growth was up 11.7 percent—an indication that Wal-Mart is efficiently using its inventory to generate sales.

When companies like Wal-Mart sell their inventory to customers, the cost of the inventory becomes an expense called cost of goods sold. **Cost of goods sold**, or cost of sales, represents the outflow of resources caused by the sale of inventory and is the most important expense on the income statement of companies that sell goods instead of services. Note that **gross margin** (also called **gross profit**), a key performance measure, is defined as sales revenue less cost of goods sold. Thus, gross

Exhibit 6-2

Relative Composition of Inventory for Different Companies



margin indicates the extent to which the resources generated by sales can be used to pay operating expenses (selling and administrative expenses) and provide for net income. For 2007, Wal-Mart reported a gross margin of \$80,840 million (net sales of \$344,992 million less cost of sales of \$264,152 million) or 23.4 percent of net sales.

The cost of inventory has a direct effect on cost of goods sold and gross margin. Therefore, to correctly interpret and analyze financial statements, one must understand inventory accounting. Accounting for inventories requires a matching of costs with revenues based on an appropriate inventory costing method. As you will see in this chapter, management is allowed considerable latitude in determining the cost of inventory and may choose among several different costing methods. In addition, certain departures from cost are allowed by GAAP. These choices that managers make affect the balance sheet valuation of inventory, the amount of reported net income, and the income taxes payable from year to year.

In this chapter, we will examine the process of accounting for inventory and cost of goods sold. We will address the following questions:

- What are the different types of inventory?
- What costs should be included in inventory?
- Which inventory system (perpetual or periodic) should be employed?
- How are inventory transactions recorded?
- How is cost of goods sold computed?
- What are the financial effects of the four alternative inventory costing methods?
- How does the application of the lower-of-cost-or-market rule affect inventory valuation?

An understanding of inventory accounting will help in the analysis of financial statements as well as in managing a business.

## Types of Inventory and Flow of Costs

In previous chapters, we generally have illustrated companies that sell services such as advertising agencies, delivery companies, repair companies, and accounting firms. For these companies, inventory plays a much smaller role. For example, in 2007, **Google** didn't even report an amount for inventory! Our focus in this chapter will be on companies that sell inventory. These companies are often referred to as either merchandisers or manufacturers.

*Merchandisers* are companies that purchase inventory in a finished condition and hold it for resale without further processing. *Retailers* like Wal-Mart, **Sears**, and **Target** are merchandisers that sell directly to consumers, while *wholesalers* are merchandisers that sell to other retailers. The inventory held by merchandisers is termed **merchandise inventory**. Merchandise inventory is an asset. When that asset is sold to a customer, it becomes an expense called cost of goods sold which appears on the income statement. Wal-Mart's inventory disclosure, shown earlier in Exhibit 6-1, is an example of a typical disclosure made by a merchandising company.

*Manufacturers* are companies that buy and transform raw materials into a finished product which is then sold. **Sony**, **Toyota**, and **Eastman Kodak** are all manufacturing companies. Manufacturing companies classify inventory into three categories: raw materials, work-in-process, and finished goods. *Raw materials inventory* are the basic ingredients used to make a product. When these raw materials are purchased, Raw Materials Inventory is increased. As raw materials are used to manufacture a product, they become part of work-in-process inventory. *Work-in-process inventory* consists of the raw materials that are used in production as well as other production costs such as labor and utilities. These costs stay in this account until the product is complete. Once the production process is complete, these costs are moved to the finished goods inventory account. The *finished goods inventory* account represents the cost of the final product that is available for sale. When the finished goods inventory is sold to a customer, it becomes an expense called cost of goods sold which appears on the income statement.

The inventory disclosure of Eastman Kodak, shown in Exhibit 6-3, is an example of a typical disclosure made by a manufacturing company.

While inventories of manufacturers present some accounting measurement problems that are beyond the scope of this text, the accounting concepts discussed in this chapter apply to inventories of both merchandisers and manufacturers. The relationship between the various inventory accounts and cost of goods sold is shown in Exhibit 6-4.

**Exhibit 6-3**

**Inventory Disclosure of Eastman Kodak**

		December 31,	
(in millions)	2007	2006	
<b>Current Assets</b>			
Cash and cash equivalents	\$2,947	\$1,469	
Receivables, net	1,939	2,072	
<b>Inventories, net</b>	<b>943</b>	<b>1,001</b>	
Other current assets	224	1,015	
<b>Total current assets</b>	<b>\$6,053</b>	<b>\$5,557</b>	

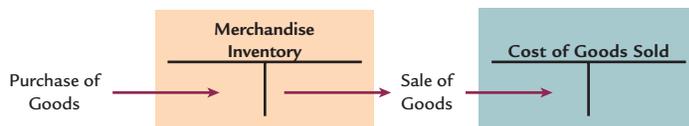
  

Note 3: Inventories, net		
		December 31,
(in millions)	2007	2006
Finished goods	\$537	\$ 606
Work-in-process	235	192
Raw materials	171	203
<b>Total inventories, net</b>	<b>\$943</b>	<b>\$1,001</b>

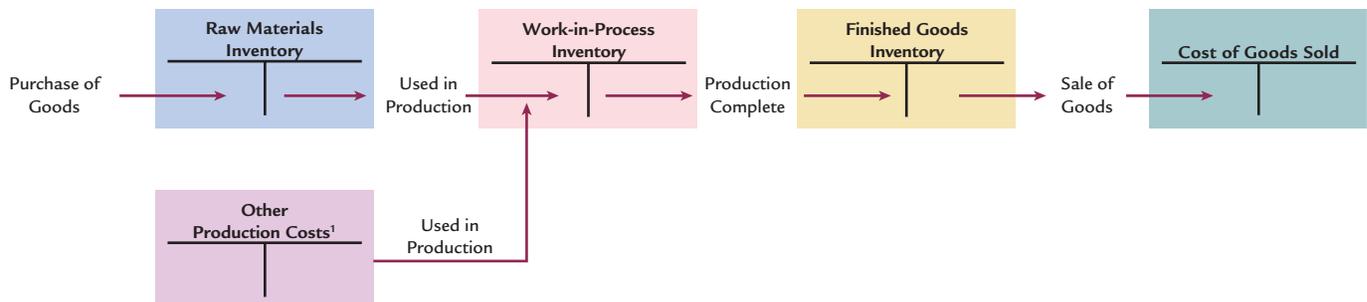
**Exhibit 6-4**

**Flow of Inventory Costs**

**Merchandiser**



**Manufacturer**



<sup>1</sup> Work-in-Process Inventory consists of raw materials used in production (also known as direct materials) as well as other production costs. These other production costs are called direct labor and factory overhead. The process by which these costs are converted to a final cost of a product is beyond the scope of this text and is covered in managerial accounting.

The concepts involved in accounting for inventories of manufacturers and merchandisers are similar. However, due to the additional complexities of accounting for manufacturing inventory, the remainder of this chapter will focus on merchandising companies.

## The Cost of Goods Sold Model

As shown in Exhibit 6-4, cost of goods sold is the cost of the outflow from inventory to customers. That is, cost of goods sold is the cost to the seller of all goods sold during the accounting period. Recall that the *matching principle* requires that any costs used to generate revenue should be recognized in the same period that the revenue is recognized. Because revenue is recognized as goods are sold, cost of goods sold is an expense.

The relationship between cost of goods sold and inventory is given by the cost of goods sold model:

$$\begin{array}{r}
 \text{Beginning inventory} \\
 + \text{Purchases} \\
 \hline
 = \text{Cost of goods available for sale} \\
 - \text{Ending inventory} \\
 \hline
 = \text{Cost of goods sold}
 \end{array}$$

Except in the case of a new company, merchandisers and manufacturers will start the year with an amount of inventory on hand called *beginning inventory*. During the year, any *purchases* of inventory are added to the inventory account. The sum of beginning inventory and purchases represents the **cost of goods available for sale**. The portion of the cost of goods available for sale that remains unsold at the end of the year is the company's *ending inventory* (the ending inventory for one period becomes the beginning inventory of the next period). The portion of the cost of goods available for sale that is sold becomes *cost of goods sold*. The cost of goods sold model is illustrated in Exhibit 6-5.

Note that the determination of cost of goods sold requires an allocation of the cost of goods available for sale between ending inventory and cost of goods sold. An application of the cost of goods sold model is illustrated in **Cornerstone 6-1**.

Exhibit 6-5

### The Cost of Goods Sold Model





**CORNERSTONE**  
**6-1**



**HOW TO Apply the Cost of Goods Sold Model**

**Concept:**

The determination of cost of goods sold requires an allocation of the cost of goods available for sale between ending inventory and cost of goods sold.

**Information:**

Bargain Shops, a retail clothing store, had a beginning inventory of \$26,000 on January 1, 2009. During 2009, the company purchased goods from a supplier costing \$411,000. At the end of 2009, the cost of the unsold inventory was \$38,000.

**Required:**

Compute cost of goods sold at December 31, 2009.

**Solution:**

Cost of goods sold of \$399,000 is computed by using the cost of goods sold model as follows:

Beginning inventory	\$ 26,000
+ Purchases	411,000
= Cost of goods available for sale	<u>\$437,000</u>
– Ending inventory	38,000
= Cost of goods sold	<u><u>\$399,000</u></u>

Note that the general structure of the cost of goods sold model can be rearranged to solve for any missing amount if the other three amounts are known. For example, if Bargain Shops did not know the cost of ending inventory but knew the cost of goods sold was \$399,000, the company could determine ending inventory by rearranging the model as follows:

Beginning inventory	\$ 26,000
+ Purchases	411,000
= Cost of goods available for sale	<u>\$437,000</u>
– Cost of goods sold	399,000
= Ending inventory	<u><u>\$ 38,000</u></u>

**CONCEPT Q&A**

Because all inventories ultimately get expensed as cost of goods sold, why not just record all costs as cost of goods sold when they are incurred?

*Costs related to inventories are initially recorded in an inventory account to help a company achieve a proper matching of expenses with revenues. By recording costs in an inventory account, a company can delay the recognition of the expense until the goods are sold. If all inventory related costs were expensed when incurred, users of financial statements would see a distorted picture of the profitability of a company.*

**Possible Answer:**

This reinforces the concept that the computation of cost of goods sold or ending inventory is simply an allocation of the cost of goods available for sale. An understanding of this cost of goods sold model should enhance your understanding of how the matching concept is applied to cost of goods sold.

**Inventory Systems**

Because inventory is at the heart of the operating cycle for most wholesalers and retailers, the inventory accounting systems that record purchases and sales and track the level of inventory are particularly important in such companies. These systems provide the information needed to determine cost of goods sold and perform financial statement analysis. In addition, these systems signal the need to purchase additional inventory or the need to make special efforts to sell existing

inventory. They also provide information necessary to safeguard the inventory from misappropriation or theft. In short, these systems provide the information that managers need to manage and control inventory.

Companies use one of two types of inventory accounting systems—a perpetual inventory system or a periodic inventory system.

**Perpetual Inventory System** In a **perpetual inventory system**, balances for inventory and cost of goods sold are continually (perpetually) updated with each sale or purchase of inventory. This type of system requires that detailed records be maintained on a transaction-by-transaction basis for each purchase and sale of inventory. For example, every time that Wal-Mart purchases inventory from a supplier, it records this purchase directly in its inventory records. Similarly, when Wal-Mart makes a sale to a customer, it will not only record the sale (as illustrated in Chapter 5) but will also update its inventory and cost of goods sold balances by decreasing inventory and increasing cost of goods sold. In other words, a perpetual inventory system records both the *revenue* and *cost* side of sales transactions. The journal entries for a perpetual system are shown later in this chapter.

With the volume of transactions that Wal-Mart has on a daily basis, this task may appear quite daunting. However, with the advent of “point of sale” cash register systems and optical bar code scanners, the implementation of a perpetual inventory system has become quite common. Some companies, like Wal-Mart, are taking this idea a step further and using radio frequency identification technology (RFID) to track inventory. By attaching RFID tags to its inventory, Wal-Mart is able to more easily track inventory from its suppliers to the final customer, with the promise of dramatic reductions in inventory losses.

In a perpetual inventory system, the accounting system keeps an up-to-date record of both ending inventory and cost of goods sold at any point in time. However, a company that uses a perpetual system should still take a physical count of inventory at least once a year to confirm the balance in the inventory account. Any difference between the physical count of inventory and the inventory balance provided by the accounting system could be the result of errors, waste, breakage, or theft.

**Periodic Inventory System** A **periodic inventory system** does not require companies to keep detailed, up-to-date inventory records. Instead, a periodic system records the cost of purchases as they occur (in an account separate from the inventory account), takes a physical count of inventory at the end of the period, and applies the cost of goods sold model to determine the balances of ending inventory and cost of goods sold. Thus, a periodic system only produces balances for ending inventory and cost of goods sold at the end of each accounting period (periodically). If a company using the periodic system needs to know the balance of inventory or cost of goods sold during a period, it must either (1) perform a physical count of inventory or (2) use inventory estimation techniques (which are covered in intermediate accounting courses).<sup>2</sup>

**Comparison of Perpetual and Periodic Inventory Systems** Perpetual and periodic systems offer distinct benefits and any choice between the two inventory systems must weigh the system’s advantages against its operating costs. The principle advantage of a periodic system is that it is relatively inexpensive to operate. Because perpetual systems require entering and maintaining more data than periodic systems, the additional costs can be quite substantial for a company with thousands of different items in inventory. However, with technological advances, this advantage is rapidly disappearing. The perpetual system has the obvious advantage of making the balances of inventory and cost of goods sold continuously available. This provides management with greater control over inventory than they would have under a periodic inventory system. Providing managers with more timely information that gives them greater

<sup>2</sup> More information on the periodic inventory system is provided in Appendixes 6A and 6B at the end of this chapter.

## DECISION-MAKING & ANALYSIS

### Just-in-Time Inventory Management

Inventory managers must balance the costs of carrying inventory against the costs of being caught short, largely the cost of lost sales. If suppliers can be relied upon to deliver needed inventory on very short notice and in ready-to-use forms, then very low inventory levels are consistent with both minimum carrying costs and minimum “out-of-stock” costs. This approach to inventory management, which requires attention to detail and very “tight” relationships with suppliers, is called just-in-time inventory management.

**1.** *What information is necessary to maintain a just-in-time inventory policy?*

To synchronize the arrival of new inventory with the selling of the old inventory, inventory managers need detailed information about order-to-delivery times, receiving-to-ready-for-sale times, and inventory quantities. Delivery and make-ready times are used to control and minimize time lags between shipment of goods by suppliers and delivery to customers. In some retail stores, for example, merchandise arrives tagged, stacked, and ready for placement on the sales floor while in other retail stores several days may be required to get the merchandise ready for sale. Information on inventory quantities is used to calculate the inventory level at which to reorder an item.

**2.** *Does just-in-time inventory management require a perpetual inventory system?*

No. While many companies do use a perpetual inventory system for just-in-time inventory management, a quantities-only perpetual system is sufficient to signal the need to reorder. To reduce costs, many companies use a quantities-only perpetual system combined with a periodic inventory system to determine inventory costs.

control over inventory can be a significant and extremely valuable advantage in a competitive business environment. For example, much of Wal-Mart’s success has been attributed to its sophisticated inventory management and control system.

We will illustrate a perpetual inventory system in this chapter because of its growth and popularity in many different types of companies.

#### OBJECTIVE > 2

Explain how to record purchases and sales of inventory using a perpetual inventory system.

### Recording Inventory Transactions—Perpetual System

The *historical cost principle* requires that the activities of a company are initially measured at their cost—the exchange price at the time the activity occurs. Applied to inventory, this principle implies that *inventory cost includes the purchase price of the merchandise plus any cost of bringing the goods to a salable condition and location.*<sup>3</sup> This definition of inventory costs means that in addition to the purchase price, inventory cost will include other “incidental” costs such as freight charges to deliver the merchandise to the company’s warehouse, insurance cost on the inventory while it is in transit, and various taxes. In general, a company should stop accumulating costs as a part of inventory once the inventory is ready for sale.<sup>4</sup> In this section, we will explore the accounting for purchases and sales of inventory for a merchandiser under a perpetual inventory system.

### Accounting for Purchases of Inventory

Let’s first take a look at how a merchandising company would account for goods purchased for resale. In a perpetual inventory system, the merchandise inventory account is used to record the costs associated with acquiring goods.

<sup>3</sup> *Accounting Research Bulletin No. 43, “Inventory Pricing”* (New York: American Institute of Certified Public Accountants, June 1953), Chapter 4, Statement 3.

<sup>4</sup> For a manufacturing company, costs should be accumulated as raw materials inventory until the goods are ready for use in the manufacturing process.

**Purchases** Purchases refers to the cost of merchandise acquired for resale during the accounting period. The purchase of inventory is recorded by increasing the merchandise inventory account. All purchases should be supported by a *source document* such as an *invoice* that provides written evidence of the transaction and provides all relevant details of the purchase. A typical invoice is shown in Exhibit 6-6. Note the various details on the invoice such as the names of the seller and the purchaser, the invoice date, the credit terms, the freight terms, a description of the goods purchased, and the total invoice amount.

Relying on the historical cost principle, the cost of purchases must include the effects of purchase discounts, purchase returns, and transportation charges.

**Purchase Discounts** As noted in Chapter 5, it is common for companies that sell goods on credit to offer their customers sales discounts to encourage prompt payment. From the viewpoint of the customer or purchaser, such price reductions are called **purchase discounts**. The credit terms specify the amount and timing of payments from the purchaser to the seller. For example, credit terms of “2/10, n/30” mean that a 2 percent discount may be taken on the invoice price if payment is made within 10 days of the invoice date. This reduced payment period is known as the **discount period**. Otherwise, full payment is due within 30 days of the invoice date. If a purchase discount is taken, the purchaser reduces the Merchandise Inventory account for the amount of the

## Exhibit 6-6

## Sample Invoice

SALESPERSON		P.O. NUMBER	REQUISITIONER	SHIPPED VIA	F.O.B. POINT	TERMS
E. Higgins		4895721	J. Parker Jones	UPS	Destination	2/10, n/30
QUANTITY	DESCRIPTION		UNIT PRICE	TOTAL		
100	Model No. 754 Athletic Running Shoe		\$100	\$10,000		
			SUBTOTAL	\$10,000		
			SALES TAX	800		
			SHIPPING & HANDLING	150		
			TOTAL DUE	\$10,950		

Shoes Unlimited

INVOICE

*We Care About Your Feet*

301 College Street  
Irvine, California 92612  
Phone 800-555-2389 Fax 949-555-2300

INVOICE #100  
DATE: Sept. 1, 2008

TO:

J. Parker Jones, Purchasing Manager  
Brandon Shoes  
879 University Blvd.  
Auburn, Alabama 36830

discount taken. The result of recording the purchase discount is that the merchandise inventory account reflects the net cost of the inventory purchased.

Generally, merchandisers should take all available discounts. Failure to pay within the discount period is equivalent to paying interest for the use of money and can be quite expensive. For example, failure to take advantage of the 2 percent discount for credit terms of “2/10, n/30” is equivalent to an annual interest rate of 36.5 percent.<sup>5</sup> Clearly, paying within the discount period is a good cash management policy.

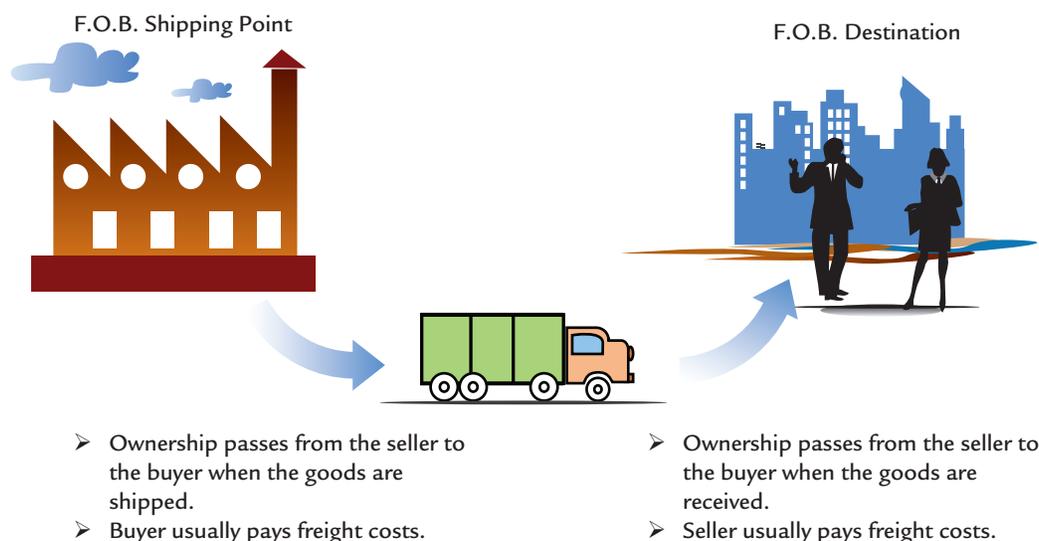
**Purchase Returns and Allowances** Merchandise is inspected when received and may be tested in various ways before it becomes available for sale. Perhaps the wrong merchandise was delivered, the merchandise did not conform to specification, the merchandise was damaged or defective, or it arrived too late at its destination. If the purchaser is dissatisfied with the merchandise, it is frequently returned to the seller for credit or for a cash refund. The cost of merchandise returned to suppliers is called **purchase returns**. In some instances, the purchaser may choose to keep the merchandise if the seller is willing to grant a deduction (allowance) from the purchase price. This situation is called a **purchase allowance**. Increases in purchase returns and allowances may signal deteriorating supplier relationships; thus purchase returns are monitored very closely by purchasing managers. Because Merchandise Inventory was increased when the purchase was initially made, a purchase return or allowance is recorded by decreasing merchandise inventory.

**Transportation Costs** Transportation, or freight, costs are expenditures made to move the inventory from the seller’s location to the purchaser’s location. The proper recording of transportation costs depends upon whether the buyer or the seller pays for the transportation. Effectively, this question is the same as asking at what point the ownership of the inventory transfers from the seller to the buyer. The point at which ownership, or title, of the inventory changes hands depends on the shipping terms of the contract. The shipping terms can be either F.O.B. (free on board) shipping point or F.O.B. destination. Exhibit 6-7 illustrates the following points:

- If the shipping terms are **F.O.B. shipping point**, ownership of the inventory passes from the seller to the buyer at the shipping point. Under F.O.B. shipping point terms, the buyer normally pays the transportation costs, commonly termed

### Exhibit 6-7

#### Shipping Terms



<sup>5</sup>This implied interest rate is computed as  $[365 \text{ days} \div (30 \text{ days} - 10 \text{ days})] \times 2\%$ . Notice that this formula uses a 20-day interest period computed as the days until final payment is due (30 days) less the days in the discount period (10 days). This period can be adjusted to fit the specific credit terms of the transaction.

**freight-in.** These costs are considered part of the total cost of purchases and the Merchandise Inventory account is increased.

- When the shipping terms are **F.O.B. destination**, ownership of the inventory passes when the goods are delivered to the buyer. Under F.O.B. destination shipping terms, the seller is usually responsible for paying the transportation costs, commonly termed **freight-out**. In this case, the transportation costs are not considered part of inventory; instead, the seller will expense these costs as a selling expense on the income statement.

**Recording Purchase Transactions** To summarize, the purchase price of inventory includes any cost of bringing the goods to a salable condition and location. Therefore, the merchandise inventory account is increased for the invoice price of a purchase as well as any transportation costs paid for by the buyer. Any purchase discounts, returns, or allowances reduce the merchandise inventory account. **Cornerstone 6-2** illustrates the journal entries required to record purchases of merchandise inventory.

**CONCEPT Q&A**

All of the purchase transactions that effect inventory look complicated. Why go to all that trouble and effort when I could just use the periodic inventory system?

*A perpetual inventory system requires a number of entries that directly effect inventory. While this system is certainly more complex than a periodic inventory system, the numerous entries provide management with up-to-date information on their inventory. The information provided by a perpetual system allows managers to better manage and control their inventory, which is the heart of merchandising companies.*

**Possible Answer:**

**HOW TO Record Purchase Transactions in a Perpetual Inventory System**

**Concept:**

The cost of inventory includes the purchase price of the merchandise plus any cost of bringing the goods to a salable condition and location.

**Information:**

On September 1, 2009, Brandon Shoes purchased 50 pairs of hiking boots for \$3,750 cash and paid \$150 of transportation costs. Also, on September 1, Brandon purchased 100 pairs of running shoes for \$10,000; however the seller paid the transportation costs of \$300. The running shoes were purchased on credit with credit terms of 2/10, n/30. Brandon paid for one-half (\$5,000) of the running shoes on September 10, within the discount period. The remaining shoes were paid for on September 30. After inspection, Brandon determined that 10 pairs of the hiking boots were defective and returned them on September 30.

**Required:**

- Prepare journal entries to record the purchase of the hiking boots.
- Prepare the journal entry to record the purchase of the running shoes.
- Prepare the journal entries to record the payment for the running shoes on September 10 and September 30.
- Prepare the journal entry to record the return of the defective hiking boots on September 30.

**Solution:**

- The cash purchase of the hiking boots includes the \$3,750 invoice price plus the \$150 of transportation costs (freight-in):

Date	Account and Explanation	Debit	Credit
Sept. 1	Merchandise Inventory	3,750	
	Cash		3,750
	(Purchased inventory for cash)		
1	Merchandise Inventory	150	
	Cash		150
	(To record the payment of freight costs)		



**CORNERSTONE 6-2**



Assets = Liabilities + Stockholders' Equity	
+3,750	
-3,750	
<hr/>	
Assets = Liabilities + Stockholders' Equity	
+150	
-150	

**CORNERSTONE**  
**6-2**  
*(continued)*

Assets = Liabilities +		Stockholders'
+10,000	+10,000	Equity

2. The credit purchase of the running shoes includes only the \$10,000 invoice price:

Date	Account and Explanation	Debit	Credit
Sept. 1	Merchandise Inventory	10,000	
	Accounts Payable		10,000
	<i>(Purchased inventory on credit)</i>		

Note: The costs of the freight is not recorded because it was paid by the seller (F.O.B. destination or freight-out). The seller would record a selling expense and credit Cash to record the freight charges.

3. Brandon paid for \$5,000 of the running shoes purchase less a discount of \$100 ( $\$5,000 \times 2\%$ ). The journal entry is:

Assets = Liabilities +		Stockholders'
-4,900	-5,000	Equity
-100		

Date	Account and Explanation	Debit	Credit
Sept. 10	Accounts Payable	5,000	
	Cash		4,900
	Merchandise Inventory		100
	<i>(Paid for one-half the running shoes purchase)</i>		

The journal entry to record the payment *outside* of the discount period is:

Assets = Liabilities +		Stockholders'
-5,000	-5,000	Equity

Date	Account and Explanation	Debit	Credit
Sept. 30	Accounts Payable	5,000	
	Cash		5,000
	<i>(Paid for one-half the running shoes purchase)</i>		

4. The journal entry required to return the \$750 of defective hiking boots (calculated as  $\$3,750 \div 50 \text{ pairs} = \$75 \text{ per pair} \times 10 \text{ pairs}$ ) is:

Assets = Liabilities +		Stockholders'
+750		Equity
-750		

Date	Account and Explanation	Debit	Credit
Sept. 30	Cash	750	
	Merchandise Inventory		750
	<i>(Returned defective hiking boots)</i>		

These journal entries illustrate that under a perpetual inventory system, inventory is constantly updated with each purchase so that the net effect of purchases is reflected in the inventory account. The computation of net purchases for Brandon Shoes is summarized in Exhibit 6-8. Although the original invoice price was \$13,750, the consideration of purchase discounts, returns and transportation charges resulted in a much different value in the merchandise inventory account.

**Exhibit 6-8**

**Calculation of Net Purchases**

Invoice price of purchase	\$13,750
Less: Purchase discounts	(100)
Purchase returns and allowances	(750)
Add: Transportation costs (freight-in)	150
Net cost of purchases	<u>\$13,050</u>

## Accounting for Sales of Inventory

In addition to purchase transactions, merchandising companies must also account for the inventory effects of sales and sales returns. Because a perpetual inventory system is being used, the merchandise inventory account is also affected.

**Sales** As discussed in Chapter 5, companies recognize sales revenue when it is earned and the collection of cash is reasonably assured. The recording of sales revenue involves two journal entries. In the first journal entry (discussed in Chapter 5), sales revenue is recognized. The second journal recognizes, consistent with the matching principle, the cost of the goods that are sold. It also reduces the merchandise inventory account so that the perpetual inventory system will reflect an up-to-date balance for inventory.

**Sales Returns** If a customer returns an item for some reason, the company will make an adjustment to sales as shown in Chapter 5. In addition, the company must make a second entry to adjust cost of goods sold and to increase inventory to reflect the return of the merchandise.

**Recording Inventory Effects of Sales Transactions** The use of a perpetual inventory system requires that two journal entries be made for both sales and sales return transactions. These journal entries are illustrated in **Cornerstone 6-3**.

### CONCEPT Q&A

Instead of making two entries to record a sale under a perpetual system, why not just make one entry for the net amount? Wouldn't gross margin be the same?

A system could be developed that combines the two entries necessary to record a sale of merchandise under a perpetual system, however important information would be lost. If an entry were made to an account such as "Gross Margin" for the difference between sales revenue and cost of goods sold, no information would be provided on the gross amount of revenues or cost of goods sold. This loss of information would be inconsistent with the purpose of financial reporting.

**Possible Answer:**

### HOW TO Record Sales Transactions in a Perpetual Inventory System

**Concept:**

The sale or return of inventory in a perpetual system requires two journal entries—one to record the revenue portion of the transaction and one to record the expense (and inventory) portion of the transaction.

**Information:**

On August 1, Brandon Shoes sold 100 pairs of football cleats to the local college football team for \$12,000 cash (each pair of cleats was sold for \$120 per pair). Brandon paid \$10,000 (or \$100 per pair) for the cleats from its supplier. On August 15, the local college football team returned 10 pairs of cleats for a cash refund of \$1,200.

**Required:**

1. Prepare the journal entries to record the sale of the football cleats.
2. Prepare the journal entries to record the return of the football cleats.

**Solution:**

1.	Date	Account and Explanation	Debit	Credit
	Aug. 1	Cash	12,000	
		Sales Revenue		12,000
		<i>(To record sale to customer)</i>		
	1	Cost of Goods Sold	10,000	
		Merchandise Inventory		10,000
		<i>(To record the cost of merchandise sold)</i>		



### CORNERSTONE 6-3



			<b>Stockholders' Equity</b>
<b>Assets</b>	=	<b>Liabilities</b>	+
+12,000			+12,000

			<b>Stockholders' Equity</b>
<b>Assets</b>	=	<b>Liabilities</b>	+
-10,000			-10,000

<b>CORNERSTONE</b>		2.	Date	Account and Explanation	Debit	Credit
<b>6-3</b>						
<i>(continued)</i>			Aug. 15	Sales Returns and Allowances	1,200	
				Cash		1,200
				<i>(To record return of merchandise)</i>		
			15	Merchandise Inventory	1,000	
				Cost of Goods Sold		1,000
				<i>(To record the cost of merchandise returned)</i>		

Assets = Liabilities +	Stockholders' Equity	
-1,200	-1,200	

Assets = Liabilities +	Stockholders' Equity	
+1,000	+1,000	

In each of the transactions in Cornerstone 6-3, the external selling price of \$120 was recorded as Sales Revenue. The cost of goods sold (or inventory) portion of the transaction was recorded at the cost to Brandon Shoes of \$100. Therefore, for each pair of shoes sold, Brandon Shoes made a gross margin of \$20 (\$120 – \$100). The total cost of goods sold recognized by Brandon Shoes is \$9,000 (\$10,000 – \$1,000). *In dealing with sales to customers, it is important to remember to record revenues at the selling price and to record expenses (and inventory) at cost.*

## Costing Inventory

A key feature of the cost of goods sold model illustrated in Cornerstone 6-1 is that the determination of cost of goods sold requires an allocation of the cost of goods available for sale between ending inventory and cost of goods sold. If the prices paid for goods are constant over time, this allocation is easy to compute—just multiply the cost per unit times the number of units on hand at year-end (to determine the cost of ending inventory) or times the number of units sold (to determine the cost of goods sold). The ending inventory and cost of goods sold have the same cost whether it is composed of the oldest units available for sale, the newest units available for sale, or some mixture of the old and new units. For example, if Spiegel Company began operations by purchasing 1,000 units of a single product available for \$24 each, total goods available for sale would be \$24,000 (1,000 units × \$24). If 800 units were sold during the period, the cost of the remaining 200-unit ending inventory is \$4,800 (\$24 × 200 units). Cost of goods sold is \$19,200 (800 units sold × \$24, or \$24,000 – \$4,800). It makes no difference which of the 1,000 units remain in ending inventory.

On the other hand, if the price paid for a good changes over time, the cost of goods available for sale may include units with different costs per unit. In such cases, the question arises: Which prices should be assigned to the units sold and which assigned to the units in ending inventory? For example, assume that Spiegel Company purchased the same total of 1,000 units during a period at different prices as follows:

Jan. 3	300 units purchased at \$22 per unit	=	\$ 6,600
Jan. 15	400 units purchased at \$24 per unit	=	9,600
Jan. 24	300 units purchased at \$26 per unit	=	7,800
	Cost of goods available for sale		\$24,000

While the cost of goods available for sale is the same (\$24,000), the cost of the 200-unit ending inventory depends on which goods remain in ending inventory. If the ending inventory is made up of the \$22 per unit goods:

- The cost of ending inventory is \$4,400 (200 × \$22); and
- The cost of goods sold is \$19,600 (\$24,000 – \$4,400).

If the ending inventory is made up of the \$26 per unit goods,

- The cost of ending inventory is \$5,200 (200 × \$26); and
- The cost of goods sold is \$18,800 (\$24,000 – \$5,200).

The determination of which units are sold and which units remain in ending inventory depend on the selection of the cost allocation method.

One way to resolve this problem is to specifically identify the units sold and their respective costs. If units have serial numbers or some other unique identifier and are relatively few in number, such a procedure is feasible. In most cases, however, specific identification is not a practical means of determining cost of goods sold and ending inventory. Instead of tracking the specific units sold and in inventory, companies usually make simple assumptions about cost flow.

## Inventory Costing Methods

The inventory system (perpetual or periodic) determines *when* cost of goods sold is calculated—for every sales transaction or at the end of the period. An *inventory costing method* determines how costs are allocated to cost of goods sold and ending inventory. Although the assumption about the composition of ending inventory and cost of goods sold could take many different forms—each leading to a different inventory costing method—accountants typically use one of four inventory costing methods<sup>6</sup>:

1. Specific identification
2. First-in, first-out (FIFO)
3. Last-in, first-out (LIFO)
4. Average cost

Each of these four costing methods represents a different procedure for allocating the cost of goods available for sale between ending inventory and cost of goods sold. Only the specific identification method allocates the cost of purchases according to the *physical flow* of specific units through inventory. That is, specific identification is based on a *flow of goods* principle. In contrast, the other three methods—FIFO, LIFO, and average cost—are based on a *flow of cost* principle. When the FIFO, LIFO, or average cost methods are used, the physical flow of goods into inventory and out to the customers is generally unrelated to the flow of unit costs. We make this point here so that you will not be confused in thinking that a cost flow assumption describes the physical flow of goods in a company. *Generally accepted accounting principles do not require that the cost flow assumption be consistent with the physical flow of goods.*

Companies disclose their choice of inventory methods in a note to the financial statements. The 2007 annual report of Wal-Mart includes the following statement:

### Notes to Consolidated Financial Statements

#### 1. Summary of Significant Accounting Policies *Inventories.*

The company values inventories at the lower of cost or market as determined primarily by the retail method of accounting, using the last-in, first-out (“LIFO”) method for substantially all of the Wal-Mart stores segment’s merchandise inventories. Sam’s Club merchandise and merchandise in our distribution warehouses are valued based on the weighted average cost using the LIFO method. Inventories of foreign operations are primarily valued by the retail method of accounting, using the first-in, first-out (“FIFO”) method. At January 31, 2007 and 2006, our inventories valued at LIFO approximate those inventories as if they were valued at FIFO.

Like many companies, Wal-Mart uses more than one method in determining the total cost of inventory. In general, LIFO and FIFO are the most widely used methods. Exhibit 6-9 shows the percentage of companies using each inventory costing method.

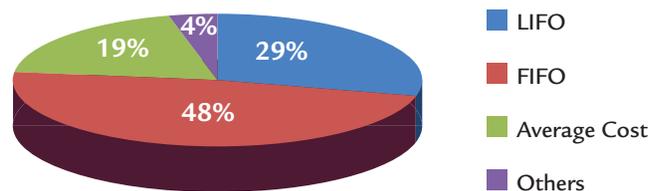
### OBJECTIVE 3

Apply the four inventory costing methods to compute ending inventory and cost of goods sold under a perpetual inventory system.

<sup>6</sup>The following sections on inventory costing methods use the perpetual inventory system. Appendix 6B uses the periodic inventory system.

## Exhibit 6-9

## Use of Inventory Costing Methods



Source: AICPA, *Accounting Trends & Techniques*, 61st edition, 2007, par. 2.63, p. 146.

With the exception of specific identification, the inventory costing methods allocate cost of goods available for sale between ending inventory and cost of goods sold using the following process.

- Step 1: Calculate the cost of goods available for sale *immediately prior* to any sale transaction.
- Step 2: Apply the inventory costing method to determine ending inventory and cost of goods sold.
- Step 3: Repeat steps 1 and 2 for all inventory transactions during the period. The sum of the cost of goods sold computed in step 2 is the cost of goods sold for the period. Ending inventory is the amount computed during the final application of step 2 for the period.

To understand how the inventory costing systems allocate costs (step 2), it is useful to think of inventory as if it were a stack of separate layers, separated by the purchase price. Each time a purchase is made at a unit cost different from that of a previous purchase, a new layer of inventory cost is added to the top of the stack. As inventory is sold it is removed from the stack according to the cost flow assumption used.

### Specific Identification

The **specific identification method** determines the cost of ending inventory and the cost of goods sold based on the identification of the *actual* units sold and in inventory. This method does not require an assumption about the flow of costs but actually assigns cost based on the specific flow of inventory. It requires that detailed records be kept of each purchase and sale be maintained so that a company knows exactly which items were sold and the cost of those items. Historically, this method was practical only for situations in which very few, high-cost items were purchased and sold—for example, a car dealership. With the introduction of bar coding, electronic scanners, and radio frequency identification, this method has become easier to implement, but its application is still relatively rare. The specific identification method is illustrated in **Cornerstone 6-4**.



#### CORNERSTONE 6-4



### HOW TO Apply the Specific Identification Method

#### Concept:

Cost of goods sold and ending inventory are determined based on the identification of the actual units sold and in inventory.

#### Information:

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = \$ 5,000	
20	Purchase 3	150 units @ \$22 = \$ 3,300	
25	Sale 2		300 units @ \$30
Goods available for sale:		1,300 units = \$23,900	Sales: 1,100 units = \$33,000

**CORNERSTONE**  
**6-4**  
*(continued)*

A review of purchase and sales invoices reveals that the following units remain in ending inventory at the end of the month:

Description	Units Sold	Units in Ending Inventory
Beginning Inventory	300	—
Purchase 1	550	50
Purchase 2	170	80
Purchase 3	80	70
Total	<u>1,100</u>	<u>200</u>

**Required:**

1. Compute the cost of ending inventory at October 31 under the specific identification method.
2. Compute the cost of goods sold at October 31 under the specific identification method.

**Solution:**

1. Ending inventory at October 31 is \$4,040, computed as:

50 units @ \$18	\$ 900
80 units @ \$20	1,600
70 units @ \$22	1,540
200 units	<u>\$4,040</u>

2. Cost of goods sold is \$19,860, computed as:

300 units @ \$16	\$ 4,800
550 units @ \$18	9,900
170 units @ \$20	3,400
80 units @ \$22	1,760
1,100 units	<u>\$19,860</u>

Three items are of interest. First, the sum of ending inventory (\$4,040) and cost of goods sold (\$19,860) equals cost of goods available for sale (\$23,900). The specific identification method, like all inventory costing methods, allocates the cost of goods available for sale between ending inventory and cost of goods sold. Second, because there are usually far fewer units in ending inventory than in cost of goods sold, it is often easier to compute the cost of ending inventory and then find the cost of goods sold by subtracting ending inventory from cost of goods available for sale (\$23,900 – \$4,040 = \$19,860). Finally, the determination of inventory cost affects both the

balance sheet and the income statement. The amount assigned to ending inventory will appear on the balance sheet. The amount assigned to cost of goods sold appears on the income statement and is used in the calculation of a company's gross margin.

### First-In, First-Out (FIFO)

The **first-in, first-out (FIFO) method** is based on the assumption that costs move through inventory in an unbroken stream, with the costs entering and leaving the inventory in the same order. In other words, *the earliest (oldest) purchases (the first in) are assumed to be the first sold (the first out) and the more recent purchases are in ending inventory*. Every time that inventory is sold, the cost of the earliest (oldest) purchases that make up cost of goods available for sale is allocated to the cost of goods sold, and the cost of the most recent purchases are allocated to ending inventory. In many instances, this cost flow assumption is an accurate representation of the physical flow of goods. **Cornerstone 6-5** illustrates the application of the FIFO method.



#### CORNERSTONE 6-5



### HOW TO Apply the FIFO Inventory Costing Method

#### Concept:

The cost of the earliest purchases that make up cost of goods available for sale is allocated to cost of goods sold, and the cost of the most recent purchases are allocated to ending inventory.

#### Information:

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = \$ 5,000	
20	Purchase 3	150 units @ \$22 = \$ 3,300	
25	Sale 2		300 units @ \$30
		Goods available for sale: 1,300 units = \$23,900	Sales: 1,100 units = \$33,000

#### Required:

Compute the cost of ending inventory and the cost of goods sold at October 31 using the FIFO method.

#### Solution:

To compute the cost of ending inventory and cost of goods sold, follow these three steps:

**Step 1: Compute the cost of goods available for sale immediately prior to the first sale.** This produces an inventory balance of \$15,600. Notice that this inventory balance is made up of two layers—a \$16 layer and an \$18 layer.

**Step 2: Apply FIFO to determine ending inventory and cost of goods sold.** Under FIFO, you must allocate the cost of goods available for sale between

inventory (the most recent purchases) and cost of goods sold (the earliest purchases).

**CORNERSTONE**  
**6-5**  
*(continued)*

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 1	Beginning inventory	$300 \times \$16 = \$4,800$	
3	Purchase 1 (600 @ \$18)	$300 \times \$16 = \$4,800$ $600 \times \$18 = \$10,800$	} = \$15,600
8	Sale 1 (800 @ \$30)	$100 \times \$18 = \$1,800$	
			$300 \times \$16 = \$4,800$ $500 \times \$18 = \$9,000$ } = \$13,800

**Step 3: Repeat Steps 1 and 2 for the remaining inventory transactions during the period.**

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 8	Inventory on hand	$100 \times \$18 = \$1,800$	$= \$1,800$
15	Purchase 2 (250 @ \$20)	$100 \times \$18 = \$1,800$ $250 \times \$20 = \$5,000$	} = \$6,800
20	Purchase 3 (150 @ \$22)	$100 \times \$18 = \$1,800$ $250 \times \$20 = \$5,000$ $150 \times \$22 = \$3,300$	
25	Sale 2 (300 @ \$30)	$50 \times \$20 = \$1,000$ $150 \times \$22 = \$3,300$	$= \$4,300$
			$100 \times \$18 = \$1,800$ $200 \times \$20 = \$4,000$ } = \$5,800

Ending inventory reported on the balance sheet is \$4,300. Cost of goods sold reported on the income statement is \$19,600, the sum of cost of goods sold during the period (\$13,800 + \$5,800). Because the sum of ending inventory and cost of goods sold (\$4,300 + \$19,600) equals cost of goods available for sale (\$23,900), Tampico could have also calculated cost of goods as the difference between cost of goods available for sale and ending inventory (\$23,900 - \$4,300).

### Last-In, First-Out (LIFO)

The **last-in, first-out (LIFO) method** allocates the cost of goods available for sale between ending inventory and cost of goods sold based on the assumption that the most recent purchases (the last in) are the first to be sold (the first out). Under the LIFO method, *the most recent purchases (newest costs) are allocated to the cost of goods sold and the earliest purchases (oldest costs) are allocated to inventory*. Except for companies that stockpile inventory (e.g., piles of coal, stacks of hay, stacks of rock), this cost flow assumption rarely coincides with the actual physical flow of inventory. **Cornerstone 6-6** illustrates the application of the LIFO method.

Ending inventory reported on the balance sheet is \$3,600. Cost of goods sold reported on the income statement is \$20,300, the sum of cost of goods sold during the period (\$14,000 + \$6,300). Because the sum of ending inventory and cost of goods sold (\$3,600 + \$20,300) equals cost of goods available for sale (\$23,900), Tampico could have also calculated cost of goods as the difference between cost of goods available for sale and ending inventory (\$23,900 - \$3,600).

### Average Cost

The **average cost method** allocates the cost of goods available for sale between ending inventory and cost of goods sold based on a weighted average cost per unit. This



## CORNERSTONE

6 - 6



### HOW TO Apply the LIFO Inventory Costing Method

#### Concept:

The cost of the most recent purchases that make up cost of goods available for sale is allocated to cost of goods sold, and the cost of the earliest (oldest) purchases are allocated to ending inventory.

#### Information:

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = \$ 5,000	
20	Purchase 3	150 units @ \$22 = \$ 3,300	
25	Sale 2		300 units @ \$30
		Goods available for sale: 1,300 units = \$23,900	Sales: 1,100 units = \$33,000

#### Required:

Compute the cost of ending inventory and the cost of goods sold at October 31 using the LIFO method.

#### Solution:

To compute the cost of ending inventory and cost of goods sold, follow these three steps:

**Step 1: Compute the cost of goods available for sale immediately prior to the first sale.** This produces an inventory balance of \$15,600. Notice that this inventory balance is made up of two layers—a \$16 layer and an \$18 layer.

**Step 2: Apply LIFO to determine ending inventory and cost of goods sold.** Under LIFO, you must allocate the cost of goods available for sale between inventory (the earliest purchases) and cost of goods sold (the most recent purchases).

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 1	Beginning inventory	300 × \$16 = \$ 4,800	
3	Purchase 1 (600 @ \$18)	300 × \$16 = \$ 4,800 600 × \$18 = \$10,800	} = \$15,600
8	Sale 1 (800 @ \$30)	100 × \$16 = \$ 1,600	

**Step 3: Repeat Steps 1 and 2 for the remaining inventory transactions during the period.**

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 8	Inventory on hand	100 × \$16 = \$ 1,600	
15	Purchase 2 (250 @ \$20)	100 × \$16 = \$1,600 250 × \$20 = \$5,000	} = \$ 6,600
20	Purchase 3 (150 @ \$22)	100 × \$16 = \$1,600 250 × \$20 = \$5,000 150 × \$22 = \$3,300	
25	Sale 2 (300 @ \$30)	100 × \$16 = \$1,600 100 × \$20 = \$2,000	150 × \$22 = \$3,300 150 × \$20 = \$3,000 } = \$6,300

weighted average cost per unit is calculated after each purchase of inventory as follows:

$$\text{Weighted Average Cost per Unit} = \frac{\text{Cost of Goods Available for Sale}}{\text{Units Available for Sale}}$$

Because a new average is computed after each purchase, this method is often called the moving-average method. This weighted average cost per unit is then multiplied by (1) the number of units sold to determine cost of goods sold and (2) the units on hand to determine ending inventory. **Cornerstone 6-7** illustrates the application of the average cost method.

## HOW TO Apply the Average Cost Inventory Costing Method

### Concept:

The cost of goods available for sale is allocated between ending inventory and cost of goods sold based on a weighted average cost of the goods available for sale.

### Information:

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = \$ 5,000	
20	Purchase 3	150 units @ \$22 = \$ 3,300	
25	Sale 2		300 units @ \$30
		Goods available for sale:	Sales: 1,100 units
		1,300 units = \$23,900	= \$33,000

### Required:

Compute the cost of ending inventory and the cost of goods sold at October 31 using the average cost method.

### Solution:

To compute the cost of ending inventory and cost of goods sold, follow these three steps:

**Step 1: Compute the cost of goods available for sale immediately prior to the first sale.** This produces an inventory balance of \$15,600.

**Step 2: Apply the average cost method to determine ending inventory and cost of goods sold.** Under the average cost method, you must allocate the cost of goods available for sale between inventory and cost of goods sold using a weighted average cost per unit. The weighted average cost is computed by taking the goods available for sale and dividing it by the number of units available for sale. This produces a weighted average cost prior to the October 8 sale of \$17.333 per unit ( $\$15,600 \div 900$  units).

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 1	Beginning inventory	300 × \$16 = \$ 4,800 (\$16 /unit)	
3	Purchase 1 (600 @ \$18)	300 × \$16 = 4,800 } 600 × \$18 = 10,800 } = \$15,600 (\$17.3333/unit) <sup>a</sup>	
8	Sale 1 (800 @ \$30)	100 × \$17.3333 = \$ 1,733	800 × 17.3333 = \$13,867

<sup>a</sup> \$15,600 ÷ 900 units = \$17.3333/unit



## CORNERSTONE 6-7



## CORNERSTONE 6-7 (continued)

**Step 3: Repeat Steps 1 and 2 for the remaining inventory transactions during the period.**

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 8	Inventory on hand	100 × \$17.3333 = \$ 1,733 (17.3333/unit)	
15	Purchase 2 (250 @ \$20)	100 × \$17.3333 = 1,733 250 × \$20.00 = 5,000	} = \$ 6,733 (19.2371/unit) <sup>b</sup>
20	Purchase 3 (150 @ \$22)	350 × \$19.2371 = 6,733 150 × \$22.00 = 3,300	
25	Sale 2 (300 @ \$30)	200 × \$20.0660 = \$ 4,013	300 × 20.0660 = \$6,020

<sup>b</sup> \$6,733 ÷ 350 units = \$19.2371/unit

<sup>c</sup> \$10,033 ÷ 500 units = \$20.0660/unit

Ending inventory reported on the balance sheet is \$4,013. Cost of goods sold reported on the income statement is \$19,887, the sum of cost of goods sold during the period (\$13,867 + \$6,020). Because the sum of ending inventory and cost of goods sold (\$4,013 + \$19,887) equals cost of goods available for sale (\$23,900), Tampico could have also calculated cost of goods as the difference between cost of goods available for sale and ending inventory (\$23,900 – \$4,013).

The average cost method results in an allocation to ending inventory and cost of goods sold that is somewhere between the allocation produced by FIFO and the allocation produced by LIFO.

### OBJECTIVE 4

Analyze the financial reporting and tax effects of the various inventory costing methods.

## Analysis of Inventory Costing Methods

Accounting policy decisions concerning inventory can have major effects on the financial statements. Proper management of these decisions, within the bounds of generally accepted accounting principles and good business ethics, can also affect the timing of income tax payments and the judgments of creditors, stockholders, and others involved in the company's affairs. Thus, it is important to understand the consequences of these accounting choices.

## CONCEPT Q&A

Why doesn't the FASB simply mandate the most conceptually correct inventory costing method instead of giving companies a choice between alternative methods?

*All inventory costing methods provide an allocation of the total dollar amount of goods available for sale between ending inventory and cost of goods sold. No one cost method is conceptually superior to any other. For example, LIFO actually achieves a better matching of current costs with current revenues on the income statement; however, the resulting balance sheet valuation can be quite misleading about the current market value of inventory on the balance sheet. Companies make the choice between inventory methods for a variety of reasons unique to their own situation. Some companies will adopt LIFO for the tax benefits, while others will adopt FIFO because they want to report higher profits or simply because FIFO is less expensive to implement.*

**Possible Answer:**

## Financial Statement Effects of Alternative Costing Methods

Although companies cannot readily change from one inventory costing method to another, financial statement analysts frequently ask the hypothetical question, "How much would inventory and income have been if a different costing method had been used?" If the prices paid for purchased inventory are stable, all inventory costing methods will yield the same amounts for ending inventory and cost of goods sold. However, when purchase prices vary, FIFO, LIFO and the average cost methods will produce different amounts for ending inventory, cost of goods sold and, therefore, income. To properly analyze financial statements, it is necessary to understand the impact of changing prices on inventories and income.

To illustrate, consider the inventory data for Tampico Beachwear, which had revenues for the period of \$33,000 (1,100 units sold × \$30 per unit) and operating expenses of \$4,000 (assumed amount). This information and the related

## Exhibit 6-10

## Financial Statement Effects of Alternative Inventory Costing Methods

Tampico Beachwear Condensed Income Statements For the month ending October 31				
	FIFO	LIFO	Average Cost	
Sales	\$33,000	\$33,000	\$33,000	\$33,000
Beginning inventory	\$ 4,800	\$ 4,800	\$ 4,800	\$ 4,800
Add: Purchases	19,100	19,100	19,100	19,100
Cost of goods available for sale	<u>\$23,900</u>	<u>\$23,900</u>	<u>\$23,900</u>	<u>\$23,900</u>
Less: Ending inventory	<u>4,300</u>	<u>3,600</u>	<u>4,013</u>	
Cost of goods sold	19,600	20,300	19,887	
Gross margin	<u>\$13,400</u>	<u>\$12,700</u>	<u>\$13,113</u>	
Operating expenses	4,000	4,000	4,000	
Income before taxes	<u>\$ 9,400</u>	<u>\$ 8,700</u>	<u>\$ 9,113</u>	
Income tax expense (30%)	2,820	2,610	2,734	
Net income	<u>\$ 6,580</u>	<u>\$ 6,090</u>	<u>\$ 6,379</u>	

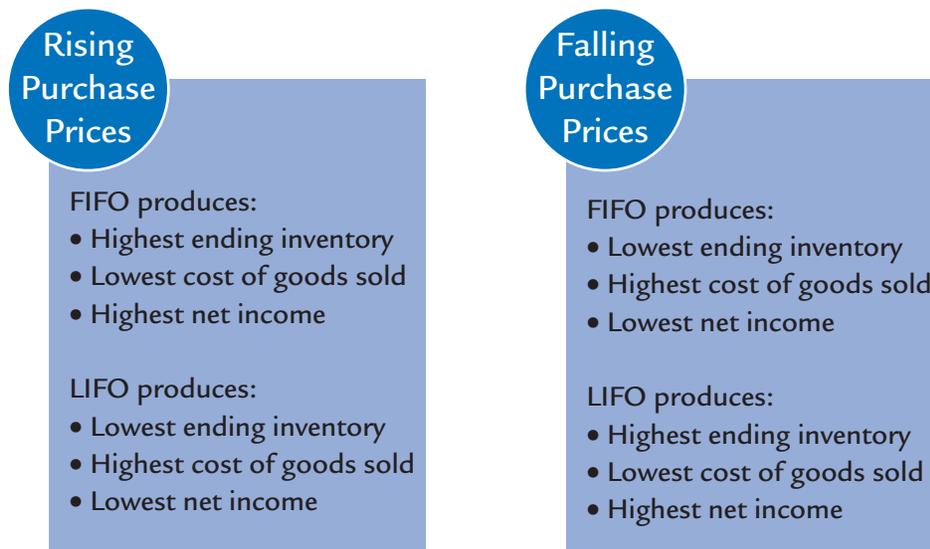
FIFO, LIFO, and average cost inventory calculations in Cornerstones 6-5 through 6-7 produced the income statement amounts shown in Exhibit 6-10.

Notice that sales, purchases, and cost of goods available for sale are the same for each company. However the changing purchase prices of each inventory layer result in different amounts for cost of goods sold, gross margin, and net income.

When *purchase prices are rising*, as they are in our example (remember that shoes went from \$16 to \$18 to \$20 to \$22), the FIFO method produces the highest cost for ending inventory, the lowest cost of goods sold, and, therefore, the highest gross margin (and net income) of the three methods. In contrast, the LIFO method produced the lowest cost for ending inventory, the highest cost of goods sold, and, therefore, the lowest gross margin (and net income) of the three methods. The average cost method produced amounts for inventory, cost of goods sold and net income that fell between the FIFO and LIFO extremes. When purchase prices are *falling*, the situation is reversed. Exhibit 6-11 summarizes these relationships.

## Exhibit 6-11

## Financial Statement Effects of Alternative Inventory Costing Methods



Thus, during periods of rising prices, we expect LIFO companies to report lower amounts for inventory cost and higher amounts for cost of goods sold than comparable FIFO companies. And during periods of falling prices, we expect LIFO companies to report higher amounts of inventory cost and lower amounts for cost of goods sold than comparable FIFO companies.<sup>7</sup> Due to these effects, it can be argued that:

- LIFO results in the more realistic amount for income because it matches the most current costs, which are closer to the current market value, against revenue.
- FIFO results in the more realistic amount for inventory because it reports the most current costs, which are closer to the current market value, on the balance sheet.

To assist in comparisons between companies that prepare their financial statements under different inventory costing methods, companies that use LIFO are required to report the amount that inventory would increase (or decrease) if the company had used FIFO. This amount is referred to as the **LIFO reserve**. For example, **General Mills**' disclosure of its LIFO reserve for 2007 is shown in Exhibit 6-12.

This disclosure shows that inventories would have been \$78 million higher under FIFO for the 2007 fiscal year. Analysts can adjust the inventory amount by substituting in the FIFO inventory values (\$1,252 million and \$1,117 million for 2007 and 2006, respectively) for the LIFO values reported on the balance sheet. In addition, income would have been higher under FIFO by \$16 million (\$78 million – \$62 million)—the difference between the LIFO reserve for 2007 and 2006.

### Exhibit 6-12

#### LIFO Reserve Disclosure

General Mills Inc. Notes to Consolidated Financial Statements Note 17: Supplemental Information (in part):		
(in millions)	May 27, 2007	May 28, 2006
Inventories:		
..... (components) at FIFO	\$1,252	\$1,117
Excess of FIFO or weighted average cost over LIFO	(78)	(62)
Inventories, at LIFO	<u>\$1,174</u>	<u>\$1,055</u>

## DECISION-MAKING & ANALYSIS

### LIFO Liquidations

Tomlinson Health Management is an aggressively managed new business that provides pharmacy services to retirement communities, nursing homes, and small hospitals in a three-state area. In order to secure tax benefits, Tomlinson uses LIFO for most of its inventories. Tomlinson's business has become increasingly competitive in recent years and the current year's income has taken a significant step down. Avery Tomlinson, the principal stockholder and CEO, has instructed the purchasing department to hold year-end inventories to the absolute minimum.

#### 1. What is the structure of the LIFO inventory?

Tomlinson's inventory has grown over a period of years. The LIFO inventory is composed of layers, each one representing a year's contribution to the inventory at the earliest purchase prices of that year. During a period of rising prices, the LIFO inventory will be made up of the relatively older costs trapped in the LIFO layers. If the quantity of inventory falls, some of these older costs, with

<sup>7</sup> An exception to the relationships described in Exhibit 6-12 occurs when the quantity of inventory drops, releasing old LIFO layers to cost of goods sold. If inventory drops when prices have been rising, LIFO results in higher net income than FIFO, as explained in the "LIFO reserve" analysis section. On the other hand, if inventory drops when prices have been falling, LIFO results in lower net income than FIFO.

relatively low unit prices, will be released to cost of goods sold. This produces a lower cost of goods sold, and higher income, than one computed at current FIFO prices.

2. *What motivates Mr. Tomlinson to reduce inventories?*

Mr. Tomlinson may be engaging in the questionable practice of “earnings management.” Reducing inventories releases old, low-priced LIFO layers to the income statement, lowering cost of goods sold and raising net income. Of course, Tomlinson’s act may also raise current income taxes and impair business operations due to insufficient quantities of inventory.

## Income Tax Effects of Alternative Costing Methods

We have seen that in periods of rising prices, LIFO allocates the newest—and therefore highest—inventory purchase prices to cost of goods sold. Higher cost of goods sold produces lower gross margin and lower income. Thus, in periods of rising prices, businesses tend to choose LIFO for computing taxable income, because it produces the lowest current taxable income and the lowest current income tax payment. In Exhibit 6-10, LIFO produced income tax expense of \$2,610 compared to income tax expense of \$2,820 if FIFO had been used.

Of course, in the long-run, all inventory costs will find their way to cost of goods sold and, therefore, the income statement. When inventory levels fall, old (low-price) LIFO layers become part of cost of goods sold, taxable income rises, and higher taxes are paid. Thus, choosing LIFO to minimize current taxes does not avoid the payment of taxes; it merely postpones it, temporarily reducing the company’s capital requirements for a period of time. The federal income tax code requires businesses that use LIFO for tax purposes to use LIFO for financial reporting purposes as well. This is known as the LIFO conformity rule.

## Consistency in Application

Although each of the four inventory costing methods is acceptable, once a business adopts a particular costing method for an item, it must continue to use it consistently over time.<sup>8</sup> The consistent application of an accounting principle over time discourages changes in accounting methods from one period to another, even if acceptable alternative methods exist. This enhances the comparability and usefulness of accounting information. A change in accounting method may still be made; however, the effects of the change must be fully disclosed. The consistent application of accounting methods and the required disclosures of any accounting changes permit readers of financial statements to assume that accounting methods do not change over time unless specifically indicated.

## Lower of Cost or Market Rule

The inventory accounting procedures described to this point have followed the historical cost principle—inventory is recorded in the firm’s records at its historical purchase price (or cost). The price for which inventory items can be sold (that is, in their market value) may decline because the goods have become obsolete, damaged, or have otherwise diminished in value. For example, clothes that have gone out of style due to changing fashions or seasons have declined in value. Similarly, technology companies experience rapid obsolescence due to rapidly changing technologies. In cases where the market value of inventory has dropped below its original cost, generally accepted accounting principles permit a departure from the historical cost concept.

This departure from the historical cost principle is called the **lower of cost or market (LCM) rule**. Under LCM, if the market value of a company’s inventory is

### OBJECTIVE > 5

Apply the lower of cost or market rule to the valuation of inventory.

<sup>8</sup>All items of inventory need not be accounted for by the same costing method. Many companies use LIFO for a portion of inventory for which prices are expected to rise and FIFO or average cost for the portion of inventory for which prices are not expected to rise.

lower than its cost, the company reduces the amount recorded for inventory to its market value. To apply LCM, a company must first determine the cost of its inventory using one of the inventory costing methods discussed earlier in the chapter (specific identification, FIFO, LIFO, or average cost). Next, the company will establish the market value of the inventory. Under LCM, market value is defined as current *replacement cost*, the current purchase price for identical goods.<sup>9</sup> Finally, the market value is compared with historical cost (usually on an item-by-item basis), and the lower of market value or historical cost is used as the cost for the inventory on the financial statements.

**Cornerstone 6-8** illustrates the application of the LCM rule.



## CORNERSTONE 6-8



### HOW TO Value Inventory at Lower of Cost or Market

#### Concept:

Inventory should be conservatively valued at the lower of its cost or market value.

#### Information:

MacKenzie Electronics prepared the following analysis of its inventory at December 31:

Product	Quantity	Historical Cost per Item	Replacement Cost (Market Value) per Item
42" LCD HDTV	12	\$1,000	\$1,100
50" Plasma HDTV	7	1,300	1,000
DVD Recorders	20	120	100

#### Required:

- Determine the lower of cost or market value for each item of inventory.
- Prepare the journal entry needed on December 31 to value the inventory at LCM.

#### Solution:

- The LCM amounts are shown in the last column of the analysis below:

Product	Cost	Market Value	Lower of Cost or Market
42" LCD HDTV	\$12,000 (12 × \$1,000)	\$13,200 (12 × \$1,100)	\$12,000
50" Plasma HDTV	9,100 (7 × \$1,300)	7,000 (7 × \$1,000)	7,000
DVD Recorders	2,400 (20 × \$ 120)	2,000 (20 × \$ 100)	2,000
	<u>\$23,500</u>	<u>\$22,200</u>	<u>\$21,000</u>

- To apply LCM, the inventory must be reduced by \$2,500 (\$23,500 – \$21,000) as follows:

Date	Account and Explanation	Debit	Credit
Dec. 31	Cost of Goods Sold	2,500	
	Merchandise Inventory		2,500
	(To reduce the inventory to market value)		

Assets = Liabilities +	Stockholders' Equity
-2,500	-2,500

<sup>9</sup>In determining the replacement cost (market value) of inventory, a company is subject to two constraints. First, the replacement cost cannot be more than the net realizable value (selling price less costs to sell) of the inventory. Second, replacement cost cannot be less than the net realizable value less a normal profit margin (markup). This concept is discussed more fully in intermediate accounting texts.

Note that the market value of the LCD HDTVs is greater than its historical cost; however, for the other two products, historical cost is greater than market value. Thus only the plasma HDTVs and the DVD recorders are reduced to market; the LCD HDTVs remain at historical cost. The journal entry reduces inventory to its market value, and the loss is recorded as an increase to cost of goods sold in the period that the market value of the item dropped.

The LCM rule is an application of the conservatism principle. The *conservatism principle* leads accountants to select the accounting methods or procedures that produce the lowest (most conservative) net income and net assets in the current period. Thus, accountants tend to recognize expenses and losses as early as possible and to recognize gains and revenues as late as possible. By conservatively valuing inventory, the LCM rule is designed to avoid overstating the current earnings and financial strength of a company. Of course, accelerating the recognition of expenses or losses and delaying recognition of revenues or gains moves them to a future period. Consequently, to the extent that conservatism produces understatements of net income and net assets in the current period, it also produces equal overstatements of net income and net assets in one or more later periods.

## CONCEPT Q&A

If FASB allows us to reduce the value of inventory to market value when the market value is less than cost, why can't we also increase the value of inventory when the market value is greater than cost?

For the same reason that the conservatism principle allows us to write inventory down to market value, it prevents us from writing inventory up to market value. Given uncertainty as to the actual future selling price of the inventory, a prudent reaction would be to avoid being overly optimistic about the company's future prospects. Overly optimistic projections of the future usually have far more serious negative consequences for people relying on the financial statements than do understatements.

Possible Answer:

## DECISION-MAKING & ANALYSIS

### LCM and the Overvaluation of Inventory

PC Location, Inc. operates six computer stores in the Chicago area. Several months before year-end, PC Location took delivery on 500 laptop computers purchased from Dell at \$800 per unit. By the end of the year, the computers have reached the stores, where they have been offered at a price of \$1,000; but few have sold. In mid-December, Dell announces a new, much improved laptop model with a suggested retail price of \$1,500.

As controller of PC Location, you are required to prepare the year-end financial statements for review by the external auditor. You know that PC Location is currently negotiating with Second Chicago Bank to increase its long-term loan as a basis for further expansion of its stores. Second Chicago has said it wants an early look at PC Location's financial statements for the current year. You also know that the 450 Dell laptops remaining in inventory are obsolete and are likely to sell for about \$400 each—which should be treated as their market value for financial reporting purposes.

You tell the chief executive officer (CEO) that operating income for the year has taken a \$180,000 hit [450 laptops × (\$800 – \$400)] as a result of the ill-considered laptop purchase and resulting inventory write-down. But she asks you to put off recognizing the write-down until Second Chicago has seen the preliminary financial statements. "Let the auditors write down the inventory when they show up in February," she says. "That's what we pay them for."

1. What are the personal consequences for you, if you do as the CEO asks? If you refuse?

If you agree to ignore the required lower of cost or market adjustment, Second Chicago may decide to grant the loan on the basis of the misleading financial statements. But when they receive the audited financial statements several months later, an investigation will no doubt be launched, and you are likely to take the blame. Of course, if you refuse to go along with the CEO, you may find yourself unemployed.

2. What are the consequences for PC Location?

Playing games with unaudited financial statements in order to mislead a lender can permanently damage the business' access to capital. The truth will eventually be told in the audited financial statements. It's rarely, if ever, worth the risk.

3. What should you do in this situation?

You should be prepared to support your adjustment and to argue the disastrous consequences of trying to mislead Second Chicago. You should also be prepared to present alternatives to proceeding with the new loan at this time. Perhaps the expansion can be deferred until the business can demonstrate that its earnings have recovered from the misguided purchase. Of course, the CEO may be adamant, and you may pay a personal price.

**OBJECTIVE** > **6**

Evaluate inventory management using the gross profit and inventory turnover ratios.

## Analyzing Inventory

As noted at the first of the chapter, inventories are at the heart of many companies' operations and must be carefully controlled and accounted for. Two measures of how successful a company is at managing and controlling its inventory are the gross profit ratio and inventory turnover.

### Key Performance Measures

The **gross profit ratio**,  $\text{gross profit} \div \text{net sales}$ , is carefully watched by managers, investors, and analysts as a key indicator of a company's ability to sell inventory at a profit. In short, the gross profit ratio tells us how many cents of every dollar are available to cover expenses other than cost of goods sold and to earn a profit. An increasing gross profit ratio could signal that a company is able to charge more for its products due to high demand or has effectively controlled the cost of its inventory. A decrease in this ratio could signal trouble. For example, a company may have reduced its selling price due to increased competition or it is paying more for its inventory.

The **inventory turnover ratio**,  $\text{cost of goods sold} \div \text{average inventory}$ , describes how quickly inventory is purchased (or produced) and sold. Companies want to satisfy the conflicting goals of having enough inventory on hand to meet customer demand while minimizing the cost of holding inventory (e.g., storage costs, obsolescence). Inventory turnover provides an indicator of how much of the company's funds is tied up in inventory. High inventory turnover ratios indicate that a company is rapidly selling its inventory, thus reducing inventory costs. Low inventory turnover reflects that the company may be holding too much inventory, thereby incurring avoidable costs or signaling that demand for a company's products has fallen. By dividing inventory turnover by 365 days, financial statement users can compute the **average days to sell inventory**. **Cornerstone 6-9** illustrates the analysis of these performance measures for Wal-Mart.



### CORNERSTONE 6-9



### HOW TO Calculate the Gross Profit and Inventory Turnover Ratios

**Concept:**

The gross profit and inventory turnover ratios provide measures of how successful a company is at managing and controlling its inventory.

**Information:**

The following information (in millions) is available for Wal-Mart for its fiscal year ending January 31, 2007:

Net sales	\$344,992	Inventory, 1/31/2006	\$31,910
Cost of goods sold	264,152	Inventory, 1/31/2007	33,685

**Required:**

1. Compute the gross profit ratio for Wal-Mart for 2007.
2. Compute the inventory turnover ratio and the average days to sell inventory for Wal-Mart for 2007.

**Solution:**

1. Wal-Mart's gross profit (margin) is \$80,840 (\$344,992 net sales – \$264,152 cost of sales). Using this gross margin, Wal-Mart's gross profit ratio is:

$$\begin{aligned} \text{Gross Profit Ratio} &= \frac{\text{Gross Profit}}{\text{Net Sales}} \\ &= \frac{\$80,840}{\$344,992} \\ &= 0.234 \text{ or } 23.4\% \end{aligned}$$

2. Inventory turnover and average days to sell inventory are:

$$\begin{aligned} \text{Inventory Turnover Ratio} &= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} \\ &= \frac{\$264,152}{(\$31,910 + \$33,685) \div 2} = 8.054 \end{aligned}$$

$$\text{Average Days to Sell Inventory} = \frac{365 \text{ days}}{\text{Inventory Turnover}} = \frac{365}{8.054} = 45.319 \text{ days}$$

**CORNERSTONE**  
**6-9**  
*(continued)*

Wal-Mart's gross profit ratio of 23.4 percent, while smaller than the industry average of 27.10 percent<sup>10</sup>, was still up 0.2 percent from the previous year. In its MD&A, Wal-Mart attributed this increase to improved margins in its general merchandise and food areas. Additionally, Wal-Mart notes that the lower than industry average gross margin was driven by the increasing percentage of its business in lower-margin food areas. Wal-Mart's inventory turnover of 8.054 times is greater than the industry average of 6.59. It takes Wal-Mart, on average, approximately 45 days to sell its inventory. While its margin is lower than the industry average, the higher inventory turnover suggests that Wal-Mart is efficiently managing its inventory, which is good news for Wal-Mart's profitability.

## Effects of Inventory Errors

The cost of goods sold model, illustrated in Cornerstone 6-1, describes the relationship between inventory and cost of goods sold. This relationship implies that the measurement of inventory affects both the balance sheet and the income statement. Even with recent technological advances, it is easy to make errors in determining the cost of the hundreds of items in a typical ending inventory. Incorrect counts, mistakes in costing, or errors in identifying items are common. Because the ending inventory of one period is the beginning inventory of the next period, errors in the measurement of ending inventory affect two accounting periods.

To illustrate the effect of an error in valuing ending inventory on the financial statements, consider the information in Exhibit 6-13. The "Correct" column shows the financial statements for 2009 and 2010 as they would appear if no error were made. The "Erroneous" column shows the financial statements for the two years as they would appear if the firm understated its inventory at December 31, 2009, as a result of miscounting or in some other way undervaluing inventory by \$15,000. The "Error" column describes the effect of the error on each line of the statements.

The understatement of the 2009 ending inventory causes an overstatement of 2009 cost of goods sold. Thus, gross margin for 2009 is understated by \$15,000. Ignoring income taxes, this error would then flow into both net income and retained earnings for 2009. However, the effect is not limited to 2009. Because the ending inventory for 2009 is the beginning inventory for 2010, the beginning inventory for 2010 is understated by \$15,000. Assuming no other errors are made, this would lead to an understatement of cost of goods sold and an overstatement of gross margin (and net income) by \$15,000. However, notice that when this flows into retained earnings, the understatement in 2009 is offset by the overstatement in 2010 so that

### OBJECTIVE 7

Describe how errors in ending inventory affect income statements and balance sheets.

<sup>10</sup>Industry average ratios were obtained from Reuters.

## Exhibit 6-13

## Effects of an Inventory Error

(amounts in thousands)		Correct	Erroneous	Error*
2009 Financial Statements	<b>Income Statement (partial)</b>			
	Sales	\$500	\$500	
	Cost of goods sold:			
	Beginning inventory	\$ 50	\$ 50	
	Purchases	250	250	
	Cost of goods available for sale	\$300	\$300	
	Less: Ending inventory	60	45	-\$15
	Cost of goods sold	240	255	+\$15
Gross margin	\$260	\$245	-\$15	
2009 Financial Statements	<b>Balance Sheet (partial)</b>			
	Inventory	\$ 60	\$ 45	-\$15
	Retained earnings	\$100	\$ 85	-\$15
2010 Financial Statements	<b>Income Statement (partial)</b>			
	Sales	\$600	\$600	
	Cost of goods sold:			
	Beginning inventory	\$ 60	\$ 45	-\$15
	Purchases	290	290	
	Cost of goods available for sale	\$350	\$335	-\$15
	Less: Ending inventory	50	50	
	Cost of goods sold	300	285	-\$15
Gross margin	\$300	\$315	+\$15	
2010 Financial Statements	<b>Balance Sheet (partial)</b>			
	Inventory	\$ 50	\$ 50	
	Retained earnings	180	180	

\* A minus sign (–) indicates an understatement and a plus sign (+) indicates an overstatement.

retained earnings is correctly stated by the end of 2010. This illustrates the self-correcting nature of inventory errors.

**Cornerstone 6-10** illustrates the analysis of inventory errors.



## CORNERSTONE 6-10



### HOW TO Analyze Inventory Errors

#### Concept:

Errors in the measurement of ending inventory will affect both the current and subsequent period balance sheet as well as the current period income statement.

#### Information:

Dunn Corporation reported net income of \$75,000 for 2009. Early in 2010, Dunn discovers that the December 31, 2009 ending inventory was overstated by \$6,000.

#### Required:

Determine the financial statement effects of the inventory errors for 2009 and 2010.

#### Solution:

For 2009, assets (ending inventory) are overstated by \$6,000. Using the cost of goods sold model, cost of goods sold is equal to cost of goods available for sale less ending inventory. The overstatement of ending inventory causes an understatement of cost of goods sold (an expense) by \$6,000. This error flows through to income and retained earnings (equity). Because the ending inventory for 2009 is the beginning inventory for 2010, the error has the opposite

effects on income for 2010. Assuming no other errors are made, the inventory error self-corrects and the 2010 balance sheet is correctly stated. These effects are summarized below.

**CORNERSTONE**  
**6-10**  
*(continued)*

	Assets	Liabilities	Equity	Revenues	Expenses	Income
<b>2009</b>	\$6,000 overstated	No effect	\$6,000 overstated	No effect	\$6,000 understated	\$6,000 overstated
<b>2010</b>	No effect	No effect	No effect	No effect	\$6,000 overstated	\$6,000 understated

Even though inventory errors are self-correcting over two periods, it is still necessary to correct them in order to produce properly stated financial information. If the error is not corrected, both income statements and the 2009 balance sheet will be incorrect. The correction of errors is covered in intermediate accounting.

## Summary of Learning Objectives

### LO1. Describe the types of inventories held by merchandisers and manufacturers, and understand how inventory costs flow through a company.

- Merchandising companies hold one type of inventory termed merchandise inventory.
- Manufacturing companies have three types of inventory—raw materials, work-in-process, and finished goods.
- When goods are purchased, the cost of the purchase is recorded in merchandise inventory (for merchandisers) or raw materials inventory (for manufacturers). During the production process, manufacturers record the cost (raw materials, labor, and overhead) in work-in-process and then transfer the cost to finished goods inventory when the product is complete.
- Once the product is sold, the cost is transferred out of the inventory account (either Merchandise Inventory or Finished Goods) and into Cost of Goods Sold to match it with sales revenue.
- The relationship between inventory and cost of goods sold is described by the cost of goods sold model.

### LO2. Explain how to record purchases and sales of inventory using a perpetual inventory system.

- In a perpetual inventory system, purchases of inventory are recorded by increasing the inventory account.
- If a purchase discount exists, inventory is reduced by the amount of the discount taken.
- When a purchased item is returned (purchase return) or a price reduction is granted by the seller (purchase allowance), the inventory item is reduced by the amount of the purchase return or allowance given.
- If transportation costs exist and the shipping terms are F.O.B. shipping point, the transportation costs are considered part of the total cost of purchases and the inventory account is increased.
- If transportation costs exist and the shipping terms are F.O.B. destination, the seller pays these costs and records them as a selling expense on the income statement.
- In a perpetual inventory system, sales are recorded through two journal entries: (1) record the sales revenue, and (2) increase Cost of Goods Sold and decrease the inventory account.

- If an item is later returned, two entries must also be made: (1) increase Sales Returns and Allowances (a contra-revenue account), and (2) increase the inventory account and decrease Cost of Goods Sold.

**LO3. Apply the four inventory costing methods to compute ending inventory and cost of goods sold under a perpetual inventory system.**

- The four inventory costing methods are: specific identification; first-in, first-out (FIFO); last-in, first-out (LIFO); and average cost.
- The specific identification method determines the cost of ending inventory and the cost of goods sold based on the identification of the actual units sold and in inventory.
- The other three inventory costing methods allocate cost of goods available for sale between ending inventory and cost of goods sold using the following process.

Step 1: Calculate the cost of goods available for sale *immediately prior* to any sale transaction.

Step 2: Apply the inventory costing method to determine ending inventory and cost of goods sold.

Step 3: Repeat steps 1 and 2 for all inventory transactions during the period. The sum of the cost of goods sold computed in step 2 is the cost of goods sold for the period. Ending inventory is the amount computed during the final application of step 2 for the period.

**LO4. Analyze the financial reporting and tax effects of the various inventory costing methods.**

- If the prices paid for purchased inventory are stable, all inventory costing methods will yield the same amounts for ending inventory and cost of goods sold.
- When purchase prices vary, FIFO, LIFO and the average cost methods will produce different amounts for ending inventory, cost of goods sold and, therefore, income.
- When prices are rising, the FIFO method produces the highest cost for ending inventory, the lowest cost of goods sold, and the highest gross margin (and net income).
- In contrast, the LIFO method produced the lowest cost for ending inventory, the highest cost of goods sold, and, therefore, the lowest gross margin (and net income) of the three methods. Because LIFO results in lower income, it results in the lowest income taxes.
- When purchase prices are *falling*, the situation is reversed.
- The average cost method produced amounts for inventory, cost of goods sold, and net income that fell between the FIFO and LIFO extremes.

**LO5. Apply the lower of cost or market rule to the valuation of inventory.**

- If the market value of inventory has dropped below its original cost, generally accepted accounting principles permit a departure from the historical cost concept.
- A company is allowed to reduce the amount recorded for inventory to its market value, where market value is defined as the current replacement cost.
- This lower of cost or market rule is an application of the conservatism principle.

**LO6. Evaluate inventory management using the gross profit and inventory turnover ratios.**

- Two useful measures of how successful a company is at managing and controlling its inventory are the gross profit ratio (gross profit  $\div$  net sales) and the inventory turnover ratio (cost of goods sold  $\div$  average inventory).
- The gross profit ratio indicates how many cents of every dollar are available to cover expenses other than cost of goods sold and to earn a profit.
- The inventory turnover ratio describes how quickly inventory is purchased (or produced) and sold.

**LO7. Describe how errors in ending inventory affect income statements and balance sheets.**

- Inventory errors can arise for a number of reasons, including incorrect counts of inventory, mistakes in costing, or errors in identifying items.
- Because the ending inventory of one period is the beginning inventory of the next period, an error in the measurement of ending inventory will affect the cost of goods sold and net income of two consecutive periods.
- Inventory errors are self-correcting, therefore, the assets and stockholders' equity of only the first period are misstated (assuming no other errors are made).

**CORNERSTONE 6-1** How to apply the cost of goods sold model, page 286

**CORNERSTONE 6-2** How to record purchase transactions in a perpetual inventory system, page 291

**CORNERSTONE 6-3** How to record sales transactions in a perpetual inventory system, page 293

**CORNERSTONE 6-4** How to apply the specific identification method, page 296

**CORNERSTONE 6-5** How to apply the FIFO inventory costing method, page 298

**CORNERSTONE 6-6** How to apply the LIFO inventory costing method, page 300

**CORNERSTONE 6-7** How to apply the average cost inventory costing method, page 301

**CORNERSTONE 6-8** How to value inventory at lower of cost or market, page 306

**CORNERSTONE 6-9** How to calculate the gross profit and inventory turnover ratios, page 308

**CORNERSTONE 6-10** How to analyze inventory errors, page 310



## CORNERSTONES FOR CHAPTER 6

## Key Terms

Average cost method, 299

Average days to sell inventory, 308

Cost of goods available for sale, 285

Cost of goods sold, 282

Discount period, 289

First-in, first-out (FIFO) method, 298

F.O.B. destination, 291

F.O.B. shipping point, 290

Freight-in, 291

Freight-out, 291

Gross margin (gross profit), 282

Gross profit ratio, 308

Inventory, 282

Inventory turnover ratio, 308

Last-in, first-out (LIFO) method, 299

LIFO reserve, 304

Lower of cost or market (LCM) rule, 305

Merchandise inventory, 283

Periodic inventory system, 287

Perpetual inventory system, 287

Purchase allowance, 290

Purchase discounts, 289

Purchase returns, 290

Purchases, 289

Specific identification method, 296

**OBJECTIVE** > **8**

Explain how to record purchases of inventory using a periodic inventory system.

## Appendix 6A: Periodic Inventory System

In a periodic inventory system, the inventory records are not kept continually, or perpetually, up-to-date. Instead, under a periodic inventory system, the inventory account is updated at the end of the period based on a physical count of the inventory on hand. The balance in the Merchandise inventory account remains unchanged during the period. As purchase transactions occur, they are recorded in one of four temporary accounts: Purchases, Purchase Discounts, Purchase Returns and Allowances, or Transportation-In.

- The purchases account accumulates the cost of the inventory acquired during the period.
- The purchase discounts account accumulates the amount of discounts on purchases taken during the period.
- The purchase returns and allowances account accumulates the cost of any merchandise returned to the supplier or any reductions (allowances) in the purchase price granted by the seller.
- The transportation-in account accumulates the cost paid by the purchaser to transport inventory from suppliers.

The balances in these temporary accounts, along with the beginning and ending inventory balances obtained from the physical count of inventory, are used to compute cost of goods sold using the cost of goods sold model illustrated in Cornerstone 6-1.

**Cornerstone 6-11** illustrates how to record purchase transactions in a periodic inventory system.



### CORNERSTONE 6-11



### HOW TO Record Purchase Transactions in a Periodic Inventory System

**Concept:**

The cost of inventory includes the purchase price of the merchandise plus any cost of bringing the goods to a salable condition and location.

**Information:**

Assume that on September 1, 2009, Brandon Shoes purchased 50 pairs of hiking boots for \$3,750 cash and paid \$150 of transportation costs. Also, on September 1, Brandon purchased 100 pairs of running shoes for \$10,000; however the seller paid the transportation costs of \$300. The running shoes were purchased on credit with credit terms of 2/10, n/30. Brandon paid for one-half (\$5,000) of the running shoes on September 10, within the discount period. The remaining shoes were paid for on September 30. After inspection, Brandon determined that 10 pairs of the hiking boots were defective and returned them on September 5.

**Required:**

1. Prepare journal entries to record the purchase of the hiking boots.
2. Prepare the journal entry to record the purchase of the running shoes.
3. Prepare the journal entries to record the payment for the running shoes on September 10 and September 30.
4. Prepare the journal entry to record the return of the defective hiking boots.

**Solution:**

1. The journal entry to record the purchase of the hiking boots and the related transportation charges is:

Date	Account and Explanation	Debit	Credit	
<b>CORNERSTONE</b>				
<b>6-11</b>				
<i>(continued)</i>				
Sept. 1	Purchases	3,750		
	Cash		3,750	
	<i>(Purchase of inventory for cash)</i>			
1	Transportation-In	150		
	Cash		150	
	<i>(Payment of freight costs)</i>			
2. The journal entry to record the credit purchase of the running shoes is:				
Sept. 1	Purchases	10,000		
	Accounts Payable		10,000	
	<i>(To record the purchase of inventory on credit)</i>			
Note: The cost of the freight is not recorded because it was paid by the seller (FOB destination or freight-out).				
3. Brandon paid for \$5,000 of the running shoes purchase less a discount of \$100 (\$5,000 2%). The journal entry is:				
Sept. 10	Accounts Payable	5,000		
	Cash		4,900	
	Purchase Discount		100	
	<i>(To record payment within the discount period)</i>			
The journal entry to record the payment <i>outside</i> of the discount period is:				
Sept. 30	Accounts Payable	5,000		
	Cash		5,000	
	<i>(To record payment outside of the discount period)</i>			
4. The journal entry required to return the \$750 of defective hiking boots (calculated as $\$3,750 \div 50 \text{ pairs} = \$75 \text{ per pair}$ ; $\$75 \times 10 \text{ pairs}$ ) is:				
Sept. 5	Cash	750		
	Purchase Returns and Allowances		750	
	<i>(Returned 10 defective hiking boots)</i>			

Under either the periodic or the perpetual inventory system, the net cost of purchases (shown below) is the same.

Purchases	\$13,750
Less: Purchase discounts	(100)
Purchase returns and allowances	(750)
Add: Transportation costs (freight-in)	150
Net cost of purchases	<u>\$13,050</u>

Additionally, for sales transactions, there is no need to make a second journal entry to record the expense (and inventory) portion of a transaction. Instead, only the revenue portion is recorded as shown earlier in the text.

The differences between a periodic and perpetual inventory system are summarized in Exhibit 6-14.

## Exhibit 6-14

## Perpetual vs. Periodic Inventory Systems

Activity	Perpetual System	Periodic System
Purchase	Inventory purchases are recorded in the <i>merchandise inventory account</i> .	The costs of inventory purchases are recorded in the <i>purchases account</i> .
Sale	When a sale is made, an entry is made to record the amount of sales revenue. A second entry is made that increases the cost of goods sold account and decreases the merchandise inventory account.	When a sale is made, an entry is made to record the amount of sales revenue only. No entry is made to cost of goods sold or inventory.
Costing ending inventory	At the end of the period, the cost of ending inventory is the balance in the inventory account (which is verified by a physical count of inventory).	The amount of ending inventory is determined at the end of the accounting by taking a physical count of inventory, a procedure by which all items of inventory on a given date are identified and counted.
Determining cost of goods sold	Cost of goods sold for the period is the balance in the cost of goods sold account at the end of the period.	Cost of goods sold is determined only at the end of the period by applying the cost of goods sold model.

## Appendix 6A: Summary of Learning Objectives

### LO8. Explain how to record purchases of inventory using a periodic inventory system.

- In a periodic inventory system, purchases of inventory are recorded by increasing the purchases account.
- If a purchase discount exists, the purchases discount account is increased by the amount of the discount taken.
- When a purchased item is returned (purchase return) or a price reduction is granted by the seller (purchase allowance), the purchase returns and allowances account is increased by the amount of the purchase return or allowance given.
- If transportation costs exist and the shipping terms are F.O.B shipping point, the transportation costs are considered part of the total cost of purchases and the purchases account is increased.
- If transportation costs exist and the shipping terms are F.O.B. destination, the seller pays these costs and records them as a selling expense on the income statement.



### CORNERSTONES FOR APPENDIX 6A

**CORNERSTONE 6-11** How to record purchase transactions in a periodic inventory system, page 314

### OBJECTIVE > 9

Compute ending inventory and cost of goods sold under a periodic inventory system.

## Appendix 6B: Inventory Costing Methods and the Periodic Inventory System

Regardless of whether a company uses a perpetual inventory system or a periodic inventory system, inventory costing methods are designed to allocate the cost of goods available for sale between ending inventory and cost of goods sold. Under a periodic

inventory system, the inventory costing methods are applied as if all purchases during an accounting period take place prior to any sales of the period. While this is not a realistic assumption, it does simplify the computation of the ending inventory and cost of goods sold since only one allocation needs to be made, regardless of the number of purchases and sales. Given this assumption, you will then apply the following steps to determine ending inventory and cost of goods sold:

Step 1: Calculate the cost of goods available for sale for the period.

Step 2: Apply the inventory costing method to determine ending inventory and cost of goods sold.

## First-In, First-Out (FIFO)

Under the FIFO method, *the earliest purchases (the first in) are assumed to be the first sold (the first out) and the more recent purchases are in ending inventory.* **Cornerstone 6-12** illustrates the application of the FIFO method. Notice that this is the same information used to illustrate the inventory costing methods applied to a perpetual inventory system (Cornerstones 6-5 through 6-7). However, the information on purchases is listed first and the sales can be combined because all purchases are assumed to occur prior to any sales. A periodic FIFO inventory costing method is shown in Cornerstone 6-12.

### HOW TO Apply the FIFO Inventory Costing Method in a Periodic Inventory System

#### Concept:

The cost of the earliest purchases that make up cost of goods available for sale is allocated to cost of goods sold, and the cost of the most recent purchases are allocated to ending inventory.

#### Information:

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. Ending inventory is made up of 200 units (1,300 units available for sale – 1,100 units sold). (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = \$ 5,000	
20	Purchase 3	150 units @ \$22 = \$ 3,300	
25	Sale 2		300 units @ \$30
Goods available for sale: 1,300 units		= \$23,900	Sales: 1,100 units = \$33,000

#### Required:

Compute the cost of ending inventory and the cost of goods sold at October 31 using the FIFO method.

#### Solution:

Step 1: Compute the cost of goods available for sale for the period (\$23,900).



### CORNERSTONE 6-12



**CORNERSTONE**  
**6-12**  
*(continued)*

Step 2: Apply FIFO to determine ending inventory and cost of goods sold. This cost of goods available for sale is allocated between inventory (the most recent purchases) and cost of goods sold (the oldest purchases) as follows:

Ending Inventory		Cost of Goods Sold	
150 units × \$22 =	\$ 3,300	300 units × \$16 =	\$ 4,800
<u>50 units × \$20 =</u>	<u>1,000</u>	600 units × \$18 =	10,800
200 units	<u>\$4,300</u>	<u>200 units × \$20 =</u>	<u>4,000</u>
		1,100 unit	<u>\$19,600</u>

### Last-In, First-Out (LIFO)

Under the LIFO method, *the most recent purchases (newest costs) are allocated to the cost of goods sold and the earliest purchases (oldest costs) are allocated to ending inventory.* **Cornerstone 6-13** illustrates the application of the LIFO method.



**CORNERSTONE**  
**6-13**



### HOW TO Apply the LIFO Inventory Costing Method in a Periodic Inventory System

**Concept:**

The cost of the most recent purchases that make up cost of goods available for sale is allocated to cost of goods sold, and the cost of the earliest (oldest) purchases are allocated to ending inventory.

**Information:**

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. Ending inventory is made up of 200 units (1,300 units available for sale – 1,100 units sold). (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = 10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = 5,000	
20	Purchase 3	150 units @ \$22 = <u>3,300</u>	
25	Sale 2		300 units @ \$30
Goods available for sale: 1,300 units		= \$23,900	Sales: 1,100 units = \$33,000

**Required:**

Compute the cost of ending inventory and the cost of goods sold at October 31 using the LIFO method.

**Solution:**

**Step 1: Compute the cost of goods available for sale for the period (\$23,900).**

**Step 2: Apply LIFO to determine ending inventory and cost of goods sold.**

This cost of goods available for sale is allocated between inventory (the oldest purchases) and cost of goods sold (the most recent purchases) as follows:

Ending Inventory	Cost of Goods Sold
200 units × \$16 = \$3,200	100 units × \$16 = \$ 1,600
	600 units × \$18 = 10,800
	250 units × \$20 = 5,000
	150 units × \$22 = 3,300
	1,100 units <u>\$20,700</u>

**CORNERSTONE**  
**6-13**  
*(continued)*

## Average Cost

Under the average cost method, the weighted average cost per unit is multiplied by the number of units in ending inventory to produce the cost of ending inventory and by the number of units sold to produce cost of goods sold. In contrast to the perpetual inventory system, the weighted average cost per unit is not continually calculated. Rather it is calculated based on the total cost of goods available for sale and the total units available for sale. This method is commonly referred to as the weighted-average method. **Cornerstone 6-14** illustrates the application of the average cost method.

### HOW TO Apply the Average Cost Inventory Costing Method in a Periodic Inventory System

#### Concept:

The cost of goods available for sale is allocated between ending inventory and cost of goods sold based on a weighted average cost of the goods available for sale.

#### Information:

Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. Ending inventory is made up of 200 units (1,300 units available for sale – 1,100 units sold). (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1		800 units @ \$30
15	Purchase 2	250 units @ \$20 = \$ 5,000	
20	Purchase 3	150 units @ \$22 = \$ 3,300	
25	Sale 2		300 units @ \$30
Goods available for sale: 1,300 units		= \$23,900	Sales: 1,100 units = \$33,000

#### Required:

Compute the cost of ending inventory and the cost of goods sold at October 31 using the average cost method.

#### Solution:

**Step 1: Compute the cost of goods available for sale for the period (\$23,900).**



**CORNERSTONE**  
**6-14**



**CORNERSTONE**  
**6-14**  
*(continued)*

**Step 2: Apply the average cost method to determine ending inventory and cost of goods sold.** This method requires you to compute a weighted average cost of the goods available for sale:

$$\begin{aligned}\text{Weighted Average Cost per Unit} &= \frac{\text{Cost of Goods Available for Sale}}{\text{Units Available for Sale}} \\ &= \frac{\$23,900}{1,300 \text{ units}} = \mathbf{\$18.3846}\end{aligned}$$

The cost of goods available for sale (\$23,900) is allocated between inventory and cost of goods sold using the average cost of the inventory as follows:

Ending Inventory	Cost of Goods Sold
200 units × \$18.3846 = <b>\$3,677</b>	1,100 units × \$18.3846 = <b>\$20,223</b>

Note that under all inventory costing methods, periodic inventory systems allocate the cost of purchased goods between cost of goods sold and ending inventory only at the end of the period. In contrast, the perpetual inventory system performs this allocation each time a sale is made. Because of this difference in the timing of cost allocations, the two systems nearly always yield different amounts for the cost of goods sold and ending inventory under both the LIFO and average cost assumptions. FIFO amounts, however, are always the same under both periodic and perpetual inventory systems.<sup>11</sup>

## Appendix 6B: Summary of Learning Objectives

**LO9. Compute ending inventory and cost of goods sold under a periodic inventory system.**

- Under a periodic inventory system, the inventory costing methods are applied as if all purchases during an accounting period take place prior to any sales of the period. Given this assumption, you will then apply the following steps:  
Step 1: Calculate the cost of goods available for sale for the period.  
Step 2: Apply the inventory costing method to determine ending inventory and cost of goods sold.



**CORNERSTONES**  
**FOR APPENDIX 6B**

**CORNERSTONE 6-12** How to apply the FIFO inventory costing method in a periodic inventory system, page 317

**CORNERSTONE 6-13** How to apply the LIFO inventory costing method in a periodic inventory system, page 318

**CORNERSTONE 6-14** How to apply the average cost inventory costing method in a periodic inventory system, page 319

<sup>11</sup>This occurs because FIFO always allocates the earliest items purchased to cost of goods sold, resulting in ending inventory being the latest items purchased. Under both the perpetual and periodic inventory systems, these are the same units of inventory at the same cost. Therefore, the timing of the cost allocation is irrelevant under FIFO.

## Review Problem

### I. Accounting for Inventory

#### Concept:

The cost of goods available for sale is allocated between ending inventory and cost of goods sold based on a costing method chosen by company management. Under a perpetual inventory system, the accounting records are continually (perpetually) updated each sale or purchase of inventory.

#### Information:

Sagamore Supplies, an office supply wholesale store, uses a perpetual inventory system. Sagamore recorded the following activity for one of its inventory accounts:

Date	Activity	# of Units	Cost per Unit
Oct. 1	Beginning inventory	2,500	\$16
15	Purchase	5,100	\$17
Nov. 3	Sale	5,900	
20	Purchase	4,800	\$18
Dec. 10	Sale	5,300	

Additional information on the purchases and sales is as follows:

- All purchases were cash purchases.
- All sales were cash sales and all inventory items were sold for \$25 per unit.

#### Required:

1. Compute the cost of ending inventory and the cost of goods sold using the FIFO, LIFO, and average cost methods.
2. Assume that Sagamore uses the FIFO inventory costing method. Prepare the journal entries to record the purchases and sales of inventory.

#### Solution:

1.

- a. Under FIFO, the cost of ending inventory is \$21,600 and cost of goods sold is \$191,500 (\$97,800 + \$93,700).

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 1	Beginning inventory	2,500 × \$16 = \$ 40,000	
15	Purchase (5,100 @ \$17)	2,500 × \$16 = \$40,000 5,100 × \$17 = \$86,700	
			\$126,700
Nov. 3	Sale (5,900 @ \$25)	1,700 × \$17 = \$ 28,900	2,500 × \$16 = \$40,000 3,400 × \$17 = \$57,800
			\$97,800

This is an interim calculation. Because the period is not over, these steps need to be repeated until the end of the accounting period.

Date	Description	Inventory Balance	Cost of Goods Sold
Nov. 3	Inventory on hand	1,700 × \$17 = \$ 28,900	
20	Purchase (4,800 @ \$18)	1,700 × \$17 = \$28,900 4,800 × \$18 = \$86,400	
			\$115,300
Dec. 10	Sale (5,300 @ \$25)	1,200 × \$18 = \$ 21,600	1,700 × \$17 = \$28,900 3,600 × \$18 = \$64,800
			\$93,700

- b. Under LIFO, the cost of ending inventory is \$19,200 and cost of goods sold is \$193,900 (\$99,500 + \$94,400).

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 1	Beginning inventory	2,500 × \$16 = \$ 40,000	
15	Purchase (5,100 @ \$17)	2,500 × \$16 = \$40,000 5,100 × \$17 = \$86,700	
			\$126,700
Nov. 3	Sale (5,900 @ \$25)	1,700 × \$16 = \$ 27,200	5,100 × \$17 = \$86,700 800 × \$16 = \$12,800
			\$99,500

This is an interim calculation. Because the period is not over, these steps need to be repeated until the end of the accounting period.

Date	Description	Inventory Balance	Cost of Goods Sold
Nov. 3	Inventory on hand	1,700 × \$16 = \$ 27,200	
20	Purchase (4,800 @ \$18)	1,700 × \$16 = \$27,200 4,800 × \$18 = \$86,400	} = \$113,600
Dec. 10	Sale (5,300 @ \$25)	1,200 × \$16 = \$ 19,200	

- c. Under average cost, the cost of ending inventory is \$21,183 and cost of goods sold is \$191,917 (\$98,359 + \$93,558).

Date	Description	Inventory Balance	Cost of Goods Sold
Oct. 1	Beginning inventory	2,500 × \$16 = \$ 40,000 (\$16 /unit)	
15	Purchase (5,100 @ \$17)	2,500 × \$16 = \$40,000 5,100 × \$17 = \$86,700	} = \$126,700 (\$16.671/unit) <sup>a</sup>
Nov. 3	Sale (5,900 @ \$25)	1,700 × \$16.671 = \$ 28,341	

<sup>a</sup> \$126,700 ÷ 7,600 units = \$16.671/unit

This is an interim calculation. Because the period is not over, these steps need to be repeated until the end of the accounting period.

Date	Description	Inventory Balance	Cost of Goods Sold
Nov. 3	Inventory on hand	1,700 × \$16.671 = \$ 28,341	
20	Purchase (4,800 @ \$18)	1,700 × \$16.671 = \$28,341 4,800 × \$18 = \$86,400	} = \$114,741 (\$17.6525/unit) <sup>1</sup>
Dec.10	Sale 2 (5,300 @ \$25)	1,200 × \$17.6525 = \$ 21,183	

<sup>1</sup> \$114,741 ÷ 6,500 units = \$17.6525/unit

2. The journal entries required to record the inventory transactions (assuming FIFO) are:

Date	Account and Explanation	Debit	Credit
Oct. 15	Merchandise Inventory Cash (Purchased inventory for cash)	40,000	40,000
Nov. 3	Cash Sales Revenue (Sold 5,900 units @ \$25 per unit)	147,500	147,500
3	Cost of Goods Sold Merchandise Inventory (Cost of sale of 5,900 units)	97,800	97,800
20	Merchandise Inventory Cash (Purchased inventory for cash)	86,400	86,400
Dec. 10	Cash Sales Revenue (Sold 5,300 units @ \$25 per unit)	132,500	132,500
10	Cost of Goods Sold Merchandise Inventory (Cost of sale of 5,300 units)	93,700	93,700

Assets = Liabilities +	Stockholders' Equity
+40,000	
-40,000	

Assets = Liabilities +	Stockholders' Equity
+147,500	+147,500

Assets = Liabilities +	Stockholders' Equity
-97,800	-97,800

Assets = Liabilities +	Stockholders' Equity
+86,400	
-86,400	

Assets = Liabilities +	Stockholders' Equity
+132,500	+132,500

Assets = Liabilities +	Stockholders' Equity
-93,700	-93,700

## Discussion Questions

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1. What are the differences between merchandisers and manufacturers?
2. Describe the types of inventories used by manufacturers and merchandisers.
3. Compare the flow of inventory costs between merchandisers and manufacturers.
4. What are components of cost of goods available for sale and cost of goods sold?
5. How is cost of goods sold determined?
6. How do the perpetual and periodic inventory accounting systems differ from each other?
7. Why are perpetual inventory systems more expensive to operate than periodic inventory systems? What conditions justify the additional cost of a perpetual inventory system?
8. Why are adjustments made to the invoice price of goods when determining the cost of inventory?
9. Identify the accounting items for which adjustments are made to the invoice price of goods when determining the net cost of purchases.
10. Describe the difference between F.O.B. shipping point and F.O.B. destination.
11. Why do sales transactions under a perpetual inventory system require two journal entries?
12. Why do the four inventory costing methods produce different amounts for the cost of ending inventory and cost of goods sold when purchase prices are changing?
13. The costs of which units of inventory are allocated to ending inventory or cost of goods sold using the FIFO, LIFO, and average cost methods?
14. If inventory prices are rising, which inventory costing method should produce the smallest payment for taxes?
15. How would reported income differ if LIFO rather than FIFO were used when purchase prices are rising? When purchase prices are falling?
16. How would the balance sheet accounts be affected if LIFO rather than FIFO were used when purchase prices are rising? When purchase prices are falling?
17. What is the LIFO reserve and when is it used?
18. Why are inventories written down to the lower of cost or market?
19. What is the effect on the current period income statement and the balance sheet when inventories are written down using the lower of cost or market method? What is the effect on future period income statement and balance sheets?
20. What does the gross profit ratio and the inventory turnover ratio tell company management about inventory?
21. How does an understatement of ending inventory affect the financial statements of two periods? How does an overstatement of ending inventory affect the financial statements of two periods?
22. (Appendix 6A) What accounts are used to record inventory purchase transactions under the periodic inventory system? Why aren't these accounts used in a perpetual inventory system?
23. (Appendix 6B) "For each inventory costing method, perpetual and periodic systems yield the same amounts for ending inventory and cost of goods sold." Do you agree or disagree with this statement? Explain.

## Multiple-Choice Exercises

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**6-1** If beginning inventory is \$50,000, purchases is \$260,000, and ending inventory is \$35,000, what is cost of goods sold as determined by the cost of goods sold model?

- a. \$175,000
- b. \$245,000
- c. \$275,000
- d. \$345,000

**6-2** Which of the following transactions would *not* result in an entry to the merchandise inventory account in the buyer's accounting records under a perpetual inventory system?

- The purchase of merchandise on credit.
- The payment of freight by the seller for goods received from a supplier.
- The return of merchandise to the supplier.
- The payment of a credit purchase of merchandise within the discount period.

**6-3** Briggs Company purchased \$10,000 of inventory on credit with credit terms of 2/10, n/30. Briggs paid for the purchase within the discount period. How much did Briggs pay for the inventory?

- \$9,000
- \$9,800
- \$10,000
- \$10,200

**6-4** Which of the following transactions would *not* result in an adjustment to the Merchandise Inventory account under a perpetual inventory system?

- The sale of merchandise for cash.
- The sale of merchandise on credit.
- The return of merchandise by a customer.
- The receipt of payment from a customer within the discount period.

**6-5** U-Save Automotive Group purchased 10 vehicles during the current month. Two trucks were purchased for \$18,000, two SUVs were purchased for \$22,000, and six hybrid cars were purchased for \$31,000. A review of the sales invoices revealed that five of the hybrid cars were sold and both trucks were sold. What is the cost of U-Save's ending inventory if it uses the specific identification method?

- \$75,000
- \$89,100
- \$93,000
- \$222,000

*The following information is used for Multiple-Choice Exercises 6-6 through 6-8:*

Morgan Inc. has the following units and costs for the month of April:

	Units Purchased at Cost	Units Sold at Retail
Beginning Inventory, April 1	1,000 units at \$20	
Purchase 1, April 9	1,200 units at \$23	
Sale 1, April 12		1,800 units at \$40
Purchase 2, April 22	800 units at \$25	

**6-6** If Morgan uses a perpetual inventory system, what is the cost of ending inventory under FIFO at April 30?

- \$24,600
- \$29,200
- \$38,400
- \$43,000

**6-7** If Morgan uses a perpetual inventory system, what is the cost of goods sold under LIFO at April 30?

- \$28,000
- \$29,200
- \$38,400
- \$39,600

**6-8** If Morgan uses a perpetual inventory system, what is the cost of ending inventory under average cost at April 30? (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

- a. \$27,040
- b. \$28,655
- c. \$38,945
- d. \$40,560

**6-9** When purchase prices are rising, which of the following statements is *true*?

- a. LIFO produces a higher cost for ending inventory than FIFO.
- b. FIFO produces a lower amount for net income than LIFO.
- c. LIFO produces a higher cost of goods sold than FIFO.
- d. Average cost produces a higher net income than FIFO or LIFO.

**6-10** Which method results in a more realistic amount for income because it matches the most current costs against revenue?

- a. FIFO
- b. LIFO
- c. Average cost
- d. Specific identification

**6-11** Which of the following statements regarding the lower of cost or market (LCM) rule is *true*?

- a. The LCM rule is an application of the historical cost principle.
- b. If a company uses the LCM rule, there is no need to use a cost flow assumption such as FIFO, LIFO, or average cost.
- c. When the market value of inventory is above the historical cost of inventory, an adjustment is made to increase inventory to its market value and increase income.
- d. When the replacement cost of inventory drops below the historical cost of inventory, an adjustment is made to decrease inventory to its market value and decrease income.

**6-12** Which of the following statements is *true* with regard to the gross profit ratio?

- 1. An increase in the gross profit rate may indicate that a company is efficiently managing its inventory.
  - 2. An increase in cost of goods sold would increase the gross profit rate (assuming sales remain constant).
  - 3. An increase in selling expenses would lower the gross profit rate.
- a. 1
  - b. 2
  - c. 1 and 2
  - d. 1 and 3

**6-13** An increasing inventory turnover ratio indicates that:

- a. a company is having trouble selling its inventory.
- b. a company may be holding too much inventory.
- c. a company has reduced the time it takes to sell inventory.
- d. a company has sold inventory at a higher profit.

**6-14** Ignoring taxes, if a company understates its ending inventory by \$10,000 in the current year:

- a. assets for the current year will be overstated by \$10,000.
- b. cost of goods sold for the current year will be understated by \$10,000.
- c. retained earnings for the current year will be unaffected.
- d. net income for the subsequent year will be overstated by \$10,000.

**6-15 (Appendix 6A)** Which of the following statements is true for a company that uses a periodic inventory system?

- The purchase of inventory requires a debit to Merchandise Inventory.
- The payment of a purchase within the discount period requires a credit to Purchase Discount.
- The return of defective inventory requires a debit to Purchase Returns and Allowances.
- Any amounts paid for freight are debited to Merchandise Inventory.

*The following information is used for Multiple-Choice Exercises 6-16 through 6-18:*

Morgan Inc. has the following units and costs for the month of April:

	Units Purchased at Cost	Units Sold at Retail
Beginning Inventory, April 1	1,000 units at \$20	
Purchase 1, April 9	1,200 units at \$23	
Sale 1, April 12		1,800 units at \$40
Purchase 2, April 22	800 units at \$25	

**6-16 (Appendix 6B)** If Morgan uses a periodic inventory system, what is the cost of goods sold under FIFO at April 30?

- \$24,600
- \$29,200
- \$38,400
- \$43,000

**6-17 (Appendix 6B)** If Morgan uses a periodic inventory system, what is the cost of ending inventory under LIFO at April 30?

- \$24,600
- \$29,200
- \$38,400
- \$43,000

**6-18 (Appendix 6B)** If Morgan uses a periodic inventory system, what is the cost of ending inventory under average cost at April 30? (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

- \$27,040
- \$28,655
- \$38,945
- \$40,560

## Cornerstone Exercises

**OBJECTIVE** > **1**  
**CORNERSTONE 6-1**

**Cornerstone Exercise 6-19 APPLYING THE COST OF GOODS SOLD MODEL**

Hempstead Company has the following data for 2009:

Item	Units	Cost
Inventory, 12/31/2008	990	\$10,890
Purchases	4,510	49,610
Inventory, 12/31/2009	720	7,920

**Required:**

- How many units were sold?
- Using the cost of goods sold model, determine the cost of goods sold.

**Cornerstone Exercise 6-20 RECORDING PURCHASE TRANSACTIONS****OBJECTIVE** > **2**

Mathis Company and Reece Company use the perpetual inventory system. The following transactions occurred during the month of April:

**CORNERSTONE 6-2**

- On April 1, Mathis Company purchased merchandise on account from Reece Company with credit terms of 2/10, n/30. The selling price of the merchandise was \$3,500 and the cost of the merchandise sold was \$2,450.
- On April 1, Mathis paid freight charges of \$100 cash to have the goods delivered to its warehouse.
- On April 8, Mathis returned \$1,000 of the merchandise. The cost of the merchandise returned was \$700.
- On April 10, Mathis paid Reece the balance due.

**Required:**

- Prepare the journal entry to record the April 1 purchase (ignore any freight charges) of merchandise by Mathis Company.
- Prepare the journal entry to record the payment of freight on April 1.
- Prepare the journal entry to record the April 8 return of merchandise.
- Prepare the journal entry to record the April 10 payment to Reece Company.

**Cornerstone Exercise 6-21 RECORDING SALES TRANSACTIONS****OBJECTIVE** > **2**

Refer to the information in **Cornerstone Exercise 6-20**.

**CORNERSTONE 6-3****Required:**

Prepare the journal entries to record these transactions on the books of Reece Company.

*The following information is used for Cornerstone Exercises 6-22 through 6-25.*

Filimonov Inc. has the following information related to purchases and sales of one of its inventory items:

Date	Description	Units Purchased at Cost	Units Sold at Retail
June 1	Beginning Inventory	150 units @ \$10 = \$1,500	
9	Purchase 1	200 units @ \$12 = \$2,400	
14	Sale 1		300 units @ \$25
22	Purchase 2	250 units @ \$14 = \$3,500	
29	Sale 2		225 units @ \$25

**Cornerstone Exercise 6-22 INVENTORY COSTING: FIFO****OBJECTIVE** > **3**

Refer to the information for Filimonov Inc. in the box above. Assume that Filimonov uses a perpetual inventory system.

**CORNERSTONE 6-5****Required:**

Calculate the cost of goods sold and the cost of ending inventory using the FIFO inventory costing method.

**Cornerstone Exercise 6-23 INVENTORY COSTING: LIFO****OBJECTIVE** > **3**

Refer to the information for Filimonov Inc. in the box above. Assume that Filimonov uses a perpetual inventory system.

**CORNERSTONE 6-6****Required:**

Calculate the cost of goods sold and the cost of ending inventory using the LIFO inventory costing method.

**Cornerstone Exercise 6-24 INVENTORY COSTING: AVERAGE COST****OBJECTIVE** > **3**

Refer to the information for Filimonov Inc. in the box above. Assume that Filimonov uses a perpetual inventory system.

**CORNERSTONE 6-7**

**Required:**

Calculate the cost of goods sold and the cost of ending inventory using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

**OBJECTIVE** > **4**

**CORNERSTONE 6-5**  
**CORNERSTONE 6-6**  
**CORNERSTONE 6-7**

**Cornerstone Exercise 6-25 EFFECTS OF INVENTORY COSTING METHODS**

Refer to your answers for Filimonov Inc. in **Cornerstone Exercises 6-22 through 6-24**.

**Required:**

1. In a period of rising prices, which inventory costing method produces the highest amount for ending inventory?
2. In a period of rising prices, which inventory costing method produces the highest net income?
3. In a period of rising prices, which inventory costing method produces the lowest payment for income taxes?
4. In a period of rising prices, which inventory method generally produces the most realistic amount for cost of goods sold? For inventory? Would your answer change if inventory prices were decreasing during the period?

**OBJECTIVE** > **5**

**CORNERSTONE 6-8**

**Cornerstone Exercise 6-26 LOWER OF COST OR MARKET**

The accountant for Murphy Company prepared the following analysis of its inventory at year-end:

Item	Units	Cost per Unit	Market Value
RSK-89013	500	\$38	\$44
LKW-91247	329	49	45
QEC-57429	462	25	33

**Required:**

Compute the carrying value of the ending inventory using the lower of cost or market method applied on an item-by-item basis.

**OBJECTIVE** > **6**

**CORNERSTONE 6-9**

**Cornerstone Exercise 6-27 INVENTORY ANALYSIS**

Singleton Inc. reported the following information for the current year:

Net sales	\$650,000	Inventory, 1/1	\$21,250
Cost of goods sold	<u>474,500</u>	Inventory, 12/31	\$24,850
Gross profit	\$175,500		

**Required:**

Compute Singleton's (a) gross profit ratio, (b) inventory turnover ratio, and (c) average days to sell inventory.

**OBJECTIVE** > **7**

**CORNERSTONE 6-10**

**Cornerstone Exercise 6-28 INVENTORY ERRORS**

McLelland Inc. reported net income of \$150,000 for 2009 and \$165,000 for 2010. Early in 2010, McLelland discovers that the December 31, 2009 ending inventory was overstated by \$8,000. For simplicity, ignore taxes.

**Required:**

1. What is the correct net income for 2009? For 2010?
2. Assuming the error was not corrected, what is the effect on the balance sheet at December 31, 2009? At December 31, 2010?

**OBJECTIVE** > **8**

**CORNERSTONE 6-11**

**Cornerstone Exercise 6-29 (APPENDIX 6A) RECORDING PURCHASE TRANSACTIONS**

Refer to the information for **Cornerstone Exercise 6-20**. Assume that Mathis uses a periodic inventory system.

**Required:**

1. Prepare the journal entry to record the April 1 purchase (ignore any freight charges) of merchandise by Mathis Company.

2. Prepare the journal entry to record the payment of freight on April 1.
3. Prepare the journal entry to record the April 8 return of merchandise.
4. Prepare the journal entry to record the April 10 payment to Reece Company.

**Cornerstone Exercise 6-30 (APPENDIX 6B) INVENTORY COSTING**  
**METHODS: PERIODIC FIFO**

Refer to the information for Filimonov Inc. given earlier (see **Cornerstone Exercise 6-22**). Assume that Filimonov uses a periodic inventory system.

**Required:**

Calculate the cost of goods sold and the cost of ending inventory using the FIFO inventory costing method.

**OBJECTIVE** > **9**

**CORNERSTONE 6-12**

**Cornerstone Exercise 6-31 (APPENDIX 6B) INVENTORY COSTING**  
**METHODS: PERIODIC LIFO**

Refer to the information for Filimonov Inc. given earlier (see **Cornerstone Exercise 6-23**). Assume that Filimonov uses a periodic inventory system.

**Required:**

Calculate the cost of goods sold and the cost of ending inventory using the LIFO inventory costing method.

**OBJECTIVE** > **9**

**CORNERSTONE 6-13**

**Cornerstone Exercise 6-32 (APPENDIX 6B) INVENTORY COSTING**  
**METHODS: PERIODIC AVERAGE COST**

Refer to the information for Filimonov Inc. given earlier (see **Cornerstone Exercise 6-24**). Assume that Filimonov uses a periodic inventory system.

**Required:**

Calculate the cost of goods sold and the cost of ending inventory using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

**OBJECTIVE** > **9**

**CORNERSTONE 6-14**

## Exercises

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**Exercise 6-33 APPLYING THE COST OF GOODS SOLD MODEL**

Wilson Company sells a single product. At the beginning of the year, Wilson had 120 units in stock at a cost of \$8 each. During the year Wilson purchased 850 more units at a cost of \$8 each and sold 210 units at \$13 each, 250 units at \$15 each, and 360 units at \$14 each.

**Required:**

1. Using the cost of goods sold model, what is the amount of ending inventory and cost of goods sold?
2. What is Wilson's gross margin for the year?

**OBJECTIVE** > **1**



**Exercise 6-34 PERPETUAL AND PERIODIC INVENTORY SYSTEMS**

Below is a list of inventory systems options:

- a. Perpetual inventory system
- b. Periodic inventory system
- c. Both perpetual and periodic inventory systems

**Required:**

Match each option with one of the following:

1. Inventory purchases are recorded in a purchases account.
2. Inventory purchases are recorded in an inventory account.
3. Only revenue is recorded as sales are made during the period; the cost of goods sold is recorded at the end of the period.

**OBJECTIVE** > **2**

4. Both revenue and cost of goods sold are recorded during the period as sales are made.
5. Cost of goods sold is determined as each sale is made.
6. Cost of goods sold is determined only at the end of the period by subtracting the cost of ending inventory from the cost of goods available for sale.
7. The inventory is verified by a physical count.

**OBJECTIVE** > **2** **Exercise 6-35 RECORDING PURCHASES**

Compass Inc., purchased 1,000 bags of insulation from Glassco, Inc. The bags of insulation cost \$4.25 each. Compass paid Turner Trucking \$260 to have all 1,000 bags of insulation shipped to its warehouse. Compass returned 50 bags that were defective and paid for the remainder. Assume that Compass uses the perpetual inventory system and that Glassco, Inc. did not offer a purchase discount.

**Required:**

1. Prepare a journal entry to record the purchase of the 1,000 bags of insulation.
2. Prepare the entry to record the payment for shipping.
3. Prepare the entry for the return of the 50 defective bags.
4. Prepare the entry to record the payment for the 950 bags kept by Compass.
5. What is the total cost of this purchase?

**OBJECTIVE** > **2** **Exercise 6-36 RECORDING PURCHASES**

Dawson Enterprises uses the perpetual system to record inventory transactions. In a recent month, Dawson engaged in the following transactions:

- a. On April 1, Dawson purchased merchandise on credit for \$21,900 with terms 2/10, n/30.
- b. On April 2, Dawson purchased merchandise on credit for \$24,600 on terms 3/15, n/25.
- c. On April 9, Dawson paid for the purchase made on April 1.
- d. On April 25, Dawson paid for the merchandise purchased on April 2.

**Required:**

Prepare journal entries for these four transactions.

**OBJECTIVE** > **2** **Exercise 6-37 RECORDING PURCHASES AND SHIPPING TERMS**

On May 12, Digital Distributors received three shipments of merchandise. The first was shipped F.O.B. shipping point, had a total invoice price of \$150,000, and was delivered by a trucking company that collected an additional \$12,000 for transportation charges from Digital Distributors. The second was shipped F.O.B. shipping point and had a total invoice price of \$89,000, including transportation charges of \$6,200 that were prepaid by the seller. The third shipment was shipped F.O.B. destination and had an invoice price of \$22,000, excluding transportation charges of \$1,200 paid by the seller. Digital uses a perpetual inventory system.

**Required:**

Prepare journal entries to record these purchases.

**OBJECTIVE** > **2** **Exercise 6-38 RECORDING PURCHASES AND SALES**

Printer Supply Company sells computer printers and printer supplies. One of its products is a toner cartridge for laser printers. At the beginning of 2009, there were 200 cartridges on hand at a cost of \$60 each. During 2009, Printer Supply Company purchased 1,400 cartridges at \$60 each. After inspection, Printer determined that 10 cartridges were defective and returned them to the supplier. Printer also sold 800 cartridges at \$95 each and sold an additional 750 cartridges at \$102 each after a midyear selling price increase. Customers returned 15 of the cartridges that were purchased at \$102 to Printer for miscellaneous reasons. Assume that Printer Supply Company uses a perpetual inventory system.

**Required:**

1. Prepare summary journal entries to record the purchases and sales of inventory. Assume that all purchases and sales are on credit but no discounts were offered.
2. What is the cost of inventory, cost of goods sold, and gross profit for 2009?

**Exercise 6-39 INVENTORY COSTING METHODS****OBJECTIVE** > **3** **4**

Crandall Distributors uses a perpetual inventory system and has the following data available for inventory, purchases, and sales for a recent year.

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
Beginning inventory	120	\$5.90	
Purchase 1, Jan 18	550	6.00	
Sale	330		\$8.80
Sale	280		9.00
Purchase 2, March 10	650	6.20	
Sale	270		9.00
Sale	290		9.50
Purchase 3, Sept. 30	250	6.30	
Sale	240		9.90

**Required:**

1. Compute the cost of ending inventory and the cost of goods sold using the specific identification method. Assume the ending inventory is made up of 50 units from beginning inventory, 40 units from purchase 1, 40 units from purchase 2, and 30 units from purchase 3.
2. Compute the cost of ending inventory and cost of goods sold using the FIFO inventory costing method.
3. Compute the cost of ending inventory and cost of goods sold using the LIFO inventory costing method.
4. Compute the cost of ending inventory and cost of goods sold using the average cost inventory costing method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
5. Compare the ending inventory and cost of goods sold computed under all four methods. What can you conclude about the effects of the inventory costing methods on the balance sheet and the income statement?

**Exercise 6-40 INVENTORY COSTING METHODS****OBJECTIVE** > **3** **4** **6**

Welding Products Company purchased 1,000 cases of welding rods at a cost of \$95 per case on April 17. On August 19, the company purchased another 1,000 cases at a cost of \$112 per case. (Assume that there was no beginning inventory.) Sales data for the welding rods are as follows:



Date	Cases Sold
May 2	200
June 29	600
July 2	50
Sept. 4	500
Oct. 31	420

Welding Products uses a perpetual inventory system and the sales price of the welding rods was \$130 per case.

**Required:**

1. Compute the cost of ending inventory and cost of goods sold using the FIFO method.
2. Compute the cost of ending inventory and cost of goods sold using the LIFO method.
3. Compute the cost of ending inventory and cost of goods sold using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

- Assume that operating expenses are \$22,500 and Welding Products has a 30% tax rate. How much will the cash paid for income taxes differ among the three inventory methods?
- Compute Welding Product's gross profit ratio and inventory turnover ratio under each of the three inventory costing methods. How would the choice of inventory costing method affect these ratios?

**OBJECTIVE** > **4** **Exercise 6-41 FINANCIAL STATEMENT EFFECTS OF FIFO AND LIFO**

The chart below lists financial statement items that may be affected by the use of either the FIFO or LIFO inventory costing methods:

	FIFO	LIFO
Ending inventory		
Cost of goods sold		
Gross margin		
Income before taxes		
Payments for income taxes		
Net income		

**Required:**

Assuming that prices are rising, complete the chart by indicating whether the specified item is (a) higher or (b) lower under FIFO and LIFO.

**OBJECTIVE** > **4** **Exercise 6-42 EFFECTS OF INVENTORY COSTING METHODS**

Jefferson Enterprises has the following income statement data available for 2009:

Sales revenue	\$737,200
Operating expenses	243,700
Interest expense	39,500
Income tax rate	34%

Jefferson uses a perpetual inventory accounting system and the average cost method. Jefferson is considering adopting the FIFO or LIFO method for costing inventory. Jefferson's accountant prepared the following data:

	If Average Cost Used	If FIFO Used	If LIFO Used
Ending inventory	\$ 56,400	\$ 73,200	\$ 41,700
Cost of goods sold	401,600	384,800	416,300

**Required:**

- Compute income before taxes, income tax expense, and net income for each of the three inventory costing methods (rounded to the nearest dollar).
- Why are the cost of goods sold and ending inventory amounts different for each of the three methods? What do these amounts tell us about the purchase price of inventory during the year?
- Which method produces the most realistic amount for net income? For inventory? Explain your answer.

**OBJECTIVE** > **3** **4** **Exercise 6-43 INVENTORY COSTING METHODS**

Neyman, Inc. has the following data for purchases and sales of inventory:



Date	Units	Cost per Unit
Beginning inventory	22	\$38
Feb. 24 purchase	110	37
Sales	120	
July 2 purchase	170	33
Oct. 31 purchase	90	27
Sales	262	

All sales were made at a sales price of \$45 per unit. Assume that Neyman uses a perpetual inventory system.

**Required:**

1. Compute the cost of goods sold and the cost of ending inventory using the FIFO, LIFO, and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
2. Why is the cost of goods sold lower with LIFO than with FIFO?

**Exercise 6-44 EFFECTS OF FIFO AND LIFO**

OBJECTIVE > 3 4

Sheepskin Company sells to colleges and universities a special paper that is used for diplomas. Sheepskin typically makes one purchase of the special paper each year on January 1. Assume that Sheepskin uses a perpetual inventory system. You have the following data for the three years ending in 2009.

<b>2007</b>	
Beginning Inventory	0 pages
Purchases	10,000 pages at \$1.60 per page
Sales	8,500 pages
<b>2008</b>	
Beginning Inventory	1,500 pages
Purchases	16,200 pages at \$2.00 per page
Sales	15,000 pages
<b>2009</b>	
Beginning Inventory	2,700 pages
Purchases	18,000 pages at \$2.50 per page
Sales	20,100 pages

**Required:**

1. What would the ending inventory and cost of goods sold be for each year if FIFO is used?
2. What would the ending inventory and cost of goods sold be for each year if LIFO is used?
3. For each year, explain the cause of the differences in cost of goods sold under FIFO and LIFO.

**Exercise 6-45 LOWER OF COST OR MARKET**

OBJECTIVE > 5

Meredith's Appliance Store has the following data for the items in its inventory at the end of the accounting period.



Item	Number of Units	Historical Cost per Unit	Market Value per Unit
Window air conditioner	15	\$194	\$110
Dishwasher	34	240	380
Refrigerator	27	382	605
Microwave	19	215	180
Washer (clothing)	36	195	290
Dryer (clothing)	21	168	245

**Required:**

Compute the carrying value of Meredith's ending inventory using the lower of cost or market rule applied on an item-by-item basis.

**Exercise 6-46 LOWER OF COST OR MARKET**

OBJECTIVE > 5

Shaw Systems sells a limited line of specially made products, using television advertising campaigns in large cities. At year-end, Shaw has the following data for its inventory:

Item	Number of Units	Historical Cost per Unit	Market Value per Unit
Phone	600	\$ 24	\$ 20
Stereo	180	177	190
Electric shaver	220	30	35
MP3 alarm clock	430	26	25
Handheld game system	570	40	19

**Required:**

Compute the carrying value of the ending inventory using the lower of cost or market rule applied on an item-by-item basis.

**OBJECTIVE** > **6****Exercise 6-47 ANALYZING INVENTORY**

Examining the recent financial statements of McLelland Clothing, Inc., you note the following:

Sales	\$754,693
Cost of goods sold	528,600
Average inventory	76,900

**Required:**

Calculate McLelland's gross profit ratio, inventory turnover ratio, and assuming a 365-day year, the average days to sell inventory. Be sure to explain what each ratio means.

**OBJECTIVE** > **7****Exercise 6-48 EFFECTS OF AN ERROR IN ENDING INVENTORY**

Waymire Company prepared the partial income statements presented below for 2009 and 2008:

	2009	2008
Sales revenue	\$538,200	\$483,700
Cost of goods sold:		
Beginning inventory	\$ 39,300	\$ 32,100
Purchases	<u>343,200</u>	<u>292,700</u>
Cost of goods available for sale	\$382,500	\$324,800
Ending inventory	<u>46,800</u>	<u>39,300</u>
Gross margin	\$202,500	\$198,200
Operating expenses	<u>167,200</u>	<u>151,600</u>
Income before taxes	<u>\$ 35,300</u>	<u>\$ 46,600</u>

During 2010, Waymire's accountant discovered that ending inventory for 2008 had been overstated by \$7,900.

**Required:**

1. Prepare corrected income statements for 2009 and 2008.
2. Prepare a schedule showing each financial statement item affected by the error and the amount of the error for that item. Indicate whether each error is an overstatement (+) or an understatement (-).

**OBJECTIVE** > **8****Exercise 6-49 (APPENDIX 6A) RECORDING PURCHASES**

Compass, Inc., purchased 1,000 bags of insulation from Glassco, Inc. The bags of insulation cost \$4.25 each. Compass paid Turner Trucking \$260 to have all 1,000 bags of insulation shipped to its warehouse. Compass returned 50 bags that were defective and paid for the remainder. Assume that Compass uses the periodic inventory system.

**Required:**

1. Prepare a journal entry to record the purchase of the 1,000 bags of insulation.
2. Prepare the entry to record the payment for shipping.
3. Prepare the entry for the return of the 50 defective bags.
4. Prepare the entry to record the payment for the 950 bags kept by Compass.
5. What is the total cost of this purchase?
6. If you have previously worked Exercise 6-35, compare your answers. What are the differences? Be sure to explain why the differences occurred.

**Exercise 6-50 (APPENDICES 6A AND B) RECORDING PURCHASES AND SALES****OBJECTIVE** > 8 9

Printer Supply Company sells computer printers and printer supplies. One of its products is a toner cartridge for laser printers. At the beginning of 2009, there were 200 cartridges on hand at a cost of \$60 each. During 2009, Printer Supply Company purchased 1,400 cartridges at \$60 each, sold 800 cartridges at \$95 each, and sold an additional 750 cartridges at \$102 each after a midyear selling price increase. Printer returned 10 defective cartridges to the supplier. In addition, customers returned 15 cartridges that were purchased at \$102 to printer for various reasons. Assume that Printer Supply Company uses a periodic inventory system.

**Required:**

1. Prepare journal entries to record the purchases and sales of inventory. Assume that all purchases and sales are on credit but no discounts were offered.
2. What is the cost of inventory, cost of goods sold, and gross profit for 2009?
3. If you have previously worked Exercise 6-38, compare your answers. What are the differences? Be sure to explain why the differences occurred.

**Exercise 6-51 (APPENDIX 6B) INVENTORY COSTING METHODS: PERIODIC INVENTORY SYSTEM****OBJECTIVE** > 9

Jackson Company had 200 units in beginning inventory at a cost of \$24 each. Jackson's 2009 purchases were:

Date	Purchases
Feb. 21	6,200 units at \$28 each
July 15	5,500 units at \$32 each
Sept. 30	8,100 units at \$34 each

Jackson uses a periodic inventory system and sold 19,600 units at \$45 each during 2009.

**Required:**

1. Calculate the cost of ending inventory and the cost of goods sold using the FIFO, LIFO and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
2. Prepare income statements through gross margin using each of the costing methods in (1). What is the effect of each method on income?

**Exercise 6-52 (APPENDIX 6B) INVENTORY COSTING METHODS: PERIODIC INVENTORY SYSTEM****OBJECTIVE** > 9

The inventory accounting records for Lee Enterprises contained the following data:

Beginning inventory	400 units at \$12 each
Purchase 1, Feb. 26	2,300 units at \$14 each
Sale, March 9	2,500 units at \$27 each
Purchase 2, June 14	2,200 units at \$15 each
Sale, Sept. 22	2,100 units at \$29 each

**Required:**

1. Calculate the cost of ending inventory and the cost of goods sold using the FIFO, LIFO, and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
2. Compare the ending inventory and cost of goods sold computed under all three methods. What can you conclude about the effects of the inventory costing methods on the balance sheet and the income statement?

**OBJECTIVE** > **9** **Exercise 6-53 (APPENDIX 6B) INVENTORY COSTING METHODS: PERIODIC SYSTEM**

Harrington Company had the following data for inventory during a recent year:

	Units	Cost per Unit	Total Cost
Beginning inventory	500	\$ 9.00	\$ 4,500
Purchase 1, 1/28	1,600	9.60	\$15,360
Purchase 2, 5/2	1,200	10.30	12,360
Purchase 3, 8/13	1,400	10.80	15,120
Purchase 4, 11/9	<u>1,100</u>	11.10	<u>12,210</u>
Total purchases	5,300		55,050
Goods available for sale	<u>5,800</u>		<u>\$59,550</u>
Less: Sales	<u>5,240</u>		
Ending inventory	<u><u>560</u></u>		

Assume that Harrington uses a periodic inventory accounting system.

**Required:**

- Using the FIFO, LIFO, and average cost methods, compute the ending inventory and cost of goods sold. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
- Which method will produce the most realistic amount for income? For inventory?
- Which method will produce the lowest amount paid for taxes?

## Problem Set A

**OBJECTIVE** > **2** **Problem 6-54A RECORDING SALE AND PURCHASE TRANSACTIONS**

Alpharack Company sells a line of tennis equipment to retailers. Alpharack uses the perpetual inventory system and engaged in the following transactions during April 2009, its first month of operations:

- On April 2, Alpharack purchased, on credit, 320 Wilbur T-100 tennis rackets with credit terms of 2/10, n/30. The rackets were purchased at a cost of \$30 each. Alpharack paid Barker Trucking \$150 to transport the tennis rackets from the manufacturer to Alpharack's warehouse, shipping terms were F.O.B. shipping point, and the items were shipped on April 2.
- On April 3, Alpharack purchased, for cash, 150 packs of tennis balls for \$10 per pack.
- On April 4, Alpharack purchased tennis clothing, on credit, from Designer Tennis Wear. The cost of the clothing was \$8,000. Credit terms were 2/10, n/25.
- On April 10, Alpharack paid for the purchase of the tennis rackets in (a).
- On April 15, Alpharack determined that \$500 of the tennis clothing was defective. Alpharack returned the defective merchandise to Designer Tennis Wear.
- On April 20, Alpharack sold 100 tennis rackets at \$90 each, 100 packs of tennis balls at \$12 per pack, and \$4,000 of tennis clothing. All sales were for cash. The cost of the merchandise sold was \$5,450.
- On April 23, customers returned \$575 of the merchandise purchased on April 20. The cost of the merchandise returned was \$300.
- On April 25, Alpharack sold another 50 tennis rackets, on credit, for \$90 each and 25 packs of tennis balls at \$12 per pack, for cash. The cost of the merchandise sold was \$2,000.
- On April 29, Alpharack paid Designer Tennis Wear for the clothing purchased on April 4 less the return on April 15.
- On April 30, Alpharack purchased 20 tennis bags, on credit, from Bag Designs for \$320. The bags were shipped F.O.B. destination and arrived at Alpharack on May 3.

**Required:**

- Prepare the journal entries to record the sale and purchase transactions for Alpharack during April 2009.
- Assuming operating expenses of \$8,500, prepare Alpharack's income statement for April 2009. (Ignore income tax expense.)

**Problem 6-55A INVENTORY COSTING METHODS**

OBJECTIVE &gt; 2 3 4

Anderson's Department Store has the following data for inventory, purchases and sales of merchandise for December:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
Beginning Inventory	5	\$6.00	
Purchase, Dec. 2	16	6.40	
Purchase, Dec. 5	20	7.00	
Sale, Dec. 7	13		\$12.00
Sale, Dec. 10	15		12.00
Purchase Dec. 12	8	7.50	
Sale, Dec. 14	18		12.00

Anderson uses a perpetual inventory system. All purchases and sales were for cash.

**Required:**

1. Compute cost of goods sold and the cost of ending inventory using FIFO. (Use two decimal places for all calculations and answers.)
2. Compute cost of goods sold and the cost of ending inventory using LIFO. (Use two decimal places for all calculations and answers.)
3. Compute cost of goods sold and the cost of ending inventory using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to two decimal places.)
4. Prepare the journal entries to record these transactions assuming Anderson chooses to use the FIFO method.
5. Which method would result in the lowest amount paid for taxes?

**Problem 6-56A INVENTORY COSTING METHODS**

OBJECTIVE &gt; 3 4

Gavin Products uses a perpetual inventory system. For 2008 and 2009, Gavin has the following data:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
<b>2008</b>			
Beginning Inventory	200	\$ 9.00	
Purchase, 2/15/2008	300	11.00	
Sale, 3/10/2008	320		\$25.00
Purchase, 9/15/2008	500	12.00	
Sale, 11/3/2008	550		25.00
Purchase 12/20/2008	150	13.00	
<b>2009</b>			
Sale, 4/4/2009	200		25.00
Purchase, 6/25/2009	200	14.00	
Sale, 12/18/2009	150		25.00

**Required:**

1. For each year, compute cost of goods sold, the cost of ending inventory, and gross margin using FIFO.
2. For each year, compute cost of goods sold, the cost of ending inventory, and gross margin using LIFO.
3. For each year, compute cost of goods sold, the cost of ending inventory, and gross margin using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
4. Which method would result in the lowest amount paid for taxes?
5. Which method produces the most realistic amount for income? For inventory? Explain your answer.
6. Compute Gavin's gross profit ratio and inventory turnover ratio under each of the three inventory costing methods. How would the choice of inventory costing method affect these ratios?

**OBJECTIVE** > **5** **Problem 6-57A LOWER OF COST OR MARKET**

Sue Stone, the president of Tippecanoe Home Products has prepared the following information for the company's television inventory at the end of 2009:

Model	Quantity	Cost per Unit	Market Value per Unit
T-260	11	\$250	\$445
S-256	24	325	300
R-193	18	210	230
Z-376	12	285	250

**Required:**

Determine the carrying amount of the inventory using lower of cost or market applied on an item-by-item basis.

**OBJECTIVE** > **3** **5** **Problem 6-58A INVENTORY COSTING AND LCM**

Ortman Enterprises sell a chemical used in various manufacturing processes. On January 1, 2009, Ortman had 5,000,000 gallons on hand, for which it had paid \$0.50 per gallon. During 2009, Ortman made the following purchases:

Date	Gallons	Cost per Gallon	Total Cost
2/20	10,000,000	\$0.52	\$ 5,200,000
5/15	25,000,000	0.56	14,000,000
9/12	32,000,000	0.60	19,200,000

During 2009, Ortman sold 65,000,000 gallons at \$0.75 per gallon (35,000,000 gallons were sold on 6/29 and 30,000,000 gallons were sold on 11/22), leaving an ending inventory of 7,000,000 gallons. Assume that Ortman uses a perpetual inventory system. Ortman uses the lower of cost or market for its inventories, as required by generally accepted accounting principles.

**Required:**

1. Assume that the market value of the chemical is \$0.76 per gallon on December 31, 2009. Compute the cost of ending inventory using the FIFO, LIFO, and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
2. Assume that the market value of the chemical is \$0.58 per gallon on December 31, 2009. Compute the cost of ending inventory using the FIFO, LIFO, and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

**OBJECTIVE** > **7** **Problem 6-59A EFFECTS OF AN INVENTORY ERROR**

The income statements for Graul Corporation for the three years ending in 2009 appear below:

	2009	2008	2007
Sales revenue	\$4,643,200	\$4,287,500	\$3,647,900
Cost of goods sold	<u>2,475,100</u>	<u>2,181,600</u>	<u>2,006,100</u>
Gross margin	\$2,168,100	\$2,105,900	\$1,641,800
Operating expense	<u>1,548,600</u>	<u>1,428,400</u>	<u>1,152,800</u>
Income from operations	\$ 619,500	\$ 677,500	\$ 489,000
Other expenses	<u>137,300</u>	<u>123,600</u>	<u>112,900</u>
Income before taxes	\$ 482,200	\$ 553,900	\$ 376,100
Income tax expense (34%)	<u>163,948</u>	<u>188,326</u>	<u>127,874</u>
Net income	<u>\$ 318,252</u>	<u>\$ 365,574</u>	<u>\$ 248,226</u>

During 2009, Graul discovered that the 2007 ending inventory had been misstated due to the following two transactions being recorded incorrectly:

- a. A purchase return of inventory costing \$63,000 was recorded twice.
- b. A credit purchase of inventory made on 12/20 for \$22,000 was not recorded. The goods were shipped F.O.B. shipping point and were shipped on 12/22/2007.

**Required:**

1. Was ending inventory for 2007 overstated or understated? By how much?
2. Prepare correct income statements for all three years.
3. Did the error in 2007 affect cumulative net income for the three-year period? Explain your response.
4. Why was the 2009 net income unaffected?

**Problem 6-60A (APPENDICES 6A AND 6B) INVENTORY COSTING METHODS** OBJECTIVE > 8 9

Anderson's Department Store has the following data for inventory, purchases, and sales of merchandise for December:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
Beginning Inventory	5	\$6.00	
Purchase, Dec. 2	16	6.40	
Purchase, Dec. 5	20	7.00	
Sale, Dec. 7	13		\$12.00
Sale, Dec. 10	15		12.00
Purchase Dec. 12	8	7.50	
Sale, Dec. 14	18		12.00

Anderson uses a periodic inventory system. All purchases and sales are for cash.

**Required:**

1. Compute cost of goods sold and the cost of ending inventory using FIFO (round all answers to two decimal places).
2. Compute cost of goods sold and the cost of ending inventory using LIFO (round all answers to two decimal places).
3. Compute cost of goods sold and the cost of ending inventory using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to two decimal places.)
4. Prepare the journal entries to record these transactions assuming Anderson chooses to use the FIFO method.
5. Which method would result in the lowest amount paid for taxes?
6. If you worked Problem 6-55A, compare your results. What are the differences? Be sure to explain why the differences occurred.

**Problem 6-61A (APPENDIX 6B) INVENTORY COSTING METHODS** OBJECTIVE > 9

Gavin Products uses a periodic inventory system. For 2008 and 2009, Gavin has the following data:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
<b>2008</b>			
Beginning Inventory	200	\$ 9.00	
Purchase, 2/15/2008	300	11.00	
Sale, 3/10/2008	320		\$25.00
Purchase, 9/15/2008	500	12.00	
Sale, 11/3/2008	550		25.00
Purchase 12/20/2008	150	13.00	
<b>2009</b>			
Sale, 4/4/2009	200		25.00
Purchase, 6/25/2009	200	14.00	
Sale, 12/18/2009	150		25.00

All purchases and sales are for cash.

**Required:**

1. Compute cost of goods sold, the cost of ending inventory, and gross margin for each year using FIFO.
2. Compute cost of goods sold, the cost of ending inventory, and gross margin for each year using LIFO.
3. Compute cost of goods sold, the cost of ending inventory, and gross margin for each year using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
4. Which method would result in the lowest amount paid for taxes?
5. Which method produces the most realistic amount for income? For inventory? Explain your answer.
6. What is the effect of purchases made later in the year on the gross margin when LIFO is employed? When FIFO is employed? Be sure to explain why any differences occur.
7. If you worked Problem 6-56A, compare your answers. What are the differences? Be sure to explain why any differences occurred.

## Problem Set B

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**OBJECTIVE** 2
**Problem 6-54B RECORDING SALE AND PURCHASE TRANSACTIONS**

Jordan Footwear sells athletic shoes and uses the perpetual inventory system. During June, Jordan engaged in the following transactions its first month of operations:

- a. On June 1, Jordan purchased, on credit, 100 pairs of basketball shoes and 210 pairs of running shoes with credit terms of 2/10, n/30. The basketball shoes were purchased at a cost of \$75 per pair, and the running shoes were purchased at a cost of \$55 per pair. Jordan paid Mole Trucking \$250 cash to transport the shoes from the manufacturer to Jordan's warehouse, shipping terms were F.O.B. shipping point, and the items were shipped on June 1 and arrived on June 4.
- b. On June 2, Jordan purchased 80 pairs of cross-training shoes for cash. The shoes cost Jordan \$60 per pair.
- c. On June 6, Jordan purchased 120 pairs of tennis shoes on credit. Credit terms were 2/10, n/25. The shoes were purchased at a cost of \$40 per pair.
- d. On June 10, Jordan paid for the purchase of the basketball shoes and the running shoes in (a).
- e. On June 12, Jordan determined that \$480 of the tennis shoes were defective. Jordan returned the defective merchandise to the manufacturer.
- f. On June 18, Jordan sold 50 pairs of basketball shoes at \$110 per pair, 100 pairs of running shoes for \$85 per pair, 18 pairs of cross-training shoes for \$100 per pair, and 35 pairs of tennis shoes for \$65 per pair. All sales were for cash. The cost of the merchandise sold was \$11,850.
- g. On June 21, customers returned 10 pairs of the basketball shoes purchased on June 18. The cost of the merchandise returned was \$750.
- h. On June 23, Jordan sold another 20 pairs of basketball shoes, on credit, for \$110 per pair and 15 pairs of cross-training shoes for \$100 cash per pair. The cost of the merchandise sold was \$2,400.
- i. On June 30, Jordan paid for the June 6 purchase of tennis shoes less the return on June 12.
- j. On June 30, Jordan purchased 60 pairs of basketball shoes, on credit, for \$75 each. The shoes were shipped F.O.B. destination and arrived at Jordan on July 3.

**Required:**

1. Prepare the journal entries to record the sale and purchase transactions for Jordan during June 2009.
2. Assuming operating expenses of \$5,300, prepare Jordan's income statement for June 2009. (Ignore income tax expense.)

**Problem 6-55B INVENTORY COSTING METHODS**OBJECTIVE > **2** **3** **4**

Edward's Company began operations in February 2009. Edward's accounting records provide the following data for the remainder of 2009 for one of the items the company sells:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
Beginning Inventory	9	\$ 90	
Purchase, Feb. 15	6	100	
Purchase, March 22	8	110	
Sale, April 9	10		\$180
Purchase, May 29	9	120	
Sale, July 10	15		180
Purchase, Sept. 10	8	130	
Sale, Oct. 15	12		180

Edward's uses a perpetual inventory system. All purchases and sales were for cash.

**Required:**

1. Compute cost of goods sold and the cost of ending inventory using FIFO.
2. Compute cost of goods sold and the cost of ending inventory using LIFO.
3. Compute cost of goods sold and the cost of ending inventory using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to two decimal places.)
4. Prepare the journal entries to record these transactions assuming Edward's chooses to use the FIFO method.
5. Which method would result in the lowest amount paid for taxes?

**Problem 6-56B INVENTORY COSTING METHODS**OBJECTIVE > **3** **4**

Hartwell Products Company uses a perpetual inventory system. For 2008 and 2009, Hartwell has the following data:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
<b>2008</b>			
Beginning Inventory	100	\$45	
Purchase, 2/25/2008	700	52	
Sale, 4/15/2008	600		\$90
Purchase, 8/30/2008	500	56	
Sale, 11/13/2008	600		90
Purchase, 12/20/2008	400	58	
<b>2009</b>			
Sale, 3/8/2009	400		90
Purchase, 6/28/2009	900	62	
Sale, 12/18/2009	800		90

**Required:**

1. For each year, compute cost of goods sold, the cost of ending inventory, and gross margin using FIFO.
2. For each year, compute cost of goods sold, the cost of ending inventory, and gross margin using LIFO.
3. For each year, compute cost of goods sold, the cost of ending inventory, and gross margin using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
4. Which method would result in the lowest amount paid for taxes?
5. Which method produces the most realistic amount for income? For inventory? Explain your answer.
6. Compute Hartwell's gross profit ratio and inventory turnover ratio under each of the three inventory costing methods. How would the choice of inventory costing method affect these ratios?

**OBJECTIVE** > **5** **Problem 6-57B LOWER OF COST OR MARKET**

Kevin Spears, the accountant of Tyler Electronics Inc., has prepared the following information for the company's inventory at the end of 2009:

Model	Quantity	Cost per Unit	Market Value per Unit
RSQ535	30	\$100	\$180
JKY942	12	75	125
LLM112	54	85	80
KZG428	23	115	140

**Required:**

Determine the carrying amount of the inventory using lower of cost or market applied on an item-by-item basis.

**OBJECTIVE** > **3** **5** **Problem 6-58B INVENTORY COSTING AND LCM**

J&J Enterprises sells paper cups to fast-food franchises. On January 1, 2009, J&J had 5,000 cups on hand, for which it had paid \$0.10 per cup. During 2009, J&J made the following purchases and sales:

Date	Units	Cost per Unit	Total Cost
2/20	100,000	\$0.12	\$12,000
5/15	57,000	0.14	7,980
9/12	85,000	0.15	12,750

During 2009, J&J sold 240,000 cups at \$0.35 per cup (80,000 cups were sold on 4/2 and 160,000 cups were sold on 10/20), leaving an ending inventory of 7,000 cups. J&J uses the lower of cost or market for its inventories, as required by generally accepted accounting principles.

**Required:**

1. Assume that the market value of the cups is \$0.38 per gallon on December 31, 2009. Compute the cost of ending inventory using the FIFO, LIFO, and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
2. Assume that the market value of the chemical is \$0.12 per cup on December 31, 2009. Compute the cost of ending inventory using the FIFO, LIFO, and average cost methods. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)

**OBJECTIVE** > **7** **Problem 6-59B EFFECTS OF AN INVENTORY ERROR**

The income statements for Picard Company for the three years ending in 2009 appear below:

	2009	2008	2007
Sales revenue	\$1,168,500	\$998,400	\$975,300
Cost of goods sold	<u>785,800</u>	<u>675,450</u>	<u>659,800</u>
Gross margin	\$ 382,700	\$322,950	\$315,500
Operating expense	<u>162,500</u>	<u>142,800</u>	<u>155,300</u>
Income from operations	\$ 220,200	\$180,150	\$160,200
Other expenses	<u>73,500</u>	<u>58,150</u>	<u>54,500</u>
Income before taxes	\$ 146,700	\$122,000	\$105,700
Income tax expense (34%)	<u>49,878</u>	<u>41,480</u>	<u>35,938</u>
Net income	<u>\$ 96,822</u>	<u>\$ 80,520</u>	<u>\$ 69,762</u>

During 2009, Picard discovered that the 2007 ending inventory had been misstated due to the following two transactions being recorded incorrectly:

- a. Inventory costing \$25,000 that was returned to the manufacturer (a purchase return) was not recorded and included in ending inventory.

- b. A credit purchase of inventory made on 8/30/2007 for \$15,000 was recorded twice. The goods were shipped F.O.B. shipping point and were shipped on 9/5/2007.

**Required:**

1. Was ending inventory for 2007 overstated or understated? By how much?
2. Prepare correct income statements for all three years.
3. Did the error in 2007 affect cumulative net income for the three-year period? Explain your response.
4. Why was the 2009 net income unaffected?

**Problem 6-60B (APPENDICES 6A AND 6B) INVENTORY COSTING METHODS** OBJECTIVE > 8 9

Edward's Company began operations in February 2009. Edward's accounting records provide the following data for the remainder of 2009 for one of the items the company sells:

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
Beginning Inventory	9	\$ 90	
Purchase, Feb. 15	6	100	
Purchase, March 22	8	110	
Sale, April 9	10		\$180
Purchase, May 29	9	120	
Sale, July 10	15		180
Purchase, Sept. 10	8	130	
Sale, Oct. 15	12		180

Edward's uses a periodic inventory system. All purchases and sales were for cash.

**Required:**

1. Compute cost of goods sold and the cost of ending inventory using FIFO.
2. Compute cost of goods sold and the cost of ending inventory using LIFO.
3. Compute cost of goods sold and the cost of ending inventory using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
4. Prepare the journal entries to record these transactions assuming Edward's chooses to use the FIFO method.
5. Which method would result in the lowest amount paid for taxes?
6. If you worked Problem 6-55B, compare your results. What are the differences? Be sure to explain why the differences occurred.

**Problem 6-61B (APPENDIX 6B) INVENTORY COSTING METHODS** OBJECTIVE > 9

Hartwell Products Company uses a periodic inventory system. For 2008 and 2009, Hartwell has the following data (assume all purchases and sales are for cash):

Activity	Units	Purchase Price (per unit)	Sale Price (per unit)
<b>2008</b>			
Beginning Inventory	100	\$45	
Purchase, 2/25/2008	700	52	
Sale, 4/15/2008	600		\$90
Purchase, 8/30/2008	500	56	
Sale, 11/13/2008	600		90
Purchase, 12/20/2008	400	58	
<b>2009</b>			
Sale, 3/8/2009	400		90
Purchase, 6/28/2009	900	62	
Sale, 12/18/2009	800		90

**Required:**

1. Compute cost of goods sold, the cost of ending inventory, and gross margin for each year using FIFO.

2. Compute cost of goods sold, the cost of ending inventory, and gross margin for each year using LIFO.
3. Compute cost of goods sold, the cost of ending inventory, and gross margin for each year using the average cost method. (Use four decimal places for per unit calculations and round all other numbers to the nearest dollar.)
4. Which method would result in the lowest amount paid for taxes?
5. Which method produces the most realistic amount for income? For inventory? Explain your answer.
6. What is the effect of purchases made later in the year on the gross margin when LIFO is employed? When FIFO is employed? Be sure to explain why any differences occur.
7. If you worked 6-56B, compare your answers. What are the differences? Be sure to explain why any differences occurred.

## Cases

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### Case 6-62 INVENTORY VALUATION AND ETHICS

Mary Cravens is an accountant for City Appliance Corporation. One of Mary's responsibilities is developing the ending inventory amount for the calculation of cost of goods sold each month. At the end of September, Mary noticed that the ending inventory for a new brand of televisions was much larger than she had expected. In fact, there had been hardly any change since the end of the previous month when the shipments of televisions arrived. Mary knew that the firm's advertising had featured the new brand's products, so she had expected that a substantial portion of the televisions would have been sold.

Because of these concerns, Mary went to the warehouse to make sure the numbers were correct. While at the warehouse, Mary noticed that 30 of the televisions in question were on the loading dock for delivery to customers and another, larger group, perhaps 200 sets, were in an area set aside for sales returns. Mary asked Barry Tompkins, the returns supervisor, why so many of the televisions had been returned. Barry said that the manufacturer had used a cheap circuit board that failed on many of the sets after they had been in service for a week or two. Mary then asked how the defective televisions had been treated when the inventory was taken at the end of September. Barry said that the warehouse staff had been told to include in the ending inventory any item in the warehouse that was not marked for shipment to customers. Therefore, all returned merchandise was considered part of ending inventory.

Mary asked Barry what would be done with the defective sets. Barry said that they would probably have to be sold to a liquidator at a few cents on the dollar. Mary knew from her examination of the inventory data that all the returned sets had been included in the September inventory at their original cost.

Mary returned to the office and prepared a revised estimate of ending inventory using the information Barry Tompkins had given her to revalue the ending inventory of the television sets. She submitted the revision along with an explanatory note to her boss, Susan Grant. A few days later, Susan stopped by Mary's office to report on a conversation with the chief financial officer, Herb Cobb. Herb told her that the original ending inventory amount would not be revised. Herb said that the television sets in question had been purchased by the owner's brother and that no one was prepared to challenge the owner's brother.

#### Required:

1. What would happen to cost of goods sold, gross margin, income from operations, and net income if the cost of the returned inventory had been reduced to its liquidation price as Mary had proposed?
2. What should Mary do now?

### Case 6-63 EFFECTS OF PRICE AND QUANTITY ON INVENTORY COSTING DATA

Quicksilver, Inc., is considering its choice of inventory costing for one of the items in its merchandise inventory. Quicksilver's accountant has prepared the following data for that item:

	FIFO	LIFO	Average Cost
Beginning inventory	\$ 50,400	\$ 50,400	\$ 50,400
Purchases	460,300	460,300	460,300
Cost of goods available for sale	\$510,700	\$510,700	\$510,700
Ending inventory	(72,600)	(54,200)	(60,900)
Cost of goods sold	<u>\$438,100</u>	<u>\$456,500</u>	<u>\$449,800</u>

#### Required:

1. What does this data imply about the number of items in beginning and ending inventory?
2. Can you infer from this data whether the prices at which Quicksilver purchased the items increased or decreased? Explain your answer.

### Case 6-64 INVENTORY COSTING WHEN INVENTORY QUANTITIES ARE SMALL

A number of companies have adopted a just-in-time procedure for acquiring inventory. These companies have arrangements with their suppliers that require the supplier to deliver inventory just as the company needs the goods. As a result, just-in-time companies keep very little inventory on hand.

#### Required:

1. Should the inventory costing method (FIFO or LIFO) have a material effect on cost of goods sold when a company adopts the just-in-time procedure and reduces inventory significantly?
2. Once a company has switched to the just-in-time procedure and has little inventory, should the inventory costing method (LIFO or FIFO) affect cost of goods sold?

### Case 6-65 INVENTORY PURCHASE PRICE VOLATILITY

In 2009, Steel Technologies, Inc., changed from the LIFO to the FIFO method for its inventory costing. Steel Technologies' annual report indicated that this change had been instituted because the price at which the firm purchased steel was highly volatile.

#### Required:

Explain how FIFO cost of goods sold and ending inventory would be different from LIFO when prices are volatile.

### Case 6-66 THE EFFECT OF REDUCTIONS IN INVENTORY QUANTITIES

Hill Motor Company, one of the country's largest automobile manufacturers, disclosed the following information about its inventory in the notes to its financial statements:

Inventories are stated generally at cost, which is not in excess of market value. The cost of inventory is determined by the last-in, first-out (LIFO) method. If the first-in, first-out (FIFO) method of inventory valuation had been used, inventory would have been about \$2,519 million higher at December 31, 2009 and \$2,668 million higher at December 31, 2008. As a result of decreases in inventory, certain inventory quantities carried at lower LIFO costs prevailing in prior years, as compared with costs of current purchases, were liquidated in 2009 and 2008. These inventory adjustments improved pre-tax operating results by approximately \$134 million in 2009, \$294 million in 2008.

**Required:**

1. Explain why the reduction in inventory quantities increased Hill Motor Company's net income.
2. If Hill Motor Company had used the FIFO inventory costing method, would the reduction in ending inventory quantities have increased net income?

**Case 6-67 ERRORS IN ENDING INVENTORY**

From time to time, business news will report that the management of a company has misstated its profits by knowingly establishing an incorrect amount for its ending inventory.

**Required:**

1. Explain how a misstatement of ending inventory can affect profit.
2. Why would a manager intent on misstating profits choose ending inventory to achieve the desired effect?

**Case 6-68 ETHICS AND INVENTORY**

An electronics store has a large number of computers in its inventory that use out-dated technology. These computers are reported at their cost. Shortly after the December 31 year-end, the store manager insists that the computers can be sold for well over their cost. But the store's accountant has been told by the sales staff that it will be difficult to sell these computers for more than half of their inventory cost.

**Required:**

1. Why is the store manager reluctant to admit that these computers have little sales value?
2. What are the consequences for the business of failing to recognize the decline in value?
3. What are the consequences for the accountant of participating in a misrepresentation of the inventory's value?

**Case 6-69 RESEARCH AND ANALYSIS USING THE ANNUAL REPORT**

Obtain Wal-Mart's 2008 annual report either through the "Investor Relations" portion of its website (do a web search for Wal-Mart investor relations) or go to <http://www.sec.gov> and click "Search for company filings" under "Filings and Forms (EDGAR)."

**Required:**

1. What amount did Wal-Mart report for inventories in its consolidated balance sheets at January 31, 2008? At January 31, 2007?
2. What inventory valuation method does Wal-Mart use to determine the cost of its inventories? (Hint: You may need to refer to the notes to the consolidated financial statements.)
3. What amount did Wal-Mart report for cost of goods sold for 2008, 2007, and 2006?
4. Compute the gross profit and inventory turnover ratios for 2008. What do these ratios tell you?
5. Does Wal-Mart use the lower of cost or market method to account for its inventory? Does it appear that Wal-Mart will write down its inventory to market value?
6. What would be the effect on the financial statements if Wal-Mart were to overstate its inventory by 1 percent?

**Case 6-70 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

1. What amounts do Abercrombie & Fitch and Aeropostale report for inventories in its Consolidated Balance Sheets at February 3, 2007 and January 28, 2006?
2. Do Abercrombie & Fitch and Aeropostale use the same method to value its inventories?
3. What amount does Abercrombie & Fitch report for cost of goods sold for the years ending February 3, 2007, January 28, 2006, and January 29, 2005 (fiscal 2006, 2005, and 2004)? What amount does Aeropostale report for cost of goods sold for the years ending February 3, 2007, January 28, 2006, and January 29, 2005?
4. Compute the gross profit and inventory turnover ratios for fiscal year ending February 3, 2007, for each company? What do these ratios tell you about the success of each company in managing and controlling its inventory?
5. Do Abercrombie & Fitch and Aeropostale use the lower of cost market method to account for their inventories? By what amount have they written inventories down in the fiscal year ending February 3, 2007?

# 7

## Operating Assets

After studying Chapter 7, you should be able to:

- **1** Define, classify, and describe the accounting for operating assets.
- **2** Explain how the cost principle applies to recording the cost of a fixed asset.
- **3** Understand the concept of depreciation.
- **4** Compute depreciation expense using various depreciation methods.
- **5** Distinguish between capital and revenue expenditures.
- **6** Describe the process of recording an impairment of a fixed asset.
- **7** Describe the process of recording the disposal of a fixed asset.
- **8** Evaluate the use of fixed assets.
- **9** Understand the measurement and reporting of intangible assets.
- **10** Understand the measurement and reporting of natural resources.

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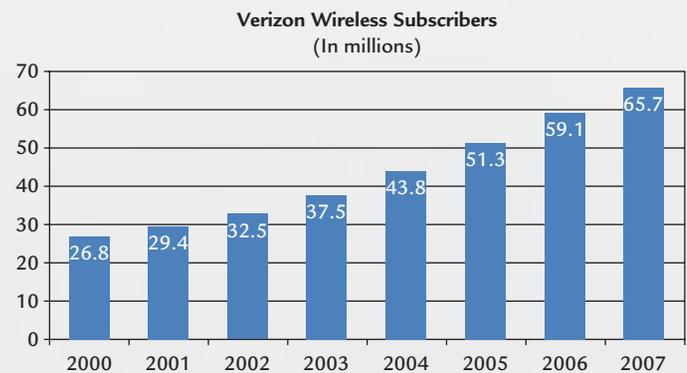


# E xperience Financial Accounting with Verizon

With revenues in excess of \$93 billion, **Verizon Communications, Inc.** is one of the world's leading providers of telecommunications services. Verizon boasts over 8.2 million broadband customers as well as almost 66 million subscribers to its wireless voice and data communication services. With users demanding enhanced data-carrying capabilities, higher transmission speeds, increased multimedia capabilities, and other features, Verizon must constantly expand and upgrade its network. One concern for Verizon management is that their network will enable them to provide sufficient capacity so that their customers will enjoy superior coverage and reliability. Recognizing that its network is a key factor in differentiating itself from its competitors, Verizon has spent more than any other telecommunications company in America (over \$100 billion since 2000) on its technology infrastructure. This amount includes more than \$30 billion to maintain, upgrade, and expand its wireless network. The results of these investments have led Verizon to claim that it operates the most reliable wireless network in the country, which has led to impressive growth in the number of subscribers to its wireless services.

For a company like Verizon, effective management of its long-term operating assets (e.g., its wireless network) is essential for the generation of revenue and profit.

Verizon's strategy for success rests on two key premises which relate to its network. First, the network must



provide reliable access to every location that its customers need to access. For a simple call home or in crisis situations, customers must be able to count on Verizon's network to function effectively. Second, Verizon is committed to investing in new technology in order to maintain a high level of customer satisfaction and remain competitive in the telecommunications industry. Without continual investment, Verizon knows it will lose customers. Consistent with these goals, Verizon spent \$17.5 billion in 2007 related to the build-up, expansion, and upgrade of its network. These expenditures represent an asset on Verizon's balance sheet that it hopes will provide a future benefit in terms of growth in market share and profitability.

By closely analyzing a company's expenditures on productive assets, you will be able to better assess the company's long-term productivity, profitability, and ability to generate cash flow.

**OBJECTIVE** > **1**

Define, classify, and describe the accounting for operating assets.

## Understanding Operating Assets

In this chapter, we will examine the measurement and reporting issues related to **operating assets**, which are the long-lived assets that are used by the company in the normal course of operations. Unlike the goods and services that a company sells, operating assets are not transferred to customers. Instead, operating assets are used by a company in the normal course of operations to generate revenue. They are usually held by a company until they are no longer of service to the company or, in other words, until their *service potential* has been exhausted. The typical operating asset is used for a period of 4 to 10 years, although some are held for only 2 or 3 years and others for as long as 30 or 40 years. Operating assets are divided into three categories:

1. Property, plant, and equipment (often called *fixed assets* or *plant assets*)
2. Intangibles
3. Natural resources

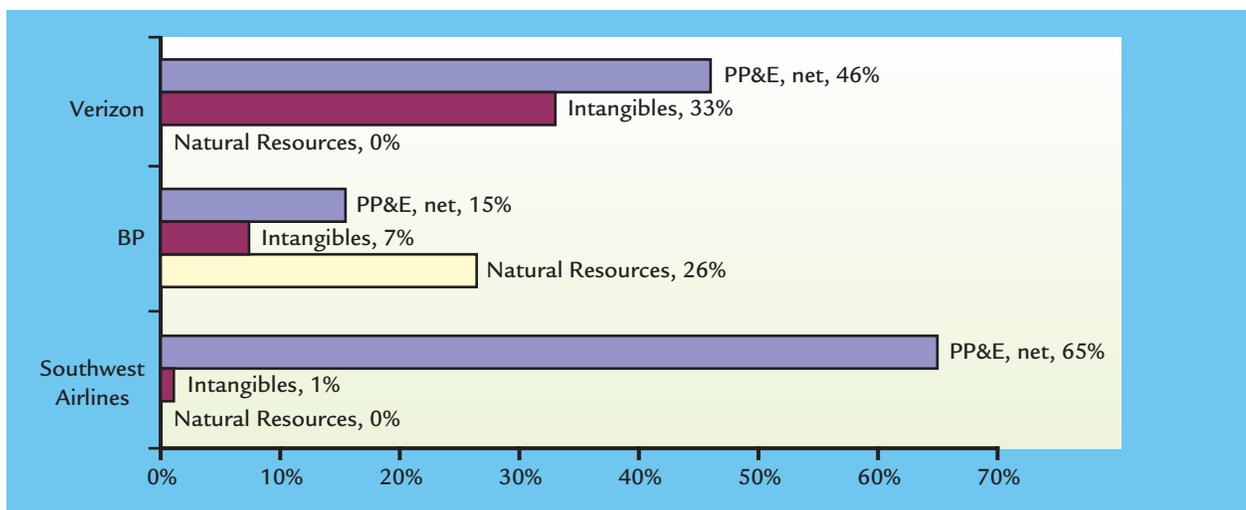
Property, plant, and equipment (PP&E) are *tangible operating assets* that can be seen and touched. They include, among other things, land, buildings, machines, and automobiles. *Intangible assets*, which generally result from legal and contractual rights, do not have physical substance. They include patents, copyrights, trademarks, licenses, and goodwill. *Natural resources* are tangible operating assets to which special accounting procedures apply. Natural resources include timberlands and deposits of natural resources such as coal, oil, and gravel.

Operating assets represent future economic benefits, or service potential, that will be used in the normal course of operations. At acquisition, an operating asset is recorded at its cost, including the cost of acquiring the asset and the cost of preparing the asset for use (cost concept). These costs are said to be *capitalized*, which means that they are reported as long-term assets with a service potential of greater than one year. As the service potential of an operating asset declines, the cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received (the matching principle). This allocation is called *depreciation* for plant assets, *amortization* for intangible assets, and *depletion* for natural resources.

Operating assets are often the most costly of the various types of assets acquired by an entity. For manufacturing companies, property, plant, and equipment frequently represents a major percentage of a manufacturing company's total assets. However in other industries, such as computer software, operating assets may be a relatively insignificant portion of a company's assets. For many companies, depreciation, amortization, and depletion are also among the largest items of periodic expense. Exhibit 7-1 shows the percentages of operating assets in relation to total assets for various companies.

Exhibit 7-1

Percentages of Operating Assets in Relation to Total Assets



For Verizon, operating assets (property, plant, and equipment plus intangible assets) comprise approximately 79 percent of its total assets. Fixed assets include the expenditures required to build, upgrade, and expand its wireless network. However, Verizon has significant investments in intangible operating assets, primarily licenses that provide Verizon with the exclusive right to use certain radio frequencies to provide wireless services. In contrast, companies such as **BP** (one of the largest oil companies in the world) have relatively more natural resources (oil and natural gas properties), while **Southwest Airlines'** operating assets are made up primarily of its airplanes. This information about a company's operating assets gives financial statement users insights into a company's ability to satisfy customer demands (productive capacity) and the effectiveness of management in using the company's assets to generate revenue. While the relative mix of operating assets may vary among companies, it is clear that the management of operating assets is critical to a company's long-term success.

In this chapter, we will discuss the measurement and reporting issues related to the initial acquisition, use, and disposition of operating assets. We will address the following questions:

- What is included in the cost of an operating asset?
- How should an operating asset's cost be allocated to expense?
- How should expenditures subsequent to acquisition be treated?
- How is the retirement of an operating asset recorded?

## Acquisition of Property, Plant, and Equipment

### OBJECTIVE 2

Explain how the cost principle applies to recording the cost of a fixed asset.

**Property, plant, and equipment** are the tangible operating assets used in the normal operations of a company. These assets are tangible in the sense that they have a visible, physical presence in the company. Property, plant, and equipment includes:

- Land—the site of a manufacturing facility or office building<sup>1</sup>
- Buildings—structures used in operations (e.g., factory, office, warehouse)
- Equipment—assets used in operations (machinery, furniture, automobiles)

In this chapter, we will examine how to determine the cost for these assets, calculate their depreciation expense, and record their retirement from service.

## Measuring the Cost of a Fixed Asset

The cost of a fixed asset is any expenditure necessary to acquire the asset and to prepare the asset for use. For example, the cost of a machine would be its purchase price (less any discount offered) plus sales taxes, freight, installation costs, and the cost of labor and materials for trial runs that check its performance. Expenditures that are included as part of the cost of the asset are said to be *capitalized*. Exhibit 7-2 shows expenditures that are typically included as part of the cost of property, plant, and equipment.

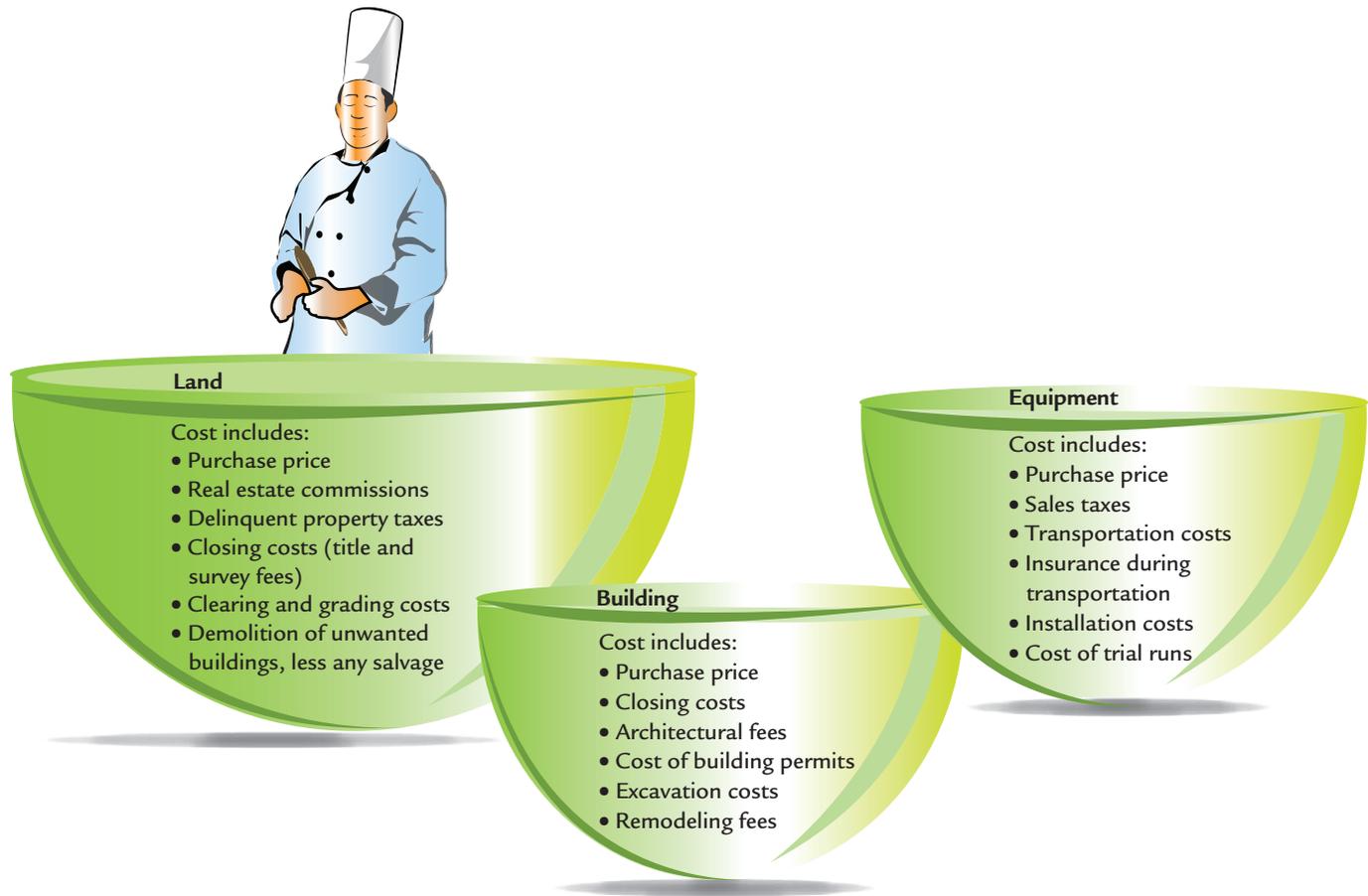
Expenditures that are *not* included as part of the cost of the asset are expensed immediately. Generally, recurring costs that benefit a period of time, not the asset's life, are expensed instead of capitalized.

**ETHICS** The distinction between whether an expenditure should be capitalized or expensed can have dramatic consequences for a company's financial statements. It was **WorldCom's** handling of this issue that triggered one of the largest financial restatements in U.S. history. By improperly capitalizing \$3.8 billion that should have been expensed immediately, WorldCom was able to increase its income and its operating cash flow, thereby concealing large losses. ♦

<sup>1</sup> Land purchased for future use or as an investment is not considered part of property, plant, and equipment.

## Exhibit 7-2

## Typical Costs of Acquiring Property, Plant, and Equipment



## Recording the Cost of a Fixed Asset

The cost principle requires that a company record its fixed assets at historical cost. When cash is paid in exchange for an asset, the amount of cash given, plus any other expenditure necessary to prepare the asset for use, becomes part of the historical cost of the acquired asset. However, when its purchase price is large, a fixed asset may be purchased by issuing debt. One might think that the interest paid on the debt should be added to the purchase price. However, interest generally is viewed as resulting from a financing decision rather than from the decision to acquire the asset. Therefore, interest on borrowed funds normally is not added to the purchase price of an asset.<sup>2</sup>

When noncash consideration, such as land or other noncash assets, is given in exchange for an asset, the purchase price of the acquired asset is the fair value of the asset given up or the fair value of the asset received, whichever is more clearly determinable. The fair value (or fair market value) of an asset is the estimated amount of cash that would be required to acquire the asset. This cash equivalent cost can be inferred from information about similar assets in comparable transactions.

**Cornerstone 7-1** illustrates the accounting procedures for the measurement and recording of the cost of an operating asset. It shows that all costs necessary to acquire the machine and prepare it for use—freight (\$2,900) and installation costs (\$5,300 + \$800 + \$1,500)—are included in the machine's historical cost. Interest on the note

<sup>2</sup> Financial Accounting Standards Board, *Statement of Financial Accounting Standards No. 34. "Capitalization of Interest,"* permits the addition of interest to the cost of assets requiring a long period of preparation for use, such as ships, large plants, or buildings.

## HOW TO Measure and Record the Cost of a Fixed Asset

### Concept:

The cost of a fixed asset is any expenditure necessary to acquire the asset and to prepare it for use.

### Information:

On June 29, 2009, Drew Company acquired a new automatic milling machine from Dayton, Inc. Drew paid \$20,000 in cash and signed a one-year, 10 percent note for \$80,000. Following the purchase, Drew incurred freight charges, on account, of \$2,900 to ship the machine from Dayton's factory to Drew's plant. After the machine arrived, Drew paid J. B. Contractors \$5,300 for installation. Drew also used \$800 of materials and \$1,500 of labor on trial runs.

### Required:

- Determine the cost of the machine.
- Prepare the journal entry necessary to record the purchase of the machine.

### Solution:

- The cost of the machine is \$110,500. The acquisition consists of the cash payment (\$20,000), the amount of debt needed to finance the purchase (\$80,000), freight charges on account (\$2,900), installation costs (\$5,300), and materials (\$800) and labor (\$1,500) for trial runs.
- Drew would record the purchase of the machine as follows:

Date	Account and Explanation	Debit	Credit
June 29, 2009	Equipment	110,500	
	Cash (\$20,000 + \$5,300)		25,300
	Notes Payable		80,000
	Accounts Payable (for freight charges)		2,900
	Inventory, Materials		800
	Wages Payable		1,500
	<i>(Record purchase of machine)</i>		

Assets	= Liabilities +	Stockholders' Equity
+110,500	+80,000	
-25,300	+2,900	
-800	+1,500	



## CORNERSTONE 7-1



payable, however, is excluded from the machine's cost and is added to interest expense when it accrues. Finally, note that the cost is capitalized (recorded as an asset), and there is no effect on the income statement.

Had Drew given 1,600 shares of its own stock, which was selling for \$50 per share, instead of the 10 percent note, the acquisition would have been recorded as follows:

Date	Account and Explanation	Debit	Credit
June 29, 2009	Equipment	110,500	
	Cash (\$20,000 + \$5,300)		25,300
	Common Stock		80,000
	Accounts Payable (for freight charges)		2,900
	Inventory, Materials		800
	Wages Payable		1,500
	<i>(Record purchase of machine)</i>		

Assets	= Liabilities +	Stockholders' Equity
+110,500	+2,900	+80,000
-25,300	+1,500	
-800		

Since the fair value of the stock [ $\$50 \times 1,600 = \$80,000$ ] equals the amount of the note, the cost is the same in both entries.

**OBJECTIVE** > **3**

Understand the concept of depreciation.

**Depreciation**

We observed earlier that the cost of a fixed asset represents the cost of future benefits or service potential to a company. With the exception of land, this service potential declines over the life of each asset as the asset is used in the operations of the company. **Depreciation** is the process of allocating, in a systematic and rational manner, the cost of a tangible fixed asset (other than land) to expense over the asset's useful life. The matching principle provides the conceptual basis for measuring and recognizing depreciation and requires that the cost of a fixed asset be allocated as an expense among the accounting periods in which the asset is used and revenues are generated by its use.

The amount of depreciation expense is recorded each period by making the following adjusting journal entry:

Depreciation Expense	xxx	
Accumulated Depreciation		xxx

The amount of depreciation recorded each period, or **depreciation expense**, is reported on the income statement. **Accumulated depreciation**, which represents the total amount of depreciation expense that has been recorded for an asset since the asset was acquired, is reported on the balance sheet as a contra-asset. That is, accumulated depreciation is deducted from the cost of the asset to get the asset's **book value** (or **carrying value**).

Exhibit 7-3 shows the disclosures relating to property, plant, and equipment and depreciation made by Verizon in its 2007 Annual Report.

Before continuing, two points are critical to understand. First, depreciation is a *cost allocation process*. It is *not* an attempt to measure the fair value of the asset or obtain some other measure of the asset's value. In fact, the book value (cost less accumulated depreciation) of an asset that is reported on a company's balance sheet is often quite different from the market value of the asset. Second, depreciation is *not* an attempt to accumulate cash for the replacement of an asset. Depreciation is a cost allocation process that does not involve cash.

**CONCEPT Q&A**

If a company did not record all of the costs necessary to acquire an asset and prepare it for use, what would be the effect on the financial statements?

*If costs were not recorded as an asset, these costs would be immediately expensed which would lower income in the current period. By recording these costs as assets, the company delays the recognition of expense until the service potential of the asset is used.*

**Possible Answer:**

**Exhibit 7-3****Excerpt from Verizon's 2006 Annual Report****Notes to Consolidated Financial Statements****NOTE 5 Property, Plant, and Equipment, Net:**

Land	\$	839
Buildings and equipment		19,734
Network equipment		173,654
Furniture, office, and data processing equipment		11,912
Work in progress		1,988
Leasehold improvements		3,612
Other		2,255
		\$ 213,994
Less: Accumulated depreciation		128,700
<i>Property, plant, and equipment, net</i>		<i>\$ 85,294</i>

## DECISION-MAKING & ANALYSIS

### Future Asset Replacement

The examination of companies' balance sheets can provide useful insights into when a company's fixed assets may need to be replaced and how much cash may be required for that purpose. Assume that you are considering a major investment in one of two long-haul trucking companies. The two companies are about the same size, travel competitive routes, and have similar net incomes. However, your inspection of the balance sheets of both companies reveals a significant difference in the accumulated depreciation for the trucks, as shown below.

	Company 1	Company 2
Trucks	\$600,000	\$550,000
Less: Accumulated depreciation	138,000	477,000
Book value	<u>\$462,000</u>	<u>\$ 73,000</u>

The following are questions that you might raise while investigating the significance of this difference in accumulated depreciation:

1. Does the difference suggest that the timing of future cash outflows needed to replace fully depreciated trucks will be different for the two companies?

Company 2's trucks are close to being fully depreciated. That is, the accumulated depreciation is almost equal to the historical cost of the asset. Assuming that estimates of useful life are consistent with economic life, it would appear that Company 2 will have to spend more cash in the near future than Company 1 for truck replacement.

2. Do these expected differences in future cash outflows for asset replacement have any implications for you as an investor?

Company 2 may have to find more cash in the near future than Company 1. To do so, Company 2 might cut dividends to provide the cash internally. It might obtain the cash by issuing debt. However, the interest on the debt would reduce earnings, and debt would also make Company 2 a more risky investment. Company 2 might sell equity to raise the extra cash, but additional equity would reduce the present owners' claim on earnings and assets. Company 2 might also sell some other assets to obtain the cash; however, the amount and pattern of net income likely would be changed by a sale of assets.

Although more information is needed about Company 2 in order to know the precise impact of the impending replacement, the comparison of the two accumulated depreciation amounts helps us gain insights into the companies and leads us to ask some important questions concerning future cash flows. Although the recording of depreciation expense does not alter cash flow, accumulated depreciation signals the approaching future time for replacement of fixed assets, which usually does require cash.

### Information Required for Measuring Depreciation

Three items of information are necessary in order to measure depreciation: (1) the cost of the fixed asset, (2) the residual value (salvage value) of the fixed asset, and (3) the useful life (or expected life) of the fixed asset.

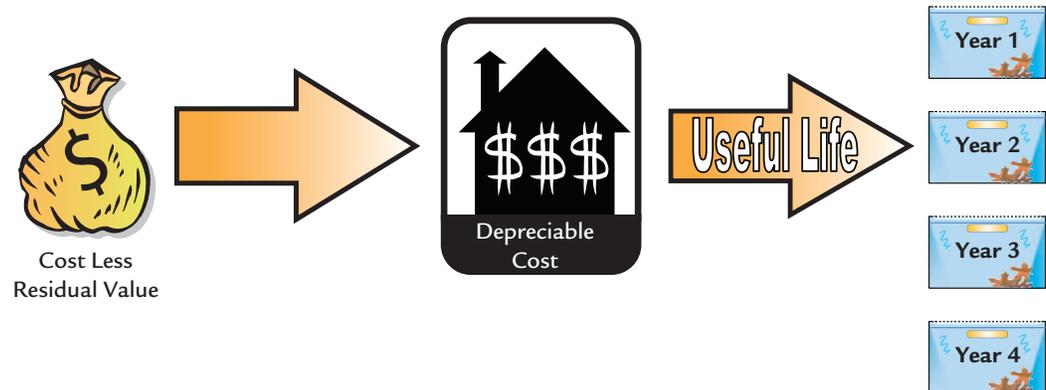
**Cost** As discussed earlier in the chapter, the cost of a fixed asset is any expenditure necessary to acquire the asset and to prepare the asset for use. In addition to cost, we also need to examine two other items—useful life and estimates of residual value—to measure depreciation. Exhibit 7-4 shows the relationship among the factors used to compute depreciation expense.

**Useful Life** The **useful life** of an asset is the period of time over which the company anticipates deriving benefit from the use of the asset.<sup>3</sup> The useful life of any fixed asset reflects both the physical capacities of the asset and the company's plans for its use. Many companies plan to dispose of assets before their entire service potential is exhausted. For example, major automobile rental companies typically use an automobile

<sup>3</sup>The useful life can be estimated in *service units* as well as in *units of time*. For example, an airline may choose to measure the useful life of its aircraft in hours of use rather than years.

## Exhibit 7-4

## Components of Depreciation Expense



for only a part of its entire economic life before disposing of it. The useful life also is influenced by technological change. Many assets lose their service potential through obsolescence long before the assets are physically inoperable. Verizon uses an estimated useful life of 3 to 40 years for its fixed assets.

**Residual Value** **Residual value** (also called **salvage value**) is the amount of cash or trade-in consideration that the company expects to receive when the asset is retired from service. Accordingly, the residual value reflects the company's plans for the asset and its expectations about the value of the asset to others once its expected life with the company is over. A truck used for 2 years may have a substantial residual value, whereas the same truck used for 10 years may have minimal residual value. Residual value is based on projections of some of the same future events that are used to estimate an asset's useful life. Since depreciation expense depends on estimates of both useful life and residual value, depreciation expense itself is an estimate.

The cost of the asset less its residual value gives an asset's **depreciable cost**. The depreciable cost of the asset is the amount that will be depreciated (expensed) over the asset's useful life.

**OBJECTIVE** > 4

Compute depreciation expense using various depreciation methods.

**Depreciation Methods**

The service potential of a fixed asset is assumed to decline with each period of use, but the pattern of decline is not the same for all assets. Some assets decline at a constant rate each year while others decline sharply in the early years of use and then more gradually as time goes on. For other assets, the pattern of decline depends on how much the asset is used in each period. *Depreciation methods* are the standardized calculations required to determine periodic depreciation expense. In the following section, we will discuss three of the most common depreciation methods:

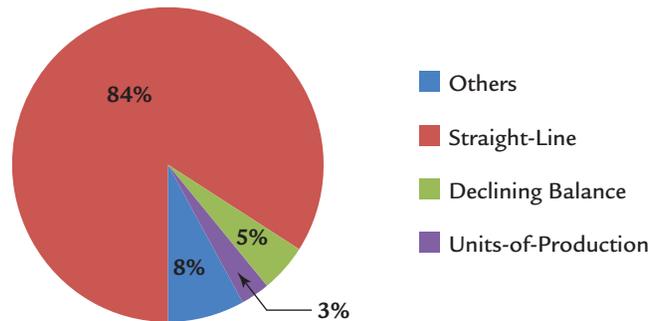
1. straight-line
2. declining balance
3. units-of-production

For any of these depreciation methods, the total amount of depreciation expense that has been recorded (accumulated depreciation) over the life of the asset will never exceed the depreciable cost (cost less residual value) of the asset.

Exhibit 7-5 shows the methods most commonly used by 600 of the largest U.S. companies.

## Exhibit 7-5

## The Relative Use of Depreciation Methods



Verizon reported the following in its notes to the financial statements:

*We record plant, property and equipment at cost . . . Plant, property and equipment . . . is generally depreciated on a straight-line basis over the following estimated useful lives: buildings, 8 to 40 years; plant equipment, 3 to 15 years; and other equipment, 3 to 5 years.*

## Straight-Line Method

As its name implies, the **straight-line depreciation** method allocates an equal amount of an asset's cost to depreciation expense for each year of the asset's useful life. It is appropriate to apply this method to those assets for which an equal amount of service potential is considered to be used each period. The straight-line method is the most widely used method because it is simple to apply and is based on a pattern of service potential decline that is reasonable for many plant assets.

The computation of straight-line depreciation expense is based on an asset's depreciable cost, which is the excess of the asset's cost over its residual value. Straight-line depreciation expense for each period is calculated by dividing the depreciable cost of an asset by the asset's useful life:

$$\text{Straight-Line Depreciation} = \frac{(\text{Cost} - \text{Residual Value})}{\text{Expected Useful Life}}$$

Alternatively, some companies will calculate an annual rate at which the asset should be depreciated. The fraction,  $(1/\text{Useful Life})$ , is called the *straight-line rate*. Using the straight-line rate, a company would compute depreciation expense by multiplying the straight-line rate by the asset's depreciable cost. **Cornerstone 7-2** illustrates the computation of depreciation expense using the straight-line method.

## CONCEPT Q&A

Why does the FASB allow companies to use different depreciation methods instead of requiring the use of a single depreciation method that would improve comparability?

The depreciation method chosen by a company should capture the declining service potential of an operating asset. Because assets are used differently, alternative methods are allowed so that the use of the asset can be better matched with the revenue it helped generate.

**Possible Answer:**

## HOW TO Compute Depreciation Expense Using the Straight-Line Method

### Concept:

As the service potential of a fixed asset declines, the cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received (the matching principle).

### Information:

On January 1, 2009, Morgan, Inc., acquired a machine for \$50,000. Morgan expects the machine to be worth \$5,000 at the end of its five-year useful life. Morgan uses the straight-line method of depreciation.



**CORNERSTONE  
7-2**



**CORNERSTONE**  
**7-2**  
*(continued)*

**Required:**

1. Compute the straight-line rate of depreciation for the machine.
2. Compute the annual amount of depreciation expense.
3. Prepare a depreciation schedule that shows the amount of depreciation expense for each year of the machine's life.
4. Prepare the journal entry required to record depreciation expense in 2009.

**Solution:**

1. The straight-line rate of 20 percent is found as follows:

$$\text{Straight-Line Rate} = \frac{1}{\text{Useful Life}} = \frac{1}{5 \text{ years}} = 20\%$$

2. The annual amount of depreciation expense is \$9,000 per year. This amount is calculated as:

$$\begin{aligned} \text{Straight-Line Depreciation Expense} &= \frac{\$50,000 - \$5,000}{5 \text{ years}} \\ &= \$9,000 \text{ per year} \end{aligned}$$

Alternatively, depreciation expense may be found by multiplying the straight-line rate (20 percent) by the asset's depreciable cost (\$45,000).

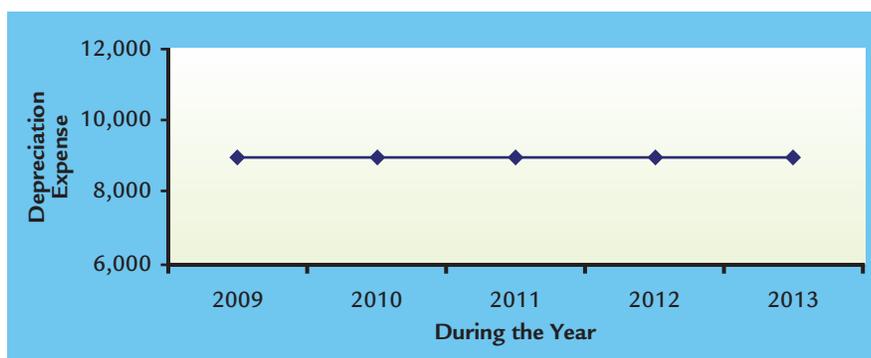
3. The depreciation schedule is shown below:

End of Year	Depreciation Expense	Accumulated Depreciation	Book Value
			\$50,000
2009	\$ 9,000	\$ 9,000	41,000
2010	9,000	18,000	32,000
2011	9,000	27,000	23,000
2012	9,000	36,000	14,000
2013	9,000	45,000	5,000
	<u>\$45,000</u>		

4. The journal entry required at the end of 2009 is:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense	9,000	
	Accumulated Depreciation		9,000
	<i>(Record straight-line depreciation expense)</i>		

Assets = Liabilities +	Stockholders' Equity
-9,000	-9,000

**Exhibit 7-6****Straight-Line Pattern of Depreciation**

As illustrated in Cornerstone 7-2, Morgan, Inc., will record the same amount of depreciation expense (\$9,000) each year. Exhibit 7-6 shows the depreciation pattern over the asset's five-year life.

The contra-asset account, accumulated depreciation, increases at a constant rate of \$9,000 per year until it equals the depreciable cost (\$45,000). The book value of the machine (cost less accumulated depreciation) decreases by \$9,000 per year, until it equals the residual value (\$5,000) at the end of the asset's useful life.

## Declining Balance Method

The **declining balance depreciation method** is an accelerated depreciation method that produces a declining amount of depreciation expense each period by multiplying the declining book value of an asset by a constant depreciation rate. It is called an accelerated method because it results in a larger amount of depreciation expense in the early years of an asset's life relative to the straight-line method. However, because the total amount of depreciation expense (the depreciable cost) must be the same under any depreciation method, accelerated methods result in a smaller amount of depreciation expense in the later years of an asset's life. The declining balance method is appropriate for assets that are subject to a rapid decline in service potential due to factors such as rapid obsolescence.

The declining balance depreciation rate is some multiple ( $m$ ) of the straight-line rate:

$$\text{Declining Balance Rate} = (m) \times \text{Straight-Line Rate}$$

The multiple ( $m$ ) is often 2, in which case the declining balance method is called the *double-declining-balance method*. (In this text, a multiple of 2 is used for the declining balance method unless otherwise noted.) The declining balance rate also can be computed by using a more complicated formula that is described in later accounting courses.

Declining balance depreciation expense for each period of an asset's useful life equals the declining balance rate times the asset's book value (cost less accumulated depreciation) at the beginning of the period. Thus declining balance depreciation expense for each period is computed by using the following equation:

$$\text{Declining Balance Depreciation Expense} = \text{Declining Balance Rate} \times \text{Book Value}$$

The calculation of declining balance depreciation expense differs in two important ways from the calculation of straight-line depreciation expense. First, the straight-line method multiplies a depreciation rate by the *depreciable cost* of the asset, but the declining balance method multiplies a depreciation rate by the *book value* of the asset. Because the book value declines as depreciation expense is recorded, this produces a declining pattern of depreciation expense over time. Second, the straight-line method records an equal amount of depreciation expense *each period* of the asset's life. However, it is likely that the computation of depreciation expense under the declining balance method would cause the asset's book value to fall below its residual value. Because an asset's book value cannot be depreciated below its residual value, a lower amount of depreciation expense (relative to what is calculated under the declining balance method) must be recorded so that depreciation stops once the residual value is reached. **Cornerstone 7-3** illustrates the computation of depreciation expense using the declining balance method.

### HOW TO Compute Depreciation Expense Using the Declining Balance Method

#### Concept:

As the service potential of a fixed asset declines, the cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received (the matching principle).

#### Information:

On January 1, 2009, Morgan, Inc., acquired a machine for \$50,000. Morgan expects the machine to be worth \$5,000 at the end of its five-year useful life. Morgan uses the double-declining-balance method of depreciation.



### CORNERSTONE 7-3



**CORNERSTONE**  
**7-3**  
*(continued)*

**Required:**

1. Compute the double-declining-balance rate of depreciation for the machine.
2. Prepare a depreciation schedule that shows the amount of depreciation expense for each year of the machine's life.
3. Prepare the journal entry required to record depreciation expense in 2009.

**Solution:**

1. The double-declining-balance rate of depreciation (40 percent) equals twice the straight-line rate of depreciation and is calculated as follows:

$$\frac{1}{\text{Useful Life}} \times 2 = \frac{1}{5} \times 2 = \frac{2}{5} \text{ or } 40\%$$

2. The depreciation schedule is shown below:

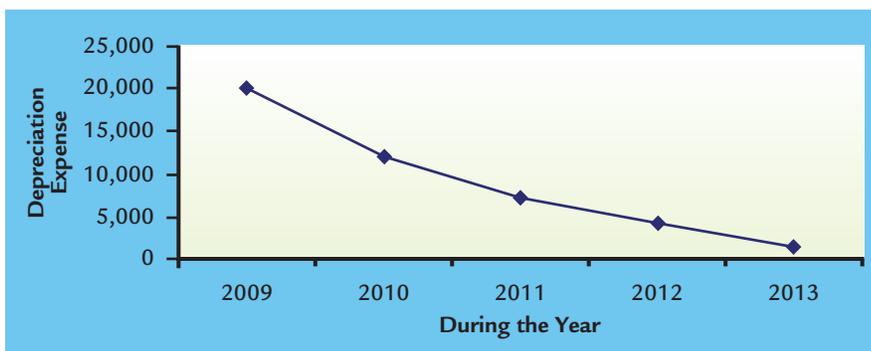
End of Year	Depreciation Expense (Rate × Book Value)	Accumulated Depreciation	Book Value
			\$50,000
2009	40% × \$50,000 = \$20,000	\$20,000	30,000
2010	40% × \$30,000 = 12,000	32,000	18,000
2011	40% × \$18,000 = 7,200	39,200	10,800
2012	40% × \$10,800 = 4,320	43,520	6,480
2013	1,480*	45,000	5,000
	<u>\$45,000</u>		

\* The computed amount of \$2,592 (40% × \$6,480) would cause book value to be lower than residual value. Therefore, depreciation expense of \$1,480 is taken in 2013 so that the book value equals the residual value.

3. The journal entry required at the end of 2009 is:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense	20,000	
	Accumulated Depreciation		20,000
	<i>(Record declining balance depreciation expense)</i>		

Assets = Liabilities +	Stockholders' Equity
-20,000	-20,000

**Exhibit 7-7****Declining Balance Pattern of Depreciation**

Relative to the straight-line method, Morgan, Inc.'s use of the double-declining-balance method of depreciation resulted in the recognition of higher depreciation expense in the early years of the asset's life and lower depreciation expense in the later years of the asset's life. This depreciation pattern is shown in Exhibit 7-7.

This pattern of expense is consistent with an asset whose service potential is used more rapidly (and its contribution to revenue is greater) in the early years of the asset's life. For this reason, the declining balance method is often used by companies in industries that experience rapid obsolescence.

## Units-of-Production Method

The two previous depreciation methods resulted in a pattern of expense that was related to the passage of time. However, when the decline in an asset's service potential is proportional to the usage of the asset and asset usage can be measured, depreciation expense can be computed using the **units-of-production method**. Usage is typically gauged by a measure of productive capacity (e.g., units produced, hours worked, or miles driven). An automobile is an example of an asset whose service potential usually declines with use, where usage is measured by the number of miles traveled.

Under the units-of-production method, depreciation expense is computed by multiplying an asset's depreciable cost by a usage ratio, as shown in the following equation:

$$\text{Units-of-Production Depreciation Expense} = \frac{\text{Actual Usage of Asset}}{\text{Expected Usage of Asset}} \times \text{Depreciable Cost}$$

↑  
(Usage Ratio)

The usage ratio is the *actual* usage of the asset in the depreciation period divided by the total *expected* usage of the asset. For example, if a company replaces its executive jet every 5,000 flight hours, the usage ratio for a year in which the jet was used for 1,000 hours would be 0.20 [1,000/5,000]. An example of depreciation expense computed by the units-of-production method is shown in **Cornerstone 7-4**. Depending on the use of the asset during the year, the units-of-production depreciation method can result in a pattern of depreciation expense that may appear accelerated, straight-line, decelerated, or erratic.

### HOW TO Compute Depreciation Expense Using the Units-of-Production Method

#### Concept:

As the service potential of a fixed asset declines (as measured by usage), the cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received (the matching principle).

#### Information:

On January 1, 2009, Morgan, Inc., acquired a machine for \$50,000. Morgan expects the machine to be worth \$5,000 at the end of its five-year useful life. Morgan expects the machine to run for 30,000 machine hours. The actual machine hours are given below:

Year	Actual Usage
	(in machine hours)
2009	3,000
2010	9,000
2011	7,500
2012	4,500
2013	6,000

Morgan uses the units-of-production method of depreciation.

#### Required:

1. Prepare a depreciation schedule that shows the amount of depreciation expense for each year of the machine's life.
2. Prepare the journal entry required to record depreciation expense in 2009.



### CORNERSTONE 7-4



**CORNERSTONE**  
**7-4**  
*(continued)*

**Solution:**

1. The depreciation schedule is shown below.

End of Year	Usage Ratio*	×	Depreciable Cost	=	Depreciation Expense	Accumulated Depreciation	Book Value
							\$50,000
2009	3,000 ÷ 30,000		\$45,000		\$ 4,500	\$ 4,500	45,500
2010	9,000 ÷ 30,000		45,000		13,500	18,000	32,000
2011	7,500 ÷ 30,000		45,000		11,250	29,250	20,750
2012	4,500 ÷ 30,000		45,000		6,750	36,000	14,000
2013	6,000 ÷ 30,000		45,000		9,000	45,000	5,000
					<u>\$45,000</u>		

\* Actual Usage ÷ Total Expected Usage

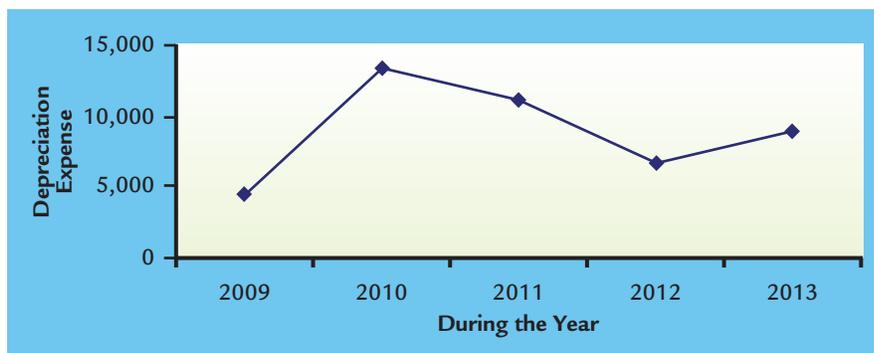
2. The journal entry required at the end of 2009 is:

Assets = Liabilities +	Stockholders' Equity
-4,500	-4,500

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense	4,500	
	Accumulated Depreciation		4,500
	<i>(Record units-of-production depreciation expense)</i>		

**Exhibit 7-8**

**Units-of-Production Pattern of Depreciation**



Note that when production varies widely and irregularly from period to period, the units-of-production method will result in an erratic pattern of depreciation expense. This depreciation pattern is illustrated in Exhibit 7-8.

Relative to the prior year, Morgan reported an increase in depreciation expense in 2010 and 2013; depreciation expense decreased in all other years. Thus, the units-of-production method does not produce a predictable pattern of depreciation expense. While this method does an excellent job of applying the matching concept, it is difficult to apply because it requires estimation of expected usage

(which is a more difficult task than simply estimating useful life in years) and is used less widely than the other two depreciation methods.

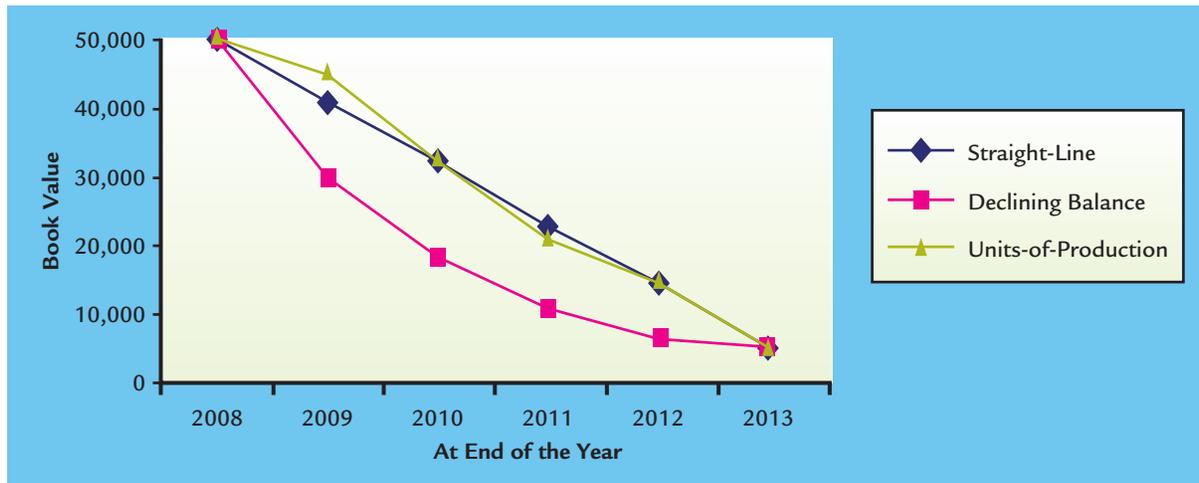
## Comparison of Depreciation Methods

Now that all three depreciation methods have been introduced, let us summarize their features:

- The straight-line depreciation method produces a constant amount of depreciation expense in each period of the asset's life and is consistent with a constant rate of decline in service potential.
- The declining balance depreciation method accelerates the assignment of an asset's cost to depreciation expense by allocating a larger amount of cost to the early years

## Exhibit 7-9

## Depreciation Patterns over Time



of an asset's life. This is consistent with a decreasing rate of decline in service potential and a decreasing amount for depreciation expense.

- The units-of-production depreciation method is based on a measure of the asset's use in each period, and the periodic depreciation expense rises and falls with the asset's use. In this sense, the units-of-production depreciation method is based not on a standardized pattern of declining service potential but on a pattern tailored to the individual asset and its use.

Exhibit 7-9 shows how the book value of Morgan's fixed asset changes over time due to the use of the straight-line, declining balance, and units-of-production depreciation methods.

Note that the total amount of depreciation expense (\$45,000) recognized by Morgan, Inc., was the same under all three methods. This resulted in the asset having a book value of \$5,000 at the end of 2013. At this point, book value is equal to residual value. While the total depreciation expense for each method was the same, the yearly amounts of depreciation expense recognized were different. Because each method is acceptable under GAAP, management should select the method that best matches the pattern of decline in service potential of the asset. This should result in a matching of the expense to the period in which the asset helped to generate revenue. Once a company chooses a method, that method should be consistently applied over time to enhance the comparability of the financial information.

**ETHICS** The use of estimates in depreciation calculations presents an ethical issue for the accountant. If an estimate is biased upward or downward, it can have significant financial statement impacts. For example, the accountant may face pressures to increase the useful life of an asset beyond what is reasonable. This upwardly biased estimate of useful life has the effect of decreasing the amount of depreciation expense recorded and increasing the company's net income. The accountant must resist these pressures and provide an unbiased estimate that faithfully portrays the service potential of the asset. ♦

### Depreciation for Partial Years

If an asset that is subject to depreciation is acquired on the first day of the accounting period, then the years of the asset's life coincide with the annual accounting periods. Under this condition, depreciation expense for each year of the asset's life

### CONCEPT Q&A

If all depreciation methods result in the same amount being recorded as an expense over the life of the operating asset, why would a financial statement user be concerned with the depreciation method chosen?

The choice of depreciation method affects the amount recognized as an expense during each year of the operating asset's life. Therefore, the company's reported income each year would be different based on the depreciation method chosen.

**Possible Answer:**

equals the depreciation expense for the corresponding accounting period. If, however, a depreciable asset is acquired during the accounting period (instead of at the beginning of the period), the years of the asset's life do not coincide with the annual accounting period. Under this condition, the matching concept requires that depreciation expense for each year of the asset's life be divided between two accounting periods. To illustrate, consider an asset purchased on April 1, 2009, which is being depreciated using the straight-line method. Depreciation for a full year (12 months) is \$20,000.<sup>4</sup> The asset would contribute depreciation expense of \$15,000 to the partial year of 2009  $[(\$20,000)(9/12)]$  and depreciation expense of \$20,000 to the full year of 2010  $[(\$20,000)(3/12) + (\$20,000)(9/12)]$ . For the sake of simplicity, most examples, exercises, and problems in this book assume that asset acquisitions occur at the beginning of the accounting period.

## Depreciation and Income Taxes

While a company will choose between the three depreciation methods discussed earlier as it prepares its financial statements, the depreciation method used in preparing its tax return need not be the same. The depreciation method used by a company to prepare its tax return is specified by the Internal Revenue Code. Tax depreciation rules are designed to stimulate investment in operating assets and, therefore, are not guided by the matching concept. Tax depreciation rules provide for the rapid

## DECISION-MAKING & ANALYSIS

### Impact of Depreciation Policy on Income

The measurement of periodic depreciation expense in a company that owns hundreds of depreciable assets in dozens of different categories calls for the exercise of careful judgment. Most large companies establish policies for depreciable assets that specify the measurement of cost, the estimation of useful lives and residual values, and the choice of depreciation methods. Since depreciation expense is a significant expense for many companies, net income may be quite sensitive to changes in depreciation policies and to differences in policies from one company to another. The following analysis demonstrates the importance of such changes to a bank loan officer.

Assume that you are a loan officer of the Prairie State Bank. The president of a ready-mix concrete company from a neighboring community, Concrete Transit Company, has applied for a five-year, \$150,000 loan to finance his company's expansion. You have examined Concrete's financial statements for the past three years and have summarized the following data:

	2009	2008	2007
Sales revenue	\$649,000	\$613,000	\$584,000
Cost of goods sold	317,000	304,000	287,000
Gross margin	<u>\$332,000</u>	<u>\$309,000</u>	<u>\$297,000</u>
Operating expenses	288,000	263,000	249,000
Income from operations	\$ 44,000	\$ 46,000	\$ 48,000
Miscellaneous expenses	25,000	23,000	20,000
Income before taxes	\$ 19,000	\$ 23,000	\$ 28,000
Tax expense	4,000	6,000	7,000
Net income	<u>\$ 15,000</u>	<u>\$ 17,000</u>	<u>\$ 21,000</u>
Depreciation expense*	<u>\$ 15,000</u>	<u>\$ 15,000</u>	<u>\$ 15,000</u>
Plant assets	\$470,000	\$470,000	\$470,000
Less: Accumulated depreciation	110,000	95,000	80,000
Book value	<u><u>\$360,000</u></u>	<u><u>\$375,000</u></u>	<u><u>\$390,000</u></u>

\* Included in operating expenses.

<sup>4</sup> Although acquisitions may occur *during* a month, for purposes of simplifying depreciation calculations, many companies follow the policy of substituting the date of the nearer first of the month for the actual transaction date. Thus, acquisitions on March 25 or April 9 would be treated as acquisitions on April 1 for purposes of calculating depreciation expense.

Your analysis of the financial statements indicates that the statement amounts and the relationships among them are as you expect, except for depreciation expense. Because you have another loan customer who is in the same business, you expected depreciation expense to be about 15 percent of the cost of the plant assets. Following are some questions you might ask in attempting to determine why the company's annual depreciation expense is so much less than you expected:

1. What variables can cause depreciation expense to differ from what is expected?

Depreciation expense can be different from the expected amount because different methods are used from those expected or because estimates of expected life or residual value differ from those expected.

2. You determine that Concrete Transit Company uses the straight-line depreciation method and that depreciation expense is, in fact, less than might be expected. In what direction do you think Concrete Transit has changed its estimate of expected life and residual value?

Concrete Transit must be using much higher estimates of residual value or of expected life than do other companies in similar businesses.

3. If you alter the company's depreciation expense to 15 percent of the cost of the plant assets, what happens to net income for the years 2007 through 2009?

Depreciation expense increases from \$15,000 to \$70,500 for each year. Net income is affected by the increase in depreciation expense as follows:

	Reported	Adjusted
2007	\$21,000	(\$27,500)*
2008	17,000	(32,500)
2009	15,000	(36,500)

\* In 2007 operating expenses increase by \$55,500 to \$304,500. Income (loss) from operations is then (\$7,500). Income (loss) before taxes becomes (\$27,500). Since there are no taxes when income before taxes is negative, the adjusted net income for 2005 is a net loss of \$27,500. The amounts for 2008 and 2009 are determined similarly.

4. Should your bank make the loan?

The adjusted net income amounts suggest that the company has been increasingly unprofitable. Since the principal and interest for the five-year loan would have to be repaid from cash provided by operations, the absence of profit suggests that the loan should not be made.

(accelerated) expensing of depreciable assets which lowers taxes. By bringing forward the bulk of depreciation expense, tax depreciation rules enable companies to save cash by delaying the payment of taxes. Most companies use the Modified Accelerated Cost Recovery System (MACRS) to compute depreciation expense for their tax returns, which is similar to the declining balance method. MACRS is not acceptable for financial reporting purposes.

## Expenditures After Acquisition

### OBJECTIVE 5

Distinguish between capital and revenue expenditures.

In addition to expenditures made when property, plant, and equipment is acquired, companies will incur costs over the life of the asset that range from ordinary repairs and maintenance to major overhauls, additions, and improvements. Companies must decide whether these expenditures should be capitalized (added to an asset account) or expensed (reported in total on the income statement).

Expenditures that do not increase the future economic benefits of the asset are called **revenue expenditures** and are expensed in the same period the expenditure is made. Verizon's policy with regard to revenue expenditures, as disclosed in the notes to the financial statements, is shown below:

*We charge the cost of maintenance and repairs, including the cost of replacing minor items not constituting substantial betterments, principally to Cost of Services and Sales as these costs are incurred.*

These expenditures maintain the level of benefits provided by the asset, relate only to the current period, occur frequently, and typically involve relatively small

dollar amounts. An example of a revenue expenditure is the normal repair and maintenance of an asset and includes items such as an oil change for a truck, painting of a building, and the replacement of a minor part of a machine.

Expenditures that extend the life of the asset, expand the productive capacity, increase efficiency, or improve the quality of the product, are called **capital expenditures**. Because these expenditures provide benefits to the company in both current and future periods, capital expenditures are added to an asset account and are subject to depreciation. These expenditures typically involve relatively large dollar amounts. Examples of capital expenditures include major repairs (e.g., a transmission rebuild), additions, remodeling of buildings, and improvements. For example, Verizon reported capital expenditures of approximately \$17.5 billion related to the build-out, upgrade, and expansion of both its wired and wireless network capacity and the introduction of new technology.

When a capital expenditure is made, it is necessary for a company to change its estimate of depreciation expense. In making this change in estimate, the company does not change previously recorded amounts related to depreciation. Instead, any revision of depreciation expense is accounted for in current and future periods.

To illustrate how a company would revise its estimate of depreciation expense, assume that Parker Publishing Company owned a printing press with a cost of \$300,000, a residual value of \$50,000, and a useful life of 10 years. Parker had been depreciating this asset using the straight-line method at a rate of \$25,000 per year  $[(\$300,000 - \$50,000)/10 \text{ years}]$ . On January 1, Parker Publishing Company paid \$90,000 to add a digital typesetting component to an existing printing press. After the addition, the printing press is expected to have a remaining useful life of six years and a residual value of \$10,000. To compute the revised depreciation expense, Parker will perform the following steps:

**Step 1: Obtain the book value of the asset at the date of the capital expenditure.** On the date of the capital expenditure, the printing press had a book value of \$100,000 (cost of \$300,000 less accumulated depreciation of \$200,000).

**Step 2: Add the cost of the expenditure to the book value.** Adding the cost of the addition (\$90,000) to the book value of the asset (\$100,000) results in a revised book value of \$190,000.

**Step 3: Compute depreciation expense using the information for the asset after the capital expenditure.** Using the updated information for the asset, straight-line depreciation expense is \$30,000 per year  $[(\$190,000 - \$10,000) \div 6 \text{ years}]$ . Note that Parker uses the revised residual value and useful life in computing depreciation expense after the date of the capital expenditure.

## OBJECTIVE > 6

Describe the process of recording an impairment of a fixed asset.

## Impairment of Property, Plant, and Equipment

As noted earlier, depreciation is a cost allocation process and does not attempt to measure the fair value of the asset. As a result, the book value of an asset and the fair value of an asset may be quite different. When the fair value of the asset falls significantly below the book value of the asset, it is possible that the asset may be impaired. An **impairment** is a permanent decline in the future benefit or service potential of an asset. The impairment may be due to numerous factors, including too little depreciation expense being recorded in previous years or obsolescence of the asset. A company is required to review an asset for impairment if events or circumstances lead the company to believe that an asset may be impaired.

The impairment test consists of two steps:

1. **Existence:** An impairment exists if the future cash flows expected to be generated by the asset are less than the asset's book value.
2. **Measurement:** If an impairment exists, the impairment loss is measured as the difference between the book value and the fair value of the asset.

Cornerstone 7-5 illustrates the accounting for an impairment.

## HOW TO Record an Impairment of Property, Plant, and Equipment

### Concept:

If there is a permanent decline in the service potential of an operating asset, the asset's book value should be reduced to reflect this reduction in service potential.

### Information:

Tabor Company acquired a machine on January 1, 2002, for \$150,000. On January 3, 2009, when the machine has a book value of \$60,000, Tabor believes that recent technological innovations may have led to an impairment in the value of the machine. Tabor estimates the machine will generate future cash flows of \$50,000 and its current fair value is \$42,000.

### Required:

1. Determine if the machine is impaired as of January 2009.
2. If the machine is impaired, compute the loss from impairment.
3. Prepare the journal entry to record the impairment.

### Solution:

1. The machine is impaired because the estimated future cash flows expected to be generated by the machine (\$50,000) are less than the book value of the machine (\$60,000).
2. The loss from impairment is \$18,000, computed as the fair value (\$42,000) less the book value (\$60,000) of the machine.
3. The journal entry to record the impairment is:

Date	Account and Explanation	Debit	Credit
Jan. 3, 2009	Loss from Impairment	18,000	
	Equipment – Machine		18,000
	<i>(To record impairment)</i>		

Assets	=	Liabilities +	Stockholders' Equity
-18,000			-18,000



## CORNERSTONE 7-5



Note that this journal entry has the effect of writing an impaired asset down to its fair value which is consistent with the convention of conservatism.

## Disposal of Fixed Assets

Although companies usually dispose of fixed assets voluntarily, disposition may also be forced. **Voluntary disposal** occurs when the company determines that the asset is no longer useful. The disposal may occur at the end of the asset's useful life or at some other time. For example, obsolescence due to unforeseen technological developments may lead to an earlier than expected disposition of the asset. **Involuntary disposal** occurs when assets are lost or destroyed through theft, acts of nature, or by accident.

Rarely do disposals occur on the first or last day of an accounting period. Therefore, the disposal of property, plant, and equipment usually requires two journal entries:

1. An entry to record depreciation expense up to the date of disposal.
2. An entry to:
  - Remove the asset's book value (the cost of the asset **and** the related accumulated depreciation)

### OBJECTIVE > 7

Describe the process of recording the disposal of a fixed asset.

- Record a gain or loss on disposition of the asset, which is computed as the difference between the proceeds from the sale and the book value of the asset.

Gains and losses on the disposition of property, plant, and equipment are normally reported as “other revenues or gains” or “other expenses and losses,” respectively, and appear immediately after income from operations on a multiple-step income statement.

Verizon’s policy for recording disposals, as shown in the notes to its 2007 financial statements is shown below.

*When the depreciable assets . . . are retired or otherwise disposed of, the related cost and accumulated depreciation are deducted from the plant accounts, and any gains or losses on disposition are recognized in income.*

**Cornerstone 7-6** illustrates the accounting for the disposition of property, plant, and equipment.



**CORNERSTONE  
7 - 6**



**HOW TO Record the Disposition of Property, Plant, and Equipment**

**Concept:**

When a company disposes of an asset that is no longer useful, the book value at the date of disposition is removed and any related gain or loss is recognized.

**Information:**

Dickerson Corporation sold a machine on July 1, 2009, for \$22,000. The machine had originally cost \$100,000. Accumulated depreciation on January 1, 2009 was \$80,000. Depreciation expense for the first six months of 2009 was \$5,000.

**Required:**

- Prepare the journal entry to record depreciation expense up to the date of disposal.
- Compute the gain or loss on disposal of the machine.
- Prepare the journal entry to record the disposal of the machine.

**Solution:**

- The journal entry to update depreciation expense is:

Date	Account and Explanation	Debit	Credit
July 1, 2009	Depreciation Expense	5,000	
	Accumulated Depreciation		5,000
	<i>(To update depreciation expense)</i>		

- The gain on disposal of \$7,000 is computed as follows:

Proceeds from sale		\$22,000
Less: Book value of asset sold		
Cost	\$100,000	
Accumulated depreciation (\$80,000 + \$5,000)	85,000	15,000
Gain on disposal		<u>\$ 7,000</u>

- The journal entry to record the disposition is:

Date	Account and Explanation	Debit	Credit
July 1, 2009	Cash	22,000	
	Accumulated Depreciation	85,000	
	Machine		100,000
	Gain on Disposal		7,000
	<i>(Record disposal of machine)</i>		

Assets = Liabilities +	Stockholders' Equity
-5,000	-5,000

Assets = Liabilities +	Stockholders' Equity
+ 22,000	+ 7,000
+ 85,000	
-100,000	

Note that Dickerson recorded depreciation expense up to the date of disposal. Once this journal entry is made, the book value is updated to reflect the increased accumulated depreciation. This revised book value is then used to compute the Gain on Disposal which appears in the “other revenues and gains” section of the income statement.

If Dickerson had received \$12,000 for the asset, the following computation would be made:

Proceeds from sale		\$12,000	
Less: Book value of asset sold			
Cost	\$100,000		
Accumulated depreciation (\$80,000 + \$5,000)	(85,000)	15,000	
Loss on disposal			<u>\$ (3,000)</u>

Because the proceeds from the sale were less than the book value, Dickerson would record a loss as follows:

Date	Account and Explanation	Debit	Credit
July 1, 2009	Cash	12,000	
	Accumulated Depreciation	85,000	
	Loss on Disposal	3,000	
	Machine		100,000
	<i>(Record disposal of machine)</i>		

Assets = Liabilities +	Stockholders' Equity
+ 12,000	-3,000
+ 85,000	
-100,000	

Dickerson would report the loss in the “other expenses and losses” section of the income statement.

## Analyzing Fixed Assets

### OBJECTIVE 8

Evaluate the use of fixed assets.

Because fixed assets are a major productive asset of most companies, it is useful to understand if the company is using these assets efficiently. In other words, how well is the company using its fixed assets to generate revenue? One measure of how efficiently a company is using its fixed assets is the **fixed asset turnover ratio**. It is calculated by dividing net sales by average fixed assets. The more efficient a company uses its fixed assets, the higher the ratio will be.

In addition to examining the efficiency of the use of fixed assets, investors are also concerned with the condition of a company's fixed assets. Because older assets tend to be less efficient than newer assets, the age of a company's fixed assets can provide useful insights for financial statement users. The age of a company's fixed assets also can provide an indication of a company's capital replacement policy and assist managers in estimating future capital expenditures. A rough estimate of the **average age of fixed assets** can be computed by dividing accumulated depreciation by depreciation expense. **Cornerstone 7-7** illustrates the calculation of the fixed asset turnover ratio and the average age of fixed assets.

The fixed asset ratio tells us that for each dollar invested in fixed assets, Brandon Company generates sales of \$1.56. In addition, Brandon Company's assets are, on average, 3.74 years old. Whether this is good or bad requires a comparison of these ratios to prior years' fixed asset turnover ratios and fixed asset turnover ratios of other companies in the industry. These ratios can provide a relative assessment of how efficiently fixed assets are being used as well as the condition of the assets.

## Intangible Assets

### OBJECTIVE 9

Understand the measurement and reporting of intangible assets.

**Intangible operating assets**, like tangible assets, represent future economic benefit to the company, but unlike tangible assets, they lack physical substance. Patents,



## CORNERSTONE 7-7



### HOW TO Calculate Fixed Asset Ratios

**Concept:**

The analysis of fixed assets can provide useful information as to how efficient the assets have been used as well as the condition of the assets.

**Information:**

The following information was obtained from the December 31, 2009, financial statements of Brandon Company:

Property, plant, and equipment, 1/1/2009	\$2,145,000
Accumulated depreciation, 1/1/2009	1,162,000
Net property, plant, and equipment, 1/1/2009	\$ 983,000
Property, plant, and equipment, 12/31/2009	\$2,494,000
Accumulated depreciation, 12/31/2009	1,481,000
Net property, plant, and equipment, 12/31/2009	\$1,013,000
Net sales	\$1,553,000
Depreciation expense	\$ 396,000

**Required:**

1. Compute the fixed asset turnover ratio for Brandon Company.
2. Compute the average age of Brandon Company's fixed assets, as of 12/31/2009.

**Solution:**

1. The fixed asset turnover ratio for Brandon Company is computed as:

$$\begin{aligned} \text{Fixed Asset Turnover} &= \text{Net Sales} \div \text{Average Fixed Assets} \\ &= 1,553,000 \div [(983,000 + 1,013,000) \div 2] \\ &= 1.56 \text{ times} \end{aligned}$$

2. The average age of Brandon Company's fixed assets at 12/31/2009 is:

$$\begin{aligned} \text{Average Age} &= \text{Accumulated Depreciation} \div \text{Depreciation Expense} \\ &= 1,481,000 \div 396,000 \\ &= 3.74 \text{ years} \end{aligned}$$

copyrights, trademarks, leaseholds, organization costs, franchises, and goodwill are all examples of intangible assets. The economic benefits associated with most intangible assets are in the form of legal rights and privileges conferred on the owner of the asset. Thus the economic value of a patent, for example, is the legal right to restrict, control, or charge for the use of the idea or process covered by the patent.

Because intangible assets lack physical substance, it is often easy to overlook their importance to the overall value of a company. Recent research suggests that between 60 percent and 80 percent of a company's market value may be tied to intangible assets. Thus, for many companies, intangible assets may be the most important asset that a company has. A pharmaceutical company such as **Merck** could easily argue that the true value of the company lies with its intellectual capital and patents, not its tangible property, plant, and equipment. However, due to unique issues with intangibles

(e.g., the highly uncertain nature of future benefits, the possibility of wide fluctuations in value), the value of many intangible assets is not adequately captured by current accounting standards. For example, Merck's intangible assets only make up approximately 4 percent of its total assets. Clearly, the value of Merck's intangible assets is understated. As the value of intangible assets continues to be a key driver of company value, the measurement and evaluation of intangibles will certainly be a crucial issue.

## Accounting for Intangible Assets

Intangible assets are recorded at cost. Similar to fixed assets, the cost of an intangible asset is any expenditure necessary to acquire the asset and to prepare the asset for use. For intangible assets purchased from outside the company, the primary element of the cost is the purchase price. Costs such as registration, filing, and legal fees are considered a necessary cost and are capitalized as part of the intangible asset.

For internally developed intangible assets, the cost of developing the asset is expensed as incurred and normally recorded as **research and development (R&D) expense**. While expenditures for R&D may lead to intangible assets such as patents and copyrights, R&D is not an intangible asset. While many disagree with this position, current accounting standards require that all R&D be recorded as an expense. Exhibit 7-10 provides a listing of some typical intangible assets.

Companies also incur significant costs such as legal fees, stock issue costs, accounting fees, and promotional fees when they are formed. It can be argued that these **organizational costs** are an intangible asset that provides a benefit to a company indefinitely. However, current accounting standards treat organizational costs as an expense in the period the cost is incurred.

### CONCEPT Q&A

If intangible assets represent a major amount of many companies' value, wouldn't any estimate of the intangible asset's value be better than not recording the asset at all?

While intangible assets are certainly relevant to financial statement users, information must be reliably measured to be recorded in the financial statements. For many intangibles, the inability to measure the intangible asset reliably results in the inability to record the intangible asset. This trade-off between the relevance and reliability of information is often a matter of judgment.

Possible Answer:

#### Exhibit 7-10

### Common Types of Intangible Assets

Intangible Asset	Description	Cost Includes	Amortization
Patent	Right to manufacture, sell, or use product. The legal life is 20 years from the date of grant.	Purchase price, registration fees, legal costs	Shorter of the economic life or legal life
Copyright	Right to publish, sell, or control a literary or artistic work. The legal life is life of author plus 70 years.	Purchase price, registration fees, legal costs	Shorter of the economic life or legal life
Trademark	Right to the exclusive use of a distinctive name, phrase, or symbol. The legal life is 20 years but it can be renewed indefinitely.	Purchase price, registration fees, legal costs	Not amortized since it has an indefinite life; reviewed at least annually for impairment
Franchise	Exclusive right to conduct a certain type of business in some particular geographic area. Life of the franchise depends on specific terms of the franchise contract.	Initial cost paid to acquire the franchise	Shorter of the economic life or legal life
Goodwill	Unidentifiable intangible asset that arises from factors such as customer satisfaction, quality products, skilled employees, and business location. Goodwill is only recognized in business combinations.	The excess of the purchase price over the fair value of the identifiable net assets acquired in a business combination.	Not amortized since it has an indefinite life; reviewed at least annually for impairment

Once an intangible asset is recorded, companies must determine if the asset has a finite life or an indefinite life. The cost of an intangible asset with a finite life, like the cost of a tangible asset, is allocated to accounting periods over the life of the asset to reflect the decline in service potential. This process is referred to as **amortization**. Most companies will amortize the cost of an intangible asset on a straight-line basis over the shorter of the economic or legal life of the asset.<sup>5</sup> For example, a patent has a legal life of 20 years from the date it is granted. However, the economic advantage offered by a patent often expires before the end of its legal life as a result of other technological developments. Therefore, the shorter economic life should be used to amortize the cost of the patent. If an intangible asset is determined to have an indefinite life, it is *not* amortized but is reviewed at least annually for impairment. **Cornerstone 7-8** illustrates the accounting for the acquisition and amortization of intangible assets.

Several items are of note: First, most intangible assets do not have a residual value. Therefore, the cost that is being amortized is usually the entire cost of the



## CORNERSTONE 7-8



### HOW TO Account for Intangible Assets

#### Concept:

Intangible assets are recorded at the cost necessary to acquire the asset and to prepare the asset for use. The cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received (the matching principle).

#### Information:

On January 1, 2009, King Company acquired a patent from Queen, Inc., for \$40,000. The patent was originally granted on January 1, 2002, and had 14 years of its legal life remaining. However, due to technological advancements, King estimates the patent will only provide benefits for 10 years. In addition, King also purchased a trademark from Queen for \$60,000.

#### Required:

1. Prepare any journal entries necessary to record the acquisition of the patent and the trademark.
2. Compute the amortization expense for the patent and the trademark.
3. Prepare any adjusting journal entries necessary to record the amortization expense.

#### Solution:

1. The patent and trademark are recorded at their historical cost as follows:

Date	Account and Explanation	Debit	Credit
Jan. 1, 2009	Patent	40,000	
	Trademark	60,000	
	Cash		100,000
	(To purchase patent and trademark)		

2. The amortization expense related to the patent (\$4,000) is computed as:

$$\frac{\text{Cost} - \text{Residual Value}}{\text{Useful Life}} = \frac{\$40,000 - \$0}{10 \text{ years}} = \$4,000$$

Assets	=	Liabilities	+	Stockholders' Equity
+ 40,000				
+ 60,000				
- 100,000				

<sup>5</sup> While the straight-line method of amortization is commonly used, any systematic and rational amortization method is acceptable under GAAP.

Because the trademark has an indefinite life, no amortization is necessary.

3. The journal entry to record the amortization expense for the patent is:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Amortization Expense	4,000	
	Patent		4,000
	<i>(To record amortization of patent)</i>		

**CORNERSTONE**  
**7-8**  
*(continued)*

<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Stockholders' Equity</b>
-4,000				-4,000

intangible asset. Second, King amortized the patent over the shorter of its remaining legal life (14 years) or its economic life (10 years). This is consistent with recognizing amortization expense over the period that the intangible asset is expected to provide benefits. Third, King recorded the amortization expense by directly crediting the intangible asset, Patent. After the amortization expense is recorded, the book value of the patent is \$36,000 (\$40,000 – \$4,000). Finally, amortization expense is reported as operating expense on the income statement.

## DECISION-MAKING & ANALYSIS

### Measuring and Estimating the Dimensions of a Patent

Marietta Corporation is a research-intensive company engaged in the design and sale of ceramic products. For the past year, half of Marietta's research staff has been engaged in designing a process for coating iron and steel with a ceramic material for use in high-temperature areas of automobile engines. The company has secured a patent for its process and is about to begin marketing equipment that uses the patented process. Accordingly, the company's controller must establish the cost of developing the patent and formulate a procedure to amortize the patent.

1. *What considerations arise in measuring the cost of the patent?*

The cost of the patent should include lawyers' fees and other similar costs incurred in securing the patent. In addition, the controller believes that half the year's cost of research activities should be assigned to the patent, including salaries paid to researchers and the costs of facilities and supplies used. However, accounting standards require that research and development expenditures be included in expense in the year in which they are incurred. Therefore the research activities should be expensed when incurred and not assigned to the patent, as the controller believes.

2. *What considerations arise in formulating an amortization procedure for the patent?*

Although the patent lasts for 20 years, Marietta expects the patented equipment to be a viable product for only five years. Moreover, 80 percent of the sales are expected to occur in the first two years following the introduction of the equipment. The company expects to introduce an improved version of the equipment, which will be covered by another patent, within about four years. One of the assistant controllers argues, therefore, that the cost of this patent should be spread over the life of both the current equipment and its successor, with most of the cost amortized in the first two years following introduction of the current equipment. However, given the uncertainty of the projections on which the argument rests, the controller decides to amortize the entire cost of the patent over a five-year period, with 80 percent of the cost divided equally between years 1 and 2 and the remaining 20 percent divided equally among years 3 through 5. Of course, amortization will not begin until the equipment actually reaches the market. Until then, the cost of the patent is carried as an intangible asset on the balance sheet.

## Natural Resources

**Natural resources**, such as coal deposits, oil reserves, and mineral deposits, make up an important part of the operating assets for many companies. For example, BP has oil and gas properties of over \$118 billion, representing approximately 26 percent of its total assets. Like intangible operating assets, natural resources present formidable estimation and measurement problems. However, natural resources differ from other operating

### OBJECTIVE > 10

Understand the measurement and reporting of natural resources.

assets in two important ways. First, unlike fixed assets, natural resources are physically consumed as they are used by a company. Second, natural resources can generally be replaced or restored only by an act of nature. (Timberlands are renewed by replanting and growth, but coal deposits and most mineral deposits are not subject to renewal.)

The accounting for natural resources is quite similar to the accounting for intangible assets and fixed assets. At acquisition, all the costs necessary to ready the natural resource for separation from the earth are capitalized. At the time a company acquires the property on which a natural resource is located (or the property rights to the natural resource itself), only a small portion of the costs necessary to ready the asset for removal are likely to have been incurred. Costs such as sinking a shaft to an underground coal deposit, drilling a well to an oil reserve, or removing the earth over a mineral deposit can be several times greater than the cost of acquiring the property.

As a natural resource is removed from the earth, the cost of the natural resource is allocated to each unit of natural resource removed. This process of allocating the cost of the natural resource to each period in which the resource is used is called **depletion**. Depletion is computed by using a procedure similar to that for the units-of-production method of depreciation. First, a depletion rate is computed as follows:

$$\text{Depletion Rate} = \frac{\text{Cost} - \text{Residual Value}}{\text{Recoverable Units}}$$

Second, depletion is calculated by multiplying the depletion rate by the number of units of the natural resource recovered during the period:

$$\text{Depletion} = \text{Depletion Rate} \times \text{Units Recovered}$$

As the natural resource is extracted, the intangible asset is reduced and the amount of depletion computed is added to inventory. As the inventory is sold, the company will recognize an expense (cost of goods sold) related to the natural resource. **Cornerstone 7-9** illustrates how to account for depletion of a natural resource.

Two items are of particular importance. First, notice that Miller records depletion in an inventory account. As the coal is sold, inventory will be reduced and cost of goods



## CORNERSTONE

7-9



### HOW TO Account for Depletion of a Natural Resource

#### Concept:

All costs necessary to acquire the natural resource and prepare it for use are capitalized as part of the natural resource. The depletion of the natural resource is added to inventory as the resource is depleted.

#### Information:

In 2008 the Miller Mining Company purchased a 4,000-acre tract of land in southern Indiana for \$12,000,000, on which it developed an underground coal mine. Miller spent \$26,000,000 to sink shafts to the coal seams and otherwise prepare the mine for operation. Miller estimates that there are 10,000,000 tons of recoverable coal and that the mine will be fully depleted eight years after mining begins in early 2009. The land has a residual value of \$500,000. During 2009, 800,000 tons of coal was mined.

#### Required:

1. Compute the cost of the natural resource
2. Compute the depletion rate.
3. How much depletion is taken in 2009?
4. Prepare the journal entry necessary to record depletion.

#### Solution:

1. The cost of the natural resource (\$38,000,000) includes all costs necessary to get the mine ready for use and is computed as:

<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Cost</td> <td style="width: 30%; text-align: right;">\$12,000,000</td> <td style="width: 40%;"></td> </tr> <tr> <td>Development/preparation costs</td> <td style="text-align: right;">26,000,000</td> <td></td> </tr> <tr> <td>Cost</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">\$38,000,000</td> <td></td> </tr> </table>	Cost	\$12,000,000		Development/preparation costs	26,000,000		Cost	\$38,000,000		<b>CORNERSTONE</b> <b>7-9</b> <i>(continued)</i>								
Cost	\$12,000,000																	
Development/preparation costs	26,000,000																	
Cost	\$38,000,000																	
<p>2. The depletion rate, \$3.75 per ton, is computed as:  Depletion Rate = <math>\\$38,000,000 - \\$500,000 \div 10,000,000 \text{ tons} = \\$3.75 \text{ per ton}</math></p>																		
<p>3. If Miller mines 800,000 tons of coal in 2009, then depletion for the year is:  Depletion = <math>\\$3.75 \times 800,000 = \\$3,000,000</math></p>																		
<p>4. The following entry is necessary to record depletion for 2009:</p>																		
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%; border-bottom: 1px solid black;">Date</th> <th style="width: 45%; border-bottom: 1px solid black;">Account and Explanation</th> <th style="width: 15%; border-bottom: 1px solid black;">Debit</th> <th style="width: 25%; border-bottom: 1px solid black;">Credit</th> </tr> </thead> <tbody> <tr> <td style="border-bottom: 1px solid black;">Dec. 31, 2009</td> <td style="border-bottom: 1px solid black;">Inventory, Coal</td> <td style="border-bottom: 1px solid black; text-align: right;">3,000,000</td> <td></td> </tr> <tr> <td></td> <td style="text-align: right;">Accumulated Depletion, Coal Mine</td> <td></td> <td style="text-align: right;">3,000,000</td> </tr> <tr> <td></td> <td style="text-align: right;"><i>(To record depletion of coal mine)</i></td> <td></td> <td></td> </tr> </tbody> </table>			Date	Account and Explanation	Debit	Credit	Dec. 31, 2009	Inventory, Coal	3,000,000			Accumulated Depletion, Coal Mine		3,000,000		<i>(To record depletion of coal mine)</i>		
Date	Account and Explanation	Debit	Credit															
Dec. 31, 2009	Inventory, Coal	3,000,000																
	Accumulated Depletion, Coal Mine		3,000,000															
	<i>(To record depletion of coal mine)</i>																	
<p>Assuming all of the coal is sold in 2009, the following entry should be made:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Cost of Goods Sold</td> <td style="width: 30%; text-align: right;">3,000,000</td> <td style="width: 40%;"></td> </tr> <tr> <td style="padding-left: 20px;">Inventory, Coal</td> <td></td> <td style="text-align: right;">3,000,000</td> </tr> </table>			Cost of Goods Sold	3,000,000		Inventory, Coal		3,000,000										
Cost of Goods Sold	3,000,000																	
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<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"></td> <td style="width: 20%; text-align: center; border-bottom: 1px solid black;">Assets = Liabilities +</td> <td style="width: 20%; text-align: center; border-bottom: 1px solid black;">Stockholders' Equity</td> </tr> <tr> <td></td> <td style="text-align: center;">+3,000,000</td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;">-3,000,000</td> <td></td> </tr> </table>				Assets = Liabilities +	Stockholders' Equity		+3,000,000			-3,000,000								
	Assets = Liabilities +	Stockholders' Equity																
	+3,000,000																	
	-3,000,000																	

sold will be recognized. Thus, the expense related to depletion will be matched with the revenue that is generated from the sale of the natural resource. Second, Miller recorded depletion in an accumulated depletion account.<sup>6</sup> At December 31, 2009, Miller could present the coal mine among its assets in the balance sheet as shown in Exhibit 7-11:

## Exhibit 7-11

**Disclosure of Natural Resource**

Property, Plant, and Equipment:	
Land	\$ 2,200,000
Equipment and machinery	19,800,000
Coal mine (cost of \$38,000,000 less accumulated depletion of \$3,000,000)	35,000,000
Total property, plant, and equipment	\$57,000,000

## Summary of Learning Objectives

- LO1. Define, classify, and describe the accounting for operating assets.**
- Operating assets are the long-lived assets used by the company in the normal course of operations to generate revenue.
  - Operating assets consist of three categories: property, plant, and equipment, intangibles and natural resources.
  - Generally, operating assets are recorded at cost.
  - As the service potential of the asset is used, the asset's cost is allocated as an expense (called depreciation, amortization or depletion).
- LO2. Explain how the cost principle applies to recording the cost of a fixed asset.**
- The cost is any expenditure necessary to acquire the asset and to prepare the asset for use.
  - This amount is generally the cash paid.
  - If noncash consideration is involved, cost is the fair value of the asset received or the fair value of the asset given up, whichever is more clearly determinable.

<sup>6</sup> An alternative practice allowed by GAAP is to credit depletion directly to the asset account.

**LO3. Understand the concept of depreciation.**

- Depreciation is the process of allocating the cost of a tangible fixed asset to expense over the asset's useful life.
- Depreciation is not an attempt to measure fair value.
- Instead, depreciation is designed to capture the declining service potential of a fixed asset.
- Three factors are necessary to compute depreciation expense: cost, residual value, and useful life.

**LO4. Compute depreciation expense using various depreciation methods.**

- The straight-line method allocates an equal amount of the asset's cost to each year of the asset's useful life by dividing the asset's depreciable cost (cost less residual value) by the asset's useful life.
- The declining balance method is an accelerated method of depreciation that produces a declining amount of depreciation expense each period by multiplying the declining book value of an asset by a constant depreciation rate (computed as some multiple of the straight-line rate of depreciation).
- The units-of-production method recognizes depreciation expense based on the actual usage of the asset. A usage ratio (actual usage divided by total expected usage) is multiplied by the depreciable cost of the asset to get depreciation expense for each period.

**LO5. Distinguish between capital and revenue expenditures.**

- Revenue expenditures are expenditures that do not increase the future benefit of an asset and are expensed as incurred.
- Capital expenditures extend the life of the asset, expand productive capacity, increase efficiency or improve the quality of the product.
- Capital expenditures are added to the asset account and are subject to depreciation.

**LO6. Describe the process of recording an impairment of a fixed asset.**

- Impairment exists when the future cash flows expected to be generated by an asset are less than the book value of the asset.
- In this situation, an impairment loss (the difference between the book value and fair value of the asset) is recognized and the asset is reduced.

**LO7. Describe the process of recording the disposal of a fixed asset.**

- When a fixed asset is disposed of (either voluntarily or involuntarily), a gain or loss is recognized.
- The gain or loss is the difference between the proceeds from the sale and the book value of the asset.
- The gain or loss is reported on the income statement as "other revenues or gains" or "other expenses and losses," respectively.

**LO8. Evaluate the use of fixed assets.**

- The efficiency with which a company uses its fixed assets to generate can be analyzed by using the fixed asset turnover ratio (net sales divided by average fixed assets).
- The condition of a company's assets and insights into the company's capital replacement policy can be examined by computing the **average age of fixed assets** (accumulated depreciation divided by depreciation expense).

**LO9. Understand the measurement and reporting of intangible assets.**

- Intangible assets are recorded at cost, which is any expenditure necessary to acquire the asset and prepare it for use.
- If the intangible asset has a finite life, it is amortized over the shorter of the economic or legal life of the asset.
- If the intangible asset has an indefinite life, it is not amortized but is reviewed at least annually for impairment.

**LO10. Understand the measurement and reporting of natural resources.**

- The cost of natural resources is any cost necessary to acquire and prepare the resource for separation from the earth.
- As the natural resource is removed, the cost is allocated to each unit of the natural resource that is removed and recorded in an inventory account. This process is called depletion.
- Depletion is calculated using a procedure similar to the units-of-production depreciation method.

**CORNERSTONE 7-1** How to measure and record the cost of a fixed asset, page 353

**CORNERSTONE 7-2** How to compute depreciation expense using the straight-line method, page 357

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**CORNERSTONE 7-5** How to record an impairment of property, plant, and equipment, page 367

**CORNERSTONE 7-6** How to record the disposition of property, plant, and equipment, page 368

**CORNERSTONE 7-7** How to calculate fixed asset ratios, page 370

**CORNERSTONE 7-8** How to account for intangible assets, page 372

**CORNERSTONE 7-9** How to account for depletion of a natural resource, page 374



### CORNERSTONES FOR CHAPTER 7

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## Review Problem

### I. Accounting for Operating Assets

**Concept:**

At acquisition, operating assets are capitalized at their historical cost. As the service potential of an operating asset declines, the cost of the asset is allocated as an expense among the accounting periods in which the asset is used and benefits are received.

**Information:**

The Carroll Company manufactures a line of cranes, shovels, and hoists, all of which are electronically controlled. During 2009, the following transactions occurred:

- On January 2, 2009, Carroll purchased a building by signing a note payable for \$702,900. The building is expected to have a useful life of 30 years and a residual value of \$3,900.
- On January 3, Carroll purchased a delivery truck for \$34,650 cash. The delivery truck is expected to have a useful life of five years and a \$5,000 residual value.
- Immediately after the acquisition, Carroll spent \$5,350 on a new engine for the truck. After installing the engine, Carroll estimated that this expenditure increased the useful life of the truck to eight years. The residual value is still expected to be \$5,000.
- In order to assure a coal supply for its heating plant, Carroll acquired a small operating coal mine for \$1,980,000. Carroll estimated that the recoverable coal reserves at acquisition were 495,000 tons. Carroll’s mine produced 40,000 tons of coal during 2009.
- Carroll owns a patent that it purchased in 2008 for \$100,000. The patent has 12 years remaining on its legal life but Carroll estimates its economic life to be 10 years. Carroll uses the straight-line amortization method.

**Required:**

- Record the acquisition of the building and the delivery truck.
- Compute and record a full year’s depreciation expense for 2009 on the building (use the straight-line depreciation method) and on the truck (use the double-declining-balance depreciation method).
- Compute and record 2009 depletion for the coal mine.
- Compute and record the amortization expense on the patent for 2009 on a straight-line basis.

**Solution:**

- The cost of the building is \$702,900 and is recorded as:

Date	Account and Explanation	Debit	Credit
Jan. 2, 2009	Building	702,900	
	Note Payable		702,900
	<i>(Purchased building by issuing note payable)</i>		

The cost of the truck is \$40,000 (\$34,650 acquisition price + \$5,350 from the overhaul of the engine). The purchase of the truck is recorded as:

Date	Account and Explanation	Debit	Credit
Jan. 3, 2009	Truck	40,000	
	Cash		40,000
	<i>(Purchase of truck for cash)</i>		

<b>Assets = Liabilities + Stockholders' Equity</b>
+702,900    +702,900

<b>Assets = Liabilities + Stockholders' Equity</b>
-40,000    +40,000

2. Depreciation on the items of property, plant, and equipment in the basket purchase:

STRAIGHT-LINE DEPRECIATION ON THE BUILDING

$$\begin{aligned} \text{Straight-Line Depreciation Expense} &= \frac{\text{Cost} - \text{Residual Value}}{\text{Expected Life}} \\ &= \frac{\$702,900 - \$3,900}{30 \text{ years}} = \$23,300 \text{ per year} \end{aligned}$$

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense, Building	23,300	
	Accumulated Depreciation, Building		23,300
	<i>(To record depreciation on building)</i>		

Assets = Liabilities +	Stockholders' Equity
-23,300	-23,300

DOUBLE-DECLINING-BALANCE DEPRECIATION FOR THE TRUCK

$$\begin{aligned} \text{Declining Balance Depreciation Expense} &= \text{Declining Balance Rate} \times \text{Book Value} \end{aligned}$$

$$\text{Declining Balance Rate} = (1/\text{Useful Life}) \times 2 = (1/8) \times 2 = 2/8, \text{ or } 25\%$$

$$\begin{aligned} \text{Cost} &= \$34,650 \text{ (from transaction } b) + \$5,350 \text{ overhaul (from transaction } c) \\ &= \$40,000 \end{aligned}$$

End of Year	Depreciation Expense	Accumulated Depreciation	Book Value
			\$40,000
2009	25% × \$40,000 = \$10,000	\$10,000	30,000
2010	25% × \$30,000 = 7,500	17,500	22,500
2011	25% × \$22,500 = 5,625	23,125	16,875
2012	25% × \$16,875 = 4,219	27,344	12,656
2013	25% × \$12,656 = 3,164	30,508	9,492
2014	25% × \$9,492 = 2,373	32,881	7,119
2015	25% × \$7,119 = 1,780	34,661	5,339
2016	339*	35,000	5,000
	<u>\$35,000</u>		

\* The amount needed to achieve a \$5,000 book value.

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense, Truck	10,000	
	Accumulated Depreciation, Truck		10,000
	<i>(To record depreciation on truck)</i>		

Assets = Liabilities +	Stockholders' Equity
-10,000	-10,000

3. Depletion on the coal mine:

DEPLETION

$$\begin{aligned} \text{Depletion Rate} &= \frac{\text{Cost} - \text{Residual Value}}{\text{Recoverable Units}} \\ &= \frac{\$1,980,000}{495,000} = \$4.00 \text{ per ton} \end{aligned}$$

$$\begin{aligned} \text{Depletion} &= \text{Depletion Rate} \times \text{Units Recovered} \\ &= \$4.00 \times 40,000 = \$160,000 \end{aligned}$$

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Inventory, Coal	160,000	
	Accumulate Depletion, Coal Mine		160,000
	<i>(To record depletion)</i>		

Assets = Liabilities +	Stockholders' Equity
+160,000	
-160,000	

## 4. Amortization of the patent:

$$\begin{aligned} \text{Straight-Line Amortization Expense} &= \frac{\text{Cost} - \text{Residual Value}}{\text{Expected Life}} \\ &= \frac{\$100,000 - \$0}{8 \text{ years}} \\ &= \$12,500 \text{ per year} \end{aligned}$$

<b>Assets = Liabilities + Stockholders' Equity</b> -12,500                      -12,500
--

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Amortization Expense Patent <i>(To record amortization of patent)</i>	12,500	12,500

## Discussion Questions

- How do operating assets differ from nonoperating assets? What benefits do operating assets provide to the company?
- What are the classifications of operating assets? How do they differ from one another?
- How does the cost concept affect accounting for operating assets? Under this concept, what is included in the cost of a fixed asset?
- How is the cost of a fixed asset measured in a cash transaction? In a noncash transaction?
- How does the matching concept affect accounting for fixed assets?
- What factors must be known or estimated in order to compute depreciation expense?
- How do the accelerated and straight-line depreciation methods differ?
- What objective should guide the selection of a depreciation method for financial reporting purposes?
- What objective should be of primary importance in the selection of a depreciation method for income tax reporting?
- What accounting concepts should be considered when evaluating the accounting for expenditures that are made for fixed assets subsequent to acquisition? Be sure to distinguish between revenue and capital expenditures.
- What is an impairment of a fixed asset?
- How is the sale of equipment at an amount greater than its book value recorded? How would your answer change if the equipment is sold at an amount less than its book value?
- Describe the benefits that intangible assets provide to an enterprise.
- What factors should be considered when selecting the amortization period for an intangible asset?
- What basis underlies the computation of depletion?

## Multiple-Choice Exercises

**7-1** Anniston Company purchased equipment and incurred the following costs:

Purchase price	\$40,000
Cost of trial runs	800
Installation costs	200
Sales tax	2,000

What is the cost of the equipment?

- a. \$40,000
- b. \$42,000
- c. \$42,900
- d. \$43,000

**7-2** The cost principle requires that companies record fixed assets at

- a. Historical cost
- b. Fair value
- c. Book value
- d. Market value

**7-3** When depreciation expense is recorded each period, what account is debited?

- a. Accumulated Depreciation
- b. Cash
- c. Depreciation Expense
- d. The fixed asset account involved

*Use the following information for Multiple-Choice Exercises 7-4 through 7-6:*

Cox Inc. acquired a machine for \$800,000 on January 1, 2009. The machine has a salvage value of \$10,000 and a five-year useful life. Cox expects the machine to run for 15,000 machine hours. The machine was actually used for 4,500 hours in 2009 and 3,000 hours in 2010.

**7-4** What amount would Cox record as accumulated depreciation at December 31, 2010, if the straight-line depreciation method were used?

- a. \$284,400
- b. \$316,000
- c. \$320,000
- d. \$324,000

**7-5** What amount would Cox record as depreciation expense at December 31, 2010, if the double-declining-balance method were used?

- a. \$192,000
- b. \$193,600
- c. \$316,000
- d. \$320,000

**7-6** What amount would Cox record as depreciation expense for 2009 if the units-of-production method were used (round your answer to the nearest dollar)?

- a. \$200,000
- b. \$237,000
- c. \$240,000
- d. \$268,000

**7-7** Which of the following statements is true regarding depreciation methods?

- a. The use of a declining-balance method of depreciation will produce lower depreciation charges in the early years of an asset's life compared to the straight-line depreciation method.
- b. Over the life of an asset, a declining-balance depreciation method will recognize more depreciation expense relative to the straight-line method.
- c. The use of a higher estimated life and a higher residual value will lower the annual amount of depreciation expense recognized under the straight-line method.
- d. The use of a declining-balance method instead of the straight-line method will produce higher book values for an asset in the early years of the asset's life.

**7-8 Normal repair and maintenance of an asset is an example of what?**

- a. Revenue expenditure
- b. Capital expenditure
- c. An expenditure that will be depreciated
- d. An expenditure that should be avoided

**7-9 Murnane Company purchased a machine on February 1, 2005, for \$100,000. In January 2009, when the book value of the machine is \$70,000, Murnane believes the machine is impaired due to recent technological advances. Murnane expects the machine to generate future cash flow of \$10,000 and has estimated the fair value of the machine to be \$55,000. What is the loss from impairment?**

- a. \$5,000
- b. \$15,000
- c. \$30,000
- d. \$45,000

**7-10 Jerabek Inc. decided to sell one of its fixed assets that had a cost of \$50,000 and accumulated depreciation of \$35,000 on July 1, 2009. On that date, Jerabek sold the fixed asset for \$20,000. What was the resulting gain or loss from the sale of the asset?**

- a. \$5,000 loss
- b. \$5,000 gain
- c. \$15,000 loss
- d. \$15,000 gain

**7-11 Which of the following statements is true?**

- a. The average age of the fixed assets is computed by dividing accumulated depreciation by depreciation expense.
- b. The fixed asset turnover ratio assists managers in determining the estimated future capital expenditures that are needed.
- c. If net sales increases, the fixed asset turnover ratio will decrease.
- d. A relatively low fixed asset turnover ratio signals that a company is efficiently using its assets.

**7-12 Which of the following is not an intangible asset?**

- a. Patent
- b. Research & development
- c. Trademark
- d. Goodwill

**7-13 Heston Company acquired a patent on January 1, 2009, for \$60,000. The patent has a remaining legal life of 15 years, but Heston expects to receive benefits from the patent for only five years. What amount of amortization expense does Heston record in 2009 related to the patent?**

- a. \$4,000
- b. \$6,000
- c. \$12,000
- d. None of the above—patents are not amortized.

**7-14 Howton Paper Company purchased \$1,200,000 of timberland in 2008 for its paper operations. Howton estimates that there are 10,000 acres of timberland and it cut 2,000 acres in 2009. The land is expected to have a residual value of \$200,000 once all the timber is cut. Which of the following is true with regard to depletion?**

- Howton will record depletion expense of \$240,000 in 2009.
- Howton's depletion rate is \$120 per acre of timber.
- Howton should deplete the timber at a rate of 20% (2,000 acres ÷ 10,000 acres) per year.
- Depletion will cause Howton's timber inventory to increase.

## Cornerstone Exercises

### Cornerstone Exercise 7-15 COST OF A FIXED ASSET

OBJECTIVE > 2

Borges, Inc., recently purchased land to use for the construction of its new manufacturing facility and incurred the following costs: purchase price, \$80,000; real estate commissions, \$4,800; delinquent property taxes, \$1,500; closing costs, \$3,300 clearing and grading of the land, \$8,100.

CORNERSTONE 7-1

**Required:**

Determine the cost of the land.

### Cornerstone Exercise 7-16 ACQUISITION COST

OBJECTIVE > 2

Cox Company recently purchased a machine by paying \$10,000 cash and signing a six month, 10% note for \$10,000. In addition to the purchase price, Cox incurred the following costs related to the machine: freight charges \$800; interest charges \$500; special foundation for machine \$400; installation costs \$1,100.

CORNERSTONE 7-1

**Required:**

Determine the cost of the machine.

### Cornerstone Exercise 7-17 STRAIGHT-LINE DEPRECIATION

OBJECTIVE > 3 4

Irons Delivery, Inc., purchased a new delivery truck for \$42,000 on January 1, 2009. The truck is expected to have a \$2,000 residual value at the end of its five-year useful life. Irons uses the straight-line method of depreciation.

CORNERSTONE 7-2

**Required:**

Prepare the journal entry to record depreciation expense for 2009 and 2010.

### Cornerstone Exercise 7-18 DECLINING BALANCE DEPRECIATION

OBJECTIVE > 3 4

Use the same information in **Cornerstone Exercise 7-17**, except that Irons uses the double-declining-balance method of depreciation.

CORNERSTONE 7-3

**Required:**

Prepare the journal entry to record depreciation expense for 2009 and 2010.

### Cornerstone Exercise 7-19 UNITS-OF-PRODUCTION DEPRECIATION

OBJECTIVE > 3 4

Use the same information in **Cornerstone Exercise 7-17**, except that Irons uses the units-of-production method of depreciation. Irons expects the truck to run for 150,000 miles. The actual miles driven in 2009 and 2010 were 40,000 and 36,000, respectively.

CORNERSTONE 7-4

**Required:**

Prepare the journal entry to record depreciation expense for 2009 and 2010.

### Cornerstone Exercise 7-20 IMPAIRMENT

OBJECTIVE > 6

Brown Industries had two machines that it believes may be impaired. Information on the machines is shown below.

CORNERSTONE 7-5

	Book Value	Estimated Future Cash Flows	Fair Value
Machine 1	\$42,000	\$50,000	\$40,000
Machine 2	55,000	40,000	32,000

**Required:**

For each machine, determine if the machine is impaired. If so, calculate the amount of the impairment loss.

**OBJECTIVE** > **7** **Cornerstone Exercise 7-21 DISPOSAL OF AN OPERATING ASSET**

**CORNERSTONE 7-6** On August 30, Williams Manufacturing Company decided to sell one of its fabricating machines that was 15 years old for \$4,000. The machine, which originally cost \$100,000, had accumulated depreciation of \$97,500.

**Required:**

Prepare the journal entry to record the disposal of the machine.

**OBJECTIVE** > **8** **Cornerstone Exercise 7-22 ANALYZE FIXED ASSETS**

**CORNERSTONE 7-7** At December 31, 2009, Clark Corporation reported beginning net fixed assets of \$84,365, ending net fixed assets of \$103,548, accumulated depreciation of \$48,753, net sales of \$212,722, and depreciation expense of \$12,315.

**Required:**

Compute Clark Corporation's fixed asset turnover ratio and the average age of its fixed assets.

**OBJECTIVE** > **9** **Cornerstone Exercise 7-23 COST OF INTANGIBLE ASSETS**

**CORNERSTONE 7-8** Advanced Technological Devices, Inc., acquired a patent for \$130,000. It spent an additional \$20,000 defending the patent in legal proceedings.

**Required:**

Determine the cost of the patent.

**OBJECTIVE** > **9** **Cornerstone Exercise 7-24 AMORTIZATION OF INTANGIBLE ASSETS**

**CORNERSTONE 7-8** Using the same information in **Cornerstone Exercise 7-23**, assume that Advanced Technological Devices amortizes the patent on a straight-line basis over its remaining economic life of 12 years.

**Required:**

Prepare the journal entry to record the amortization expense related to the patent.

**OBJECTIVE** > **10** **Cornerstone Exercise 7-25 DEPLETION OF NATURAL RESOURCES**

**CORNERSTONE 7-9** Brandon Oil Company recently purchased oil and natural gas reserves in a remote part of Alaska for \$800,000. Brandon spent \$10,000,000 preparing the oil for extraction from the ground. Brandon estimates that 120,000,000 barrels of oil will be extracted from the ground. The land has a residual value of \$20,000. During 2009, 15,000,000 barrels are extracted from the ground.

**Required:**

Calculate the amount of depletion taken in 2009.

## Exercises

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**OBJECTIVE** > **1** **Exercise 7-26 BALANCE SHEET PRESENTATION**

Listed below are items that may appear on a classified balance sheet.

1. Land
2. Amounts due from customers
3. Office building
4. Truck
5. Goods held for resale
6. Amounts owed to others
7. Patent
8. Timberland
9. Land held as investment
10. Goodwill

**Required:**

Indicate whether each item is included as an operating asset on a classified balance sheet. If not included as an operating asset, indicate the proper balance sheet classification.

**Exercise 7-27 BALANCE SHEET CLASSIFICATION****OBJECTIVE** > 1

Flying High Airlines, a small commuter airline, has the following items on its balance sheet—airplane, fuel truck, trademark, baggage handling machine, building, airplane fuel.

**Required:**

Indicate the proper balance sheet classification of each item.

**Exercise 7-28 ACQUISITION COST****OBJECTIVE** > 2

Listed below are items that may relate to property, plant, and equipment.

1. Purchase price of a machine
2. Delinquent property taxes
3. Interest on debt used to purchase equipment
4. Sales taxes paid on purchase of equipment
5. Costs to install a machine
6. Ordinary repairs to equipment
7. Cost to remodel a building
8. Architectural fees paid for design of a building
9. Cost of training employees to run equipment
10. Transportation costs to have furniture delivered

**Required:**

Determine whether each item is included as part of the cost of property, plant, and equipment. For any item excluded from the cost of property, plant, and equipment, explain why the item was excluded.

**Exercise 7-29 COST OF A FIXED ASSET****OBJECTIVE** > 2

Laurel Cleaners purchased an automatic dry cleaning machine for \$135,000 from TGF Corporation on April 1, 2009. Laurel paid \$35,000 in cash and signed a five-year, 10 percent note for \$100,000. Laurel will pay interest on the note each year on March 31, beginning in 2010. Transportation charges of \$3,500 for the machine were paid by Laurel. Laurel also paid \$2,400 for the living expenses of the TGF installation crew. Solvent, necessary to operate the machine, was acquired for \$1,000. Of this amount, \$500 of the solvent was used to test and adjust the machine.

**Required:**

1. Compute the cost of the new dry cleaning machine.
2. Explain why you excluded any expenditures from the cost of the dry cleaning machine.

**Exercise 7-30 COST OF A FIXED ASSET****OBJECTIVE** > 2

Colson Photography Service purchased a new digital imaging machine on April 15 for \$13,400. During installation Colson incurred and paid in cash the following costs:

Rental of drill	\$150
Electrical contractor	400
Plumbing contractor	190

Colson also paid \$160 to replace a bracket on the digital imager that was damaged when one of Colson's employees dropped a box on it while it was being installed.

**Required:**

1. Determine the cost of the digital imaging machine.
2. Explain why you included or excluded the \$160 bracket replacement cost.

**OBJECTIVE** > **2** **Exercise 7-31 COST OF FIXED ASSETS**

Mooney Sounds, a local stereo retailer, needed a new store because it had outgrown the leased space it had used for several years. Mooney acquired and remodeled a former grocery store. As a part of the acquisition, Mooney incurred the following costs:

Cost of grocery store	\$350,000
Cost of land (on which the grocery store is located)	65,000
New roof for building	74,000
Lumber used for remodeling	23,200
Paint	515
Wire and electrical supplies	4,290
New doors	6,400
New windows	3,850
Wages paid to workers for remodeling	12,500
Additional inventory purchased for grand opening sale	45,300

**Required:**

Determine the cost of the land and the building.

**OBJECTIVE** > **2** **4** **Exercise 7-32 COST AND DEPRECIATION**

On January 1, 2009, Quick Stop, a convenience store, purchased a new soft-drink cooler. Quick Stop paid \$23,000 cash for the cooler. Quick Stop also paid \$730 to have the cooler shipped to its location. After the new cooler arrived, Quick Stop paid \$2,410 to have the old cooler dismantled and removed. Quick Stop also paid \$820 to a contractor to have new wiring and drains installed for the new cooler. Quick Stop estimated that the cooler would have a useful life of six years and a residual value of \$200. Quick Stop uses the straight-line method of depreciation.

**Required:**

1. Prepare any necessary journal entries to record the cost of the cooler.
2. Prepare the adjusting entry to record 2009 depreciation expense on the new cooler.
3. What is the book value of the cooler at the end of 2009?

**OBJECTIVE** > **3** **Exercise 7-33 CHARACTERISTICS OF DEPRECIATION METHODS**

Below is a common list of depreciation methods and characteristics related to depreciation.

**DEPRECIATION METHODS**

- a. Straight-line depreciation method
- b. Declining-balance depreciation method
- c. Units-of-production depreciation method when actual units produced increases over the life of the asset.

**CHARACTERISTICS**

1. Allocates the same amount of cost to each period of a depreciable asset's life.
2. Results in depreciation expense that decreases over the life of the asset.
3. Results in depreciation expense that increases over the life of the asset.
4. Consistent with the matching concept.
5. Calculated by multiplying a *constant* depreciation rate by depreciable cost.
6. Calculated by applying a *constant* depreciation rate to the asset's book value at the beginning of the period.
7. Results in lowest income taxes in early years of the asset's life.

**Required:**

Match one or more of the depreciation methods with each characteristic.

**OBJECTIVE** > **3** **4** **Exercise 7-34 DEPRECIATION METHODS**

Berkshire Corporation purchased a copying machine for \$9,800 on January 1, 2009. The machine's residual value was \$1,175 and its expected life was five years or 2,000,000 copies. Actual usage was 480,000 copies the first year and 440,000 the second year.

**Required:**

1. Compute depreciation expense for 2009 and 2010 using the:
  - a. straight-line method
  - b. double-declining-balance method
  - c. units-of-production method
2. For each depreciation method, what is the book value of the machine at the end 2009? At the end of the 2010?
3. Assume that Berkshire Corporation decided to use the double-declining-balance method of depreciation. What is the effect on assets and income relative to if Berkshire had used the straight-line method of depreciation?

**Exercise 7-35 DEPRECIATION METHODS**

Clearcopy, a printing company, acquired a new press on January 1, 2009. The press cost \$171,600 and had an expected life of eight years or 4,500,000 pages and an expected residual value of \$15,000. Clearcopy printed 675,000 pages in 2009.

**Required:**

1. Compute 2009 depreciation expense using the:
  - a. straight-line method
  - b. double-declining-balance method
  - c. units-of-production method
2. What is the book value of the machine at the end of 2009?

**OBJECTIVE** > 3 4**Exercise 7-36 DEPRECIATION METHODS**

Quick-as-Lightning, a delivery service, purchased a new delivery truck for \$40,000 on January 1, 2009. The truck is expected to have a useful life of ten years or 150,000 miles and an expected residual value of \$3,000. The truck was driven 15,000 miles in 2009 and 13,000 miles in 2010.

**Required:**

1. Compute depreciation expense for 2009 and 2010 using the:
  - a. straight-line method
  - b. double-declining-balance method
  - c. units-of-production method
2. For each method, what is the book value of the machine at the end 2009? At the end of 2010?

**OBJECTIVE** > 3 4**Exercise 7-37 CHOICE AMONG DEPRECIATION METHODS**

Walnut Ridge Production, Inc., purchased a new computerized video editing machine at a cost of \$370,000. The system has a residual value of \$55,000 and an expected life of five years.

**Required:**

1. Compute depreciation expense, accumulated depreciation, and book value for the first three years of the machine's life using:
  - a. the straight-line method
  - b. the double-declining-balance method
2. Which method would produce the largest income in the first, second, and third year, respectively, of the asset's life?
3. Why might the controller of Walnut Ridge Production be interested in the effect of choosing a depreciation method? Evaluate the legitimacy of these interests.

**OBJECTIVE** > 3 4**Exercise 7-38 REVISION OF DEPRECIATION**

On January 1, 2007, Blizzards-R-U's purchased a snow-blowing machine for \$85,000. The machine was expected to have a residual value of \$5,000 at the end of its five-year useful life. On January 1, 2009, Blizzards-R-U's concluded that the machine would have a remaining useful life of six years with a residual value of \$800.

**Required:**

Determine the revised annual depreciation expense for 2009.

**OBJECTIVE** > 3 4

**OBJECTIVE** > **5** **Exercise 7-39 CAPITAL VERSUS REVENUE EXPENDITURE**

Warrick Water Company, a privately owned business, supplies water to several communities. Warrick has just performed an extensive overhaul on one of its water pumps. The overhaul is expected to extend the life of the pump by 10 years. The residual value of the pump is unchanged. You have been asked to determine which of the following costs should be capitalized as a part of this overhaul. Those costs not capitalized should be expensed.

Element of Cost	Classification and Explanation
New pump motor	
Repacking of bearings (performed monthly)	
New impeller	
Painting of pump housing (performed annually)	
Replacement of pump foundation	
New wiring (needed every five years)	
Installation labor, motor	
Installation labor, impeller	
Installation labor, wiring	
Paint labor	
Placement of fence around pump*	

\* A requirement of the Occupational Safety and Health Administration that will add to maintenance costs over the remaining life of the pump.

**Required:**

Classify each cost as part of the overhaul or as an expense. Be sure to explain your reasoning for each classification.

**OBJECTIVE** > **5** **Exercise 7-40 EXPENDITURES AFTER ACQUISITION**

The following expenditures were incurred during the year:

1. Paid \$4,000 for an overhaul of an automobile engine.
2. Paid \$20,000 to add capacity to a cellular phone company's wireless network.
3. Paid \$200 for routine maintenance of a manufacturing machine.
4. Paid \$10,000 to remodel an office building.
5. Paid \$300 for ordinary repairs

**Required:**

Classify the following expenditures as either capital or revenue expenditures.

**OBJECTIVE** > **5** **Exercise 7-41 EXPENDITURES AFTER ACQUISITION**

Roanoke Manufacturing placed a robotic arm on a large assembly machine on January 1, 2009. The assembly machine was acquired on January 1, 2002 and was expected to last another three years. The following information is available concerning the assembly machine.

Cost, assembly machine	\$750,000
Accumulated depreciation, 1/1/2009	480,000

The robotic arm cost \$210,000 and was expected to extend the useful life of the machine by three years. Therefore, the useful life of the assembly machine, after the arm replacement, is six years. The assembly machine is expected to have a residual value of \$120,000 at the end of its useful life.

**Required:**

1. Prepare the journal entry necessary to record the addition of the robotic arm.
2. Compute 2009 depreciation expense for the machine and prepare the necessary journal entry.
3. What is the book value of the machine at the end of 2009?
4. What would have been the effect on the financial statements if Roanoke Manufacturing had expensed the addition of the robotic arm?

**Exercise 7-42 EXPENDITURES AFTER ACQUISITION AND DEPRECIATION****OBJECTIVE** > **5**

Eastern National Bank installed a wireless encryption device in January 2005. The device cost \$120,000. At the time the device was installed, Eastern estimated that it would have an expected life of eight years and a residual value of \$10,000. By 2008 the bank's business had expanded and modifications to the device were necessary. At the end of 2008, Eastern spent \$45,000 on modifications for the device. The modified device was entered into service on the first business day of 2009. Eastern estimates that the expected life of the device from January 2009 is six years and the new residual value is \$5,000. Eastern uses the straight-line method of depreciation. Had Eastern not modified the device, it estimates that processing delays would have caused the bank to lose business that will provide a profit of at least \$100,000 per year.

**Required:**

1. Compute the accumulated depreciation for the device at the time the modifications were made (four years after acquisition).
2. What is the book value of the device before and after the modification?
3. What will be annual straight-line depreciation expense for the device after the modification?
4. The bank's president notes, "Since the after-modification depreciation expense exceeds the before-modification depreciation expense, this modification was a poor idea." Comment on the president's assertion.

**Exercise 7-43 IMPAIRMENT****OBJECTIVE** > **6**

On January 1, 2002, the Key West Company acquired a pie-making machine for \$50,000. The machine was expected to have a useful life of 10 years with no residual value. Key West uses the straight-line depreciation method. On January 1, 2009, due to technological changes in the bakery industry, Key West believed that the asset might be impaired. Key West estimates the machine will generate net cash flows of \$12,000 and has a current fair value of \$5,000.

**Required:**

1. What is the book value of the machine on January 1, 2009?
2. Compute the loss related to the impairment.
3. Prepare the journal entry necessary to record the impairment of the machine.

**Exercise 7-44 SALE OF PLANT ASSET****OBJECTIVE** > **7**

Perfect Auto Rentals sold one of its cars on January 1, 2009. Perfect had acquired the car on January 1, 2007, for \$13,500. At acquisition Perfect assumed that the car would have an estimated life of three years and a residual value of \$3,000. Assume that Perfect has recorded straight-line depreciation expense for 2007 and 2008.

**Required:**

1. Prepare the journal entry to record the sale of the car assuming the car sold for:
  - a. \$6,500 cash
  - b. \$4,000 cash
  - c. \$7,000 cash
2. How should the gain or loss on the disposition (if any) be reported on the income statement?

**Exercise 7-45 SALE OF PLANT ASSET****OBJECTIVE** > **7**

Pacifica Manufacturing retired a computerized metal stamping machine on December 31, 2009. Pacifica sold the machine to another company and did not replace it. The following data are available for the machine:

Cost (installed), 1/1/2004	\$920,000
Residual value expected on 1/1/2004	160,000
Expected life, 1/1/2004	8 years

The machine was sold for \$188,000 cash. Pacifica uses the straight-line method of depreciation.

**Required:**

1. Prepare the journal entry to record depreciation expense for 2009.
2. Compute accumulated depreciation at December 31, 2009.
3. Prepare the journal entry to record the sale of the machine.
4. Explain how the gain or loss on the sale would be reported on the 2009 income statement.

**OBJECTIVE** > **8**



**Exercise 7-46 ANALYZE FIXED ASSETS**

Tabor Industries is a technology company that operates in a highly competitive environment. In 2006, management had significantly curtailed its capital expenditures due to cash flow problems. Tabor reported the following information for 2009:

- Net fixed assets (beginning of year) \$489,000
- Net fixed assets (end of year) 505,000
- Net sales 1,065,000
- Accumulated depreciation (end of year) 543,000
- Depreciation expense 116,000

An analyst reviewing Tabor's financial history noted that Tabor had previously reported fixed asset turnover ratios and average age of its assets as follows:

	2004	2005	2006	2007	2008
Fixed asset turnover	2.48	2.45	2.74	2.57	2.33
Average age of assets (years)	1.81	1.79	1.94	2.81	3.74

During this time frame, the industry average fixed asset turnover ratio is 2.46 and the industry average age of assets is 1.79 years.

**Required:**

1. Compute Tabor's fixed asset turnover ratio.
2. Compute the average age of Tabor's fixed assets.
3. Comment on Tabor's fixed asset turnover ratios and the average age of the fixed assets.

**OBJECTIVE** > **9**



**Exercise 7-47 ACQUISITION AND AMORTIZATION OF INTANGIBLE ASSETS**

TLM Technologies had these transactions related to intangible assets during 2009.

- Jan. 2 Purchased a patent from Luna Industries for \$200,000. The remaining legal life of the patent is 15 years and TLM expects the patent to be useful for 8 years.
- 5 Paid legal fees in a successful legal defense of the patent of \$80,000.
- June 29 Registered a trademark with the federal government. Registration costs were \$12,000. TLM expects to use the trademark indefinitely.
- Sept. 2 Paid research and development costs of \$500,000.

**Required:**

1. Prepare the journal entries necessary to record the transactions.
2. Prepare the entries necessary to record amortization expense for the intangible assets.
3. What is the balance of the intangible assets at the end of 2009?

**OBJECTIVE** > **9**

**Exercise 7-48 AMORTIZATION OF INTANGIBLES**

On January 1, 2009, Boulder Investments, Inc., acquired a franchise to operate a Burger Doodle restaurant. Boulder paid \$160,000 for a 10-year franchise and incurred organization costs of \$12,000.

**Required:**

1. Prepare the journal entry to record the cash payment for the franchise fee and the organization costs.
2. Prepare the journal entry to record the annual amortization expense at the end of the first year.

**Exercise 7-49 DEPLETION RATE****OBJECTIVE** > 10

Oxford Quarries purchased 45 acres of land for \$225,000. The land contained stone that Oxford will remove from the ground, finish, and then sell as facing material for buildings. Oxford spent \$435,000 preparing the quarry for operation. Oxford estimates that the quarry contains 55,000 tons of usable stone and that it will require six years to remove all the usable stone once quarrying begins. Upon completion of quarrying, Oxford estimates that the land will have a residual value of \$11,000. During the current year, Oxford extracted 8,500 tons of stone.

**Required:**

1. Compute the depletion rate per ton.
2. Prepare the journal entry to record the extraction of the stone.

**Exercise 7-50 DEPLETION OF TIMBER****OBJECTIVE** > 10

Bedford Ridge Development purchased a 5,000-acre tract of forested land in southern Georgia. The tract contained about 1,500,000 pine trees that, when mature, can be used for utility poles. Bedford paid \$900 per acre for the timberland. The land has a residual value of \$180 per acre when all the trees are harvested. During 2009, Bedford harvested 150,000 trees.

**Required:**

1. Compute the depletion per tree.
2. Prepare the journal entry to record the harvesting of the trees for 2009.

**Exercise 7-51 BALANCE SHEET PRESENTATION****OBJECTIVE** > 1 3 4 8

The following information relates to the assets of Westfield Semiconductor as of December 31, 2009. Westfield uses the straight-line method for depreciation and amortization.



Asset	Acquisition Cost	Expected Life	Residual Value	Time Used
Land	\$104,300	Infinite	\$100,000	10 years
Building	430,000	25 years	30,000	10 years
Machine	285,000	5 years	10,000	2 years
Patent	80,000	10 years	0	3 years
Truck	21,000	100,000 miles	3,000	44,000 miles

**Required:**

Use the information above to prepare the property, plant, and equipment and intangible assets portions of a classified balance sheet for Westfield Semiconductors.

**Problem Set A****Problem 7-52A FINANCIAL STATEMENT PRESENTATION OF OPERATING ASSETS****OBJECTIVE** > 1

Olympic Acquisitions, Inc., prepared the following post-closing trial balance at December 31, 2009:

	Debit	Credit
Cash	\$ 6,400	
Accounts receivable	15,000	
Supplies	26,000	
Land	42,000	
Buildings	155,000	
Equipment	279,000	

(Continued)

	Debit	Credit
Truck	32,000	
Franchise	49,600	
Goodwill	313,500	
Accounts payable		\$ 4,100
Accumulated depreciation, buildings		112,000
Accumulated depreciation, equipment		153,000
Accumulated depreciation, truck		16,300
Wages payable		7,000
Interest payable		7,300
Income taxes payable		12,000
Notes payable (due in 8 years)		190,000
Common stock		300,000
Retained earnings		116,800
Totals	\$918,500	\$918,500

**Required:**

Prepare a classified balance sheet for Olympic Acquisitions at December 31, 2009. Olympic reports the three categories of operating assets in separate subsections of assets.

**OBJECTIVE** > **2****Problem 7-53A COST OF A FIXED ASSET**

Mist City Car Wash purchased a new brushless car-washing machine for one of its bays. The machine cost \$31,800. Mist City borrowed the purchase price from its bank on a one-year, 12 percent note payable. Mist City paid \$500 to have the machine transported to its place of business and an additional \$200 in shipping insurance. Mist City incurred the following costs as a part of the installation:

Plumbing	\$2,700
Electrical	1,640
Water (for testing the machine)	35
Soap (for testing the machine)	18

During the testing process, one of the motors became defective when soap and water entered the motor because its cover had not been installed properly by Mist City's employees. The motor was replaced at a cost of \$450.

**Required:**

Compute the cost of the car-washing machine.

**OBJECTIVE** > **3** **4****Problem 7-54A DEPRECIATION METHODS**

Hansen Supermarkets purchased a radio frequency identification (RFID) system for one of its stores at a cost of \$150,000. Hansen determined that the system had an expected life of seven years (or 50,000,000 items scanned) and an expected residual value of \$7,200.

**Required:**

- Determine the amount of depreciation expense for the first and second years of the system's life using the (a) straight-line and (b) double-declining-balance depreciation methods.
- If the number of items scanned the first and second years were 7,200,000 and 8,150,000, respectively, compute the amount of depreciation expense for the first and second years of the system's life using the units-of-production depreciation method.
- Compute the book values for all three depreciation methods as of the end of the first and second years of the system's life.

**Problem 7-55A DEPRECIATION SCHEDULES**

OBJECTIVE &gt; 3 4

Wendt Corporation acquired a new depreciable asset for \$80,000. The asset has a four-year expected life and a residual value of zero.

**Required:**

1. Prepare a depreciation schedule for all four years of the asset's expected life using the straight-line depreciation method.
2. Prepare a depreciation schedule for all four years of the asset's expected life using the double-declining-balance depreciation method.
3. What questions should be asked about this asset to decide which depreciation method to use?

**Problem 7-56A EXPENDITURES AFTER ACQUISITION**

OBJECTIVE &gt; 3 4 5

Pasta, a restaurant specializing in fresh pasta, installed a pasta cooker in early 2007 at a cost of \$11,800. The cooker had an expected life of five years and a residual value of \$600 when installed. As the restaurant's business increased, it became apparent that renovations would be necessary so the cooker's output could be increased. In January 2010, Pasta spent \$8,200 to install new heating equipment and \$4,100 to add pressure-cooking capability. After these renovations, Pasta estimated that the remaining useful life of the cooker was 10 years and that the residual value was now \$1,500.

**Required:**

1. Compute one year's straight-line depreciation expense on the cooker before the renovations.
2. Assume that three full years of straight-line depreciation expense had been recorded on the cooker before the renovations were made. Compute the book value of the cooker after the renovations were made.
3. Compute one year's straight-line depreciation expense on the renovated cooker.

**Problem 7-57A REPAIR DECISION**

OBJECTIVE &gt; 5

Clermont Transit operates a summer ferry service to islands in the Ohio River. Farmers use the ferry to move farming equipment to and from the islands. Clermont's ferry is in need of repair. A new engine and steering assembly must be installed, or the Coast Guard will not permit the ferry to be used. Because of competition, Clermont will not be able to raise its rates for ferry service if these repairs are made. Costs of providing the ferry service will not be decreased if the repairs are made.

**Required:**

1. Identify the factors that Clermont should consider when evaluating whether or not to make the repairs.
2. Since the revenue rate cannot be increased and costs will not be decreased if the repairs are made, can the cost of the repairs be capitalized? Why or why not?

**Problem 7-58A DISPOSITION OF OPERATING ASSETS**

OBJECTIVE &gt; 7

In order to provide capital for new hotel construction in other locations, Wilton Hotel Corporation has decided to sell its hotel in Pierre, South Dakota. Wilton auctions the hotel and its contents on October 1, 2009, with the following results:

Land	\$600,000
Building	300,000
Furniture and fixtures	120,000

Wilton's accounting records reveal the following information about the assets sold:

Asset	Acquisition Cost	Accumulated Depreciation
Land	\$ 15,000	
Building	350,000	\$295,000
Furniture and fixtures	298,000	133,000

**Required:**

Prepare a separate journal entry to record the disposition of each of these assets.

**OBJECTIVE** > **9** **10****Problem 7-59A NATURAL RESOURCE AND INTANGIBLE ACCOUNTING**

McLeansboro Oil Company acquired an operating oil well during a recent year. The following assets were acquired for \$1,350,000 cash.

Asset	Fair Value	Expected Life
Oil well	\$1,100,000	55,000 barrels
Land	85,000	Indefinite
Pump	65,000	550,000 barrels

**Required:**

- Write the entry to record this acquisition in McLeansboro's journal. (Hint: Record the cost in excess of fair value as goodwill.)
- If McLeansboro pumps and sells 11,000 barrels of oil in one year, compute the amount of depletion.
- Prepare journal entries to record depletion for the 11,000 barrels of oil pumped and sold.
- Is the goodwill amortized? Explain your reasoning.
- Why are the land and the pump capitalized separately from the oil well?

**OBJECTIVE** > **9****Problem 7-60A ACCOUNTING FOR INTANGIBLE ASSETS**

On January 1, 2003, Technocraft, Inc., acquired a patent that was used for manufacturing semiconductor-based electronic circuitry. The patent was originally recorded in Technocraft's ledger at its cost of \$1,796,000. Technocraft has been amortizing the patent over an expected economic life of 10 years. Residual value was assumed to be zero. Technocraft sued another company for infringing on its patent. On January 1, 2010, Technocraft spent \$180,000 on this suit and won a judgment to recover the \$180,000 plus damages of \$500,000. The sued company paid the \$680,000.

**Required:**

- Compute and record amortization expense on the patent for 2009 (prior to the lawsuit).
- Prepare the necessary journal entry on January 1, 2010, to record the expenditure of \$180,000 to defend the patent.
- Prepare the journal entry to record the award of \$680,000 on January 1, 2010.
- Indicate the entry you would have made had Technocraft lost the suit. (Assume that the patent would be valueless if Technocraft had lost the suit.)

## Problem Set B

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**OBJECTIVE** > **1****Problem 7-52B FINANCIAL STATEMENT PRESENTATION OF OPERATING ASSETS**

Athens, Inc., prepared the following post-closing trial balance at December 31, 2009:

	Debit	Credit
Cash	\$ 3,100	
Accounts receivable	28,000	
Prepaid insurance	8,500	
Land	21,200	
Buildings	308,000	
Equipment	124,000	
Patent	9,800	
Goodwill	42,400	
Accounts payable		\$ 7,600

	Debit	Credit
Accumulated depreciation, buildings		102,000
Accumulated depreciation, equipment		48,000
Unearned revenue		9,700
Interest payable		3,800
Income taxes payable		17,100
Notes payable (due in 10 years)		170,000
Common stock		125,000
Retained earnings		61,800
Totals	\$545,000	\$545,000

**Required:**

Prepare a classified balance sheet for Athens Inc. at December 31, 2009. Athens reports the three categories of operating assets in separate subsections of assets.

**Problem 7-53B COST OF A FIXED ASSET****OBJECTIVE** > 2

Metropolis Country Club purchased a new tractor to be used for golf course maintenance. The machine cost \$53,200. Metropolis borrowed the purchase price from its bank on a one-year, 10 percent note payable. Metropolis incurred the following costs:

Shipping costs	\$300
Shipping insurance	150
Calibration of cutting height	83

**Required:**

Compute the cost of the lawnmower.

**Problem 7-54B DEPRECIATION METHODS****OBJECTIVE** > 3 4

Graphic Design Inc. purchased a state-of-the-art laser engraving machine for \$90,000. Parker determined that the system had an expected life of 10 years (or 2,000,000 items engraved) and an expected residual value of \$5,400.

**Required:**

- Determine the amount of depreciation expense for the first and second years of the machine's life using the (a) straight-line and (b) double-declining-balance depreciation methods.
- If the number of items engraved the first and second years was 205,000 and 187,000 respectively, compute the amount of depreciation expense for the first and second years of the machine's life using the units-of-production depreciation method.
- Compute the book values for all three depreciation methods as of the end of the first and second years of the system's life.

**Problem 7-55B DEPRECIATION SCHEDULES****OBJECTIVE** > 3 4

Dunn Corporation acquired a new depreciable asset for \$150,000. The asset has a five-year expected life and a residual value of zero.

**Required:**

- Prepare a depreciation schedule for all five years of the asset's expected life using the straight-line depreciation method.
- Prepare a depreciation schedule for all five years of the asset's expected life using the double-declining-balance depreciation method.
- What questions should be asked about this asset to decide which depreciation method to use?

**Problem 7-56B EXPENDITURES AFTER ACQUISITION****OBJECTIVE** > 3 4 5

Murray's Fish Market, a store that specializes in providing fresh fish to the Nashville, Tennessee area, installed a new refrigeration unit in early 2007 at a cost of \$21,500. The

refrigeration unit has an expected life of eight years and a residual value of \$500 when installed. As the fish market's business increased, it became apparent that renovations were necessary so that the capacity of the refrigeration unit could be increased. In January 2010, Pasta spent \$18,800 to install an additional refrigerated display unit (that was connected to the original unit) and replace the refrigeration coils. After this addition and renovation, Murray's Fish Market estimated that the remaining useful life of the original refrigeration unit was 12 years and that the residual value was now \$1,000.

**Required:**

1. Compute one year's straight-line depreciation expense on the refrigeration unit before the addition and renovations.
2. Assume that three full years of straight-line depreciation expense were recorded on the refrigeration unit before the addition and renovations were made. Compute the book value of the refrigeration unit after the renovations were made.
3. Compute one year's straight-line depreciation expense on the renovated refrigeration unit.

**OBJECTIVE** > **5** **Problem 7-57B REMODELING DECISION**

Ferinni Company operates a travel agency out of a historic building in Smalltown. Ferinni's CEO believes that the building needs to be remodeled in order to reach a wider customer base. The CEO proposes building a new entry that would be adjacent to Main Street in order to attract more foot traffic. The current entry faces a parking deck at the rear of the building and is easily overlooked by customers. The new entry will require the rearrangement of several offices inside the building. Because of competition from Internet travel sites, Ferinni will not be able to raise rates for its travel service after the remodeling is made.

**Required:**

1. Identify the factors that Ferinni should consider when evaluating whether to remodel the building.
2. Since the revenue rate cannot be increased, can the cost of the remodeling be capitalized? Why or why not?

**OBJECTIVE** > **7** **Problem 7-58B DISPOSITION OF OPERATING ASSETS**

Salva Pest Control disposed of four assets recently. Salva's accounting records provided the following information about the assets at the time of their disposal:

Asset	Cost	Accumulated Depreciation
Pump	\$ 5,900	\$ 4,800
Truck	18,600	17,500
Office equipment	4,200	4,000
Chemical testing apparatus	7,300	4,000

The truck was sold for \$2,000 cash, and the chemical testing apparatus was donated to the local high school. Because the pump was contaminated with pesticides, \$500 in cash was paid to a chemical disposal company to decontaminate the pump and dispose of it safely. The office equipment was taken to the local landfill.

**Required:**

Prepare a separate journal entry to record the disposition of each of these assets.

**OBJECTIVE** > **9** **10** **Problem 7-59B NATURAL RESOURCE AND INTANGIBLE ACCOUNTING**

In 2002, the Mudcat Gas Company purchased a natural gas field in Oklahoma for \$158,000,000. The fair value of the land was \$1,500,000 and the fair value of the natural gas reserves was \$156,217,500. At that time, estimated recoverable gas was 104,145,000 cubic feet.

**Required:**

1. Write the entry to record this acquisition in Mudcat's journal. (Hint: Record the cost in excess of fair value as goodwill.)
2. If Mudcat recovers and sells 2,500,000 cubic feet in one year, compute the depletion.
3. Prepare journal entries to record depletion for the 2,500,000 cubic feet of natural gas recovered and sold.
4. Is the goodwill amortized? Explain your reasoning.
5. Why is the land capitalized separately from the natural gas reserves?

**Problem 7-60B ACCOUNTING FOR INTANGIBLE ASSETS****OBJECTIVE**  **9**

Blackford and Medford Publishing Company own the copyright on many top authors. In 2010, Blackford and Medford acquired the copyright on the literary works of Susan Monroe, an underground novelist in the 1960s, for \$800,000 cash. Due to a recent resurgence of interest in the 1960s, the copyright has an estimated economic life of eight years. The residual value is estimated to be zero.

**Required:**

1. Prepare a journal entry to record the acquisition of the copyright.
2. Compute and record the 2010 amortization expense for the copyright.

**Cases****Case 7-61 ETHICS, INTERNAL CONTROLS, AND THE CAPITALIZATION DECISION**

James Sage, an assistant controller in a large company, has a friend and former classmate, Henry Cactus, who sells computers. Sage agrees to help Cactus get part of the business that has been going to a large national computer manufacturer for many years. Sage knows that the controller would not approve a shift away from the national supplier but believes that he can authorize a number of small orders for equipment that will escape the controller's notice. Company policy requires that all capital expenditures be approved by a management committee; however, expenditures under \$2,000 are all expenses and are subject to much less scrutiny. The assistant controller orders four computers to be used in a distant branch office. In order to keep the size of the order down, he makes four separate orders over a period of several months.

**Required:**

1. What are the probable consequences of this behavior for the company? For the assistant controller?
2. Describe internal control procedures that would be effective in discouraging and detecting this kind of behavior.

**Case 7-62 MANAGEMENT'S DEPRECIATION DECISION**

Great Basin Enterprises, a large holding company, acquired North Spruce Manufacturing, a medium-sized manufacturing business, from its founder, who wishes to retire. Despite great potential for development, North Spruce's income has been dropping in recent years. Great Basin installs a new management group (including a new controller) at North Spruce and gives the group six years to expand and revitalize the operations; management compensation includes a bonus based on net income generated by the North Spruce operations. If North Spruce does not show considerable improvement by the end of the sixth year, Great Basin will consider selling it. The new management immediately makes significant investments in new equipment but finds that new revenues develop slowly. Most of the new equipment will be replaced in 8 to 10 years. To defer income taxes to the maximum extent, the controller uses accelerated depreciation methods and the minimum allowable "expected lives" for the new equipment, which

average 5 years. In preparing financial statements, the controller uses the straight-line depreciation method and expected lives that average 12 years for the new equipment.

**Required:**

1. Why did the controller compute depreciation expense on the financial statements as he or she did?
2. What are the possible consequences of the controller's decision on the amount of depreciation expense shown on the financial statements if this decision goes unchallenged?

**Case 7-63 THE EFFECT OF ESTIMATES OF LIFE AND RESIDUAL VALUE ON DEPRECIATION EXPENSE**

Hattiesburg Manufacturing purchased a new computer-integrated system to manufacture a group of fabricated metal and plastic products. The equipment was purchased from Bessemer Systems at a cost of \$630,000. As a basis for determining annual depreciation expense, Hattiesburg's controller requests estimates of the expected life and residual value for the new equipment. The engineering and production departments submit the following divergent estimates:

	Engineering Department Estimates	Production Department Estimates
Expected life	9 years	7 years
Residual value	\$ 90,000	0

Before considering depreciation expense for the new equipment, Hattiesburg Manufacturing has net income in the amount of \$250,000. Hattiesburg uses the straight-line method of depreciation.

**Required:**

1. Compute a full year's depreciation expense for the new equipment, using each of the two sets of estimates.
2. Ignoring income taxes, what will be the effect on net income of including a full year's depreciation expense based on the engineering estimates? Based on the production estimates?
3. If a business has a significant investment in depreciable assets, the expected life and residual value estimates can materially affect depreciation expense and therefore net income. What might motivate management to use the highest or lowest estimates? How would cash outflows for income taxes be affected by the estimates?

**Case 7-64 RESEARCH & ANALYSIS USING THE ANNUAL REPORT**

Obtain Verizon Communications, Inc.'s most current annual report either through the "Investor Relations" portion of their website (do a web search for Verizon Communications investor relations) or go to <http://www.sec.gov> and click "search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

1. What method of depreciation does Verizon use? What are the typical useful lives of Verizon's operating assets?
2. What is the cost of Verizon's property, plant, and equipment? List the major components of Verizon's property, plant, and equipment.
3. What amount of accumulated depreciation is associated with property, plant, and equipment?
4. Refer to the statement of cash flows:
  - a. What is the amount of depreciation expense reported for each of the last three years?
  - b. How much did Verizon spend on the acquisition of operating assets (capital expenditures) in each of the last three years?

- c. How much property, plant, and equipment was disposed of in the last year?
  - d. Is the change in depreciation expense consistent with the pattern of capital expenditures observed? Why or why not?
5. What is the change in accumulated depreciation for the most recent year? Is this change explained by the depreciation expense reported? If not, what other items might cause accumulated depreciation to change?
  6. Describe Verizon's capital expenditure plans for the future.
  7. Explain Verizon's accounting policy with regard to intangible assets.
  8. List the types of intangible assets that Verizon possesses. What is Verizon's largest intangible asset?

**Case 7-65 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aerostale** that are supplied with this text.

**Required:**

1. With regard to depreciation methods:
  - a. What depreciation method does Abercrombie & Fitch use? What depreciation method does Aerostale use?
  - b. What are the typical useful lives of each company's operating assets?
  - c. What effect will the useful lives have on the company's financial statements?
2. Refer to the statement of cash flows:
  - a. What is the amount of depreciation and amortization expense that each company reported for the three years presented?
  - b. How much did each company spend on the acquisition of operating assets (capital expenditures) in each of the last three years?
  - c. Is the change in depreciation and amortization expense consistent with the pattern of capital expenditures observed? Why or why not?
3. Compute the fixed asset turnover and the average age of fixed assets for each company. What conclusions can you draw from these ratios?

# 8

## Current and Contingent Liabilities

After studying Chapter 8, you should be able to:

- ▶ **1** Explain liability recognition and measurement criteria.
- ▶ **2** Identify and record the kinds of activities that produce current liabilities.
- ▶ **3** Describe contingent liabilities and the alternatives for their recognition and measurement.
- ▶ **4** Measure warranty liabilities and warranty expense.
- ▶ **5** Analyze liquidity ratios using information contained in the current liabilities section.



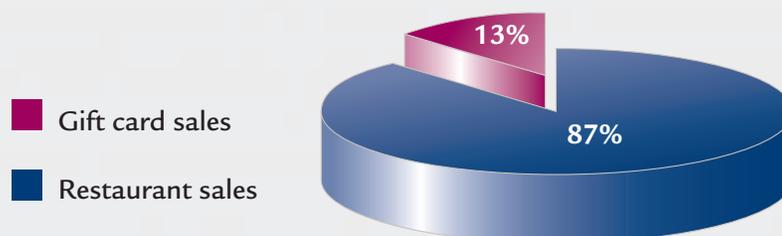
# E xperience Financial Accounting with Ruth's Chris Steak House

**Ruth's Chris Steak House** was founded in 1965 when Ruth Fertel mortgaged her home for \$22,000 to purchase the "Chris Steak House," a 60-seat restaurant located near the New Orleans Fair Grounds racetrack. Today this brand is considered one of the top restaurants in the world with revenues of over \$200 million and net income of approximately \$11 million. Interestingly, over \$36 million (approximately 13 percent) of its restaurant revenues comes from the sale of gift cards, which have become a popular holiday gift among business professionals. According to the National Retail Foundation,

total holiday gift-card spending increased 34 percent in 2006 to \$24.8 billion, with restaurants as the second most popular category.<sup>1</sup>

As you will learn in this chapter Ruth's Chris has a liability (unearned revenues) related to the sale of gift cards until the meal is provided. That is, gift-card revenue should not be recognized until the card is redeemed (for goods or services) or expires, and therefore, Ruth's Chris should not expect to see much of the revenue benefit from gift cards until the following year.

Ruth's Chris Steak House Revenues



<sup>1</sup>Source: Jeff Omohundro, Katie H. Willett, and Jason Belcher, "Dining Less at the Mall," *Barron's Online*, October, 18, 2007: <http://online.barrons.com/article/SB119265481714262454.html?mod=yahoobarrons&ru=yahoo>. Accessed October 25, 2007.

## Current and Contingent Liabilities

Chapters 4, 5, 6, and 7 explained accounting and reporting for assets. Now we want to move to the other side of the balance sheet and discuss liabilities and equity, which are the sources of cash and other financial resources used to acquire assets. We begin by examining liabilities.

Finding potential creditors, arranging attractive credit terms, structuring borrowings with lenders, and arranging to have enough cash coming in to pay the liabilities as they come due is one of the most important managerial functions. The result of liability management and the accounting recognition, measurement, and reporting issues for those activities appears in the liabilities portion of the balance sheet. The information provided by **Intel** in its 2007 balance sheet is typical:

Intel Corporation Consolidated Balance Sheets (in millions) December 30, 2007	
LIABILITIES	
<b>Current liabilities:</b>	
Short-term debt	\$ 142
Accounts payable	2,361
Accrued compensation and benefits	2,417
Accrued advertising	749
Deferred income on shipments to distributors	625
Other accrued liabilities	1,938
Income taxes payable	339
Total current liabilities	<u>\$8,571</u>
Long-term income taxes payable	785
Long-term debt	1,980
Other long-term liabilities	1553

Naturally, existing and potential creditors also find this information useful as they want to know about the obligations management has assumed.

In this chapter and the next we discuss the three kinds of business obligations: current liabilities, contingent liabilities, and long-term debt. Current liabilities are those obligations that are (1) expected to be retired with existing current assets or creation of new current liabilities, and (2) due within one year or one operating cycle, whichever is longer. All other liabilities are considered long-term. Contingent liabilities can be either current or long-term, but they are “iffy” in two ways. They may or may not turn into actual obligations and, for those contingencies that do become obligations, the timing and amount of the required payment is uncertain. In this chapter we focus on current and contingent liabilities and address the following questions:

- When are liabilities recognized?
- How are liabilities measured?
- What kind of activities produce current liabilities and how are they recorded in the accounting records?
- What are contingent liabilities and how are they recorded in the accounting records?
- How do you measure and record warranty liabilities?

**OBJECTIVE** > **1**  
Explain liability recognition and measurement criteria.

## Recognition and Measurement of Liabilities

**Liabilities** are probable future sacrifices of economic benefits. These commitments, which arise from activities that have already occurred, require the business to transfer assets or provide services to another entity sometime in the future. For example, an account payable arises from a past transaction in which the business received goods

or services from a creditor and requires the business to pay cash to the creditor at some future time.

Within this general definition, liabilities have a wide variety of characteristics. Although liabilities frequently require the payment of cash, some may require the transfer of assets other than cash, or the performance of services. Although the exact amount and timing of future payments are usually known, for some liabilities they may not be. Further, though many liabilities are legally enforceable claims, some may represent merely *probable* claims. Finally, although liabilities usually identify the entity to be paid, the definition does not exclude payment to unknown recipients. Thus, the future outflow associated with a liability may or may not involve the payment of cash; may or may not be known with certainty; may or may not be legally enforceable; and may or may not be payable to a known recipient.

## Recognition of Liabilities

Most liabilities are recognized when goods or services are received or money is borrowed (see Exhibit 8-1). When a liability depends on a future event (i.e., a contingent liability), such as the outcome of a lawsuit, recognition depends on how likely the occurrence of the event is and whether a good estimate of the payment amount can be made. If the future payment is judged to be less than likely to occur or the payment is not estimable, the obligation should not be recognized. Such obligations may require disclosure in footnotes to the financial statements, as explained later in this chapter.

## Measurement of Liabilities

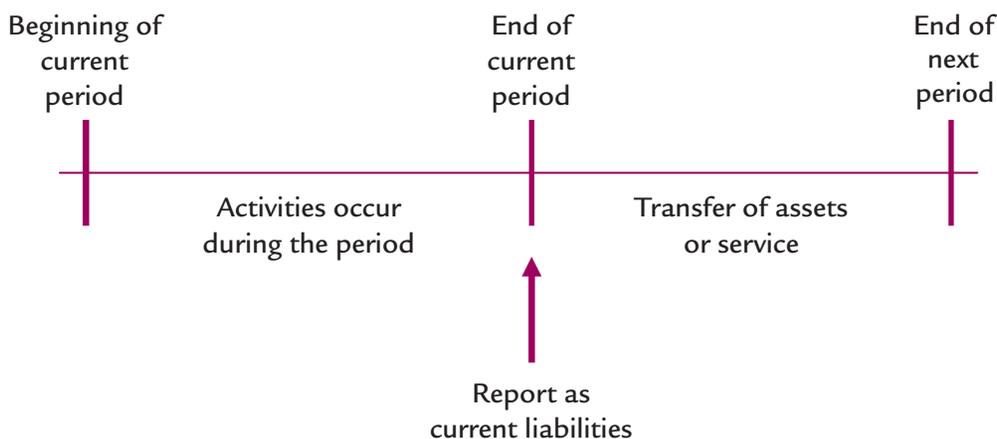
We all know that when you owe money you typically pay interest. That is, if you borrow \$100 at 10 percent interest, then when you pay it back one year later you must repay \$110 (the \$100 principal and \$10 [ $\$100 \times 10\%$ ] interest). Sometimes companies will appear to give you a zero percent interest loan. For example, furniture and electronics retailers frequently advertise “no interest, no money down for 12 months” or some such terms. Of course, we know this really means that the “interest” is included in the sales price because no business is going to truly provide zero percent interest.

In theory, the amount of the liability reported on the balance sheet should not include any interest that has not yet occurred. For example, on a balance sheet prepared six months after borrowing the \$100 at 10 percent interest described above, you should report a liability of \$105 (the \$100 payable for the principal and \$5 [ $\$100 \times 10\% \times 6/12$ ] “interest payable” for the six months of interest that is currently owed).

However, many liabilities are more like your credit card or utilities bill. For example, you might owe your power company \$150 for the use of electricity during September. You likely do not receive this bill until sometime during October and you do not have to pay it until near the end of November. Further, there appears to be no

Exhibit 8-1

### Recognition of Current Liabilities



interest because you owe \$150 whether you pay the bill when you receive it in October or wait until the November due date.

Despite the apparent lack of interest, we all know that theoretically interest exists. Consequently, in theory we should calculate the interest on such liabilities. For example, if we made a balance sheet at the end of September, then a liability for the power company should be calculated to exclude the theoretical interest included in the \$150 payment at the end of November (i.e., two months interest at the market rate). Fortunately, we ignore the interest for most current liabilities because the amount of interest is relatively small. So most current liabilities are simply recorded and reported at the total amount owed as we will see in the next section.

## Current Liabilities

### OBJECTIVE 2

Identify and record the kinds of activities that produce current liabilities.

**Current liabilities** are obligations that require the firm to pay cash or another current asset, create a new current liability, or provide goods or services within the longer of one year or one operating cycle. Since most firms have operating cycles shorter than one year, the one-year rule usually applies.

Some firms combine their current liabilities into a very short list, while others provide considerable detail. Exhibit 8-2 compares the current liabilities sections of the balance sheets for two airlines—**Southwest** and **UAL (United Airlines)**. Although it's reasonable to assume that both airlines have similar types of current liabilities,

### Exhibit 8-2

#### Current Liability Sections from Two Balance Sheets

Southwest Airlines Co. Consolidated Balance Sheets (in millions)		
	December 31, 2007	December 31, 2006
<b>Current liabilities:</b>		
Accounts payable	\$ 759	\$ 643
Accrued liabilities	3,107	1,323
Air traffic liability	931	799
Current maturities of long-term debt	41	122
Total current liabilities	<u>\$4,838</u>	<u>\$2,887</u>
UAL Corporation Statement of Consolidated Financial Position (in millions)		
	December 31	
	2007	2006
<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>		
<b>Current liabilities:</b>		
Advance ticket sales	\$1,918	\$1,669
Mileage Plus deferred revenue	1,268	1,111
Accrued salaries, wages and benefits	896	795
Accounts payable	877	667
Advanced purchase of miles	694	681
Long-term debt maturing within one year	678	1,687
Fuel purchase commitments	493	283
Distribution payable	257	—
Current obligations under capital leases	250	110
Accrued interest	141	241
Other	507	701
	<u>\$7,979</u>	<u>\$7,945</u>

Southwest combines theirs into a relatively short list while UAL provides more detail. Further, you will note that UAL orders its individual current liabilities from largest to smallest (with “other” at the end), while Southwest appears to order its current liabilities in alphabetical order, or perhaps the order in which the liabilities will be paid.

In the sections that follow we will briefly describe how various types of current liabilities arise, and the principles that underlie their recognition, measurement, and reporting.

## Accounts Payable

An **account payable** arises when a business purchases goods or services on credit. It is really just the flip side of an account receivable—when you have a payable, the business you owe has a receivable. Credit terms generally require that the purchaser pay the amount due within 30 to 60 days and seldom require the payment of interest. Accounts payable do not require a formal agreement or contract. For example, your account with the power company usually does not require you to sign a formal contract.

You may recall from Chapter 5 that accounts receivable has some valuation issues related to estimating bad debts. Accounts payable, on the other hand, have no such issues. They are measured and reported at the total amount required to satisfy the account, which is the cost of the goods or services acquired. For example, if Game Time Sporting Goods buys and receives running shoes on May 15, 2009, for which it pays its supplier \$2,000 on June 15, 2009, it would need to make the following journal entries:

Date	Account and Explanation	Debit	Credit
May 15	Inventory	2,000	
	Accounts Payable		2,000
	<i>(Record purchase of inventory)</i>		
June 15	Accounts Payable	2,000	
	Cash		2,000
	<i>(Record payment to supplier)</i>		

Assets = Liabilities +		Stockholders'
		Equity
+2,000	+2,000	

Assets = Liabilities +		Stockholders'
		Equity
-2,000	-2,000	

## Notes Payable

A **note payable** typically arises when a business borrows money or purchases goods or services from a company that requires a formal agreement or contract (like when you signed a contract to lease your apartment or buy a car). In fact, this formal agreement or contract is what distinguishes the note payable from an account payable. This agreement typically states the timing of repayment and the amount (principal and/or interest) to be repaid. Notes payable typically mature in anywhere from three to 12 months, but it can be longer (of course, if it does not mature for over 12 months, it will be classified as a long-term liability). These longer maturities also explain why creditors are more likely to impose interest on notes payable than with accounts payable.

Notes payable normally specify the amount to be repaid indirectly, by stating the amount borrowed (the principal) and an interest rate. These notes are called *interest-bearing notes* because they explicitly state an **interest rate**. The maturity amount of an interest-bearing note is not stated explicitly but is determined from the interest rate, the principal amount, and the maturity date.

When a business borrows using a short-term, interest-bearing note, the transaction is recorded at the amount borrowed. For example, assume that Starcrest Cleaners borrows \$600,000 cash from a bank with a six-month, 8 percent note payable. Starcrest borrows the money on March 1, 2011, to finance the acquisition of inventory for its spring selling season. Starcrest would recognize the note as follows:

Date	Account and Explanation	Debit	Credit
Mar. 1	Cash	600,000	
	Notes Payable		600,000
	<i>(Record issuance of 6-month, 8% note)</i>		
Aug. 31	Notes Payable	600,000	
	Interest Expense	24,000	
	Cash		624,000
	<i>(Record payment of note)</i>		

Assets = Liabilities +		Stockholders'
		Equity
+600,000	+600,000	

Assets = Liabilities +		Stockholders'
		Equity
-624,000	-600,000	-24,000

In addition to short-term borrowings, notes payable are often created when a borrower is unable to pay an account payable in a timely manner. In this case the borrower is typically granted a payment extension, but the creditor requires a formal note be signed to impose interest. You may recall from above that a current liability can be retired through creation of a new current liability. Rolling an account payable into a note payable would be an example of this. The accounting for such a transaction is straightforward as illustrated in **Cornerstone 8-1**.



**CORNERSTONE**  
**8 - 1**



**HOW TO Record Accounts and Notes Payable**

**Concept:**

A liability must be recognized when a business is required to transfer assets (or provide services) to another entity at some point in the future for activities that have already occurred.

**Information:**

Gibson Shipping regularly orders packing materials from Ironman Enterprises. On March 8, 2010, Gibson orders \$25,000 from Ironman on account. This amount is due on May 15, 2010. However, due to the unexpected loss of a large customer Gibson experiences a cash flow crunch. On May 15, Gibson approaches Ironman about a payment extension and Ironman grants the extension on the condition that Gibson sign a note that specifies 7 percent interest beginning on May 15, 2010, with a due date of November 15, 2010. Gibson pays the amount in full on November 15, 2010.

**Required:**

1. Provide the necessary journal entry for Gibson Shipping on March 8, 2010.
2. Provide the necessary journal entry for Gibson Shipping on May 15, 2010.
3. Provide the necessary journal entry for Gibson Shipping on November 15, 2010.

**Solution:**

1. Entry on March 8, 2010:

		Stockholders'
Assets =	Liabilities +	Equity
+25,000	+25,000	

Date	Account and Explanation	Debit	Credit
Mar. 8	Supplies	25,000	
	Accounts Payable		25,000
	<i>(Record purchase of packing materials)</i>		

2. Entry on May 15, 2010:

		Stockholders'
Assets =	Liabilities +	Equity
	+25,000	
	-25,000	

Date	Account and Explanation	Debit	Credit
May 15	Accounts Payable	25,000	
	Notes Payable		25,000
	<i>(Record issuance of note payable)</i>		

3. Entry on November 15, 2010:

		Stockholders'
Assets =	Liabilities +	Equity
-25,875	-25,000	-875

Date	Account and Explanation	Debit	Credit
Nov. 15	Notes Payable	25,000	
	Interest Expense	875*	
	Cash		25,875
	<i>(Record payment of note and interest)</i>		

\*\$25,000 × 7% × 6/12

## Current Portion of Long-Term Debt

The current portion of long-term debt is the amount of long-term debt principal that is due within the next year. At the end of each accounting period, the long-term debt that is due during the next year is reclassified as a current liability (see Southwest Airlines and UAL in Exhibit 8-2). Since the reclassification of most long-term debt as current does not usually change the accounts or amounts involved, journal entries are not required. In some cases, long-term debt that is due within the next year will be paid with the proceeds of a new long-term debt issue. Remember current liabilities must be retired with existing current assets or creation of new current liabilities—a new long-term debt issue is creation of a new *long-term*, not current, liability. When such refinancing is expected, the maturing obligation is not transferred to current liabilities but is left as a long-term debt. We discuss long-term liabilities in more detail in Chapter 9.

## Other Payables

Accounts payable are reserved for amounts owed to outside suppliers of goods and services, and notes payable reflect amounts owed in which formal agreements or contracts were signed. However, businesses will have other current liabilities that do not fall into these two categories. There are many situations that can give rise to these other payables, but we will restrict our discussion to some of the most common.

**Accrued Payables** Unlike accounts and notes payable, which are recognized when goods or services change hands, **accrued payables** are recognized by adjusting entries. They usually represent the completed portion of activities that are in process at the end of the period. For example, Green's Landscaping pays wages of \$10,000 (or \$1,000 per work day) to its employees every other Friday. The standard entry is:

Date	Account and Explanation	Debit	Credit
Dec. 20	Wages Expense	10,000	
	Cash		10,000
	<i>(Record payment of wages)</i>		

	<b>Assets = Liabilities +</b>	<b>Stockholders'</b>
		<b>Equity</b>
	-10,000	-10,000

What happens, however, when December 31 falls on the Tuesday before the Friday payday? In this case, the expense for the seven days that have already been worked (five days from last week and Monday and Tuesday of this week) must be matched to the proper period. Additionally, because the work has been performed, but the employees have not yet been paid, Green's Landscaping has a liability to its employees. As such, on December 31 Green's would make the following adjusting entry:

Date	Account and Explanation	Debit	Credit
Dec. 31	Wages Expense	7,000	
	Wages Payable		7,000
	<i>(Record accrual of wages expense)</i>		

	<b>Assets = Liabilities +</b>	<b>Stockholders'</b>
		<b>Equity</b>
	+7,000	-7,000

Further, when Green's pays \$10,000 to its employees on January 3, three days' pay are an expense of the current year (Wednesday, January 1 through Friday, January 3) and seven days' pay retires the Wages Payable from December 31:

Date	Account and Explanation	Debit	Credit
Jan. 3	Wages Expense	3,000	
	Wages Payable	7,000	
	Cash		10,000
	<i>(Record payment of wages)</i>		

	<b>Assets = Liabilities +</b>	<b>Stockholders'</b>
		<b>Equity</b>
	-10,000    -7,000	-3,000

This sort of process is used for a wide variety of activities that are completed over time. For example, taxes are paid on April 15 based on the previous year's net income. As such, on December 31 an adjusting entry will match the appropriate income tax expense to the current year and set up a liability (income taxes payable) that will be paid off by April 15. The same logic applies to other similar situations, such as property taxes and interest expense. Interest expense is illustrated in [Cornerstone 8-2](#).



**CORNERSTONE**  
**8 - 2**



**HOW TO Calculate and Record Accrued Interest**

**Concept:**

Accrual basis accounting requires us to match expenses to the period the expense helped generate revenues (the matching principle). When accrual accounting matches the expense to a period before it is actually paid, an adjusting entry records the accrued expense and corresponding payable amount.

**Information:**

Fitch Auto Parts borrowed \$100,000 on October 1, 2009, at 10 percent interest. The interest and principal are due on September 30, 2010.

**Required:**

1. Provide the adjusting journal entry on December 31, 2009.
2. Provide the journal entry(ies) on September 30, 2010.

**Solution:**

1. Entry on December 31, 2009:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Interest Expense	2,500*	
	Interest Payable		2,500
	<i>(Record accrual of interest expense)</i>		

\*\$100,000 × 10% × 3/12

2. Entry on September 30, 2010:

Date	Account and Explanation	Debit	Credit
Sept. 30, 2010	Notes Payable	100,000	
	Interest Expense	7,500*	
	Interest Payable	2,500	
	Cash		110,000
	<i>(Record payment of note and interest)</i>		

\*\$100,000 × 10% × 9/12

Assets = Liabilities +	Stockholders' Equity
+2,500	-2,500

Assets = Liabilities +	Stockholders' Equity
-110,000    -2,500	-7,500
	-100,000

Exhibit 8-3 illustrates the financial statement effects of the transactions recorded in Cornerstone 8-2. Notice that the interest payment of \$10,000 is recorded as interest expense of \$2,500 in 2009 and \$7,500 in 2010.

**Exhibit 8-3**

**Effect of Borrowing Money on the Annual Income Statement and Balance Sheet**

	10/1/09	12/31/09	9/30/10	12/31/10
	2009		2010	
<b>Annual income statement:</b>				
Interest expense		\$ 2,500		\$ 7,500
<b>Annual balance sheet:</b>				
Note payable		\$100,000		\$ 0
Interest payable		2,500		0
<b>Transactions:</b>				
Cash borrowed		\$100,000		
Principal payment				\$100,000
Interest payment				10,000

**Sales Tax** At the time of a sale, most retail businesses collect **sales taxes**, usage taxes, or excise taxes for various state, local, and federal taxing authorities. These taxes, although collected as part of the total selling price, are not additions to revenue. Instead, they are money collected from the customer for the governmental unit levying the tax. These tax collections are liabilities until they are paid to the taxing authority. For example, businesses typically must remit sales tax collected to the state every quarter. **Cornerstone 8-3** illustrates the accounting for sales tax.

**HOW TO Record the Liabilities for Sales Tax**

**Concept:**

By law, companies frequently collect sales tax from customers. However, the company has no rights to these monies; instead, the cash must be passed along to the taxing authority.

**Information:**

During the first quarter of 2009, McLean County Tire sold, on credit, 3,000 truck tires at \$75 each plus State of Illinois sales tax of 5 percent. Included in the \$75 price per tire was a \$1.50/tire federal excise tax. Any taxes collected are paid to the appropriate taxing authority at the end of the quarter.

**Required:**

1. Provide the journal entry to record the first quarter sales.
2. Provide the journal entry to record the payment of the taxes to the appropriate taxing authority.

**Solution:**

1.

Date	Account and Explanation	Debit	Credit
Mar. 31	Accounts Receivable	236,250	
	Sales Revenue		220,500*
	Illinois Sales Tax Payable		11,250**
	Federal Excise Tax Payable		4,500***
	<i>(Record sale of truck tires)</i>		

\*3,000 tires × (\$75 – \$1.50 per tire)

\*\*3,000 tires × \$75 × 5%

\*\*\*3,000 tires × \$1.50

Recognize that the receivable [(3,000 tires × \$75 per tire) + (5% × 3,000 × \$75)] is larger than the sales revenue. The difference is the amount of the taxes McLean County Tire collects for the state and federal government—liabilities to McLean County Tire until the governmental units are paid.

2. Entry to record payment of sales taxes:

Date	Account and Explanation	Debit	Credit
Apr. 10	Illinois Sales Tax Payable	11,250	
	Federal Excise Tax Payable	4,500	
	Cash		15,750
	<i>(Record payment of first quarter sales tax)</i>		



**CORNERSTONE  
8-3**



Assets	=	Liabilities	+	Stockholders' Equity
+236,250		+11,250		+220,500
		+4,500		

Assets	=	Liabilities	+	Stockholders' Equity
-15,750		-11,250		-4,500

**Withholding and Payroll Taxes** Businesses are required to withhold taxes from employees' earnings and to pay taxes based on wages and salaries paid to employees. These **withholding** and **payroll taxes** are liabilities until they are paid to the taxing authority. Note that there are really two sources for these taxes. First, you are well aware that employees must pay certain taxes that are “withheld” from their

paycheck. This is the difference between your gross pay and your net pay. The business does not have any rights to this money; instead, as with sales tax, they must pay these amounts to the proper authority. The standard withholdings are federal, state, and possibly city or county income taxes, as well as Social Security and Medicare. Employees may also have amounts withheld for such things as retirement accounts (e.g., 401-K), parking, and health insurance, among other things, but these are not taxes.

Additionally, the business itself must pay certain taxes based on employee payrolls. You may be less aware of some of these taxes, but the dollar amounts are very real to any business. These amounts are not withheld from employee pay, rather they are additional amounts that must be paid over and above gross pay. For example, employers match your contribution to Social Security and Medicare (together these are called FICA). That is, if you have \$400 withheld from your paycheck for Social Security, your employer pays the federal government \$800 related to your employment. Employers also pay federal and state unemployment taxes (these are used to fund unemployment benefits) based on their history of firing employees (because fired employees are eligible to collect unemployment benefits). Finally, employers do have other costs—typically called fringe benefits—associated with employees, but these are not taxes. Examples of fringe benefits include employer contributions to retirement accounts and health insurance.

Most U.S. businesses have the following obligations to pay taxes or withhold them from employee earnings:

Tax	Business Payroll Tax	Withholding from Employee Pay
Old age, survivors, and disability (Social Security)*	6.20%	6.20%
Medicare tax	1.45	1.45
State unemployment tax	rate varies	
Federal unemployment tax	rate varies	
Federal income tax		rate varies
State income tax		rate varies

\*Applies to the first \$102,000 of wages in 2008. Maximum amount is increasing over time.

**Cornerstone 8-4** illustrates the accounting for payroll withholding and payroll taxes.



## CORNERSTONE 8 - 4



### HOW TO Record Payroll Taxes

#### Concept:

Employers not only withhold taxes from the employees' gross pay and later pay these amount withheld to the taxing authority, but they also pay additional amounts over and above gross pay.

#### Information:

Assume that McLean County Tire's hourly employees earned \$48,500 in the pay period ending July 31. Assume further that federal and state income taxes withheld are \$8,245 and \$1,940, respectively. The taxes noted above, plus a state unemployment tax rate of 3 percent and a federal unemployment tax rate of 5 percent, are applicable. We will recognize McLean County Tire's payroll activities in two steps.

#### Required:

1. Provide the journal entry related to the \$48,500 gross pay earned by the employees.
2. Provide the journal entry related to the payroll taxes over and above gross pay.

**Solution:**

- Entry to record wages expense and associated liabilities:

Date	Account and Explanation	Debit	Credit
July 31	Wages Expense	48,500.00*	
	Federal Income Tax Payable		8,245.00
	State Income Tax Payable		1,940.00
	Social Security Tax Payable		3,007.00*
	Medicare Tax Payable		703.25**
	Cash	34,604.75	

(Record wages and liabilities)

**CORNERSTONE**  
**8 - 4**  
*(continued)*

Assets	= Liabilities +	Stockholders' Equity
-34,604.75	+8,245.00	-48,500.00
	+1,940.00	
	+3,007.00	
	+703.25	

\* \$48,500 × 6.2%  
\*\* \$48,500 × 1.45%

- Now we will recognize the employer tax expenses and the associated employer tax liabilities.

Date	Account and Explanation	Debit	Credit
July 31	Federal Unemployment Tax Expense	2,425.00	
	State Unemployment Tax Expense	1,455.00	
	Employer Social Security Tax Expense	3,007.00	
	Employer Medicare Tax Expense	703.25	
	Federal Unemployment Tax Payable		2,425.00*
	State Unemployment Tax Payable		1,455.00**
	Employer Social Security Tax Payable		3,007.00***
	Employer Medicare Tax Payable		703.25****

(Record employer payroll taxes)

Assets	= Liabilities +	Stockholders' Equity
	+2,425.00	-2,425.00
	+1,455.00	-1,455.00
	+3,007.00	-3,007.00
	+703.25	-703.25

\* \$48,500 × 5%  
\*\* \$48,500 × 3%  
\*\*\* \$48,500 × 6.2%  
\*\*\*\* \$48,500 × 1.45%

Note that the \$48,500.00 payroll is (1) smaller than the total expense of \$56,090.25 (i.e., the sum of all expenses from both journal entries) and (2) larger than the \$34,604.75 cash paid (i.e., net pay) to employees. As you can see from this discussion of payroll taxes, the actual cost of an employee is more than his or her gross pay.

**DECISION-MAKING & ANALYSIS**

**The Cost of Fringe Benefits**

The employer payroll taxes that were just discussed are only part of the costs above salary that a business pays when it brings a new employee onto the payroll. We will analyze this issue by assuming that you just accepted a new \$52,000 per year staff job with VonZany Chocolates.

- What costs beyond salary might VonZany Chocolates incur by adding you to their payroll?

Most companies have some “fringe benefits” that they offer along with salary to full-time employees. These fringe benefits all come at some cost. Assume that VonZany offered you the fringe benefits identified below at the costs noted.

Fringe Benefit	Cost
Medical insurance	\$ 8,400
Eye care, glasses, and contacts	500
Dental insurance	300
Disability insurance	750
Retirement (10% of salary)	5,200
Typical bonus (3 weeks' pay)	3,000
Total fringe benefits	<u>\$18,150</u>

(Continued)

Now, add the employer payroll taxes using the rates identified above:

Employer Payroll Tax	Cost
OASDI (Social Security at 6.2%)	\$3,224
Medicare (at 1.45%)	754
Federal and state unemployment (at 3.5%)	1,820
Total employer payroll taxes	<u>\$5,798</u>

The total cost of bringing you on the payroll is \$75,948. The fringe benefits and payroll taxes raise the cost of employing you to 46.1 percent more than your salary.

2. How many more VonZany Chocolate bars have to be sold so that VonZany's income before taxes does not go down because you have been added to the payroll?

VonZany would have to earn enough additional revenue to pay the \$75,948 total cost of your employment plus the additional costs of producing and selling the additional chocolate bars. If we check a recent VonZany's income statement, we see that product costs plus selling, marketing, and administrative costs are approximately 87 percent of revenue. So VonZany's could use 13 percent of every sales dollar to pay for you.

Let's assume that VonZany sells VonZany Chocolate bars for \$1 each. For each additional bar sold, the company will realize 13¢ toward the cost of your employment. So VonZany would have to sell 584,215 more VonZany bars each year to come out even after adding you to the payroll.

$$\frac{\$75,948}{\$0.13} = 584,215$$

Remember, your employer can afford to keep you employed *only* if you help make revenues go up (after subtracting the direct costs of producing the product) or expenses go down by at least enough to break even. Promotions will come to those who do better and termination to those who don't contribute enough.

**Unearned Revenues** Unearned revenue is the liability created when customers pay for goods or services in advance. In such instances, the seller has a liability to the purchaser in the amount of the prepayment. This liability is discharged either by providing the goods or services purchased (at which time revenue is recognized) or by refunding the amount of the prepayment.<sup>2</sup>

Assume, for example, that Charter Air sold 30 roundtrip flights to Escape Travel for \$990,000. The contract requires Charter to make one roundtrip flight with 150 seats each Saturday between New York and Miami for Escape's customers to meet cruise ships. The flights begin on January 15. Escape paid in advance for the flights, and Charter recognized the payment in its accounts as follows:

Date	Account and Explanation	Debit	Credit
Jan. 8	Cash	990,000	
	Unearned Sales Revenue		990,000
	<i>(Record receipt of cash for service to be provided)</i>		

<b>Assets =</b>	<b>Liabilities +</b>	<b>Stockholders'</b>
<b>+990,000</b>	<b>+990,000</b>	<b>Equity</b>

Each time Charter provides one of the roundtrip flights, it should recognize the revenue that has been earned. The entry for each flight will look just like the entry for the first flight:

Date	Account and Explanation	Debit	Credit
Jan. 15	Unearned Sales Revenue	33,000	
	(\$990,000 ÷ 30 flights)		
	Sales Revenue		33,000
	<i>(Record revenue earned)</i>		

<b>Assets =</b>	<b>Liabilities +</b>	<b>Stockholders'</b>
<b>-33,000</b>	<b>+33,000</b>	<b>Equity</b>

**Cornerstone 8-5** illustrates the accounting for unearned revenues.

<sup>2</sup>If the goods or services are not provided, the seller may also be liable for legal damages. The amount of such damages would be recorded as an expense.

## HOW TO Record Unearned Revenues

### Concept:

When customers pay for goods or services in advance the business recognizes a liability. The revenue is recognized at the time the goods or services are provided.

### Information:

Jim's Steakhouse sells \$100,000 of gift cards in December 2009. These gift cards may be redeemed at any time; however, they do expire on December 31, 2010. During 2010, \$98,875 of gift cards are redeemed.

### Required:

1. Provide the journal entry related to the sale of gift cards.
2. Provide the journal entry related to redemption of the gift cards.
3. Provide the journal entry related to the expiration of the remaining gift cards.

### Solution:

1. Entry to record sale of gift cards during December 2009:

Date	Account and Explanation	Debit	Credit
Dec. 2009	Cash	100,000	
	Unearned Sales Revenue (Record sale of gift cards)		100,000



## CORNERSTONE 8-5



Assets	=	Liabilities	+	Stockholders' Equity
+100,000		+100,000		

2. Note that these entries are made individually as each gift card is redeemed:

Date	Account and Explanation	Debit	Credit
2010	Unearned Sales Revenue	98,875	
	Sales Revenue (Record redemption of gift cards)		98,875

Assets	=	Liabilities	+	Stockholders' Equity
		-98,875		+98,875

3. When gift cards expire, the sales revenue is recognized because the business does not need to provide any additional goods or services.

Date	Account and Explanation	Debit	Credit
Dec. 31, 2010	Unearned Sales Revenue	1,125	
	Sales Revenue (Record expiration of gift cards)		1,125

Assets	=	Liabilities	+	Stockholders' Equity
		-1,125		+1,125

A similar *long-term* liability, called *customer deposits*, is recorded when customers make advance payments or security deposits that are not expected to be earned or returned soon enough to qualify as current liabilities.

On a related point, this also demonstrates revenue recognition. Revenue will not be recognized until it is realized or realizable and earned. This amount is already realized, so the first criterion is met; however, it is not earned until the goods or services are provided.

Measurement of the liabilities described so far is not affected by uncertainties about the amount, timing, or recipient of future asset outflows. Such uncertainties are exhibited by the liabilities we examine next.

## Contingent Liabilities

A contingency is defined as an "...existing condition, situation, or set of circumstances involving uncertainty as to a possible gain or loss that will be resolved when a future event occurs or fails to occur." A **contingent liability** (or, contingent loss) results when there is uncertainty about a possible loss. For example, a firm may be contingently liable for

## CONCEPT Q&A

Why is a liability recognized when a customer prepays for a good or service (i.e., an unearned revenue)?

Liabilities are probable future sacrifices of economic benefits which arise from activities that have already occurred. Because in this situation the business will provide the goods or services purchased by the customer at some future point, the prepayment meets the definition of a liability.

Possible Answer:

## OBJECTIVE > 3

Describe contingent liabilities and the alternatives for their recognition and measurement.

damages under a lawsuit that has yet to be decided by the courts. When the courts reach a decision, the liability will be known, but until then it is contingent on that decision.

A contingent liability is not recognized in the accounts unless the event on which it is contingent is probable (likely to occur) and a reasonable estimate of the loss can be made. If the contingent event is likely to occur, reliable measurement of the liability is usually possible, so recognition is appropriate. For example, contingent liabilities arising from product warranties and pensions are recognized, because it is possible to reliably measure those liabilities using statistics drawn from previous experiences.

On the other hand, if occurrence of the contingent event is not probable or reliable measurement of the obligation is impossible, the potential obligation is not recorded as a liability. Instead, as shown in Exhibit 8-4, it may be disclosed in footnotes to the financial statements.

Lawsuits filed against a business provide a classic example of contingent liabilities. Interestingly, most large companies are party to multiple lawsuits at any point in time. Estimating when a loss is probable and determining a reasonable estimate requires information from the attorneys, but businesses rarely record a contingent liability prior to the jury deciding against them. We've probably all heard of such lawsuits as when Stella Liebeck sued **McDonald's** in 1992. Liebeck was sitting in the passenger seat of a car. While removing the coffee cup's lid to add sugar to her coffee, Liebeck spilled her coffee, burning her legs. It was determined that she suffered third degree burns over 6 percent of her body. McDonald's could have settled the case for \$20,000, but they

refused. Liebeck ultimately was awarded \$200,000 in compensatory damages, which was reduced to \$160,000 because she was found to be 20 percent at fault. She also was awarded \$2.7 million in punitive damages.

The accounting question becomes: When is a liability (and corresponding expense) recorded? Proper matching would suggest that the expense should have been recorded at the time Liebeck spilled the coffee. However, at this time the loss was contingent. As discussed above, the liability and expense are not recorded until it is deemed probable that McDonald's would lose the lawsuit and a reasonable estimate could be made. It probably is no surprise that McDonald's did not record a liability for this amount until they lost the lawsuit.

But what about lawsuits that most of us would consider to be less frivolous, such as those brought against the cigarette industry? Exhibit 8-5 shows an excerpt from the litigation note in **Reynolds American Inc.'s (RAI)** 10-K. RAI is the second largest cigarette manufacturer in the United States with brands including Camel and Winston. Of course, this is only a small excerpt consisting of approximately 500 words. The entire note contains over 24,000 words. This excerpt shows that RAI does not record contingent liabilities until final verdicts are reached.

### CONCEPT Q&A

In financial accounting, a contingency is an "...existing condition, situation, or set of circumstances involving uncertainty" as to possible gain or loss (FAS No. 5, Par. 1). Accounts receivable have a contingent loss related to bad debts. That is, a group of customers owes us money (i.e., the accounts receivable), however, there is uncertainty about whether the customers will pay us. How do we account for this contingency and why do we account for it in this way?

As discussed in Chapter 5, companies typically use an estimate of uncollectible receivables to recognize "bad debt expense" and reduce the accounts receivable valuation through a credit to the "allowance for doubtful accounts." This is done because it is probable that amounts will be uncollectible and this amount is reasonably estimated (generally based on the companies' past experience). So, although bad debt expense does not produce a liability (instead it reduces an asset), the accounting for this contingency is consistent with contingent liabilities.

Possible Answer:

#### Exhibit 8-4

#### Recognition of Contingent Liabilities

	A Reasonable Estimate Can Be Made	No Reasonable Estimate Can Be Made
<b>Probable</b>	Make a journal entry to record the liability.	No journal entry is made: disclose information in footnote to the financial statements.
<b>Reasonably Possible</b>	No journal entry is made: disclose information in footnote to the financial statements.	No journal entry is made: disclose information in footnote to the financial statements.
<b>Remote</b>	Neither record as a liability nor disclose in a footnote to the financial statements.	Neither record as a liability nor disclose in a footnote to the financial statements.

## Exhibit 8-5

**Excerpts from Reynolds American Inc. Notes to Consolidated Financial Statements included in their 2007 10-K**

*Accounting for Tobacco-Related Litigation Contingencies*

In accordance with GAAP, RAI and its subsidiaries, including RJR Tobacco and the Conwood companies, as applicable, record any loss concerning litigation at such time as an unfavorable outcome becomes probable and the amount can be reasonably estimated. In the third quarter of 2007, RJR Tobacco accrued \$6 million related to unfavorable judgments in two individual plaintiff's cases tried in conjunction with the *Engle v. R. J. Reynolds Tobacco Co.* case. On February 8, 2008, RJR Tobacco paid \$5.9 million relating to those judgments, which amount was determined using the total amount of verdicts together with accrued interest beginning November 7, 2000. Additional interest, if any, determined by the trial court will be immaterial to the Company. With the exception of two *Engle*-related verdicts, and for the reasons set forth below, RAI's management continues to conclude that the loss of any particular pending smoking and health tobacco litigation claim against RJR Tobacco or its affiliates or indemnitees, or the loss of any particular claim concerning the use of smokeless tobacco against the Conwood companies, when viewed on an individual basis, is not probable.

Subject to the foregoing paragraph, RJR Tobacco and its affiliates believe that they have valid defenses to the smoking and health tobacco litigation claims against them, as well as valid bases for appeal of adverse verdicts against them. RAI, RJR Tobacco and their affiliates and indemnitees have, through their counsel, filed pleadings and memoranda in pending smoking and health tobacco litigation that set forth and discuss a number of grounds and defenses that they and their counsel believe have a valid basis in law and fact. RJR Tobacco and its affiliates and indemnitees continue to win the majority of smoking and health tobacco litigation claims that reach trial, and a very high percentage of the tobacco-related litigation claims brought against them continue to be dismissed at or before trial. Based on their experience in the smoking and health tobacco litigation against them and the strength of the defenses available to them in such litigation, RJR Tobacco and its affiliates believe that their successful defense of smoking and health tobacco litigation in the past will continue in the future.

Except for verdicts in two individual smoking and health cases tried as part of the *Engle* class-action case mentioned above, no liability for pending smoking and health tobacco litigation was recorded in RAI's consolidated balance sheet as of December 31, 2007. RJR has liabilities totaling \$94 million that were recorded in 1999 in connection with certain indemnification claims asserted by Japan Tobacco, Inc., referred to as JTI, against RJR and RJR Tobacco relating to certain activities of Northern Brands International, Inc., a now inactive, indirect subsidiary of RAI formerly involved in the international tobacco business, referred to as Northern Brands. For further information on Northern Brands and related litigation and the indemnification claims of JTI, see "—Litigation Affecting the Cigarette Industry—Other Litigation and Developments" and "—Other Contingencies and Guarantees" below.

Of course, the likelihood that a contingent event will occur may change over time. A contingent liability that should not be recorded or disclosed at one time may need to be recorded or disclosed at a later time because the facts and circumstances change. Contingent liabilities arising from litigation frequently have this character.

## Warranties

When goods are sold, the customer is often provided with a warranty against defects that might develop. A **warranty** usually guarantees the repair or replacement of defective goods during a period (ranging from a few days to several years) following the sale.

The use of parts and labor to satisfy warranty claims may occur in the accounting period in which the sale is made, but it is also likely to occur in some subsequent accounting period. The matching concept requires that all expenses required to produce sales revenue for a given period be recorded in that period. Since warranty costs are sales-related, they must be recorded in the sales period. And since all warranty costs probably have not been incurred by the end of the sales period, they must be estimated. Businesses are likely able to make reasonable estimates of their warranty costs based on past experience.

The recognition of warranty expense and estimated warranty liability is normally recorded by an adjustment at the end of the accounting period. As warranty claims are paid to customers or related expenditures are made, the estimated liability is reduced.

**Cornerstone 8-6** illustrates the accounting for warranties.

### OBJECTIVE 4

Measure warranty liabilities and warranty expense.

## CONCEPT Q&A

Why are warranties expensed at the point of sale when a company often does not incur warranty costs until later periods?

This is a classic illustration of the matching principle. Remember, the matching principle says that expenses will be recognized in the periods they helped generate revenues. The presence of the warranty "helped" sell the item. Additionally, warranties are contingencies—if the product fails, then the company will experience a loss. As discussed above, when loss contingencies are probable and a reasonable estimate can be made, a journal entry is made to record the expense and recognize a liability.

Possible Answer:



## CORNERSTONE 8 - 6



### HOW TO Record Warranties

#### Concept:

Future warranty expenses must be recognized, or matched, in the period of sale.

#### Information:

Nolan Electronics offers a 12-month warranty on all its computers. Nolan estimates that one computer of each 2,000 sold will require warranty service and that the average warranty claim will cost Nolan \$155.

#### Required:

- Assuming Nolan sells 3,000,000 computers during 2009, provide the journal entry to recognize the warranty expense and associated liability.
- Assuming that in January 2010 Nolan sends \$10,400 cash and parts costing \$8,300 to its dealers for warranty repairs, provide the necessary journal entry.

#### Solution:

$$1. (3,000,000 \text{ computers sold}) \times \left( \frac{1 \text{ failure}}{2,000 \text{ sold}} \right) \times \left( \frac{\$155}{1 \text{ failure}} \right) = \$232,500$$

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Warranty Expense	232,500	
	Estimated Warranty Liability		232,500
	<i>(Record warranty expense for 2009)</i>		

- Entry to recognize payments for warranty repairs during January 2010.

Date	Account and Explanation	Debit	Credit
Jan. 2010	Estimated Warranty Liability	18,700	
	Cash		10,400
	Inventory		8,300
	<i>(Record payment for warranty repairs)</i>		

Note that the income statement effect of warranties (activity in the equity column) occurs when goods are sold. Note also that payments or other asset outflows associated with the satisfaction of warranty claims do not affect the income statement.

Assets = Liabilities +	Stockholders' Equity
+232,500	-232,500

Assets = Liabilities +	Stockholders' Equity
-10,400    -18,700	
-8,300	

Actual warranty claims are unlikely to exactly equal the business' estimate. Any small overestimate or underestimate is usually combined with the next warranty estimate. However, large overestimates or underestimates must be recognized in the accounts and reported on the income statement as other income or other expenses as soon as they become apparent.

### OBJECTIVE 5

Analyze liquidity ratios using information contained in the current liabilities section.

### Analyzing Current Liabilities

Both investors and creditors are interested in a company's liquidity—that is, its ability to meet its short-term obligations. Failure to pay current liabilities can lead to suppliers refusing to sell to the company and employees leaving. As such, even companies with good business models can be forced into bankruptcy by their inability to pay current liabilities.

The following ratios are often used to analyze a company's ability to meet its current obligations:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

$$\text{Quick Ratio} = \frac{(\text{Cash} + \text{Marketable Securities} + \text{Accounts Receivable})}{\text{Current Liabilities}}$$

$$\text{Cash Ratio} = \frac{(\text{Cash} + \text{Marketable Securities})}{\text{Current Liabilities}}$$

$$\text{Operating Cash Flow Ratio} = \frac{\text{Cash flows from Operating Activities}}{\text{Current Liabilities}}$$

The first three ratios compare all or parts of current assets to current liabilities. The logic is that current liabilities need to be paid over approximately the same time frame that current assets are turned into cash. “Acceptable” current ratios vary from industry to industry, but the thought is that current assets must exceed current liabilities (which implies a current ratio  $> 1$ ) to be able to meet current obligations. In fact, the general rule of thumb appears to be that a current ratio greater than two is appropriate. However, the second and third ratios recognize that some current assets are harder to liquidate. Both the quick and cash ratio exclude inventories because including inventories assumes that sales will be made. The quick ratio assumes that accounts receivable are liquid. This is true when customers have low credit risk and pay in relatively short amounts of time. Of course, such an assumption is not true for all industries. Consequently, the use of the cash ratio may be more appropriate in these cases. Operating cash flow, on the other hand, looks at the ability of cash generated from operating activities to meet current obligations. As with the current ratio, the operating cash flow ratio assumes that sales will continue into the future. **Cornerstone 8-7** illustrates the analysis of current liabilities.

## HOW TO Calculate Liquidity Ratios

### Concept:

Investors and creditors are interested in a company’s ability to meet its current obligations. Analysis of information contained in current liabilities provides such information.

### Information:

Consider the following information from **Standard Pacific**, a large builder of single-family homes, as of December 31, 2006 (in thousands).

Current liabilities	473,498	Receivables	77,725
Cash & equivalents	17,376	Inventories	3,472,285
Marketable securities	0	Cash flows from operating activities	(360,651)

### Required:

Calculate the following:

1. current ratio
2. quick ratio
3. cash ratio
4. operating cash flow ratio

### Solution:

Although the information to calculate these ratios is given, most of it can be found on the balance sheet (the exception is cash flows from operating activities, which is on the statement of cash flows).

1. current ratio:  $(17,376 + 0 + 77,725 + 3,472,285)/473,498 = 7.53$
2. quick ratio:  $(17,376 + 0 + 77,725)/473,498 = 0.20$
3. cash ratio:  $(17,376 + 0)/473,498 = 0.04$
4. operating cash flow ratio:  $-360,651/473,498 = -0.76$



## CORNERSTONE 8-7



In isolation, the current ratio discussed in Cornerstone 8-7 appears very strong. For most industries, a current ratio greater than seven is rare. However, closer examination reveals that a vast majority of the current assets is inventory (unsold homes). In strong real estate markets new homes can sell quite fast, but when a real estate slump hits, such homes can remain unsold for long periods of time. In fact, during 2007 such a slump hit the U.S. real estate market and Standard Pacific, and other home builders, experienced much slower sales (Standard Pacific's sales were down approximately 30 percent). In fact, a few home builders even resorted to selling homes at a loss to generate needed cash. The quick ratio and cash ratio also discussed in Cornerstone 8-7 show that Standard Pacific must sell homes to generate the necessary cash to meet its current obligations. The highly negative cash flows from operations were due to growing inventory in 2006. Although this growing inventory could be interpreted as expanding operations, it could also signal slowing sales.

## DECISION-MAKING & ANALYSIS

### A Decision for Short-Term Financing

Hydraulic Controls Company manufactures hydraulic clutch assemblies for compact foreign and domestic automobiles. The following data are available on Hydraulic's current liabilities, current assets, sales revenue, and net income (loss) for the past three years:

Item	2013	2012	2011
Accounts payable	\$ 174,000	\$ 146,000	\$ 104,000
Short-term notes payable	332,000	291,000	229,000
Income taxes payable	-0-	43,000	50,000
Total current liabilities	\$ 506,000	\$ 480,000	\$ 383,000
Total current assets	485,000	546,000	611,000
Sales revenue	5,047,000	5,293,000	5,538,000
Net income (loss)	(10,000)	89,000	130,000

Hydraulic Controls has asked its bank to increase its short-term notes payable by \$100,000. Following are some questions the bank might ask Hydraulic's management:

**1.** *How will the short-term notes be repaid?*

The short-term notes would be repaid from current assets. But decline in the amount of current assets relative to current liabilities suggests that even the present amount of current liabilities may not be payable with the resources currently available.

**2.** *What might be causing the recent increases in current liabilities and decreases in current assets?*

Because profitability is declining, the firm may not be able to borrow from outside sources or secure cash from operations. Therefore, it may be drawing down current assets and increasing current liabilities to provide capital.

**3.** *Should the bank extend additional credit to Hydraulic?*

The decline in profitability, the trend in the ratio of current assets to current liabilities, and the present excess of current liabilities over current assets suggest that it would be unwise to extend additional credit at this time.

## Summary

This chapter explains the measurement and reporting of current liabilities and contingent liabilities. Because current liabilities will be paid within a short time, they are measured at the value of what was received or at the amount of the payment to be made. Notes payable require adjustments when the note is outstanding at the end of the accounting period. Accrued payables—wages or rent, for example—are also recorded with adjustments. Payroll costs often include substantial amounts beyond the wages or salaries paid to employees; these, too, are current liabilities. When

customers pay for goods or services in advance, the unearned revenues are treated in the same way.

Contingent liabilities arise when the firm has an obligation to outsiders for which the amount, timing, or recipient depends on future events. In such cases, the amount of the obligation must be estimated, and the required accounting depends on the likelihood of the future events or their measurability. A common example of contingent liabilities is warranties.

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## Summary of Learning Objectives

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**LO1. Explain liability recognition and measurement criteria.**

- Most liabilities are recognized in exchange for goods and services or the borrowing of money.
- In theory, the amount reported on the balance sheet should not include interest that has not yet accrued.
- However, for nearly all current liabilities, unaccrued interest is deemed immaterial, so most current liabilities are simply recorded and reported at the total amount due.

**LO2. Identify and record the kinds of activities that produce current liabilities.**

- Current liabilities are obligations to outsiders that require the firm to pay cash or another current asset or provide goods or services within the longer of one year or one operating cycle.
- Such obligations are the result of many common transactions such as:
  - purchasing goods or services on credit (i.e., accounts payable)
  - the completed portion of activities that are in process at the end of the period such as wages or interest (i.e., accrued payables)
  - sales tax collected from customers
  - payroll taxes such as income taxes withheld from employees and Social Security
  - notes payable
  - goods or services paid for in advance by customers (i.e., unearned revenues)
  - the portion of long-term debt due within the year are all current liabilities

**LO3. Describe contingent liabilities and the alternatives for their recognition and measurement.**

- A contingent liability is an obligation whose amount, timing, or recipient depends on future events.
- A contingent liability is not recognized in the accounts unless the event on which it is contingent is probable (likely to occur) and a reasonable estimate of the liability can be made.
- If occurrence of the contingent event is not probable or reliable measurement of the obligation is impossible, the potential obligation is not recorded as a liability, but may be disclosed in the footnotes.

**LO4. Measure warranty liabilities and warranty expense.**

- Since warranties help generate sales, the estimated future cost of servicing the warranty must be recorded in the sales period (this is an example of the matching principle).
- This is done by expensing the estimate of the future cost of servicing the warranty and creating a liability.
- As warranty claims are paid to customers or related expenditures are made, the estimated liability is reduced.

**LO5. Analyze liquidity ratios using information contained in the current liabilities section.**

- Both investors and creditors are interested in a company's liquidity—that is, its ability to meet its short-term obligations.
- Failure to pay current liabilities can lead to suppliers refusing to sell needed inventory and employees leaving.
- As such, even companies with good business models can be forced into bankruptcy by their inability to pay current liabilities.
- Common ratios used to analyze a company's ability to meet its current obligations are:
  - current ratio
  - quick ratio
  - cash ratio
  - operating cash flow ratio



### CORNERSTONES FOR CHAPTER 8

**CORNERSTONE 8-1** How to record accounts and notes payable, page 406

**CORNERSTONE 8-2** How to calculate and record accrued interest, page 408

**CORNERSTONE 8-3** How to record the liabilities for sales tax, page 409

**CORNERSTONE 8-4** How to record payroll taxes, page 410

**CORNERSTONE 8-5** How to record unearned revenues, page 413

**CORNERSTONE 8-6** How to record warranties, page 416

**CORNERSTONE 8-7** How to calculate liquidity ratios, page 417

## Key Terms

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Account payable, 405

Accrued payables, 407

Contingent liability, 413

Current liabilities, 404

Interest rate, 405

Liabilities, 402

Note payable, 405

Payroll taxes, 409

Sales taxes, 409

Unearned revenue, 412

Warranty, 415

Withholding taxes, 409

## Review Problem

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### Recording Current Liabilities and Calculating the Current Ratio

ABC Co. has the following balances in its accounts as of the beginning of the day on December 31 (this is not all of the accounts):

Account	Debit	Credit
Accounts payable		\$ 100,000
Accounts receivable	\$150,000	
Cash	75,000	
Interest payable		0
Inventory	270,000	
Long-term notes payable		1,000,000
Other current assets	60,000	
Other current liabilities		45,000
Sales taxes payable		10,000
Short-term notes payable		0
Unearned revenues		30,000

The following information is *not* reflected in these balances:

- On December 31, ABC accepted delivery of \$30,000 of inventory. ABC has not yet paid its suppliers.
- On December 1, ABC bought some equipment for \$200,000 with a short-term note payable bearing 12 percent interest. ABC has not made any journal entries related to this transaction.
- Customers prepaid \$10,600 related to services ABC will perform next year. This price included 6 percent sales tax.
- \$20,000 in gross salaries and wages are paid. Assume all employees are below the Social Security maximum; there is no state unemployment tax; and 1 percent federal unemployment tax, \$2,000 of federal income tax, and \$500 of state income tax are withheld.

#### Required:

- Prepare the necessary journal entries for *a–d*.
- Determine the current ratio before accounting for the additional information.
- Determine the current ratio after accounting for the additional information.
- Explain why ABC's current ratio deteriorated so badly.

#### Solution:

- The necessary journal entries for each part are as follows:

	Date	Account and Explanation	Debit	Credit																													
a.	Dec. 31	Inventory	30,000		<table border="1"> <tr> <td colspan="2"></td> <td style="text-align: right;"><b>Stockholders'</b></td> </tr> <tr> <td><b>Assets</b></td> <td>=</td> <td><b>Liabilities</b></td> <td>+</td> <td><b>Equity</b></td> </tr> <tr> <td>+30,000</td> <td></td> <td>+30,000</td> <td></td> <td></td> </tr> </table>			<b>Stockholders'</b>	<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>	+30,000		+30,000																	
		<b>Stockholders'</b>																															
<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>																													
+30,000		+30,000																															
		Accounts Payable		30,000																													
		<i>(Record purchase of inventory)</i>																															
b.	31	Equipment	200,000		<table border="1"> <tr> <td colspan="2"></td> <td style="text-align: right;"><b>Stockholders'</b></td> </tr> <tr> <td><b>Assets</b></td> <td>=</td> <td><b>Liabilities</b></td> <td>+</td> <td><b>Equity</b></td> </tr> <tr> <td>+200,000</td> <td></td> <td>+200,000</td> <td></td> <td></td> </tr> </table>			<b>Stockholders'</b>	<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>	+200,000		+200,000																	
		<b>Stockholders'</b>																															
<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>																													
+200,000		+200,000																															
		Short-term Notes Payable		200,000																													
		<i>(Record issue of note for equipment purchase)</i>																															
		ABC must also accrue interest on December 31.																															
	31	Interest Expense ( $200,000 \times 12\% \times 1/12$ )	2,000		<table border="1"> <tr> <td colspan="2"></td> <td style="text-align: right;"><b>Stockholders'</b></td> </tr> <tr> <td><b>Assets</b></td> <td>=</td> <td><b>Liabilities</b></td> <td>+</td> <td><b>Equity</b></td> </tr> <tr> <td></td> <td></td> <td>+2,000</td> <td></td> <td>-2,000</td> </tr> </table>			<b>Stockholders'</b>	<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>			+2,000		-2,000															
		<b>Stockholders'</b>																															
<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>																													
		+2,000		-2,000																													
		Interest Payable		2,000																													
		<i>(Record interest accrued on short-term note)</i>																															
c.	31	Cash	10,600		<table border="1"> <tr> <td colspan="2"></td> <td style="text-align: right;"><b>Stockholders'</b></td> </tr> <tr> <td><b>Assets</b></td> <td>=</td> <td><b>Liabilities</b></td> <td>+</td> <td><b>Equity</b></td> </tr> <tr> <td>+10,600</td> <td></td> <td>+10,000</td> <td></td> <td>+600</td> </tr> </table>			<b>Stockholders'</b>	<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>	+10,600		+10,000		+600															
		<b>Stockholders'</b>																															
<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>																													
+10,600		+10,000		+600																													
		Unearned Revenue		10,000																													
		Sales Taxes Payable		600																													
		<i>(Record unearned revenue and sales taxes)</i>																															
d.	31	Wages Expense	20,000		<table border="1"> <tr> <td colspan="2"></td> <td style="text-align: right;"><b>Stockholders'</b></td> </tr> <tr> <td><b>Assets</b></td> <td>=</td> <td><b>Liabilities</b></td> <td>+</td> <td><b>Equity</b></td> </tr> <tr> <td>-15,970</td> <td></td> <td>+1,240</td> <td></td> <td>-20,000</td> </tr> <tr> <td></td> <td></td> <td>+290</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>+2,000</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>+500</td> <td></td> <td></td> </tr> </table>			<b>Stockholders'</b>	<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>	-15,970		+1,240		-20,000			+290					+2,000					+500		
		<b>Stockholders'</b>																															
<b>Assets</b>	=	<b>Liabilities</b>	+	<b>Equity</b>																													
-15,970		+1,240		-20,000																													
		+290																															
		+2,000																															
		+500																															
		Social Security Tax Payable ( $\$20,000 \times 6.2\%$ )		1,240																													
		Medicare Tax Payable ( $\$20,000 \times 1.45\%$ )		290																													
		Federal Income Tax Payable		2,000																													
		State Income Tax Payable		500																													
		Cash		15,970																													
		<i>(Record wages expense and related liabilities)</i>																															

(Continued)

Assets = Liabilities +	Stockholders' Equity
+200	-200
+1,240	-1,240
+290	-290

Date	Account and Explanation	Debit	Credit
31	Employer Social Security Tax Expense	1,240	
	Employer Medicare Tax Expense	290	
	Federal Unemployment Tax Expense (\$20,000 × 1%)	200	
	Social Security Tax Payable		1,240
	Medicare Tax Payable		290
	Federal Unemployment Tax Payable		200
	(Record employer payroll taxes)		

2. Before accounting for the additional information:

Current assets:	
Cash	\$ 75,000
Accounts receivable	150,000
Inventory	270,000
Other current assets	60,000
Total current assets	<u>\$555,000</u>
Current liabilities:	
Accounts payable	\$100,000
Interest payable	0
Sales taxes payable	10,000
Short-term notes payable	0
Unearned revenues	30,000
Other current liabilities	45,000
Total current liabilities	<u>\$185,000</u>

$$\text{Current Ratio} = \$555,000 / \$185,000 = 3.0$$

3. After accounting for the additional information:

	Debit	Credit	
Current assets:			
Cash	\$10,600 (c)	\$ 15,970 (d)	\$ 69,630
Accounts receivable			150,000
Inventory	30,000 (a)		300,000
Other current assets			60,000
Total current assets			<u>\$579,630</u>
Current liabilities:			
Accounts payable		30,000 (a)	\$130,000
Interest payable		2,000 (b)	2,000
Sales taxes payable		600 (c)	10,600
Short-term notes payable		200,000 (b)	200,000
Unearned revenues		10,000 (c)	40,000
Other current liabilities		5,760 (d)*	50,760
Total current liabilities			<u>\$433,360</u>

$$* 1,240 + 290 + 2,000 + 500 + 200 + 1,240 + 290 = 5,760$$

$$\text{Current Ratio} = \$579,630 / \$433,360 = 1.34$$

4. The primary cause of the deterioration of ABC's current ratio is the addition of the short-term note payable related to the equipment. This transaction almost doubled the current liabilities, but current assets were unaffected by the addition of equipment. Another way to think about this is that ABC financed long-term operational assets with short-term financing.

## Discussion Questions

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1. What are liabilities?
2. How is the amount of a liability measured?
3. When are most liabilities recognized?
4. What are current liabilities? Provide some common examples.
5. Describe two ways (the book mentions three, but you only need two) in which current liabilities are frequently ordered on the balance sheet.
6. What is the difference between an account payable and a note payable?
7. What sort of transaction typically creates an account payable?
8. What type of transaction typically creates a note payable?
9. Why is interest ignored when recording accounts payable?
10. How is interest computed on an interest-bearing short-term note?
11. When would debt that must be repaid within the next year be classified as long-term instead of current?
12. What do we mean by accrued liabilities? Provide some common examples.
13. Provide examples of payroll taxes that are paid by the employee through reduction of their gross pay. Provide some examples of payroll taxes that are paid by the employer.
14. Why do unearned revenues and customers' deposits qualify as liabilities?
15. What are contingent liabilities? Provide an example.
16. Why is the liability for warranties recognized when products are sold rather than when the warranty services are performed?
17. Describe the circumstances under which the current, quick, and cash ratios, respectively, are more appropriate measures of short-term liquidity than the other ratios?
18. Describe the differences between the current, quick, and cash ratios. Which one is the most conservative measure of short-term liquidity?
19. How does the rationale for the operating cash flow ratio differ from the rationale for the current, quick, and cash ratios?

## Multiple-Choice Exercises

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### 8-1 Liabilities are recognized:

- a. in exchange for goods.
- b. in exchange for services.
- c. in exchange for borrowing money.
- d. all of the above.

### 8-2 When reporting liabilities on a balance sheet, in theory, what measurement should be used?

- a. future value of the present outflow
- b. present value of the present outflow
- c. future value of the future outflow
- d. present value of the future outflow

### 8-3 Kinsella Seed borrowed \$200,000 on October 1, 2008, at 10 percent interest. The interest and principal are due on September 30, 2009. What journal entry should be recorded on December 31, 2008?

- a. Debit Interest Payable 5,000; credit Interest Expense 5,000.
- b. Debit Interest Receivable 20,000; credit Interest Expense 20,000.
- c. Debit Interest Expense 5,000; credit Interest Payable 5,000.
- d. No entry is necessary.

**8-4** Kinsella Seed borrowed \$200,000 on October 1, 2008, at 10 percent interest. The interest and principal are due on September 30, 2009. What journal entry should be made with respect to the interest payment on September 30, 2009?

- Debit Interest Expense 15,000; debit Interest Payable 5,000; credit Cash 20,000.
- Debit Interest Expense 15,000; credit Cash 15,000.
- Debit Interest Expense 20,000; credit Cash 20,000.
- Debit Cash 20,000; credit Interest Expense 15,000; credit Interest Payable 5,000.

**8-5** Which of the following is *not* a current liability?

- bonds payable due in five years
- unearned revenue
- sales tax
- accounts payable

**8-6** Which of the following is *not* an example of an accrued payable?

- wages payable
- accounts payable
- property taxes payable
- interest payable

**8-7** Kramerica, Inc., sold 200 oil drums to Thompson Manufacturing for \$100 each. In addition to the \$100 sale price per drum, there is a \$2 per drum federal excise tax and a 10 percent state sales tax. What journal entry should be made to record this sale?

- Debit Accounts Receivable 20,000; debit Tax Expense 2,400; credit Federal Excise Tax Payable \$400; credit State Sales Tax Payable 2,000; credit Revenue 20,000.
- Debit Accounts Receivable 22,400; credit Federal Excise Tax Payable \$400; credit State Sales Tax Payable 2,000; credit Revenue 20,000.
- Debit Accounts Receivable 22,400; credit Revenue 22,400.
- Debit Accounts Receivable 20,000; credit Revenue 20,000.

**8-8** All of the following represent taxes commonly collected by businesses from customers *except*:

- State sales tax
- Federal excise tax
- Local sales tax
- Unemployment tax

**8-9** Payroll taxes typically include all of the following *except*:

- Social Security tax
- Federal excise tax
- Medicare tax
- Federal income tax

**8-10** When a credit is made to the state income tax payable account, the corresponding debit is made to:

- Tax Expense
- Cash
- Wages Expense
- Tax Payable

**8-11 When should a contingent liability be recognized?**

- when the contingent liability is probable
- when a reasonable estimation can be made
- A and B
- neither A nor B

**8-12 Which of the following is true?**

- A contingent liability should always be recorded in the footnotes to the financial statements.
- A contingent liability should always be recorded within the financial statements.
- A company can choose to record a contingent liability either within its financial statements or in the footnotes to the financial statements.
- No journal entries or footnotes are necessary if the possibility of a contingent liability is remote.

**8-13 Warranty expense is:**

- recorded in the period of sale.
- recorded as it is incurred.
- capitalized as a warranty asset.
- none of the above.

**8-14 To record warranties, the adjusting journal entry would be:**

- a debit to Warranty Expense and a credit to Estimated Warranty Liability.
- a debit to Warranty Expense and a debit to Cash.
- a debit to Estimated Warranty Liability and a credit to Warranty Expense.
- a debit to Estimated Warranty Liability and a credit to Cash.

**8-15 How is the current ratio calculated?**

- Current Assets/Current Liabilities
- (Cash + Marketable Securities + Accounts Receivable)/Current Liabilities
- (Cash + Marketable Securities)/Current Liabilities
- Cash flows from Operating Activities/Current Liabilities

**8-16 How is the cash ratio calculated?**

- Current Assets/Current Liabilities
- (Cash + Marketable Securities + Accounts Receivable)/Current Liabilities
- (Cash + Marketable Securities)/Current Liabilities
- Cash Flows from Operating Activities/Current Liabilities

## Cornerstone Exercises

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**Cornerstone Exercise 8-17 NOTES PAYABLE**

On June 30, Carmean Inc. borrows \$100,000 from 1<sup>st</sup> National Bank with a 10-month, 6 percent note.

**Required:**

What journal entry is made on June 30?

**OBJECTIVE** > 2**CORNERSTONE 8-1****Cornerstone Exercise 8-18 NOTES PAYABLE**

Rogers Machinery Company borrowed \$240,000 on June 1, with a six-month, 8.5 percent, interest-bearing note.

**OBJECTIVE** > 2**CORNERSTONE 8-1**

**Required:**

1. Record the borrowing transaction.
2. Record the repayment transaction.

**OBJECTIVE** > **2****Cornerstone Exercise 8-19 ACCRUED INTEREST****CORNERSTONE 8-2**

On October 1, Wilshire Company borrowed \$60,000 from People's National Bank on a one-year, 7 percent note.

**Required:**

What adjusting entry should Wilshire make at December 31?

**OBJECTIVE** > **2****Cornerstone Exercise 8-20 ACCRUED INTEREST****CORNERSTONE 8-2**

On May 1, the Garner Corporation borrowed \$30,000 from the First Bank of Midlothian on a one-year, 6 percent note.

**Required:**

If the company keeps its records on a calendar year, what adjusting entry should Garner make on December 31?

**OBJECTIVE** > **2****Cornerstone Exercise 8-21 ACCRUED PROPERTY TAXES****CORNERSTONE 8-2**

Annual property taxes covering the preceding 12 months are always paid to the county on June 30. Elise, Inc., is always assessed a \$2,500 property tax by the county.

**Required:**

Given this information, determine the adjusting journal entry that Elise, Inc., must make on December 31 (assuming that its fiscal year ends as of December 31).

**OBJECTIVE** > **2****Cornerstone Exercise 8-22 SALES TAX****CORNERSTONE 8-3**

Garner's Antique Hot Rods recently sold a 1957 Chevy for \$13,000. The state sales tax is 7 percent, and there is a \$100-per-car federal excise tax.

**Required:**

Provide the journal entry to record the sale.

**OBJECTIVE** > **2****Cornerstone Exercise 8-23 SALES TAX****CORNERSTONE 8-3**

Cobb Baseball Bats sold 150 bats for \$50 each, plus an additional sales tax of 7 percent.

**Required:**

Provide the journal entry to record the sale.

**OBJECTIVE** > **2****Cornerstone Exercise 8-24 PAYROLL TAXES****CORNERSTONE 8-4**

Hernandez Builders has a gross payroll for June amounting to \$400,000. The following amounts have been withheld:

Federal income tax	\$70,000
State income tax	30,000
Social Security	9,000
Medicare	3,000
Charitable contributions	1% of gross pay
Union dues	2% of gross pay

Also, the unemployment tax rate is 3 percent, and applies to all but \$50,000 of the gross payroll.

**Required:**

1. What is the amount of net pay recorded by Hernandez?
2. Make the journal entry to record the payroll.

**Cornerstone Exercise 8-25 PAYROLL TAXES**

Kinsella, Inc., has a gross payroll of \$8,000 for the pay period. Social Security and Medicare for both the employees and Kinsella are 6.2% and 1.45%, respectively, of the entire payroll. Kinsella must also withhold \$800 in federal income tax from the employees and pay state unemployment tax of \$30.

**Required:**

Provide the necessary journal entries for Kinsella to record these payroll taxes.

**OBJECTIVE** > 2**CORNERSTONE 8-4****Cornerstone Exercise 8-26 PAYROLL ADJUSTING ENTRIES**

Employees earn \$5,000 per day, work five days per week, Monday through Friday, and get paid every Friday. The previous payday was January 26 and the accounting period ends on January 31.

**Required:**

What is the ending balance in the wages payable account on January 31?

**OBJECTIVE** > 2**Cornerstone Exercise 8-27 PAYROLL ADJUSTING ENTRIES**

A company's weekly payroll amounts to \$50,000 and payday is every Friday. Employees work five days per week, Monday through Friday. The appropriate journal entry was recorded at the end of the accounting period, Tuesday, March 31, 2009.

**Required:**

What journal entry is made on Friday, April 3, 2009?

**OBJECTIVE** > 2**Cornerstone Exercise 8-28 UNEARNED REVENUE**

Brand Landscaping offers a promotion where they will mow your lawn 15 times if the customer pays \$600 in advance.

**Required:**

Make the journal entry to record:

1. The customers' prepayment of \$600.
2. Brand's mowing of the lawn one time.

**OBJECTIVE** > 2**CORNERSTONE 8-5****Cornerstone Exercise 8-29 CONTINGENT LIABILITIES**

Contingent liabilities are existing conditions, situations, or sets of circumstances involving uncertainty as to possible loss.

**Required:**

Under what circumstances (if any) are contingent liabilities recognized on the balance sheet?

**OBJECTIVE** > 3**Cornerstone Exercise 8-30 CONTINGENT LIABILITIES**

Many companies provide warranties with their products. Such warranties typically guarantee the repair or replacement of defective goods for some specified period of time following the sale.

**Required:**

Why do most warranties require companies to make a journal entry to record a liability for future warranty costs?

**OBJECTIVE** > 3**Cornerstone Exercise 8-31 WARRANTIES**

In 2009, BMJ Plumbing Company sold 400 water heaters for \$350 each. The water heaters carry a two-year warranty for repairs. BMJ Plumbing estimates that repair costs will average 2 percent of the total selling price.

**Required:**

How much is recorded in the warranty liability account as a result of selling the water heaters during 2009, assuming no warranty service has yet been performed?

**OBJECTIVE** > 4**CORNERSTONE 8-6**

**OBJECTIVE** > **4** **Cornerstone Exercise 8-32 WARRANTIES****CORNERSTONE 8-6**

In 2009, Waldo Balloons sold 100 hot air balloons at \$4,000 each. The balloons carry a five-year warranty for defects. Waldo estimates that repair costs will average 4 percent of the total selling price. The estimated warranty liability at the beginning of the year was \$42,000. Claims of \$11,000 were actually incurred during the year to honor their warranty.

**Required:**

What was the balance in the estimated warranty liability at the end of the year?

**OBJECTIVE** > **5** **Cornerstone Exercise 8-33 CURRENT RATIO****CORNERSTONE 8-7**

A company has \$200 in cash, \$500 in accounts receivable, \$700 in inventory, and \$400 in current liabilities.

**Required:**

1. What is its current ratio?
2. What is its quick ratio?
3. What is its cash ratio?

**OBJECTIVE** > **5** **Cornerstone Exercise 8-34 CURRENT RATIO****CORNERSTONE 8-7**

Assume cash is \$150, short-term marketable securities are \$50, accounts receivable are \$350, inventories are \$275, current liabilities are \$65, and total liabilities are \$100.

**Required:**

1. What is the current ratio?
2. What is the quick ratio?
3. What is the cash ratio?

## Exercises

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**OBJECTIVE** > **2** **Exercise 8-35 RECORDING VARIOUS LIABILITIES**

Glenview Hardware had the following transactions that produced liabilities during 2009:

- a. Purchased merchandise on credit for \$20,000.
- b. Year-end wages of \$7,600 incurred, but not paid. Related federal income tax of \$1,200, Medicare tax of \$280, and state income tax of \$195 are withheld.
- c. Year-end estimated income taxes payable, but unpaid, for the year in the amount of \$21,300.
- d. Sold merchandise on account for \$872, including sales tax of \$32.
- e. Employer's share of Social Security tax for the period was \$1,154.
- f. Borrowed cash under a 90-day, 9 percent, \$9,000 interest-bearing note.

**Required:**

Prepare the entry to record each of these transactions (treat each transaction independently).

**OBJECTIVE** > **1** **2** **4** **Exercise 8-36 REPORTING LIABILITIES**

Morton Electronics had the following obligations:

- a. A legally enforceable claim against the business to be paid in three months.
- b. A guarantee given by a seller to a purchaser to repair or replace defective goods during the first six months following a sale.
- c. An amount payable to Bank One in 10 years.
- d. An amount to be paid next year to Citibank on a long-term note payable.

**Required:**

Describe how each of these items should be reported in the balance sheet.

**Exercise 8-37 ACCOUNTS PAYABLE****OBJECTIVE** > 2

For Hammerton Autos, a used-car dealer, the following transactions occurred during the first 10 days of August:

- Hammerton purchased, on credit, space for classified advertisements in the *Chicago Tribune* for \$245. The advertising was run the day the space was purchased.
- Hammerton purchased office supplies from Office Depot on credit in the amount of \$185.
- One of Hammerton's sales staff sold a car. The salesperson's commission is \$100. The commission will be paid September 10. (Concern yourself only with the commission.)
- The electric bill for July was received. The bill is \$239 and is due August 15.
- A \$390 bill from Carey Alignment services was received. Carey had aligned 10 cars for Hammerton in late July. The payment is due August 20.

**Required:**

Prepare journal entries for the above transactions. Assume that Hammerton prepares annual financial statements on December 31.

**Exercise 8-38 ACCRUED LIABILITIES****OBJECTIVE** > 2

Charger Electronics had the following items that require adjusting entries at the end of the year.



- Charger pays its employees \$2,500 every Friday. This year December 31 falls on a Thursday.
- Charger earned income of \$150,000 for the year for tax purposes. Its effective tax rate is 30 percent. These taxes must be paid by April 15 of next year.
- Charger borrowed \$50,000 with a note payable dated October 1. This note specifies 8 percent. The interest and principal are due on March 31 of the following year.
- Charger's president earns a bonus equal to 10 percent of income in excess of \$100,000. Income for the year was \$150,000. This bonus is paid in May of the following year and any expense is charged to wages expense.

**Required:**

Prepare the adjusting journal entries to record these transactions at the end of the current year.

**Exercise 8-39 ACCRUED LIABILITIES****OBJECTIVE** > 2

Thornwood Tile had the following items that require adjusting entries at the end of the year.

- Thornwood pays payroll of \$30,000 every other Friday. This year December 31 falls on the Tuesday before payday.
- Thornwood purchased \$100,000 of tile on March 1 with a note payable requiring 12 percent interest. The interest and principal on this note are due within one year. As of December 31, Thornwood had not made any principal or interest payments.
- Thornwood's earned income is \$500,000 for the year for tax purposes. Its effective tax rate is 25 percent. These taxes must be paid by April 15 of next year.

**Required:**

Prepare the adjusting journal entries to record these transactions at the end of the current year.

**OBJECTIVE** > **2** **Exercise 8-40 SALES TAX**

Weston Cellular provides wireless phone service. During April 2010, it billed customers a total of \$75,000 before taxes. Weston also must pay the following taxes on these charges:

1. State of Illinois sales tax of 6 percent
2. Federal excise tax of 0.01 percent
3. State of Illinois use tax of 0.05 percent

**Required:**

Assuming Weston collects these taxes from the customer, what journal entry would Weston make when the customers pay their bills?

**OBJECTIVE** > **2** **Exercise 8-41 PAYROLL ACCOUNTING**

Blitzen Marketing Research paid its weekly and monthly payroll on January 31. The following information is available about the payroll:

Item	Amount	Expense Classification
Monthly salaries	\$25,400	Administrative expense
Hourly wages	79,600	Operating expense
FICA:		
Social Security (both employee & employer)	6.20%	
Medicare (both employee & employer)	1.45%	Administrative expense
Withholding for federal income tax	\$21,240	
Withholding for state income tax	2,680	
Federal unemployment tax	1,200	Administrative expense
State unemployment tax	600	Administrative expense

Blitzen will pay both the employer's taxes and the taxes withheld on April 15.

**Required:**

Prepare the journal entry to record the payroll payment and the incurrence of the associated expenses and liabilities.

**OBJECTIVE** > **2** **Exercise 8-42 UNEARNED REVENUE**

Irvine Pest Control signed a \$2,100-per-month contract on November 1, 2009, to provide pest control services to rental units owned by Garden Grove Properties. Irvine received three months' service fees in advance, on signing the contract.

**Required:**

1. Prepare Irvine's journal entry to record the \$6,300 cash receipt.
2. Prepare Irvine's adjusting entry at December 31, 2009.
3. How would the advance payment be reported in Irvine Pest Control's December 31, 2009, balance sheet? How would the advance payment be reported in Garden Grove Properties' December 31, 2009, balance sheet?

**OBJECTIVE** > **3** **Exercise 8-43 RECOGNITION AND REPORTING OF CONTINGENT LIABILITIES**

A list of alternative accounting treatments is followed by a list of potential contingent liabilities.

**Alternative Accounting Treatments**

- a. Estimate the amount of liability and record.
- b. Do not record as a liability but disclose in a footnote to the financial statements.
- c. Neither record as a liability nor disclose in a footnote to the financial statements.

**Potential Contingent Liabilities**

1. Income taxes related to revenue included in net income this year but taxable in a future year.

2. Income taxes related to cash collected, which will be included in both net income and taxable income in a future year.
3. Estimated cost of future services under a product warranty related to past sales.
4. Estimated cost of future services under a product warranty related to future sales.
5. Estimated cost of pension benefits related to past employee services that has yet to be funded.
6. Loss from out-of-court settlement of lawsuit that is likely to occur toward the end of next year.
7. Potential loss on environmental cleanup suit against company; a court judgment against the company is considered less than probable but more than remotely likely.
8. Potential loss under class-action suit by a group of customers; during the current year, the likelihood of a judgment against the company has increased from remote to possible but less than probable.
9. Potential loss under an affirmative action suit by a former employee; the likelihood of a judgment against the company is considered to be remote.
10. Potential loss from a downturn in future economic activity.

**Required:**

Match the appropriate accounting treatment with each of the potential liabilities listed below. Your answer should list the numbers 1 through 10 and, opposite each number, the letter of the appropriate accounting treatment.

**Exercise 8-44 WARRANTIES****OBJECTIVE** > **4**

Moon Electronics sells television sets and other sound and video equipment. Sales and expected warranty claims for the year are as follows:

Item	Unit Sales	Expected Warranty Claims for Warranty Period	Cost per Claim
Television set	860	1 claim per 100 sold	\$60
VCR	290	10 claims per 100 sold	38
Stereo	1,800	4 claims per 100 sold	42

**Required:**

Prepare the entry to record warranty expense for Moon Electronics for the year.

**Exercise 8-45 RATIO ANALYSIS****OBJECTIVE** > **5**

Intel Corporation provided the following information on its 2006 balance sheet and statement of cash flows:

Current liabilities	\$8,514,000,000	Inventories	\$ 4,314,000,000
Cash and equivalents	6,598,000,000	Other current assets	2,146,000,000
Marketable securities	3,404,000,000	Cash flows from	
Receivables	2,709,000,000	operating activities	10,620,000,000

**Required:**

1. Calculate the following:
  - a. current ratio
  - b. quick ratio
  - c. cash ratio
  - d. operating cash flow ratio
2. Interpret these results.

## Problem Set A

### OBJECTIVE > 2

#### Problem 8-46A ACCOUNTS PAYABLE WITH PURCHASE DISCOUNTS

Richmond Company engaged in the following transactions during 2009:

- Purchased \$16,000 of merchandise on February 16. The seller offered terms of 1/10, n/15.
- Paid for the purchased merchandise (transaction *a*) on February 26.
- Borrowed \$140,000 on a 10-month, 9 percent interest-bearing note on April 30.
- Purchased \$28,000 of merchandise on June 4. The seller offered terms of 2/15, n/20.
- Paid for the purchased merchandise (transaction *d*) on June 24.
- Received from Haywood, Inc., on August 19 a \$12,000 deposit against a total selling price of \$120,000 for merchandise to be manufactured for Haywood.
- Paid quarterly installments of Social Security and individual federal income tax withholdings, as shown below, on October 15. The Social Security was recorded as an expense during the quarter, and the amount paid represents both the employee and employer share (50% each).

Social Security tax	\$116,000
Federal income tax withheld	419,000

Assume that Richmond records inventory using the gross method.

#### Required:

- Prepare journal entries for these transactions.
- Prepare any adjusting entries necessary at December 31, 2009.

### OBJECTIVE > 2

#### Problem 8-47A PAYROLL ACCOUNTING

Stadium Manufacturing has the following data available for its September 30, 2009, payroll:

Wages earned	\$183,000*
Federal income tax withheld	45,900
State income tax withheld	4,300

\*All subject to Social Security and Medicare matching and withholding of 6.2% and 1.45%, respectively.

Federal unemployment tax at 0.8 percent is payable on wages of \$4,000, and state unemployment tax at 3.0 percent is payable on the same amount of wages.

#### Required:

Compute the amounts of taxes payable and the amount of wages that will be paid to employees. Then prepare the journal entries to record the wages earned and the payroll taxes.

### OBJECTIVE > 2

#### Problem 8-48A INTEREST-BEARING NOTE

Fairborne Company borrowed \$240,000 on a five-month, 7 percent, interest-bearing note on November 1, 2008. Fairborne ends its fiscal year on December 31. The note was paid with interest on March 31, 2009.

#### Required:

- Prepare the entry for this note on November 1, 2008.
- Prepare the adjusting entry for this note on December 31, 2008.
- Indicate how the note and the accrued interest would appear in the balance sheet at December 31, 2008.
- Prepare the entry to record the repayment of the note on March 31, 2009.

**Problem 8-49A INTEREST-BEARING NOTE REPLACING AN UNPAID ACCOUNT PAYABLE****OBJECTIVE** > 2

Conti Products owed \$50,000 on account for inventory purchased on December 1, 2010. Conti's fiscal year ends on December 31. Conti was unable to pay the amount owed by the February 28 due date because of financial difficulties. On March 1, 2011, Conti signed a \$50,000, 10 percent interest-bearing note. This note was repaid with interest on September 1, 2011.

**Required:**

1. Prepare the entry recorded on December 1, 2010.
2. Prepare the adjusting entry recorded on December 31, 2010.
3. Prepare the entry recorded on March 1, 2011.
4. Prepare the entry recorded on September 1, 2011.

**Problem 8-50A SALES TAX****OBJECTIVE** > 2

Clinton Power provides electricity to a wide area of western Kentucky. During October 2011 it billed 1,000 of its residential customers located in the town of Heyworth a total of \$131,000 for electricity. In addition Clinton Power is required to collect the following taxes:



- a. Meter Charge: A flat rate of \$4.50 per customer remitted to the local municipality (Heyworth) to maintain and read the customer's meter
- b. Public Benefit Charge: A State of Kentucky mandated charge of \$1.25 per customer for investing in energy efficiency, renewable energy, and low-income assistance programs
- c. State Tax: A tax of 1 percent used to fund the Kentucky Energy Commission
- d. Federal Excise Tax: A tax of 0.05 percent used to fund the Federal Energy Commission

**Required:**

1. Determine how much Clinton Power will bill these 1,000 customers in total for the month of October 2011.
2. Provide the entry to record the billing of these amounts.
3. Provide the entry to record the collection of these amounts.
4. Provide the entry to record the payment of the sales taxes to the appropriate governmental unit.

**Problem 8-51A UNEARNED REVENUE AND CUSTOMER DEPOSITS****OBJECTIVE** > 2

On November 20, 2009, Green Bay Electronics agreed to manufacture and supply 500 electronic control units used by Wausau Heating Systems in large commercial and industrial installments. Wausau deposited \$480 per unit upon signing the three-year purchase agreement, which set the selling price of each control unit at \$1,500. Green Bay will record these units at \$300 per unit in inventory. No units were delivered during 2009. In 2010, 100 units were delivered, 150 units were delivered during 2011, and the remaining units were delivered during 2012. Assume Green Bay uses a perpetual inventory system.

**Required:**

1. Prepare the entry by Green Bay to record receipt of the deposit during 2009. How would the deposit be reported in the financial statements at the end of 2009?
2. Prepare the entry by Green Bay to record the delivery of 100 units during 2010. How would the deposit be reported in the financial statements at the end of 2010?
3. Prepare the entry by Green Bay to record the delivery of 150 units during 2011. Wausau pays in cash upon delivery for units not covered by the deposit.

**Problem 8-52A WARRANTIES****OBJECTIVE** > 4

Mason Auto Repair specializes in the repair of foreign car transmissions. To encourage business, Mason offers a six-month warranty on all repairs. The following data are available for 2009:



Transmissions repaired, 2009	2,430
Expected frequency of warranty claims	0.07 per repair
Actual warranty claims, 2009	181
Estimated warranty liability, 1/1/09	\$1,100
Cost of each warranty claim	21

Assume that warranty claims are paid in cash.

**Required:**

1. Compute the warranty expense for 2009.
2. Prepare the entry to record the payment of the 2009 warranty claims.
3. What is the December 31, 2009, balance in the estimated warranty liability account? Why has the balance in the estimated warranty liability account changed from January 1, 2009?

**OBJECTIVE** > **5** **Problem 8-53A RATIO ANALYSIS**

Consider the following information taken from Green Mountain Coffee Roaster's (GMCR's) financial statements:

	September 30 (in thousands)	
	2006	2005
Current assets:		
Cash and cash equivalents	\$ 1,274	\$ 6,450
Receivables	30,071	16,548
Inventories	31,796	14,072
Other current assets	4,818	2,620
Total current assets	<u>\$67,959</u>	<u>\$39,690</u>
Current liabilities:		
Current portion of long-term debt	\$ 97	\$ 3,530
Accounts payable	23,124	11,228
Accrued compensation costs	5,606	1,929
Accrued expenses	9,108	5,054
Other current liabilities	874	777
Total current liabilities	<u>\$38,809</u>	<u>\$22,518</u>

Also, Green Mountain Coffee Roaster's operating cash flows were \$12,829 and \$14,874 in 2006 and 2005, respectively.

**Required:**

1. Calculate GMCR's current ratio for 2006 and 2005.
2. Calculate GMCR's quick ratio for 2006 and 2005.
3. Calculate GMCR's cash ratio for 2006 and 2005.
4. Calculate GMCR's operating cash flow ratio for 2006 and 2005.
5. Provide some reasons why GMCR's liquidity may be considered to be improving and some reasons why it may be worsening.

## Problem Set B

**OBJECTIVE** > **2** **Problem 8-46B ACCOUNTS PAYABLE WITH PURCHASE DISCOUNTS**

Daniels Company engaged in the following transactions during 2010:

- a. Purchased \$48,000 of merchandise on January 26. The seller offered terms of 1/10, n/15.
- b. Paid for the purchased merchandise (transaction *a*) on February 6.
- c. Borrowed \$420,000 on an eight-month, 7 percent interest-bearing note on May 31.

- d. Purchased \$84,000 of merchandise on June 2. The seller offered terms of 2/15, n/20.
- e. Paid for the purchased merchandise (transaction *d*) on June 28.
- f. Received from Haywood, Inc., on September 4 a \$36,000 deposit against a total selling price of \$360,000 for merchandise to be manufactured for Haywood.
- g. Paid quarterly installments of Social Security and individual federal income tax withholdings, as shown below, on October 10. The Social Security was recorded as an expense during the quarter, and the amount paid represents both the employee and employer share (50% each).

Social Security tax	\$ 348,000
Federal income tax withheld	1,257,000

Assume that Daniels records inventory using the gross method.

**Required:**

1. Prepare journal entries for these transactions.
2. Prepare any adjusting entries necessary at December 31, 2010.

**Problem 8-47B PAYROLL ACCOUNTING**

**OBJECTIVE** > **2**

McLaughlin Manufacturing has the following data available for its March 31, 2009, payroll:

Wages earned	\$366,000*
Federal income tax withheld	91,800
State income tax withheld	8,600

\*All subject to Social Security and Medicare matching and withholding at 6.2% and 1.45%, respectively.

Federal unemployment tax at 3.2 percent is payable on wages of \$7,000, and state unemployment tax at 3.0 percent is payable on the same amount of wages.

**Required:**

Compute the taxes payable and wages that will be paid to employees. Then prepare the journal entries to record the wages earned and the payroll taxes.

**Problem 8-48B INTEREST-BEARING NOTE**

**OBJECTIVE** > **2**

Bordewick Company borrowed \$120,000 on a seven-month, 9 percent, interest-bearing note on October 1, 2009. Bordewick ends its fiscal year on December 31. The note was paid with interest on April 30, 2010.

**Required:**

1. Prepare the entry for this note on October 1, 2009.
2. Prepare the adjusting entry for this note on December 31, 2009.
3. Indicate how the note and the accrued interest would appear on the balance sheet at December 31, 2009.
4. Prepare the entry to record the repayment of the note on April 30, 2010.

**Problem 8-49B INTEREST-BEARING NOTE REPLACING AN UNPAID ACCOUNT PAYABLE**

**OBJECTIVE** > **2**

Monte Cristo Products owed \$100,000 on account for inventory purchased on November 1, 2010. Monte Cristo's fiscal year ends on December 31. Monte Cristo was unable to pay the amount owed by the January 31 due date because of financial difficulties. On February 1, 2011, Monte Cristo signed a \$100,000, 12 percent interest-bearing note. This note was repaid with interest on August 31, 2011.



**Required:**

1. Prepare the entry recorded on November 1, 2010.
2. Prepare the adjusting entry recorded on December 31, 2010.
3. Prepare the entry recorded on February 1, 2011.
4. Prepare the entry recorded on August 31, 2011.

**OBJECTIVE** > **2** **Problem 8-50B SALES TAX**

Yossarian Power Corporation provides electricity to a wide area of eastern Maine. During March 2009 it billed 3,000 of its residential customers located in the town of Maryville a total of \$393,000 for electricity. In addition Yossarian Power is required to collect the following taxes:

- Meter Charge: A flat rate of \$3.50 per customer remitted to the local municipality (Maryville) to maintain and read the customer's meter
- Public Benefit Charge: A State of Maine mandated charge of \$1.05 per customer for investing in energy efficiency, renewable energy, and low-income assistance programs
- State Tax: A tax of 2 percent used to fund the Maine Energy Commission
- Federal Excise Tax: A tax of 0.15 percent used to fund the Federal Energy Commission

**Required:**

- Determine how much Yossarian Power will bill these 3,000 customers in total for the month of March 2009.
- Provide the entry to record the billing of these amounts.
- Provide the entry to record the collection of these amounts.
- Provide the entry to record the payment of the sales taxes to the appropriate governmental unit.

**OBJECTIVE** > **2** **Problem 8-51B UNEARNED REVENUE AND CUSTOMER DEPOSITS**

On November 20, 2011, Billy Pilgrim Technology agreed to manufacture and supply 800 centrifuges used by Cathcart Systems to produce chemicals. Cathcart deposited \$100 per unit upon signing the three-year purchase agreement, which set the selling price of each centrifuge at \$500. Billy Pilgrim will record these units at \$150 per unit in inventory. No units were delivered during 2011. During 2012, 125 units were delivered, 75 units were delivered during 2013, and the remaining units were delivered during 2014. Assume Billy Pilgrim uses a perpetual inventory system.

**Required:**

- Prepare the entry by Billy Pilgrim to record receipt of the deposit during 2011. How would the deposit be reported in the financial statements at the end of 2011?
- Prepare the entry by Billy Pilgrim to record the delivery of 125 units during 2012. How would the deposit be reported in the financial statements at the end of 2012?
- Prepare the entry by Billy Pilgrim to record the delivery of 75 units during 2013. Cathcart pays in cash upon delivery for units not covered by the deposit.

**OBJECTIVE** > **4** **Problem 8-52B WARRANTIES**

Montague Auto Repair specializes in the repair of foreign car transmissions. To encourage business, Montague offers a six-month warranty on all repairs. The following data are available for 2009:

Transmissions repaired, 2009	1,250
Expected frequency of warranty claims	0.12 per repair
Actual number of warranty claims, 2009	75
Estimated warranty liability, 1/1/09	\$ 550
Cost of each warranty claim	\$ 10

Assume that warranty claims are paid in cash.

**Required:**

- Compute the warranty expense for 2009.
- Prepare the entry to record the payment of the 2009 warranty claims.
- What is the December 31, 2009, balance in the estimated warranty liability account? Why has the balance in the estimated warranty liability account changed from January 1, 2009?

**Problem 8-53B RATIO ANALYSIS****OBJECTIVE** 5

Consider the following information taken from Chicago Water Slide's (CWS's) financial statements:

	September 30 (in thousands)	
	2008	2007
Current assets:		
Cash and cash equivalents	\$ 2,548	\$12,900
Receivables	60,142	33,096
Inventories	63,592	28,144
Other current assets	9,636	5,240
Total current assets	<u>\$135,918</u>	<u>\$79,380</u>
Current liabilities:		
Current portion of long-term debt	\$ 194	\$ 7,060
Accounts payable	46,248	22,456
Accrued compensation costs	11,212	3,858
Accrued expenses	18,216	10,108
Other current liabilities	1,748	1,554
Total current liabilities	<u>\$ 77,618</u>	<u>\$45,036</u>

Also, Chicago Water Slide's Operating Cash Flows were \$25,658 and \$29,748 in 2008 and 2007, respectively.

**Required:**

1. Calculate CWS's current ratio for 2008 and 2007.
2. Calculate CWS's quick ratio for 2008 and 2007.
3. Calculate CWS's cash ratio for 2008 and 2007.
4. Calculate CWS's operating cash flow ratio for 2008 and 2007.
5. Provide some reasons why CWS's liquidity may be considered to be improving and some reasons why it may be worsening.

**Cases****Case 8-54 ETHICS AND CURRENT LIABILITIES**

Many long-term loans have contractual restrictions designed to protect the lender from deterioration of the borrower's liquidity or solvency in the future. These restrictions (typically called loan covenants) often take the form of financial-statement ratio values. For example, a lending agreement may state that the loan principal is immediately due and payable if the current ratio falls below 1.2. When borrowers are in danger of violating one or more of these loan covenants, pressure is put on management and the financial accountants to avoid such violations.

Jim is a second year accountant at a large publicly-traded corporation. His boss approaches him and says,

*"Jim, I know why we increased our warranty liability, but it puts our current ratio in violation of a loan covenant with our bank loan. I know the bank will pass on it this time, but it's a big hassle to get the waiver. I just don't want to deal with it. I need you to reduce our estimate of warranty liability as far as possible."*

**Required:**

1. How would lowering the estimate of warranty liability affect the current ratio?
2. How should Jim respond to his boss?
3. Given that Jim's employer is a publicly-traded corporation, what safeguards should be at Jim's disposal?

**Case 8-55 SHORT-TERM BORROWING WITH RESTRICTIONS**

Rocky Mountain Products has a line-of-credit agreement with Norwest Bank that allows it to borrow up to \$100,000 at any given time provided that Rocky Mountain's current assets always exceed its current liabilities by the principal amount of the outstanding loan. If this requirement is violated, the entire loan is payable immediately; thus Rocky Mountain is very careful to fulfill the requirement at all times. All loans under this line of credit are due in one month and bear interest at a rate of 1 percent per month. On January 1, 2009, Rocky Mountain has current assets of \$150,000 and current liabilities of \$92,000; hence, the excess of current assets over current liabilities is \$58,000. Rocky Mountain's current liabilities at January 1, 2009, include a short-term loan under the line of credit of \$35,000 due on February 1, 2009.

**Required:**

1. Prepare the journal entry to record the borrowing of \$35,000 on January 1, 2009. By how much did this transaction increase or decrease the excess of current assets over current liabilities?
2. Assume that Rocky Mountain used the entire amount of the loan to purchase inventory. Prepare the journal entry to record the purchase. By how much did this purchase increase or decrease the excess of current assets over current liabilities?
3. Without violating the loan restriction, how much more could Rocky Mountain borrow under its line of credit on January 1, 2009, to invest in inventory? To invest in new equipment? Explain.

**Case 8-56 RESEARCHING AND ANALYSIS USING THE ANNUAL 10-K**

Obtain **Whole Foods'** 2007 annual report either through the "Investor Relations" portion of its website (do a web search for Whole Foods investor relations) or go to <http://www.sec.gov> and click "Search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

1. What are Whole Foods' total current liabilities for 2007?
2. How much of their current liabilities is the current portion of long-term liabilities?
3. How much is the current portion of long-term debt (see Note 8)?
4. Look at Item 3 in the 10-K (this discusses Whole Foods' legal proceedings). Describe the major current legal proceedings involving Whole Foods. Based on the information in item 3, do you believe that Whole Foods has recognized a contingent liability related to these current legal proceedings?
5. Calculate Whole Foods' current ratio for 2007 and 2006.
6. Discuss Whole Foods' short-term liquidity based on the values and trends of the current ratio.
7. Calculate Whole Foods' quick ratio and cash ratio for 2007 and 2006.
8. Discuss the implications of these ratios when evaluating Whole Foods' short-term liquidity.
9. Calculate Whole Foods' operating cash flows ratio.
10. Discuss the implications of this ratio when evaluating Whole Foods' short-term liquidity.

**Case 8-57 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

1. Both Abercrombie & Fitch (Note 14) and Aeropostale (Note 14) have notes that discuss contingencies. What contingencies do they disclose? Do you think any of these contingencies are included in the Income Statement or on the Balance Sheet? Why or why not?

2. Calculate Abercrombie & Fitch's and Aeropostale's current ratio for the years ended February 3, 2007, and January 28, 2006.
3. Compare Abercrombie & Fitch's and Aeropostale's short-term liquidity based on the values and trends of the current ratio.
4. Calculate Abercrombie & Fitch's and Aeropostale's quick ratio and cash ratio for the years ended February 3, 2007, and January 28, 2006.
5. Compare the values and trends of these ratios when evaluating Abercrombie & Fitch's and Aeropostale's short-term liquidity.
6. Calculate Abercrombie & Fitch's and Aeropostale's operating cash flows ratio for the years ended February 3, 2007, and January 28, 2006.
7. Compare Abercrombie & Fitch's and Aeropostale's short-term liquidity based on the values and trends of the operating cash flows ratio.

# 9

## Long-Term Liabilities

After studying Chapter 9,  
you should be able to:

- ▶ **1** Describe debt securities and the markets in which they are issued.
- ▶ **2** Account for the issuance of long-term debt.
- ▶ **3** Use the straight-line method to account for premium/discount amortization.
- ▶ **4** Use the effective interest rate method to account for premium/discount amortization.
- ▶ **5** Determine the after-tax cost of financing with debt and explain financial leverage.
- ▶ **6** Contrast the terms and the accounting for operating and capital leases.
- ▶ **7** Analyze a company's long-term solvency using information related to long-term liabilities.
- ▶ **8** (Appendix 9A) Calculate the market price of long-term debt using present value techniques.

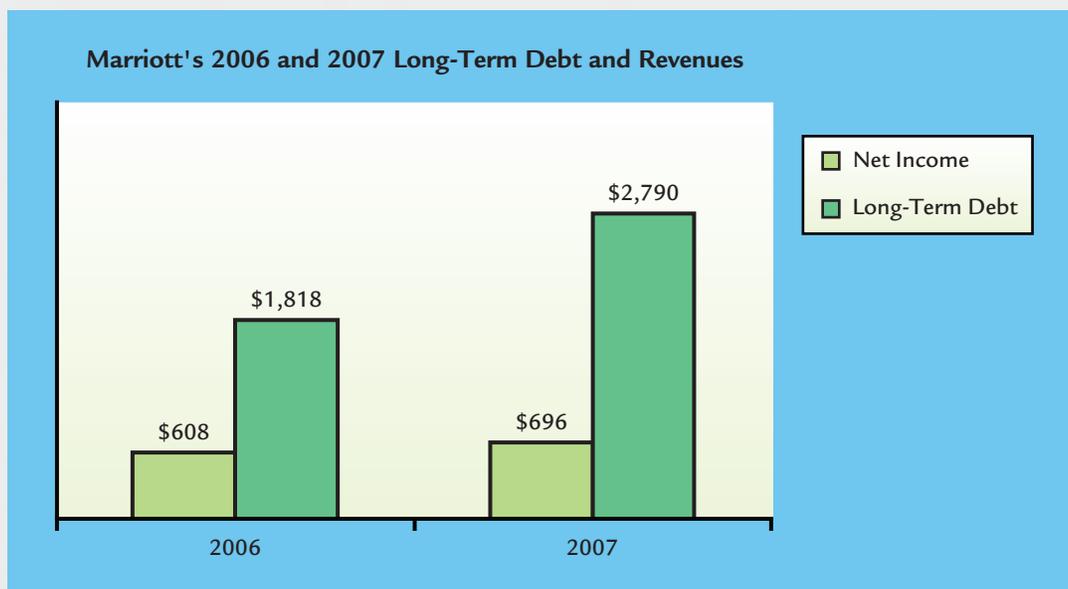


# E xperience Financial Accounting with Marriott

**Marriott International, Inc.**, is a worldwide operator and franchisor of approximately 3,000 hotels and related facilities. With 13 lodging brands ranging from the Ritz-Carlton to Fairfield Inn, Marriott has locations in 68 countries and territories. In 2007, Marriott's net income was almost \$700 million with revenues of \$12.90 billion. Further, the total value of their outstanding stock at the end of 2007 was approximately \$12.2 billion, which was the highest in the industry. Marriott continues to expand with about 100,000 rooms under construction at the end of

2007, and their cash flows from operations are more than sufficient to finance their expansion and improvement plans.

However, Marriott's long-term debt continues to grow as it increased from approximately \$1.8 billion at the end of 2006 to \$2.8 billion at the end of 2007. Further, in the exhibit below, you will notice that the long-term debt appears to be increasing at a far greater rate than net income. Is the increasing long-term debt level a bad sign?



Industries that use property, plant, and equipment to generate revenues (e.g., hotels) typically have higher debt than industries that use intangible assets (e.g., software or pharmaceuticals). There are a number of reasons this is true, but one is that PP&E is readily transferable to creditors in the event of financial distress, so creditors are more receptive to lending at lower rates.

After reading the chapter, we will see that increasing long-term debt is not necessarily a bad sign. Although increasing long-term debt means increasing interest expense, interest expense has the advantage of being tax deductible unlike dividends paid to shareholders. Another advantage is that creditors do not share in the profits of the company, while shareholders do. Thus, if the borrowed money creates a return that is greater than the interest expense on the debt, the shareholders benefit. This is the concept of leverage. We will discuss this concept more in Chapter 12.

Long-term debt generally refers to obligations that extend beyond one year. Bonds, long-term notes, debentures, and capital leases belong in this category of liabilities. Exhibit 9-1 shows **Whirlpool's** long-term debt obligations.<sup>1</sup>

On the balance sheet, long-term debt is typically reported as a single number. The more detailed list, like this one for Whirlpool, is usually included in the notes to the financial statements.

Notice that Whirlpool subtracted current maturities (just before the bottom line) from the rest of its long-term debt. The difference (\$1,798 for 2006) is the amount included as long-term debt on the balance sheet. As we noted in Chapter 8, long-term debt that is due to mature over the next year is reported as a current liability. In the interest of simplifying our discussion of long-term debt, we will disregard the reclassification of long-term debt as current liabilities throughout this chapter.

Companies use long-term debt, along with issuing stock (see Chapter 10), as a way to finance and expand their operations. There is a long history of finance research investigating the optimal mix of debt and equity financing because there are advantages and disadvantages for both. Determining the optimal mix is beyond the scope of this book, but suffice it to say that factors affecting the optimal mix are difficult to quantify. One measure of this mix is the debt to equity ratio (see further discussion later in the chapter). Exhibit 9-2 shows the debt to equity ratio for select industries as taken from Google Finance. A debt to equity ratio above 1.0 indicates that liabilities are greater than stockholders' equity.

The cash flows or other economic sacrifices required to pay long-term debt obligations are clearly specified in debt contracts. They include repayment of principal

### Exhibit 9-1

#### Excerpt from Whirlpool's 2006 10-K

	December 31,	
	2006	2005
	(in millions)	
Eurobonds (EUR 300 million)—5.875% due 2006	\$ —	\$ 357
Medium-term notes, from 5% to 9.03%, maturing from 2007 to 2015	314	—
Debentures—9.1%, maturing 2008	125	125
Variable rate notes, maturing through 2009	200	—
Senior notes, from 6.125% to 8.6%, maturing from 2010 to 2016	873	325
Debentures—7.75%, maturing 2016	243	243
Other (various maturing through 2013)	60	60
	<u>\$1,815</u>	<u>\$1,110</u>
Less current maturities	17	365
Total long-term debt, net of current maturities	<u>\$1,798</u>	<u>\$ 745</u>

<sup>1</sup> We use the term *debt* instead of *liabilities* in this chapter because this is the term used in real financial statements.

## Exhibit 9-2

**Debt to Equity Ratio Levels for Various Industries**

Software and programming	0.16
Major drugs (pharmaceuticals)	0.35
Water utilities	1.13
Hotel and motels	1.44
Airlines	3.23

plus interest. Thus borrowing using long-term debt instruments creates interest expense. When an obligation extends over several interest periods, the amount of interest associated with each period must be determined. **Interest amortization** is the process used to determine the amount of interest to be recorded in each of the periods the liability is outstanding.<sup>2</sup>

There are two methods of interest amortization. The **effective interest rate method** is based on compound interest calculations. The **straight-line method**, on the other hand, represents a simple approximation of effective interest amortization. Although the effective interest rate method is the technically correct method, the straight-line method may be used if it produces approximately the same numerical results as the effective interest rate method. Frequently, the two methods do, in fact, produce quite similar results. In this book, the effective interest rate and straight-line methods are discussed separately.

## Bonds Payable and Notes Payable

When a company borrows money from a bank, it typically signs a formal agreement or contract called a “note.” Frequently, notes are also issued in exchange for a noncash asset such as equipment. Collectively, we refer to these notes as **notes payable**. Larger corporations typically elect to issue bonds instead of notes. A **bond** is a type of note which requires the issuing entity to pay the face value of the bond to the holder when it matures and usually to pay interest periodically at a specified rate. A bond issue essentially breaks down a large debt (large corporations frequently borrow hundreds of millions of dollars) into smaller chunks (usually \$1,000) because the total amount borrowed is too large for a single lender. For example, rather than try to find a single bank willing (and able) to lend \$800,000,000 at a reasonable interest rate, corporations typically find it easier and more economical to issue 800,000 bonds with a \$1,000 face value. *However, the concept behind the way we account for notes and bonds is identical (the only difference is the account title—either “bonds payable” or “notes payable”)* and analysts typically do not distinguish between the two. As such, the terms have come to be used somewhat interchangeably.

All such contracts require the borrower to repay the **face value** (also called **par value** or **principal**). Typically the face value is repaid at **maturity**, which is a specified date in the future. However, some contracts require the principal to be repaid in, for example, monthly installments. These contracts typically require equal payments to be made each period. A portion of each payment is interest and a portion is principal. Car and home loans are examples of installment loans. We illustrate installment debt later in the chapter.

Most debt contracts also require that the borrower make regular interest payments. Historically, interest payments were made when a bondholder detached a coupon from the debt contract and mailed it to the company on the interest payment date. These obligations are called *coupon notes, coupon debentures, or coupon bonds*,

### OBJECTIVE > 1

Describe debt securities and the markets in which they are issued.

<sup>2</sup>The same interest amortization procedures used by borrowers to account for liabilities are also used by lenders to account for the corresponding assets.

and the required interest payments are *coupon payments*. The terminology for coupons is still used today, but most often, the payments are automatically sent to the registered bondholder.

The amount of each interest payment can be calculated from the face amount, the interest rate, and the number of payments per year, all stated in the debt contract. (The interest rate identified in the contract goes by various names, including **stated rate**, **coupon rate**, and **contract rate**). Recall the formula for calculating interest:

$$\text{Face Value} \times \text{Interest Rate} \times \text{Time (in years)}$$

To illustrate, consider a contract with a face amount of \$1,000, a stated interest rate of 8 percent, and semiannual interest payments. For this \$1,000 note the amount of each semiannual interest payment is \$40:

$$\$1,000 \times 8\% \times 6/12 = \$40$$

In practice, bonds also differ along a number of other dimensions. First, bonds are either **secured** or **unsecured**. A secured bond has some collateral pledged against the corporation's ability to pay. For example, **mortgage bonds** are secured by real estate. In this case, should the borrower fail to make the payments required by the bond, the lender can take possession of the real estate (i.e., repossess) that secures the bond. The real estate provides "security" for the lender in case the debt is not paid. Bonds are also frequently secured by the stocks or bonds of other corporations and, in theory, can be secured by anything of value.

Most bonds, however, are unsecured. These are typically called **debenture bonds**. In this case there is no collateral; instead, the lender is relying on the general credit of the corporation. What this really means is, should the borrower go bankrupt, any secured bondholders will get their collateral before the unsecured bondholders receive a single penny. That is, unsecured bondholders are the last lenders to be paid in bankruptcy (only the shareholders follow). You may have heard of the term **junk bonds**. These are unsecured bonds where the risk of the borrower failing to make the payments is relatively high. Why would anyone lend money under such circumstances? Because they receive a high enough rate of interest to compensate them for the risk.

Bonds also may be callable. **Callable bonds** give the borrower the right to pay off (or call) the bonds prior to their due date. The borrower typically "calls" debt when the interest rate being paid is much higher than the current market conditions. It is not unlike when homeowners refinance to obtain a lower interest rate on their home mortgage.

Finally, bonds also may be convertible. **Convertible bonds** allow the bondholder to convert the bond into another security—typically common stock. Convertible bonds will specify the conversion ratio. For example, each \$1,000 bond may be convertible into 20 shares of common stock. In this case, bondholders will convert when the value of the 20 shares becomes more attractive than the interest payments and repayment of the \$1,000 principal. Exhibit 9-3 summarizes long-term debt terms you will need to understand.

## Selling New Debt Securities

Borrowing, through the use of notes or bonds, is attractive to businesses as a source of money because the relative cost of issuing debt (i.e., the interest payments) is often lower than the cost of issuing equity (i.e., giving up ownership shares). Businesses may sell bonds directly to institutions such as insurance companies or pension funds. However, bonds are frequently sold to the public through an underwriter. Underwriters generate a profit either by offering a price that is slightly less than the expected market price (thereby producing a profit on resale) or by charging the borrower a fee.

Underwriters examine the provisions of the instrument (i.e., secured or unsecured, callable or not callable, convertible or not convertible), the credit standing of the borrowing business, and the current conditions in the credit markets and

## Exhibit 9-3

**Long-Term Debt Terms**

<b>Notes/Bonds</b>	Different names for debt instruments that require borrowers to pay the lender the face value and usually to make periodic interest payments.
<b>Face Value/Par Value/Principal</b>	The amount of money the borrower agrees to repay at maturity.
<b>Maturity Date</b>	The date on which the borrower agrees to pay the creditor the face (or par) value.
<b>Stated/Coupon/Contract Rate</b>	The rate of interest paid on the face (or par) value. The borrower pays the interest to the creditor each period until maturity.
<b>Market/Yield Rate</b>	The market rate of interest demanded by creditors. This is a function of economic factors and the creditworthiness of the borrower. It may differ from the stated rate.
<b>Secured and Unsecured/ Debenture Bonds</b>	Secured debt provides collateral (e.g., real estate or another asset) for the lender. That is, if the borrower fails to make the payments required by the debt, the lender can “repossess” the collateral. Debt that does not have collateral is unsecured. Unsecured bonds typically are called debenture bonds.
<b>Junk Bonds</b>	Junk bonds are unsecured bonds that are also very risky, and, therefore, pay a high rate of interest to compensate the lender for the added risk.
<b>Callable Bonds</b>	Callable bonds give the borrower the option to pay off the debt prior to maturity. Borrowers will typically exercise this option when the interest being paid on the debt is substantially greater than the current market rate of interest.
<b>Convertible Bonds</b>	Convertible bonds give the lender the option to convert the bond into other securities—typically shares of common stock. Lenders will typically exercise this option when the value of the shares of common stock is more attractive than the interest and principal payments supplied by the debt instrument.

the economy as a whole to determine the **market rate** of interest (or **yield**) for the bond. The yield may differ from the stated rate because the underwriter disagrees with the borrower as to the correct yield or because changes in the economy or creditworthiness of the borrower between the setting of the stated rate and the date of issue.

As shown in Exhibit 9-4, there are three possible relationships between the stated interest rate and yield: (1) they can be equal, (2) the yield can be less than the stated rate, or (3) the yield can be greater than the stated rate. If the yield is equal to the stated rate, the bonds sell for the face value, or par. If the yield is less than the stated rate, the bonds represent particularly good investments because the interest payments are higher than market. In this case, the demand for such bonds will bid the selling price up above face value. When this happens bonds are said to sell at a premium. On the other hand, if the yield is greater than the stated rate of interest, the below market interest payments will drive the selling price below the face value.

**Exhibit 9-4**

**The Relationships between Stated Interest Rate and Yield**

Bonds Sold at	Yield Compared to Stated Rate	Interest Over the Life of the Bonds
Premium (above Par)	Yield < Stated Rate	Interest Expense < Interest Paid
Par	Yield = Stated Rate	Interest Expense = Interest Paid
Discount (below Par)	Yield > Stated Rate	Interest Expense > Interest Paid

**OBJECTIVE 2**

Account for the issuance of long-term debt.

**Accounting for Issuance of Long-Term Debt**

As mentioned previously, the accounting for notes and bonds is conceptually identical. We will illustrate the accounting with some bond examples and some note examples, but remember that everything would stay the same in the examples if we substituted the word note for bond and vice versa.

There are three basic cash flows for which the issuing corporation must account: the cash received when the bonds are issued (the issue or selling price), the interest payments, and the repayment of the principal (or face value).

Assume that a corporation issues bonds with a total face value of \$500,000, with a stated rate of 6.5 percent payable annually, and the principal is due in five years. Exhibit 9-5 depicts all three cash flows.

**Recording Issuance**

The market price for debt is typically quoted as a percentage of face value. For example, if \$100,000 face value bonds are issued at 103, their selling price is 103 percent of face value, or \$103,000. Any amount paid above the face value is called a premium. In this case, a \$3,000 premium was paid. If the bond is issued below face value, this difference is called a discount. For example, if these \$100,000 face value bonds were issued at 96, there would be a \$4,000 discount.

At the time of issue, the borrower records the face value of the bonds in a bond payable account and records any premium or discount in a separate account called Premium on Bonds Payable or Discount on Bonds Payable (see **Cornerstone 9-1**). The premium and discount accounts are called “valuation” accounts because they affect the value at which the liability is shown on the balance sheet. That is, as you can see in Exhibit 9-6, both the premium and discount accounts are netted with bonds payable on the balance sheet, so on the date of issue the book value of the bonds payable is equal to the market value.

**CONCEPT Q&A**

Why is the market value of bonds not always equal to their face value?

*If, for example, the stated rate of interest is higher than the market rate of interest, the bonds represent particularly good investments. As such, the demand for such bonds will bid the price up above face value. On the other hand, if the stated rate of interest is lower than the market rate of interest, the lack of demand for such bonds will bid the market price below face value.*

**Possible Answer:**

**Exhibit 9-5**

**Cash Flows for a Bond**

Face value: \$500,000      Stated rate: 6.5%  
 Due: 5 years      Interest payments:  $\$500,000 \times 0.065 \times (12/12)$



## Exhibit 9-6

## Balance Sheet Presentation

Long-term liabilities:		
Bonds payable	100,000	
Add: Premium on bonds payable	<u>3,000</u>	
Carrying value		103,000
Or		
Long-term liabilities:		
Bonds payable	100,000	
Less: Discount on bonds payable	<u>4,000</u>	
Carrying value		96,000

## HOW TO Record the Issuance of Bonds

**Concept:**

When bonds are issued, the Bonds Payable account is increased by the face amount of the bonds. As such, this represents the principal that must be repaid at maturity—regardless of the issue price of the bonds. Any premium or discount is recorded in a separate, valuation account. A premium exists when lenders pay more than face value for the bonds because the stated rate is greater than yield. A discount, on the other hand, exists when lenders pay less than face value for the bonds because the stated rate is less than yield.

**Information:**

On December 31, 2006, ABC Co. issued \$100,000 face value of bonds, with a stated rate of 8 percent, due in five years with interest payable annually on December 31.

**Required:**

1. Provide the journal entry assuming the bonds sell for par.
2. Provide the journal entry assuming the bonds sell for 103.
3. Provide the journal entry assuming the bonds sell for 96.

**Solution:**

1. At par:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2006	Cash	100,000	
	Bonds Payable		100,000
	<i>(Record issuance of bonds at par)</i>		

Assets	= Liabilities	+ Stockholders' Equity
+100,000	+100,000	

2. At 103:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2006	Cash (100,000 × 103%)	103,000	
	Bonds Payable		100,000
	Premium on Bonds Payable		3,000
	<i>(Record issuance of bonds at premium)</i>		

Assets	= Liabilities	+ Stockholders' Equity
+103,000	+100,000	+3,000

3. At 96:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2006	Cash (100,000 × 96%)	96,000	
	Discount on Bonds Payable	4,000	
	Bonds Payable		100,000
	<i>(Record issuance of bonds at discount)</i>		

Assets	= Liabilities	+ Stockholders' Equity
+96,000	+100,000	-4,000

CORNERSTONE  
9-1

**OBJECTIVE** > **3**

Use the straight-line method to account for premium/discount amortization.

## Recognizing Interest Expense and Repayment of Principal—The Straight-Line Method

---

Keep in mind that any amount paid to the lender in excess of the amount borrowed (i.e., face value less any discount or plus any premium) represents interest. Let's see why. When bonds mature, the face value is repaid to the lender, regardless of whether they were issued at face value, at a premium, or at a discount. In our examples above, when the bonds were issued at par (face value) the amount of cash received when issued was equal to the amount to be repaid at maturity. When the bonds were issued at a premium, the amount of cash received when issued was \$103,000 (\$3,000 greater than the face value), but only the face value (\$100,000) is repaid at maturity. The \$3,000 difference represents an effective reduction of the amount of interest paid to the borrower. In contrast, when the bonds were issued at a discount, the amount of cash received was \$96,000 (\$4,000 less than the face value), but the entire face value (\$100,000) must be repaid at maturity. The additional \$4,000 effectively represents additional interest. However, the accounting system must allocate this interest among the various accounting periods in which the debt is outstanding. This allocation has two parts: (1) the actual interest payment made to the lender during the period and (2) amortizing any premium or discount on the bond.

Although the interest payment made to the lender during the period is always a component of the period's interest expense, there are two methods for amortizing any premium or discount. In the effective interest rate method, interest expense for the period is always the yield (i.e., effective interest rate) times the carrying (or book) value of the bonds at the beginning of the period. The second method is the straight-line method. In this method equal amounts of premium or discount are amortized to interest expense each period. Although GAAP requires use of the effective interest rate method, the straight-line method may be used if the results are not materially different from the effective interest rate method.

Repayment of the principal at maturity is trivial. Recall that the principal amount repaid is equal to the face value. This is also the amount that was originally credited to the note or bond payable. As such, you merely need to debit the note or bond payable and credit the cash.

While it is possible for companies to sell an almost unlimited number of different kinds of debt instruments by varying parameters of the contract, we want to discuss three of the most frequently used forms:

1. Debt with regular interest payments sold at their face or par value.
2. Debt with no interest payments and a single payment of principal at maturity. Because no interest payments are made (i.e., a stated rate of zero percent), this debt is sold for a relatively large discount.
3. Debt with regular interest payments sold for more (a premium) or less (a discount) than the face or par value.

For each of these debt contracts, we will discuss how interest expense is allocated to the various accounting periods using the straight-line method.

### Debt with Regular Interest Payments Sold at Par

When debt is sold at par there is no premium or discount to amortize. In this case, the interest expense reported on the income statement is equal to the interest payment(s) made to the creditor during the period (see [Cornerstone 9-2](#)). This situation typically happens when a business borrows from a single creditor. In this case, the two parties can easily agree on a stated rate that equals the appropriate yield. [Cornerstone 9-2](#) illustrates how interest expense is recorded in this case.

### Debt Requiring No Interest Payments

Some businesses want to avoid the necessity of making regular interest payments during the life of their long-term debt obligations so they can use the cash that would otherwise be paid in interest to invest in new assets. Fortunately, there are some

## HOW TO Record Interest Expense for Bonds Sold at Par

### Concept:

When bonds are issued at par there is no discount or premium to amortize so the only component of interest expense is the interest paid to the lender for the period.

### Information:

On December 31, 2006, ABC Co. issued \$100,000 of 8 percent bonds at par. These bonds are due in five years with interest payable annually on December 31.

### Required:

1. Calculate the interest payment made on December 31 of each year.
2. Provide the journal entry necessary to recognize the interest expense on December 31, 2007–2011.
3. Provide the journal entry to record the repayment of the loan principal on December 31, 2011.

### Solution:

1. The interest payment on December 31 of each year will be:  

$$\$100,000 \times 8\% = \$8,000$$
2. Recognition of interest expense on December 31, 2007–2011.

Date	Account and Explanation	Debit	Credit
Dec. 31	Interest Expense	8,000	
	Cash		8,000
	(Record interest payment)		

Note that the interest expense recorded is equal to the cash paid to the lender when the bond is issued at par.

3. Recognition of repayment of the bond principal on December 31, 2011.

Date	Account and Explanation	Debit	Credit
Dec. 31, 2011	Bonds Payable	100,000	
	Cash		100,000
	(Record repayment of principal)		



## CORNERSTONE 9-2



Assets	=	Liabilities	+	Stockholders' Equity
-8,000				-8,000

Assets	=	Liabilities	+	Stockholders' Equity
-100,000		-100,000		

investors who do not want to receive cash interest payments. The presence of these borrowers and lenders creates a market for *zero coupon* (no interest payment) debt.

A zero coupon debt instrument is sold at a substantial discount from face value because the stated rate (zero percent) is obviously below yield. For example, zero coupon bonds are also called *deep discount* bonds because of the substantial discount necessary to sell these bonds. Although no interest payments are made, a portion of the discount is amortized as interest expense each period. At maturity, the discount has been fully amortized (i.e., the discount balance is \$0) and the borrower repays the lender the face value of the debt.

Exhibit 9-7 shows how the carrying value of the bond shown in [Cornerstone 9-3](#) grows over time due to the discount amortization. Remember that carrying value is the bond payable balance (which is a credit) less the discount balance (which is a debit). It is also worth re-emphasizing three other points. First, as the discount is amortized, the carrying value increases. Second, at maturity the discount is fully amortized and the carrying value is equal to the face value. Third, zero-coupon bonds are issued at substantial discounts because 0 percent interest is substantially below market yield rates (in this case the yield would have been

## CONCEPT Q&A

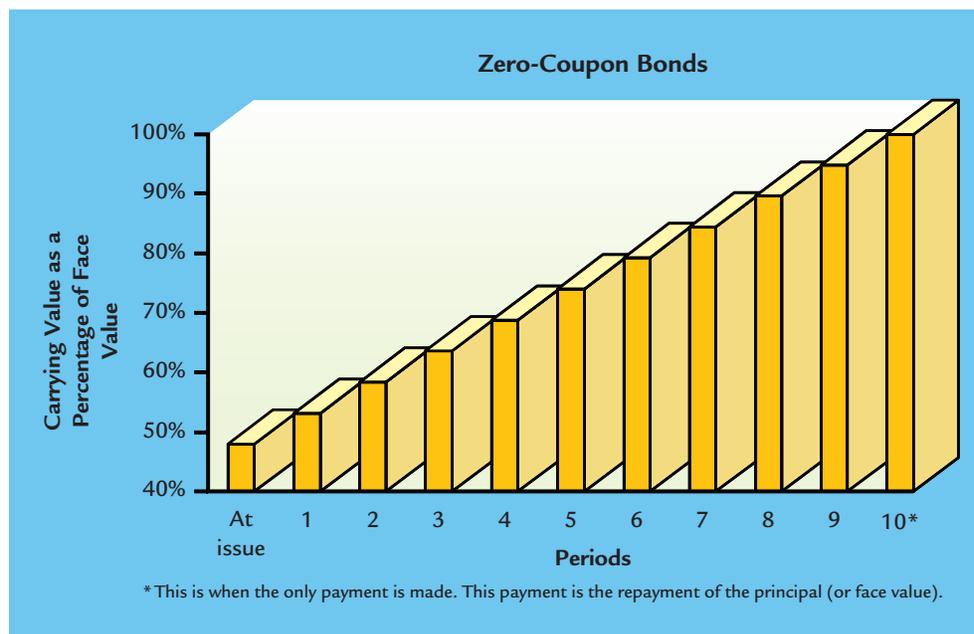
How can there be interest expense each period for zero-coupon bonds if there are no interest payments?

*Z*ero-coupon bonds are sold at a deep discount. After all, who would lend \$1 today to only receive \$1 at some point in the future? The difference between the issue price (e.g., \$24,000,000 in Cornerstone 9-3) and the face value repaid at maturity (e.g., \$50,000,000 in Cornerstone 9-3) represents interest. This interest is allocated, or matched, to each of the accounting periods in which the loan is outstanding.

**Possible Answer:**

## Exhibit 9-7

## Carrying Value over the Life of a Zero-Coupon Bond



## CORNERSTONE

9 - 3



## HOW TO Record Interest Expense for Zero-Coupon Bonds

**Concept:**

When noninterest-bearing bonds are issued, the discount is amortized to interest expense each period. Under the straight-line method of amortization, an equal amount of discount is amortized each period.

**Information:**

On December 31, 2006, XYZ Co. issued \$50,000,000 of 10-year, zero-coupon bonds at 48.

**Required:**

1. Provide the journal entry to record the issuance of the bonds on December 31, 2006.
2. Calculate the amount of discount that will be amortized each period.
3. Provide the journal entry necessary to recognize the interest expense on December 31, 2007–2016.
4. Provide the journal entry to record the repayment of the loan principal on December 31, 2016.
5. Complete the following amortization table:

Annual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value*
At issue					
1					
2					
3					
4					
5					
6					
7					

**CORNERSTONE**  
**9-3**  
*(continued)*

Annual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value*
8					
9					
10					

\* Carrying Value = Face Value – Discount on Bonds Payable

**Solution:**

1. Entry to record the issuance of bonds:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2006	Cash	24,000,000	
	Discount on Bonds Payable	26,000,000	
	Bonds Payable		50,000,000
	<i>(Record issuance of zero-coupon bonds)</i>		

Assets = Liabilities + Stockholders' Equity	
+24,000,000	+50,000,000
	-26,000,000

2. The total discount is:

Face Value – Bond Issue Price = Discount

\$50,000,000 – (\$50,000,000 × 48%) = Discount

\$50,000,000 – \$24,000,000 = \$26,000,000

The total discount will be amortized equally over the 10-year life of the bond:

\$26,000,000/10 years = \$2,600,000 per year

3. Recognition of interest expense on December 31, 2007–2016.

Date	Account and Explanation	Debit	Credit
Dec. 31	Interest Expense	2,600,000	
	Discount on Bonds Payable		2,600,000
	<i>(Record interest expense on zero-coupon bonds)</i>		

Assets = Liabilities + Stockholders' Equity	
+2,600,000	-2,600,000

4. Recognition of repayment of the bond principal on December 31, 2016.

Date	Account and Explanation	Debit	Credit
Dec. 31, 2016	Bonds Payable	50,000,000	
	Cash		50,000,000
	<i>(Record repayment of principal)</i>		

Assets = Liabilities + Stockholders' Equity	
-50,000,000	-50,000,000

- 5.

Annual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue				\$26,000,000	\$24,000,000
1	\$0	\$2,600,000	\$2,600,000	23,400,000	26,600,000
2	0	2,600,000	2,600,000	20,800,000	29,200,000
3	0	2,600,000	2,600,000	18,200,000	31,800,000
4	0	2,600,000	2,600,000	15,600,000	34,400,000
5	0	2,600,000	2,600,000	13,000,000	37,000,000
6	0	2,600,000	2,600,000	10,400,000	39,600,000
7	0	2,600,000	2,600,000	7,800,000	42,200,000
8	0	2,600,000	2,600,000	5,200,000	44,800,000
9	0	2,600,000	2,600,000	2,600,000	47,400,000
10	0	2,600,000	2,600,000	0	50,000,000

Note that the discount on bonds payable is amortized to \$0 at maturity.

approximately 7.63 percent). In this example notice that the beginning carrying value was less than 50 percent of the face value.

## Debt with Regular Interest Payments Sold at a Premium or Discount

As mentioned above, the sale of a bond at a discount or premium affects the borrower's interest expense. This is because total interest expense is the difference between the payments to the lenders and the amount received by the borrowing business. Let us compare a \$1,000,000, 10 percent, five-year bond contract with semiannual interest payments that are sold at a \$10,000 discount (99 percent of par) with the same issue sold at a \$20,000 premium (102 percent of par).

	Bond Sold at a Discount	Bond Sold at a Premium
Face amount payment at maturity	\$1,000,000	\$1,000,000
Interest payments (10 at \$50,000 each)	500,000	500,000
Total payments to lenders	\$1,500,000	\$1,500,000
Less: Proceeds at issue	990,000	1,020,000
Total interest expense over life of bond	<u>\$ 510,000</u>	<u>\$ 480,000</u>

For the discounted bond, total interest expense (\$510,000) exceeds interest payments (\$500,000) by \$10,000. For the bond issued at a premium, total interest expense (\$480,000) is \$20,000 less than the cash interest payments (\$500,000).

This total interest expense is spread over the life of the bond. For the 10 percent, \$1,000,000 bond sold at 99, interest expense would be \$51,000 per six-month interest period:

$$\frac{\$510,000}{10} = \$51,000 \text{ per six-month interest period}$$

Another way of calculating this would be as follows:

Interest paid	\$50,000
Amortization of discount (10,000/10 periods)	1,000
Total interest expense per period	<u>\$51,000</u>

In fact, amortization tables like you see in Cornerstones 9-3, 9-4, and 9-5 are used to help calculate these amounts. Although such tables aren't really necessary when using the straight-line method for amortizing bond discount or premium, they are extremely helpful when the effective interest rate method is used, as is shown later in the chapter.



### CORNERSTONE 9 - 4



## HOW TO Record Interest Expense for Bonds Sold at a Discount

### Concept:

When interest-bearing bonds are issued at a discount, the interest expense for the period is the amount of interest payment for the period *plus* the discount amortization for the period. Under the straight-line method of amortization, an equal amount of discount is amortized each period.

### Information:

On December 31, 2006, ISU Inc. issues five-year, \$100,000,000, 8 percent bonds at 99 (\$99,000,000). The discount at the time of the sale is \$1,000,000. Interest is paid semiannually on June 30 and December 31.

### Required:

1. Provide the journal entry to record the issuance of the bonds on December 31, 2006.
2. Calculate the amount of discount that will be amortized each semiannual period.

- Calculate the amount of interest expense for each semiannual period.
- Complete the following amortization table:

**CORNERSTONE**  
**9-4**  
*(continued)*

Semiannual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

- Provide the journal entry necessary to recognize the interest expense on June 30 and December 31, 2007–2011.
- Provide the journal entry to record the repayment of the loan principal on December 31, 2011.

**Solution:**

- Entry to record the issuance of bonds at a discount:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2006	Cash	99,000,000	
	Discount on Bonds Payable	1,000,000	
	Bonds Payable		100,000,000
	<i>(Record issuance of bonds)</i>		

Assets	Liabilities	Stockholders' Equity
+99,000,000	-1,000,000	+100,000,000

- Discount Amortization =  $\frac{\$1,000,000}{10 \text{ periods}} = \$100,000$  per period
- Interest Expense = Interest Payment + Discount Amortization  
 $= (100,000,000 \times 8\% \times 6/12) + 100,000$   
 $= 4,000,000 + 100,000$   
 $= 4,100,000$
- 

Semiannual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue				\$1,000,000	\$ 99,000,000
1	\$4,000,000	\$4,100,000	\$100,000	900,000	99,100,000
2	4,000,000	4,100,000	100,000	800,000	99,200,000
3	4,000,000	4,100,000	100,000	700,000	99,300,000
4	4,000,000	4,100,000	100,000	600,000	99,400,000
5	4,000,000	4,100,000	100,000	500,000	99,500,000
6	4,000,000	4,100,000	100,000	400,000	99,600,000
7	4,000,000	4,100,000	100,000	300,000	99,700,000
8	4,000,000	4,100,000	100,000	200,000	99,800,000
9	4,000,000	4,100,000	100,000	100,000	99,900,000
10	4,000,000	4,100,000	100,000	0	100,000,000

Note that the discount on bonds payable is amortized to \$0 at maturity.

**CORNERSTONE**  
**9 - 4**  
*(continued)*

		Stockholders'
Assets = Liabilities + Equity		
-4,000,000 +100,000 -4,100,000		

5. The following entry would be made at all 10 interest payment dates:

Date	Account and Explanation	Debit	Credit
June 30/Dec. 31	Interest Expense	4,100,000	
	Cash		4,000,000
	Discount on Bonds Payable		100,000
	<i>(Record interest payment on bonds)</i>		

6. At maturity (December 31, 2011), the bond principal is paid off along with the final interest payment (the final interest payment was recorded in 4).

		Stockholders'
Assets = Liabilities + Equity		
-100,000,000 -100,000,000		

Date	Account and Explanation	Debit	Credit
Dec. 31, 2011	Bonds Payable	100,000,000	
	Cash		100,000,000
	<i>(Record repayment of principal)</i>		



**CORNERSTONE**  
**9 - 5**



**HOW TO Record Interest Expense for Bonds Sold at a Premium**

**Concept:**

When interest-bearing bonds are issued at a premium, the interest expense for the period is the amount of interest payment for the period *less* the premium amortization for the period. Under the straight-line method of amortization, an equal amount of premium is amortized each period.

**Information:**

On December 31, 2006, ISU Inc. issues five-year, \$100,000,000, 8 percent bonds at 102 (\$102,000,000). The premium at the time of the sale is \$2,000,000. Interest is paid semiannually on June 30 and December 31.

**Required:**

- Provide the journal entry to record the issuance of the bonds on December 31, 2006.
- Calculate the amount of premium that will be amortized each semiannual period.
- Calculate the amount of interest expense for each semiannual period.
- Complete the following amortization table:

Semiannual Period	Cash Payment (Credit)	Interest Expense (Debit)	Premium on Bonds Payable (Debit)	Premium on Bonds Payable Balance	Carrying Value
At issue					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

- Provide the journal entry necessary to recognize the interest expense on June 30 and December 31, 2007–2011.
- Provide the journal entry to record the repayment of the loan principal on December 31, 2011.

**CORNERSTONE**  
**9-5**  
*(continued)*

**Solution:**

- Entry to record the issuance of bonds at a premium:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2006	Cash	102,000,000	
	Bonds Payable		100,000,000
	Premium on Bonds Payable		2,000,000
	<i>(Record issuance of bonds)</i>		

		Stockholders'
		Assets = Liabilities + Equity
+102,000,000		
	+2,000,000	
	+100,000,000	

- $$\begin{aligned} \text{Premium Amortization} &= \text{Total Premium} / \text{Number of Interest Periods} \\ &= 2,000,000 / 10 \\ &= 200,000 \end{aligned}$$
- $$\begin{aligned} \text{Interest Expense} &= \text{Interest Payment} - \text{Premium Amortization} \\ &= (100,000,000 \times 8\% \times 6/12) - 200,000 \\ &= 4,000,000 - 200,000 \\ &= 3,800,000 \end{aligned}$$

- | Semiannual Period | Cash Payment (Credit) | Interest Expense (Debit) | Premium on Bonds Payable (Debit) | Premium on Bonds Payable Balance | Carrying Value |
|-------------------|-----------------------|--------------------------|----------------------------------|----------------------------------|----------------|
| At issue          |                       |                          |                                  | \$2,000,000                      | \$102,000,000  |
| 1                 | \$ 4,000,000          | \$3,800,000              | \$200,000                        | 1,800,000                        | 101,800,000    |
| 2                 | 4,000,000             | 3,800,000                | 200,000                          | 1,600,000                        | 101,600,000    |
| 3                 | 4,000,000             | 3,800,000                | 200,000                          | 1,400,000                        | 101,400,000    |
| 4                 | 4,000,000             | 3,800,000                | 200,000                          | 1,200,000                        | 101,200,000    |
| 5                 | 4,000,000             | 3,800,000                | 200,000                          | 1,000,000                        | 101,000,000    |
| 6                 | 4,000,000             | 3,800,000                | 200,000                          | 800,000                          | 100,800,000    |
| 7                 | 4,000,000             | 3,800,000                | 200,000                          | 600,000                          | 100,600,000    |
| 8                 | 4,000,000             | 3,800,000                | 200,000                          | 400,000                          | 100,400,000    |
| 9                 | 4,000,000             | 3,800,000                | 200,000                          | 200,000                          | 100,200,000    |
| 10                | 4,000,000             | 3,800,000                | 200,000                          | 0                                | 100,000,000    |

Note that the premium on bonds payable is amortized to \$0 at maturity.

- The following entry would be made at all 10 interest payment dates:

Date	Account and Explanation	Debit	Credit
June 30/Dec. 31	Interest Expense	3,800,000	
	Premium on Bonds Payable	200,000	
	Cash		4,000,000
	<i>(Record interest payment on bonds)</i>		

		Stockholders'
		Assets = Liabilities + Equity
-4,000,000		
	-200,000	
	-3,800,000	

- At maturity (December 31, 2011), the bond principal is paid off along with the final interest payment (the final interest payment was recorded in 4).

Date	Account and Explanation	Debit	Credit
Dec. 31, 2011	Bonds Payable	100,000,000	
	Cash		100,000,000
	<i>(Record repayment of principal)</i>		

		Stockholders'
		Assets = Liabilities + Equity
-100,000,000		
	-100,000,000	

**Exhibit 9-8**

**Carrying Value over the Life of a Bond Issued at a Discount**

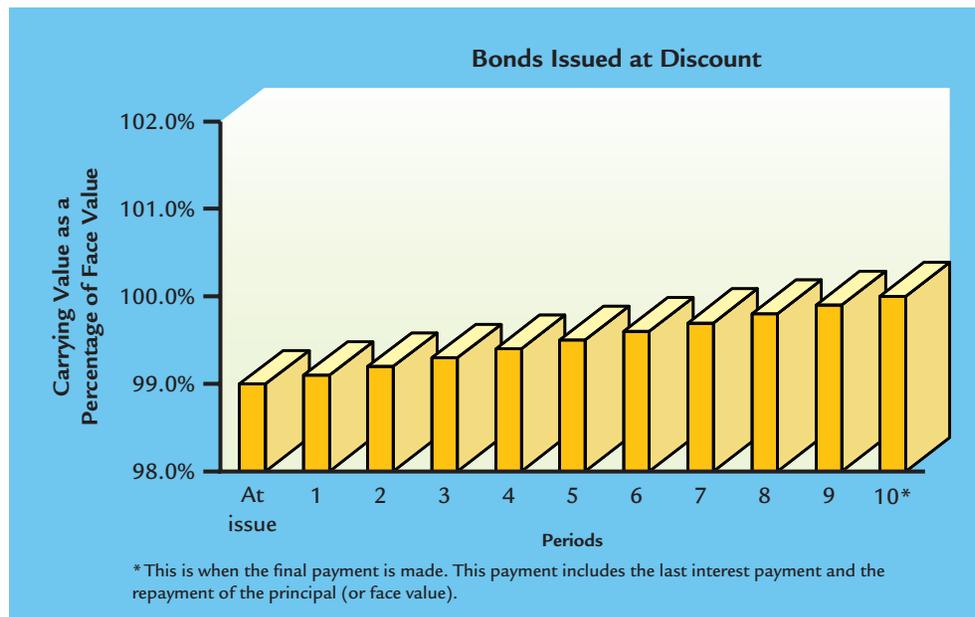


Exhibit 9-8 illustrates how the carrying value of the bond shown in Cornerstone 9-4 grows over time due to the discount amortization. Notice that the beginning carrying value is 99 percent of the face value. This indicates that although the 8 percent stated rate is below market yield, it is only slightly below. (In fact, the yield would be approximately 8.25 percent.) Further, although the magnitude of the discount and the corresponding amortization is much smaller than it was on the zero-coupon bond, the discount amortization still increases the bond carrying value. In Cornerstone 9-5 we see how things change when the bond is issued at a premium.

Exhibit 9-9 illustrates how the carrying value of the bonds shown in Cornerstone 9-5 declines over time due to the premium amortization. Notice that the beginning carrying value is 102 percent of the face value. This indicates that the 8 percent stated rate is slightly above market yield. (In fact, the yield would be approximately 7.51 percent.) Notice that in this case, the carrying value is the face value of the bond plus the premium because both the bond payable and the premium have credit balances. Further, as the premium is amortized, the premium balance declines and the carrying value moves closer to face value.

**CONCEPT Q&A**

Why are premiums and discounts on bonds payable amortized to Interest Expense?

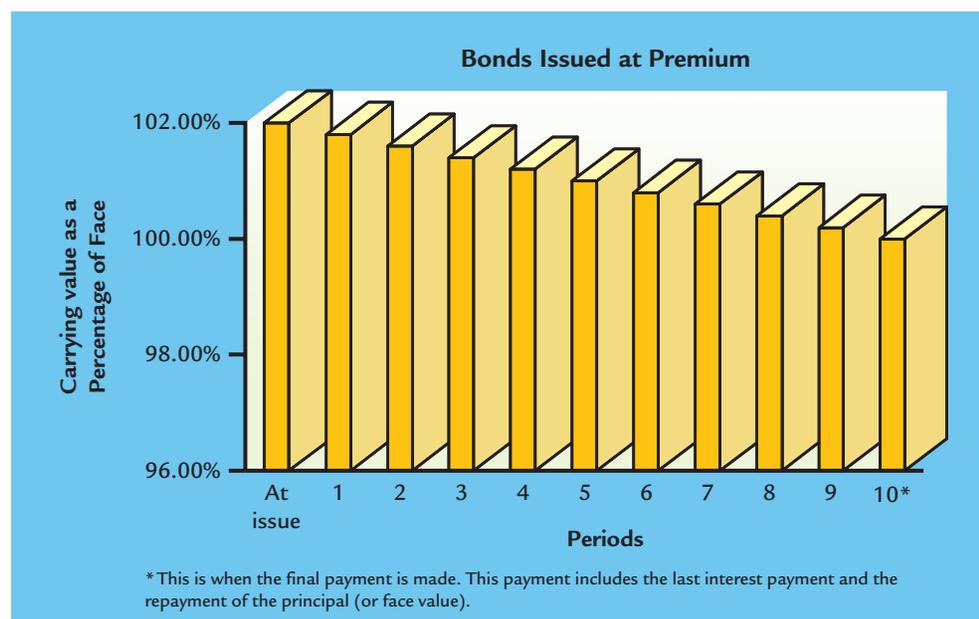
Possible Answer: Discounts occur when the stated rate of interest is below the market rate of interest. In this case, lenders lend less than the face value to the borrower, but are repaid the entire face value at maturity. This difference between the amount lent and the amount repaid conceptually represents an additional interest payment to compensate the lender for accepting a below market interest rate. Similarly, premiums occur when the stated rate of interest is above the market rate of interest. In this case, lenders lend more than the face value to the borrower, but are only repaid the face value at maturity. This difference represents a prepayment of interest by the lender to compensate the borrower for providing above market interest payments.

**Accruing Interest**

In the previous discussion, interest payments were made on the last day of the period—December 31. This is frequently not the case in the real world. Assume that on September 1, 2007, Quark Communications borrows \$120,000,000 with a three-year, 7 percent note. The note requires annual interest payments (each equal to 7 percent of \$120,000,000) and repayment of the principal plus the final year's interest

## Exhibit 9-9

## Carrying Value over the Life of a Bond Issued at a Premium



at the end of the third year. This borrowing would be recognized in Quark's accounts as follows:

Date	Account and Explanation	Debit	Credit
Sept. 1, 2007	Cash	120,000,000	
	Notes Payable		120,000,000
	<i>(Record issuance of note)</i>		

Assets = Liabilities + Stockholders' Equity	
+120,000,000	+120,000,000

The annual interest payment is \$8,400,000 ( $\$120,000,000 \times 0.07$ ), and is due on August 31 of 2007, 2008 and 2009. The total amount of cash paid over the life of the note is \$145,200,000 [ $(3 \times \$8,400,000) + \$120,000,000$ ], and the total interest on the note is \$25,200,000 ( $\$145,200,000 - \$120,000,000$ ). Using straight-line procedures, the interest amortized to each interest period is \$8,400,000 ( $\$25,200,000/3$ )—exactly the same as the interest payment in each period.

Since no interest payment is made at Quark's year end (December 31), interest must be accrued for the period. Interest expense for the four-month period from September through December is \$2,800,000 [ $(4/12) \times \$8,400,000$ ]. That means interest expense for the eight-month period from January through August is \$5,600,000 [ $(8/12) \times \$8,400,000$ ]. Quark would recognize interest expense and the payment of interest on this note during 2007, 2008 and 2009 as follows:

9/1/07	12/31/07	8/31/08	12/31/08	8/31/09	12/31/09	8/31/10
4 months	8 months	4 months	8 months	4 months	8 months	
accrue interest		\$8,400,000 pay interest	accrue interest	\$8,400,000 pay interest	accrue interest	\$8,400,000 pay interest

- Adjustment to recognize interest expense and interest payable on 12/31/07, 12/31/08, and 12/31/09

Date	Account and Explanation	Debit	Credit
Dec. 31	Interest Expense	2,800,000	
	Interest Payable		2,800,000
	<i>(Record accrual of interest on note)</i>		

Assets = Liabilities + Stockholders' Equity	
+2,800,000	-2,800,000

2. Recognition of interest expense (8 months) and payment of 12 months interest on 8/31/08, 8/31/09 and 8/31/10:

Date	Account and Explanation	Debit	Credit
Aug. 31	Interest Expense	5,600,000	
	Interest Payable	2,800,000	
	Cash		8,400,000
	<i>(Record payment of interest on note)</i>		

3. Recognition payment of note principal on 8/31/10:

Date	Account and Explanation	Debit	Credit
Aug. 31, 2010	Notes Payable	120,000,000	
	Cash		120,000,000
	<i>(Record repayment of principal on note)</i>		

Observe that although Quark’s note involves multiple payments extending over three years, recognition of the borrowing and its repayment are very similar to the procedure used for short-term interest-bearing notes illustrated in Chapter 8. We will now illustrate the effective interest rate method of accounting for premium and discount amortization.

**OBJECTIVE** 4

Use the effective interest rate method to account for premium/discount amortization.

## Recognizing Interest Expense and Repayment of Principal—The Effective Interest Rate Method

The straight-line and effective interest rate methods are identical when a bond is issued at par because there are no premiums or discounts to amortize. Further, even when premiums or discounts exist, the *total* interest expense over the life of the bonds is identical. However, the interest expense allocated to the individual accounting periods differs because premiums and discounts are amortized in different manners.

Under the effective interest rate method, the amortization of premiums and discounts results in the interest expense for each accounting period being equal to a constant percentage of the bond book value (also called *carrying value*). That is, the interest expense changes every period, but the effective interest rate on the bond book value is constant. The straight-line method, on the other hand, has a constant interest expense each period, but the effective interest rate on the bond book value changes every period.

To use the effective interest method, you must distinguish between interest payments, which are calculated as follows:

$$\text{Face Value} \times \text{Stated Rate} \times \text{Time (in years)}$$

and effective interest expense, which is calculated as follows:

$$\text{Carrying Value} \times \text{Yield Rate} \times \text{Time (in years)}$$

This difference is so important it bears emphasis. Interest payments are calculated with face value and the stated rate of interest. These payments are the same each period. Interest expense, under the effective rate method, is calculated by using the Carrying Value (Face Value – Discount Balance or Face Value + Premium Balance) and the yield, or market rate, of interest.

**Cornerstones 9-6 and 9-7** illustrate how discounts and premiums, respectively, are amortized under the effective interest rate method.

Note that the interest expense using the straight-line method is a constant amount. In contrast, the interest expense using the effective interest method results in a different amount each period. This is because the interest expense is based on a constant *rate*. This rate is applied to the remaining carrying value of the bonds each

### CONCEPT Q&A

Is the total amount of interest expense over the life of the bond higher when we use straight-line amortization or the effective interest rate method?

Neither—the total amount of interest expense is identical under both methods. What changes is the interest expense allocated to each period. This is shown in Exhibit 9-10.

Possible Answer:

## HOW TO Record Interest Expense for Bonds Sold at a Discount using the Effective Interest Rate Method

### Concept:

When interest-bearing bonds are issued at a discount, the interest expense for the period is the amount of interest payment for the period *plus* the discount amortization for the period. Under the effective interest rate method of amortization, a constant (or effective) rate of interest on the bond book, or carrying, value is allocated to the period.

### Information:

On December 31, 2006, ABC Co. issued \$1,000,000 of 8 percent bonds, due in five years with interest payable annually on December 31. The market rate of interest is 9 percent. Assume the bond was issued at \$961,103. This was calculated using time value of money concepts (see Cornerstone 9-10 in the appendix for calculation).

### Required:

- Complete the following amortization table:

Annual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue					
12/31/07					
12/31/08					
12/31/09					
12/31/10					
12/31/11					

- Provide the journal entry necessary to recognize the interest expense on December 31, 2007 and 2008.
- Provide the journal entry to record the repayment of the loan principal on December 31, 2011.

### Solution:

- | Annual Period | Cash Payment* (Credit) | Interest Expense** (Debit) | Discount on Bonds Payable*** (Credit) | Discount on Bonds Payable Balance | Carrying Value**** |
|---------------|------------------------|----------------------------|---------------------------------------|-----------------------------------|--------------------|
| At issue      |                        |                            |                                       | \$38,897                          | \$ 961,103         |
| 12/31/07      | \$80,000               | \$86,499                   | \$6,499                               | 32,398                            | 967,602            |
| 12/31/08      | 80,000                 | 87,084                     | 7,084                                 | 25,314                            | 974,686            |
| 12/31/09      | 80,000                 | 87,722                     | 7,722                                 | 17,592                            | 982,408            |
| 12/31/10      | 80,000                 | 88,417                     | 8,417                                 | 9,175                             | 990,825            |
| 12/31/11      | 80,000                 | 89,175                     | 9,175                                 | 0                                 | 1,000,000          |

\* Cash Payment = Face Value  $\times$  8%  $\times$  12/12 = \$80,000

\*\* Interest Expense = Carrying Value  $\times$  9%  $\times$  12/12

\*\*\* Change in Discount Balance = Interest Expense – Cash Payment.

\*\*\*\* New Carrying Value = Previous Carrying Value + Change in Discount on Bonds Payable Balance.



## CORNERSTONE 9 - 6



**CORNERSTONE**  
**9 - 6**  
*(continued)*

12/31/07

		Stockholders'
Assets =	Liabilities +	Equity
-80,000	+6,499	-86,499

12/31/08

		Stockholders'
Assets =	Liabilities +	Equity
-80,000	+7,084	-87,084

		Stockholders'
Assets =	Liabilities +	Equity
-1,000,000	-1,000,000	

2. The following entries would be made on December 31, 2007 and 2008:

Account and Explanation	12/31/07		12/31/08	
	Debit	Credit	Debit	Credit
Interest Expense	86,499		87,084	
Cash		80,000		80,000
Discount on Bonds Payable		6,499		7,084

*(Record interest payment on bonds)*

3. At maturity (December 31, 2011) the bond principal is paid off along with the final interest payment (assume the final interest payment was recorded in a separate entry as in 2).

Date	Account and Explanation	Debit	Credit
Dec. 31, 2011	Bonds Payable	1,000,000	
	Cash		1,000,000

*(Record repayment of principal)*



**CORNERSTONE**  
**9 - 7**



**HOW TO Record Interest Expense for Bonds Sold at a Premium using the Effective Interest Rate Method**

**Concept:**

When interest-bearing bonds are issued at a premium, the interest expense for the period is the amount of interest payment for the period *minus* the premium amortization for the period. Under the effective interest rate method of amortization, a constant (or effective) rate of interest on the bond book, or carrying, value is allocated to the period.

**Information:**

On December 31, 2006, ABC Co. issued \$1,000,000 of 8 percent bonds, due in five years with interest payable annually on December 31. The market rate of interest is 7 percent. Assume the bond was issued at \$1,041,002 (see Cornerstone 9-10 for calculation).

**Required:**

1. Complete the following amortization table:

Annual Period	Cash Payment (Credit)	Interest Expense (Debit)	Premium on Bonds Payable (Debit)	Premium on Bonds Payable Balance	Carrying Value
At issue					
12/31/07					
12/31/08					
12/31/09					
12/31/10					
12/31/11					

2. Provide the journal entry necessary to recognize the interest expense on December 31, 2007 and 2008.
3. Provide the journal entry to record the repayment of the loan principal on December 31, 2011.

**Solution:**

1.

Annual Period	Cash Payment* (Credit)	Interest Expense** (Debit)	Premium on Bonds Payable*** (Debit)	Premium on Bonds Payable Balance	Carrying Value****
At issue				\$41,002	\$1,041,002
12/31/07	\$80,000	\$72,870	\$7,130	33,872	1,033,872
12/31/08	80,000	72,371	7,629	26,243	1,026,243
12/31/09	80,000	71,837	8,163	18,080	1,018,080
12/31/10	80,000	71,266	8,734	9,346	1,009,346
12/31/11	80,000	70,654	9,346	0	1,000,000

\* Cash Payment = Face Value  $\times$  8%  $\times$  12/12 = \$80,000\*\* Interest Expense = Carrying Value  $\times$  7%  $\times$  12/12

\*\*\* Change in Premium Balance = Cash Payment – Interest Expense

\*\*\*\* New Carrying Value = Previous Carrying Value – Change in Premium on Bonds Payable Balance

2. The following entry would be made on December 31, 2007 and 2008:

Account and Explanation	12/31/07		12/31/08	
	Debit	Credit	Debit	Credit
Interest Expense	72,870		72,371	
Premium on Bonds Payable	7,130		7,629	
Cash		80,000		80,000

(Record interest payment on bonds)

12/31/07

Stockholders'		
Assets	=	Liabilities + Equity
-80,000		-7,130    -72,870

12/31/08

Stockholders'		
Assets	=	Liabilities + Equity
-80,000		-7,629    -72,371

3. At maturity (December 31, 2011), the bond principal is paid off along with the final interest payment (assume the final interest payment was recorded in a separate entry as in 2).

Date	Account and Explanation	Debit	Credit
Dec. 31, 2011	Bonds Payable	1,000,000	
	Cash		1,000,000

(Record repayment of principal)

Stockholders'		
Assets	=	Liabilities + Equity
-1,000,000		-1,000,000

period. Exhibit 9-10 illustrates how the carrying value of the bonds are different between the straight-line and effective interest methods for both a premium and a discount.

## Installment Debt

Instead of paying off the principal at maturity, some debt requires a portion of the principal to be paid off each period (usually monthly), along with some interest. Classic installment debt payments are home mortgages or car payments. Installment debt payments are the same each period, but the portion that is considered interest changes because the outstanding principal balance is changing. To illustrate, consider buying a car for \$20,000, at 6 percent annual interest, and 48 monthly payments. In this case, each monthly payment would be \$469.70. After 48 payments you would have paid a total of \$22,545.60 (\$469.70  $\times$  48). This means you would have paid \$2,545.60 of interest and \$20,000 of principal. However, the initial monthly

## CONCEPT Q&A

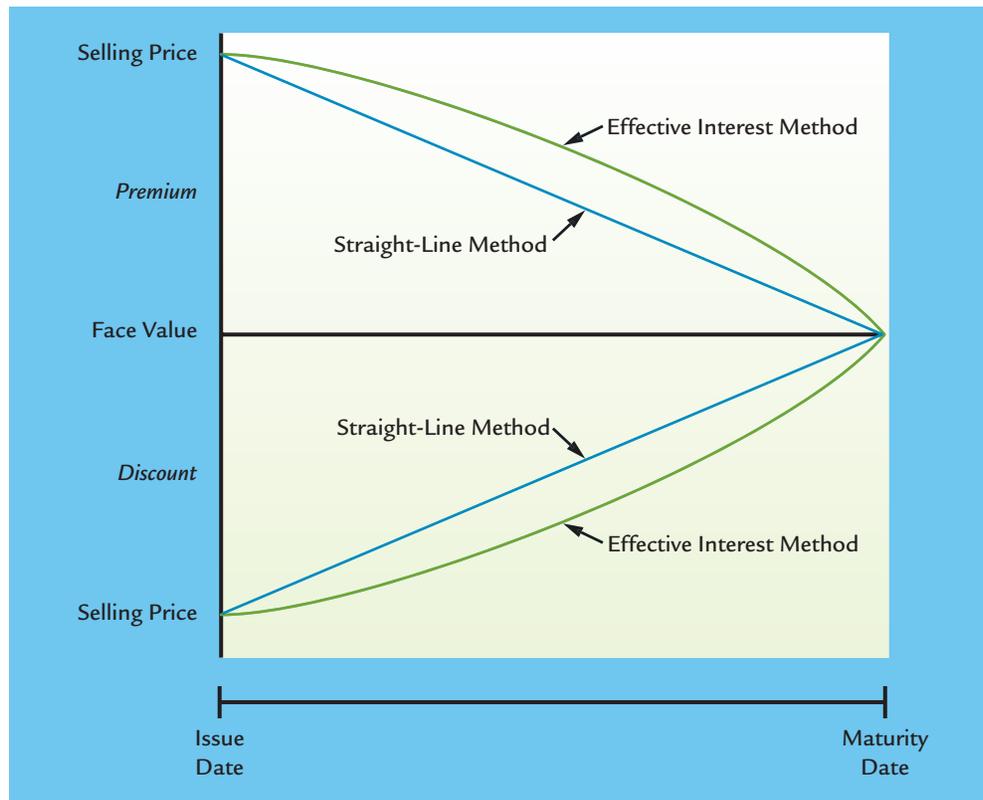
Why is the effective interest rate method GAAP?

The effective interest rate method does a better job allocating, or matching, the time value of money to the proper period. Under the effective interest rate method, the interest expense is equal to market rate of interest (or yield) at issue on the bond book value. This makes sense because market forces will ensure that the creditor receives the market rate of return on the investment.

Possible Answer:

**Exhibit 9-10**

**Long-Term Debt Carrying Value Using Straight-Line and Effective Interest Methods to Amortize Premium and Discount**



**CONCEPT Q&A**

How do credit cards calculate interest?

Although terms vary from card to card, they all charge some percentage of our average balance for the period. For example, if your card charges 1.5 percent of the average balance for the month and you have a \$5,000 average balance, then interest charge would be \$75. Interest of 1.5 percent may not sound that bad, but remember that this is per month. That equates to 18 percent per year (1.5 percent × 12 months). Further, if all you do is pay the interest, recognize that you are not lowering your outstanding balance at all.

Possible Answer:

payments would have a relatively high portion allocated to interest because your outstanding loan balance is relatively high. Your last few payments, on the other hand, would have a relatively low portion allocated to interest because your outstanding loan balance is relatively low. We use a home mortgage to illustrate installment debt in [Cornerstone 9-8](#).

Exhibit 9-11 shows the installment note discussed in Cornerstone 9-8. Notice that interest is a decreasing portion of each payment. This is because the principal balance is decreasing with each payment. Although this exhibit doesn't provide the detail, with long-term installment loans (e.g., a home mortgage often requires monthly payments over 30 years—360 in total), a vast majority of the early payments will be interest expense.



**CORNERSTONE 9-8**



**HOW TO Account for Installment Debt Using the Effective Interest Rate Method**

**Concept:**

Installment debt has equal periodic payments with a portion of each payment being allocated to interest expense and the remainder paying down the principal balance. The interest expense portion is calculated as follows:

$$\text{Outstanding Loan Balance at the Beginning of the Period} \times \text{Interest Rate} \times \text{Time (in years)}$$

Accordingly, each payment reduces the outstanding loan balance, which in turn, reduces the interest expense in the subsequent period.

**Information:**

On December 31, 2009, Strand Ranch buys a John Deere combine for \$190,000. Strand Ranch signs an installment note to pay off the debt with 10 semiannual payments (i.e., they'll pay it off over five years). The note specifies a 5 percent interest rate, which results in a \$21,709.17 payment every six months for the next five years. (Note that the final payment is adjusted to be equal to the remaining balance. The difference occurs due to rounding.)

**Required:**

1. Provide the journal entry to record the purchase of the John Deere combine on December 31, 2009.
2. Complete the following amortization table:

Period	Cash Payment (Credit)	Interest Expense (Debit)	Reduction of Note Payable (Debit)	Note Payable Balance
At Issue				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

3. Provide the journal entry to record the installment loan payment on June 30, 2011 (the third payment).
4. Provide the journal entry to record the installment loan payment on December 31, 2014 (the tenth, and final, payment).

**Solution:**

1. Entry to record the issuance of note for purchase of equipment:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Equipment	190,000	
	Notes Payable		190,000
	<i>(Record note issued for equipment purchase)</i>		

Stockholders' Equity	
Assets	Liabilities + Equity
+190,000	+190,000

- 2.

Period	Cash Payment (Credit)	Interest Expense (Debit)	Reduction of Note Payable (Debit)	Note Payable Balance
At issue				\$190,000.00
1	\$21,709.17	\$4,750.00	\$16,959.17	173,040.83
2	21,709.17	4,326.02	17,383.15	155,657.68
3	21,709.17	3,891.44	17,817.73	137,839.95
4	21,709.17	3,446.00	18,263.17	119,576.78
5	21,709.17	2,989.42	18,719.75	100,857.03
6	21,709.17	2,521.43	19,187.74	81,669.29
7	21,709.17	2,041.73	19,667.44	62,001.85
8	21,709.17	1,550.05	20,159.12	41,842.73
9	21,709.17	1,046.07	20,663.10	21,179.63
10	21,709.12*	529.49	21,179.63	0.00

\* Plug amount, slight difference due to rounding.

**CORNERSTONE**  
**9-8**  
*(continued)*

## CORNERSTONE 9-8 (continued)

		Stockholders'
Assets = Liabilities + Equity		
-21,709.17	-17,817.73	-3,891.44

3. Recognize that the interest expense is declining each period because the outstanding loan balance (the column on the far right of the amortization table) is declining each period.

Date	Account and Explanation	Debit	Credit
June 30, 2011	Note Payable	17,817.73	
	Interest Expense	3,891.44	
	Cash		21,709.17
	<i>(Record payment 3 on notes payable)</i>		

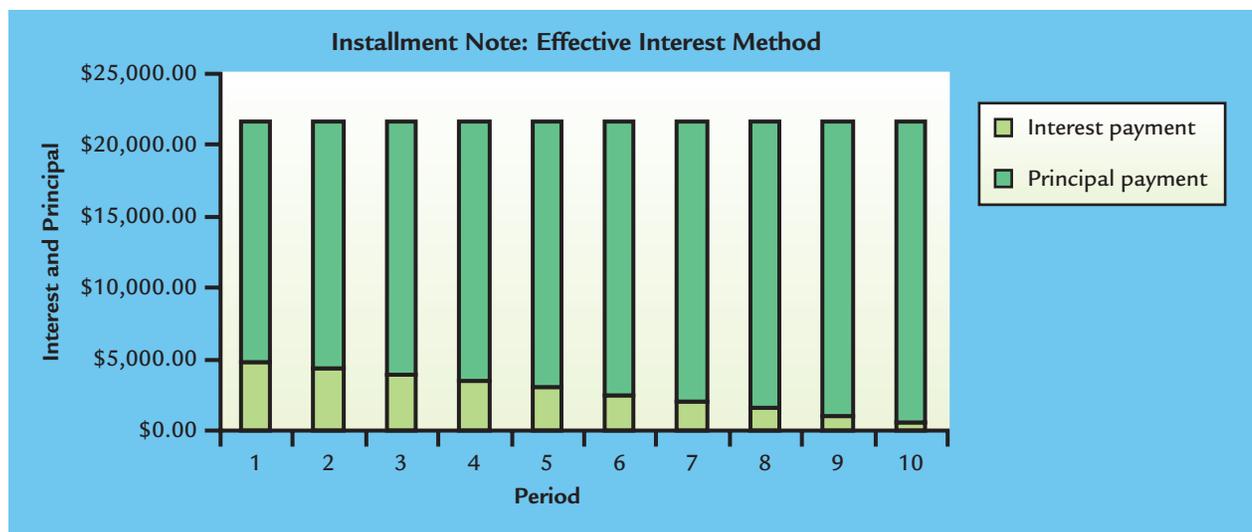
4. Entry to record the final payment:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2014	Note Payable	21,179.63	
	Interest Expense	529.49	
	Cash		21,709.12
	<i>(Record payment 10 on notes payable)</i>		

		Stockholders'
Assets = Liabilities + Equity		
-21,709.12	-21,179.63	-529.49

### Exhibit 9-11

#### Amount of Interest and Principal Payment on an Installment Note



### OBJECTIVE 5

Determine the after-tax cost of financing with debt and explain financial leverage.

## Pros and Cons of Financing with Debt

A significant advantage of financing with debt rather than stock is the fact that the interest expense on debt is deductible for income tax purposes. Consider the case of Carmel Company which issued \$1,000,000 of 8 percent bonds that resulted in interest expense of \$80,000 per year. The net cash outflow for Carmel's bonds is significantly less than \$80,000, however, because of the effect of interest deductibility.

Since interest expense is deductible, taxable income is \$80,000 less than it is without the bond issue. At a rate of 30 percent ( $\$80,000 \times 30\%$ ), income taxes were reduced by \$24,000, yielding a net cash outflow for the bonds of \$56,000 ( $\$80,000 - \$24,000$ ). In other words, the cost of financing with bonds (or any other form of debt with tax-deductible interest payments) is the interest *net of income taxes*, which is determined using the following formula:

$$\begin{aligned}
 \text{Interest Net of Income Taxes} &= (1 - \text{Tax Rate})(\text{Interest}) \\
 &= (1 - 0.30)(\$80,000) \\
 &= \$56,000
 \end{aligned}$$

Another potential advantage of debt is that it fixes the amount of compensation to the lender. No matter how successful the firm is in using borrowed capital, its creditors receive only the return specified in the debt agreement (interest plus the face amount). Thus, if the borrowed capital generates income in excess of the interest on the debt, the firm's stockholders benefit. The use of borrowed capital to produce more income than needed to pay the interest on the debt is called **leverage**.

Under the right conditions, leverage has significant advantages. However, conditions also exist under which the use of leverage is disadvantageous. Exhibit 9-12 illustrates both conditions. Two companies—Carmel Company and Noblesville, Inc.—have identical financial circumstances except that Carmel finances its operations with debt as well as stock; Noblesville carries no debt. In 2008, favorable economic conditions allow Carmel to make the most of its leverage. Carmel's stockholders earn \$3.64 per share, which includes an amount attributable to earnings in excess of the cost of borrowing. In contrast, Noblesville's stockholders earn only \$2.80 per share in 2008. However, income from operations falls sharply in 2009. As a result, Carmel's stockholders earn only \$0.84 per share compared with \$0.93 per share for Noblesville's stockholders. Just as stockholders receive earnings in excess of the interest on debt, so they must bear the burden when the interest on debt exceeds earnings.

A third advantage of financing with debt is that in periods of inflation, debt permits the borrower to repay the lender in dollars that have declined in purchasing power. For instance, based on changes in the consumer price index (CPI), \$1,000,000 borrowed in 1970 and repaid in 1990 provided the lender with only 30 percent of the purchasing power of the amount loaned in 1970.

The primary negative attribute of debt is the inflexibility of the payment schedule. Debt requires specified payments to creditors on specified dates. If a payment is not made as scheduled, the borrower can be forced into bankruptcy. This attribute of debt makes it a more risky source of capital than equity. The larger the proportion of debt an entity uses to finance its capital needs, the greater the risk of default. As risk increases (because of a higher proportion of debt), the cost of the debt increases. At a certain point, the risk becomes so great that additional debt cannot be issued at any cost. For firms whose operational and competitive circumstances produce substantial fluctuations in earnings, even low levels of debt may be considered too risky.

## Exhibit 9-12

**Effects of Financing with Debt**

	2008		2009	
	Carmel Company	Noblesville, Inc.	Carmel Company	Noblesville, Inc.
Balance sheet:*				
Assets	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000
Bonds payable	1,000,000	-0-	1,000,000	-0-
Stockholders' equity	2,000,000	3,000,000	2,000,000	3,000,000
Number of capital stock shares	100,000	150,000	100,000	150,000
Income statement:				
Income from operations	\$ 600,000	\$ 600,000	\$ 200,000	\$ 200,000
Interest expense (8%)	80,000	-0-	80,000	-0-
Income before taxes	\$ 520,000	\$ 600,000	\$ 120,000	\$ 200,000
Income taxes expense (30%)	156,000	180,000	36,000	60,000
Net income	\$ 364,000	\$ 420,000	\$ 84,000	\$ 140,000
Earnings per share	\$ 3.64	\$ 2.80	\$ 0.84	\$ 0.93

\* Annual averages (assume that current liabilities are negligible).

In sum, a business must weigh both the negative and positive aspects of debt financing in deciding whether or not to take the risk. This extremely complex decision is treated more fully in finance courses.<sup>3</sup>

Occasionally, a business finds that it is unable to make the interest or principal payments required by its long-term debt. If there is reason to expect that the firm will eventually be able to secure enough cash to make part of or all the required payments, creditors may permit a restructuring of the cash payment schedule. The amount at which the firm's liabilities are measured may or may not be changed by such a restructuring. In such cases, creditors must analyze the situation to ensure that they are better off than they would be if they forced a bankruptcy.

We turn now to leases, which can serve as another means of financing asset acquisitions.

## OBJECTIVE > 6

Contrast the terms and the accounting for operating and capital leases.

## Leases

During the past 30 years, leases have increasingly become an alternative to outright asset purchases for firms seeking to expand their operations. A **lease** enables a firm to use property without legally owning it. When firms first began to use leases as sources of capital, they generally omitted them from the liabilities sections of their balance sheets. In 1976, however, the Financial Accounting Standards Board identified two kinds of lease obligations, operating leases and capital leases, and required that capital leases be included among a firm's assets and liabilities.<sup>4</sup> We will discuss both types of leases and their accounting in the sections that follow.

### Operating Leases

The most common form of lease is an **operating lease**, under which the lessor (the legal owner of the asset) retains the risks and obligations of ownership, while the lessee uses the asset during the term of the lease. Automobiles, apartments, retail space, and office space are usually rented with operating leases. All discussions of rental arrangements considered earlier in this book have been operating leases.

Under an operating lease, the leased asset does not appear in the records of the lessee, because the legal owner of the asset retains the risks and obligations of ownership. Rent paid in advance of the use of the asset is reported as prepaid rent, and rent expense is recognized in the period in which the leased asset is used. However, because many financial-statement users view leases as liabilities, the sum of all payments required by noncancelable operating leases for the next five years must be disclosed in a footnote to the lessee's financial statements. Exhibit 9-13 is taken from **Starbucks'** 2006 10-K.

### Capital Leases

A **capital lease** is a noncancelable agreement that is in substance a purchase of the leased asset. If a lease has any of the following characteristics, it is essentially a purchase, and is therefore considered a capital lease:

1. A transfer of the leased asset to the lessee occurs at the end of the lease at no cost or at a "bargain price."
2. The term for the lease is at least 75 percent of the economic life of the leased asset.
3. The present value of the lease payments is at least 90 percent of the fair value of the leased asset.

Although the lessor remains the legal owner of the leased asset, a capital lease transfers virtually all the benefits of ownership to the lessee. Therefore, a capital lease

<sup>3</sup>The preceding discussion has explained the accounting concepts and procedures for debt used by borrowers. Although the concepts and procedures used by investors in debt securities are based on the same measurements and calculations, the reporting conventions are somewhat different. The most fundamental difference is that investors record debt acquired as assets rather than liabilities and record the interest as revenue rather than expense.

<sup>4</sup>Financial Accounting Standards Board, "Accounting for Leases," Statement of Financial Accounting Standards No. 13.

## Exhibit 9-13

## Excerpts from Starbucks' 2006 10-K

**Note 13****Leases**

Minimum future rental payments under noncancelable operating lease obligations as of October 1, 2006, are as follows (in thousands):

FISCAL YEAR ENDING	
2007	\$ 531,634
2008	520,553
2009	492,759
2010	452,859
2011	408,412
Thereafter	1,486,721
Total minimum lease payments	<u>\$3,892,938</u>

is appropriately shown among the lessee's assets and liabilities. At the beginning of such a lease, a capital lease liability is recorded at the present value of the future lease payments. At this time, an asset is recorded in the same amount. Over the life of the lease the asset is depreciated, using an appropriate depreciation method. The lease liability is reduced and interest expense recorded as lease payments are made.

To illustrate the computations and entries for capital leases, we will assume that on January 1, 2009, ABT Laboratories signed a five-year lease for data processing equipment. The current cash value (present value) of the future lease payments using a 9 percent interest rate—and the fair value of the data processing equipment—is \$600,000. The equipment has an expected economic life of five years and no residual value. The terms of the lease require a payment of \$154,255 at the end of each year.

On January 1, 2009, ABT would recognize the asset and the capital lease liability as follows:

Date	Account and Explanation	Debit	Credit
Jan. 1, 2009	Leased Asset	600,000	
	Capital Lease Liability		600,000
	<i>(Record capital lease of equipment)</i>		

Assets = Liabilities +		Stockholders' Equity
+600,000	+600,000	

Interest expense on the lease for the first year is \$54,000 ( $\$600,000 \times 9\%$ ). The lease payment (\$154,255) is larger than the interest expense because the payment includes an amount to pay down the principal amount of the lease liability as well as the interest. At the end of the lease, the last lease payment will pay the last period's interest and will pay off the lease liability.

At the end of the first year, ABT would recognize the lease payment, interest expense, and reduction in the capital lease liability as follows:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Capital Lease Liability*	100,255	
	Interest Expense	54,000	
	Cash		154,255
	<i>(Record capital lease payment)</i>		

Assets = Liabilities +		Stockholders' Equity
-154,225	-100,255	-54,000

\*The capital lease liability reduction is the cash payment minus the interest expense ( $\$154,255 - \$54,000 = \$100,255$ ).

ABT would also recognize depreciation expense at the end of the first year with the following adjustment:

Date	Account and Explanation	Debit	Credit
Dec. 31, 2009	Depreciation Expense, Leased Asset	120,000*	
	Accumulated Depreciation, Leased Asset		120,000
	<i>(Record depreciation on lease equipment)</i>		

Assets = Liabilities +		Stockholders' Equity
-120,000		-120,000

\*(600,000/5 years)

Thus, the total first year expense for the property is the sum of the interest expense and the depreciation expense:

$$\$54,000 + \$120,000 = \$174,000$$

Disclosure rules for capital leases require that lease liabilities be reported with a business's long-term debt, and that future cash payments for capital leases be reported in a table like the one used for operating leases. The 2007 disclosure by **Federal Express Corporation** is typical, showing capital lease obligations as part of long-term debt (see Exhibit 9-14).

Depending on their terms, capital leases can be more or less attractive than borrowing as a means of financing asset acquisitions, as the following analysis demonstrates. Ives Corporation plans to acquire five new trucks. If purchased, the trucks will cost \$12,000 each. One truck dealer will allow Ives to pay 10 percent down (\$6,000) and will finance the remaining \$54,000 on a five-year, 10 percent interest-bearing note requiring annual interest payments of \$5,400 and a principal payment of \$54,000 at maturity. Another dealer will lease trucks of the same make to Ives on a capital lease requiring annual payments of \$15,828 for five years. The trucks would become Ives' property at the end of the lease.

The following tables show the interest expense under the two arrangements:

	Leasing	Borrowing
Cash payments:		
Year 1	\$15,828	\$11,400
Year 2	15,828	5,400
Year 3	15,828	5,400
Year 4	15,828	5,400
Year 5	15,828	59,400
Total for 5 years	<u>\$79,140</u>	<u>\$87,000</u>
Less: Principal	60,000	60,000
Interest expense for 5 years	<u>\$19,140</u>	<u>\$27,000</u>

**Exhibit 9-14**
**Excerpts from Federal Express Corporation's 2007 10-K**

in millions	May 31	
	2007	2006
Capital lease obligations	308	310
<p>Our capital lease obligations include leases for aircraft and facilities. Our facility leases include leases that guarantee the repayment of certain special facility revenue bonds that have been issued by municipalities primarily to finance the acquisition and construction of various airport facilities and equipment. These bonds require interest payments at least annually, with principal payments due at the end of the related lease agreement.</p> <p>A note on the firm's lease commitments contains the following disclosure:</p> <p>A summary of future minimum lease payments under capital leases with an initial or remaining term of one year at May 31, 2007 is as follows (in millions):</p>		
2008		\$103
2009		13
2010		97
2011		8
2012		8
Thereafter		<u>137</u>
		<u>\$366</u>
Less amount representing interest		58
Present value of net minimum lease payments		<u>\$308</u>

Although the leasing alternative promises a lower total cash outflow and lower total interest expense, its level payment schedule does not allow Ives to defer payment to the same extent as the borrowing option. The advantage of the deferred payment may more than offset the advantages offered by the lease.

In addition, the payment schedules shown above do not include the effects of the interest on income tax payments. Since the interest expense is greater under borrowing, the tax effects of borrowing will also be greater. Of course, the data presented here are insufficient to enable a final recommendation. A complete analysis of these alternatives would include an evaluation of the amounts and timing of the payments required by the two options and the income tax effects of both interest and depreciation. (Such analyses are explained in finance courses.)

## Ratio Analysis

Although long-term creditors are concerned with a company's short-term liquidity, they are primarily concerned with its long-term solvency. As such, long-term creditors focus on ratios that incorporate (1) long-term debt and (2) interest expense/payments.

The following ratios are often used to analyze a company's debt load:

$$\text{Debt to Equity} = \frac{\text{Total Liabilities}}{\text{Total Equity}}$$

$$\text{Debt to Total Assets} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

$$\text{Long-Term Debt to Equity} = \frac{\text{Long-Term Debt}}{\text{Total Equity}}$$

The long-term debt to equity ratio is designed to look at the mix of debt and equity financing. For example, if the ratio is 1.00, then 50 percent of the company's financing comes from shareholders while the other 50 percent comes from creditors. However, over the last few decades borrowing arrangements have become much more varied. That is, historically when companies borrowed they locked themselves into long-term debt contracts. Now many companies use short-term borrowing, such as revolving credit, as part of their financing plan. This has the advantage of allowing companies to more frequently adjust their levels of borrowing based on current conditions. The downside is that short-term credit exposes them to greater risk of interest rate changes. For example, when interest rates increase, short-term borrowers may be forced to refinance at these higher rates while long-term borrowers will be locked in at the lower rates. Of course, short-term borrowers can, and do, hedge these interest rate risks, but that is a topic for advanced accounting and finance courses.

Because it is increasingly common to use short-term debt financing, the debt to equity and debt to total asset ratios contain all debt. Although the denominators for these two ratios differ, they both give a sense of the extent to which a company is financed with debt. You can see this more clearly by remembering that Total Assets = Total Liabilities + Total Equity. Both ratios therefore measure the relative size of Total Liabilities in the accounting equation.

Other ratios focus a company's ability to make interest payments. These ratios are often called coverage ratios because they provide information on the company's ability to meet or cover its interest payments. The most common ratios focus either on accrual basis interest expense or the cash basis interest payment and are typically measured pretax because interest expense is tax deductible.

$$\begin{aligned} &\text{Times Interest Earned (Accrual Basis)} \\ &= \frac{(\text{Net Income} + \text{Income Taxes} + \text{Interest Expense})}{\text{Interest Expense}} \end{aligned}$$

$$\begin{aligned} &\text{Times Interest Earned (Cash Basis)} \\ &= \frac{(\text{Cash Flows from Operations} + \text{Taxes Paid} + \text{Interest Paid})}{\text{Interest Payments}} \end{aligned}$$

## OBJECTIVE 7

Analyze a company's long-term solvency using information related to long-term liabilities.

## CONCEPT Q&A

Is it always better to have lower debt to equity, debt to total assets, and long-term debt to equity ratios?

No. Debt provides opportunities for leverage. Think about it in this way—if you're guaranteed a return greater than your interest payments, it would not make sense to avoid borrowing. Of course, the reality is that while no returns are guaranteed, interest payments are unavoidable.

Possible Answer:

**ETHICS** When evaluating a company's solvency, a major concern is whether all debt was properly recorded. Companies have long engaged in transactions designed to hide debt. Such transactions are typically called *off-balance-sheet financing*. Interestingly, many such transactions are legal and considered to be ethical by most. For example, many companies structure their lease agreements to avoid meeting the criteria for capital leases that require recording an asset and liability related to the future lease obligation. Because these leases are then treated as operating leases, no asset or liability is recorded on the books (see the Lease Section on page 466).

Because many financial-statement users view operating leases as unavoidable obligations, FASB requires disclosure of operating lease obligations for each of the subsequent five years and in total (see Exhibit 9-13 on page 467). This disclosure allows users to adjust ratios. For example, in the footnotes of its 2006 10-K, American Airlines reports future minimum lease payments of \$11.409 billion related to its operating leases. If we capitalize these amounts, their debt to equity ratio goes from 25.25 (see solution to **Cornerstone 9-9**) to 35.95  $[(26,916 + 11,409)/(1,066)]$ .



## CORNERSTONE 9 - 9



### HOW TO Calculate and Analyze Long-Term Debt Ratios

**Concept:**

Investors and creditors are interested in a company's ability to meet its long-term obligations. Analysis of information about (1) long-term liabilities and (2) interest expense and payments provides such information.

**Information:**

Consider the following information from the 2006 10-Ks for **American Airlines** and **Southwest Airlines** (in millions).

American Airlines			
Long-term debt	\$ 8,799	Interest expense	\$ 795
Total liabilities	26,916	Net income	164
Total assets	25,850	Interest payments	864
Total equity	(1,066)	Cash flows from operations	1,597
		Income tax expense	0
		Income taxes paid	0
Southwest Airlines			
Long-term debt	\$ 1,689	Interest expense	\$ 128
Total liabilities	7,011	Net income	499
Total assets	13,460	Interest payments	90
Total equity	6,449	Cash flows from operations	1,406
		Income tax expense	291
		Income taxes paid	15

**Required:**

- Calculate the following ratios for both companies:
  - debt to equity
  - debt to total assets
  - long-term debt to equity
  - times interest earned (accrual basis)
  - times interest earned (cash basis)
- Interpret these results.

**Solution:**

1.

	American Airlines	Southwest Airlines
a. debt to equity	$\$26,916/(\$1,066) = -25.25$	$\$7,011/\$6,449 = 1.09$
b. debt to total assets	$\$26,916/\$25,850 = 1.04$	$\$7,011/\$13,460 = 0.52$
c. long-term debt to equity	$\$8,799/(\$1,066) = -8.25$	$\$1,689/\$6,449 = 0.26$
d. times interest earned (accrual basis)	$(\$164 + \$0 + \$795)/\$795 = 1.21$	$(\$499 + \$291 + \$128)/\$128 = 7.17$
e. times interest earned (cash basis)	$(\$1,597 + \$0 + \$864)/\$864 = 2.85$	$(\$1,406 + \$15 + \$90)/\$90 = 16.79$

**CORNERSTONE**  
**9-9**  
*(continued)*

2. Southwest's solvency risk is clearly far lower than American's. Not only does American have an extremely high debt burden, but a huge portion of its earnings and cash flows are needed for interest. Southwest, on the other hand, has a relatively low debt load and can easily make its interest payments. Not surprisingly, American is well below industry averages on most ratios while Southwest is an industry leader. These ratios are also reflected in their credit ratings. American has fluctuated between B and B- while Southwest is typically an A or A-.

Many companies also create other legal entities (called "special purpose entities" or SPEs) to "hide" debt. As with leases, such transactions are legal when certain rules are met involving outside investors. Enron, however, created some SPEs in which the documentation appeared to meet the outside investor rules to keep the debt off Enron's balance sheet. In hindsight, however, either unwritten, side-agreements or complicated aspects of some of the contracts indicate that the debt should have been included on Enron's balance sheet. Keeping this debt off their balance sheet was important for Enron in maintaining its credit rating, but these unwritten, side-agreements and complicated aspects of the contracts were necessary to attract the outside investors. While virtually nobody considers structuring their leases to allow treatment as an operating lease to be unethical, the side-agreements and subterfuge used by Enron was not only unethical, but in many cases criminal. ♦

## Summary

Long-term debt arises from transactions supported by a variety of legal documents, including notes, bonds, and capital leases. This chapter explains the accounting procedures for calculating interest expense using both the straight-line and effective interest rate methods.

Long-term debt accounting is complicated by the fact that debt is often sold at a premium or discount. A premium or discount affects the amount of interest expense associated with a debt instrument. There are advantages to financing asset acquisitions with long-term debt. For example, debt is frequently a less expensive source of capital than stock (equity) and interest payments are tax deductible.

Leases represent an important alternative to notes, debentures, and equity as a means of acquiring assets. When a lease is, in substance, a purchase of leased facilities, it is known as a *capital lease*. An asset and a long-term liability are recorded for such leases. Since a firm's ability to borrow through debt or capital leases is usually limited, most firms are financed by a mixture of debt and equity. The use of equity as a source of long-term capital will be discussed in Chapter 10.

## Summary of Learning Objectives

---

**LO1. Describe debt securities and the markets in which they are issued.**

- Debt securities are issued in exchange for borrowed cash.
- In return for the borrowed cash, the borrower typically makes periodic interest payments and repays the face, or par, value at maturity.
- These securities may be placed directly with a creditor such as a bank or pension fund or it may be more widely distributed with the help of an underwriter.

**LO2. Account for the issuance of long-term debt.**

- The issue price of long-term debt is typically quoted as a percentage of face value.
- At the time of issuance the borrower records the face value of the debt in bonds payable (or notes payable).
  - Any amount of cash received over the face value is credited to a premium
  - Any amount of cash received under the face value is debited to a discount
- The bonds payable (or notes payable) is netted with the premium or discount when reported on the balance sheet.

**LO3. Use the straight-line method to account for premium/discount amortization.**

- In the straight-line method, equal amounts of premium or discount are amortized to interest expense each period.
- This results in a constant interest expense each period.
- Although GAAP requires use of the effective interest rate method, the straight-line method may be used if the results are not materially different from the effective interest rate method.

**LO4. Use the effective interest rate method to account for premium/discount amortization.**

- GAAP requires the effective interest rate method to be used to amortize any premium or discount, unless the straight-line method is not materially different.
- Under this method, premiums and discounts are amortized in a manner that results in the interest expense for each accounting period being equal to a constant percentage of the bond book, or carrying, value.
- That is, the interest expense changes every period, but the effective interest rate on the bond book value is constant.
- This constant percentage is called the “yield” and represents the market rate of interest at the date of issue.

**LO5. Determine the after-tax cost of financing with debt and explain financial leverage.**

- Since interest expense is deductible for tax purposes, the presence of interest expense lowers the taxes owed.
- The formula for the after-tax effect of interest expense is  $(1 - \text{Tax Rate}) \times \text{Interest Expense}$ .

**LO6. Contrast the terms and the accounting for operating and capital leases.**

- A capital lease is a noncancelable agreement that is, in substance, a purchase of the leased asset.
- If a lease includes one of the following requirements it is considered a capital lease:
  - A transfer of the leased asset to the lessee occurs at the end of the lease at no cost or at a “bargain price,” or
  - The term for the lease is at least 75 percent of the economic life of the leased asset, or
  - The present value of the lease payments is at least 90 percent of the fair value of the leased asset.

- If a lease qualifies as a capital lease an asset and liability must be recorded.
- If the lease does not meet requirements to be treated as a capital lease, then it is treated as an operating lease.
- Under an operating lease, the leased asset does not appear in the records of the lessee, because the legal owner of the asset retains the risks and obligations of ownership.
- Rent paid in advance of the use of the asset is reported as prepaid rent, and rent expense is recognized in the period in which the leased asset is used.

**LO7. Analyze a company's long-term solvency using information related to long-term liabilities.**

- Although long-term creditors are concerned with a company's short-term liquidity, they are primarily concerned with its long-term solvency.
- As such, long-term creditors focus on ratios that incorporate
  - long-term debt and
  - interest expense/payments.

<b>CORNERSTONE 9-1</b>	How to record the issuance of bonds, page 447
<b>CORNERSTONE 9-2</b>	How to record interest expense for bonds sold at par, page 449
<b>CORNERSTONE 9-3</b>	How to record interest expense for zero-coupon bonds, page 450
<b>CORNERSTONE 9-4</b>	How to record interest expense for bonds sold at a discount, page 452
<b>CORNERSTONE 9-5</b>	How to record interest expense for bonds sold at a premium, page 454
<b>CORNERSTONE 9-6</b>	How to record interest expense for bonds sold at a discount using the effective interest rate method, page 459
<b>CORNERSTONE 9-7</b>	How to record interest expense for bonds sold at a premium using the effective interest rate method, page 460
<b>CORNERSTONE 9-8</b>	How to account for installment debt using the effective interest rate method, page 462
<b>CORNERSTONE 9-9</b>	How to calculate and analyze long-term debt ratios, page 470



**CORNERSTONES  
FOR CHAPTER 9**

## Key Terms

Bond, 443	Market rate, 445
Callable bonds, 444	Maturity, 443
Capital lease, 466	Mortgage bonds, 444
Contract rate, 444	Notes payable, 443
Convertible bonds, 444	Operating lease, 466
Coupon rate, 444	Par value, 443
Debenture bonds, 444	Principal, 443
Effective interest rate method, 443	Secured, 444
Face value, 443	Stated rate, 444
Interest amortization, 443	Straight-line method, 443
Junk bonds, 444	Unsecured, 444
Lease, 466	Yield, 445
Leverage, 465	

**OBJECTIVE** > **8**

Calculate the market price of long-term debt using present value techniques.

## Appendix: Pricing Long-Term Debt

As stated in the chapter, debt agreements create contractually defined cash flows for the lender. Specifically, lenders typically receive (1) periodic interest payments and (2) repayment of the loan principal at some future date (i.e., loan maturity). To receive these cash flows, the lender must decide how much to lend. When you borrow from a bank or car dealer, this single lender will set the interest rate to reflect the desired market, or yield, rate. However, there are notable exceptions. For example, if you buy a car for \$25,000 at 0.9 percent interest, does that mean the car dealer's yield is 0.9 percent? No, it really means that they would have been happy to sell you the car for something below \$25,000, such as \$24,250. In this case, the "extra" principal you repay ( $\$750 = \$25,000 - \$24,250$ ) represents interest.

Of course, similar situations happen to businesses, but by far the most common situation has to do with bonds because the stated rate of interest (e.g., 8 percent) on the bond does not provide the desired yield. The chapter discussed how if the yield is above the stated rate, the bond will sell at a discount (e.g., 98) and if the yield is below the stated rate, it will sell at a premium (e.g., 103). But, how are these prices determined?

Bonds are priced at the present value of the two future cash flows—the periodic interest payments provide an annuity, while the repayment of the principal is a lump sum. This calculation is shown in **Cornerstone 9-10**.



### CORNERSTONE 9-10



#### HOW TO Determine the Market Value of a Bond

**Concept:**

Bonds are issued at the present value of future cash flows. The interest payments and repayment of the bond principal (or face value) are the future cash flows. These amounts must be discounted at the market rate of interest (or yield).

**Information:**

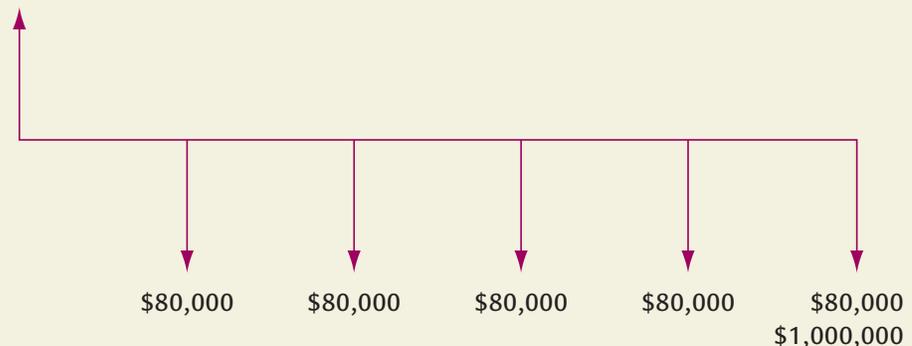
On December 31, 2006, ABC Co. issued \$1,000,000 of 8 percent bonds, due in five years with interest payable annually on December 31.

**Required:**

1. Draw the cash flow diagram.
2. What is the market value of these bonds if sold to yield 8 percent?
3. What is the market value of these bonds if sold to yield 9 percent?
4. What is the market value of these bonds if sold to yield 7 percent?

**Solution:**

1. PV = ?



2. To calculate the present value of the future cash flows two calculations must be made. One recognizes that the interest payments represent an annuity, while the second recognizes that repayment of the principal is a single sum.

Using 8 percent yield:

$$\begin{aligned} \text{PV of interest payments} &= (\text{Interest payment}) \\ &\quad (\text{PV of an annuity, 5 periods, 8\%}) \\ &= \$80,000 \times 3.992710^* = \$319,417 \end{aligned}$$

$$\begin{aligned} \text{PV of principal payments} &= (\text{Principal payment}) \\ &\quad (\text{PV of a single sum, 5 periods, 8\%}) \\ &= \$1,000,000 \times 0.680583^* = \$680,583 \end{aligned}$$

---

<b>Market price of bonds</b>	<b>\$1,000,000</b>
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\*Although present and future value tables provided at the end of Appendix 3 (Exhibits A3-7, A3-8, A3-9, and A3-10) only show five decimal places, we have used factors to six decimal places in these calculations (and those that follow). Use of six decimal places allows the market price of the bond when issued at par to be calculated with no rounding error.

3. Using 9 percent yield:

$$\begin{aligned} \text{PV of interest payments} &= (\text{Interest payment}) \\ &\quad (\text{PV of an annuity, 5 periods, 9\%}) \\ &= \$80,000 \times 3.889651 = \$311,172 \end{aligned}$$

$$\begin{aligned} \text{PV of principal payments:} &= (\text{Interest payment}) \\ &\quad (\text{PV of a single sum, 5 periods, 9\%}) \\ &= \$1,000,000 \times 0.649931 = \$649,931 \end{aligned}$$

---

<b>Market price of bonds</b>	<b>\$961,103</b>
------------------------------	------------------

---

4. Using 7 percent yield:

$$\begin{aligned} \text{PV of interest payments} &= (\text{Interest payment}) \\ &\quad (\text{PV of an annuity, 5 periods, 7\%}) \\ &= \$80,000 \times 4.100197 = \$328,016 \end{aligned}$$

$$\begin{aligned} \text{PV of principal payments} &= (\text{Interest payment}) \\ &\quad (\text{PV of a single sum, 5 periods, 7\%}) \\ &= \$1,000,000 \times 0.712986 = \$712,986 \end{aligned}$$

---

<b>Market price of bonds</b>	<b>\$1,041,002</b>
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**CORNERSTONE**  
**9-10**  
*(continued)*

## Appendix: Summary of Learning Objectives

- LO8. Calculate the market price of long-term debt using present value techniques.**
- Bonds are issued at the present value of future cash flows.
  - The interest payments and repayment of the bond principal (or face value) are the future cash flows.
  - These amounts must be discounted at the market rate of interest (or yield).



## CORNERSTONES FOR APPENDIX 9

**CORNERSTONE 9-10** How to determine the market value of a bond, page 474

## Review Problem

### I. Straight-Line Method

To finance a new hydroelectric plant, Midwest Electric issues \$100,000,000 of 9 percent, 15-year bonds on December 31, 2005. The bonds pay interest semiannually on June 30 and December 31. Assume the market rate of interest on December 31, 2005, was above 9 percent.

#### Required:

1. Will the bonds be issued at par, a premium, or a discount? Why?
2. Describe the cash payments made by Midwest Electric.
3. Provide the journal entry to record the bond issue assuming the bonds were issued at 91.
4. What is the amount of discount amortization per six month interest period?
5. Complete the following amortization table through June 30, 2008.

Semiannual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue					
6/30/06					
12/31/06					
6/30/07					
12/31/07					
6/30/08					

6. Provide the journal entries for December 31, 2007, and June 30, 2008.
7. How will the bonds be shown on the December 31, 2007, balance sheet?
8. Provide the journal entry to record the repayment of principal at maturity.

#### Solution:

1. The bonds will be issued at a discount (below par) because the stated rate is below the market rate. Thus, Midwest Electric will have to lower the price below face value to compensate creditors for accepting a below market interest payment.
2. The interest payments are made semiannually, so the interest payments are:

$$\$100,000,000 \times 9\% \times 6/12 = \$4,500,000$$

There are 30 interest payments over the 15-year life of the bonds, so total interest payments are:

$$\$4,500,000 \times 30 = \$135,000,000$$

At maturity, the face value of \$100,000,000 is also repaid. Thus, total payments (interest plus principal) of \$235,000,000 are made.

3. Date	Account and Explanation	Debit	Credit
Dec. 31, 2005	Cash	91,000,000	
	Discount on Bonds Payable	9,000,000	
	Bonds Payable		100,000,000
	(Record issuance of bonds)		

Assets = Liabilities + Stockholders' Equity		
+91,000,000	-9,000,000	+100,000,000

4. Discount Amortization = Total Discount/Number of Interest Periods  
 = 9,000,000/30  
 = 300,000

5. Semiannual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue				\$9,000,000	\$91,000,000
6/30/06	\$4,500,000	\$4,800,000	\$300,000	8,700,000	91,300,000
12/31/06	4,500,000	4,800,000	300,000	8,400,000	91,600,000
6/30/07	4,500,000	4,800,000	300,000	8,100,000	91,900,000
12/31/07	4,500,000	4,800,000	300,000	7,800,000	92,200,000
6/30/08	4,500,000	4,800,000	300,000	7,500,000	92,500,000

12/31/07

Assets = Liabilities + Stockholders' Equity		
-4,500,000	+300,000	-4,800,000

6. Account and Explanation	12/31/07		6/30/08	
	Debit	Credit	Debit	Credit
Interest Expense	4,800,000		4,800,000	
Cash		4,500,000		4,500,000
Discount on Bonds Payable		300,000		300,000
(Record interest payment on bonds)				

6/30/08

Assets = Liabilities + Stockholders' Equity		
-4,500,000	+300,000	-4,800,000

7. Long-term liabilities:
- |                                 |                  |            |
|---------------------------------|------------------|------------|
| Bonds payable                   | 100,000,000      |            |
| Less: Discount on bonds payable | <u>7,800,000</u> | 92,200,000 |

8. Date	Account and Explanation	Debit	Credit
Dec. 31, 2021	Bonds Payable	100,000,000	
	Cash		100,000,000
	(Record repayment of bonds)		

Assets = Liabilities + Stockholders' Equity		
-100,000,000	-100,000,000	

## II. Effective Interest Method

To finance a new hydroelectric plant, Midwest Electric issues \$100,000,000 of 9 percent, 15-year bonds on December 31, 2005. The bonds pay interest semiannually on June 30 and December 31. Assume the market rate of interest on December 31, 2005, was 10 percent.

### Required:

- Will the bonds be issued at par, a premium, or a discount? Why?
- Describe the cash flows.
- Using present value techniques, verify the bond issue price of \$92,309,730? (This requires the appendix.)
- Provide the journal entry to record the bond issue.
- Prepare an effective interest rate amortization table through June 30, 2008.

Semiannual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue					
6/30/06					
12/31/06					
6/30/07					
12/31/07					
6/30/08					

6. Provide the journal entries for December 31, 2007, and June 30, 2008.
7. How will the bonds be shown on the December 31, 2007, balance sheet?
8. Provide the journal entry to record the repayment of principal at maturity.

**Solution:**

1. The bonds will be issued at a discount (below par) because the stated rate is below the market rate. Thus, Midwest Electric will have to lower the price below face value to compensate creditors for accepting a below market interest payment.
2. The interest payments are made semiannually, so the interest payments are:

$$\$100,000,000 \times 9\% \times 6/12 = \$4,500,000$$

There are 30 interest payments over the 15-year life of the bonds, so total interest payments are:

$$\$4,500,000 \times 30 = \$135,000,000$$

At maturity the face value of \$100,000,000 is also repaid. Thus, total payments (interest plus principal) of \$235,000,000 are made.

3. The issue price is the present value of the cash flows:

$$\begin{aligned} \text{PV of interest payments} &= (\text{Interest payment}) \\ &\quad (\text{PV of an annuity, 30 semiannual periods, 5\%}) \\ &= \$4,500,000 \times 15.372451 = \$69,176,030 \end{aligned}$$

$$\begin{aligned} \text{PV of principal payments} &= (\text{Principal payment}) \\ &\quad (\text{PV of a single sum, 30 semiannual periods, 5\%}) \\ &= \$100,000,000 \times 0.231337 = \$23,133,700 \end{aligned}$$

Market price of bonds \$92,309,730

	Stockholders'	
Assets =	Liabilities +	Equity
+92,309,730	-7,690,270	
	+100,000,000	

4. Date	Account and Explanation	Debit	Credit
Dec. 31, 2005	Cash	92,309,730	
	Discount on Bonds Payable	7,690,270	
	Bonds Payable		100,000,000
	<i>(Record issuance of bonds)</i>		

5.	Annual Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
	At issue				\$7,690,270	\$92,309,730
	6/30/06	\$4,500,000	\$4,615,487	\$115,487	7,574,783	92,425,217
	12/31/06	\$4,500,000	\$4,621,261	\$121,261	7,453,522	92,546,478
	6/30/07	\$4,500,000	\$4,627,324	\$127,324	7,326,198	92,673,802
	12/31/07	\$4,500,000	\$4,633,690	\$133,690	7,192,508	92,807,492
	6/30/08	\$4,500,000	\$4,640,375	\$140,375	7,052,133	92,947,867

12/31/07

	Stockholders'	
Assets =	Liabilities +	Equity
-4,500,000	+133,690	-4,633,690

6. Account and Explanation	12/31/07 Debit	12/31/07 Credit	6/30/08 Debit	6/30/08 Credit
Interest Expense	4,633,690		4,640,375	
Cash		4,500,000		4,500,000
Discount on Bonds Payable		133,690		140,375
<i>(Record interest payment on bonds)</i>				

6/30/08

	Stockholders'	
Assets =	Liabilities +	Equity
-4,500,000	+140,375	-4,640,375

7. Long-term liabilities:
 

Bonds payable	\$100,000,000	
Less: Discount on bonds payable	7,192,508	\$92,807,492

	Stockholders'	
Assets =	Liabilities +	Equity
-100,000,000	-100,000,000	

8. Date	Account and Explanation	Debit	Credit
Dec. 31, 2021	Bonds Payable		100,000,000
	Cash	100,000,000	
	<i>(Record repayment of bonds)</i>		

## Discussion Questions

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1. What is long-term debt?
2. What is the difference between a bond and a note? How do the accounting treatments differ?
3. What does the face (or par) value of a bond represent?
4. What is the maturity date of a bond?
5. What is the stated or coupon rate of a bond?
6. How does a bond's stated rate differ from its yield rate? Which one is used to calculate the interest payment?
7. How does a secured bond differ from an unsecured bond?
8. What does it mean if a bond is "callable"?
9. What does it mean if a bond is "convertible"?
10. What is a junk bond?
11. How is total interest for long-term debt calculated?
12. Describe the process that businesses follow to sell new issues of long-term debt.
13. Describe how the relationship between the stated rate and yield rate affect the price at which bonds are sold.
14. How are premiums and discounts presented on the balance sheet?
15. How do premiums and discounts on long-term debt securities affect interest expense?
16. What is the difference between the straight-line and effective interest rate methods of amortizing premiums and discounts?
17. How can there be interest expense each period for zero-coupon bonds if there are no interest payments?
18. Under the effective interest rate method, describe the difference in calculating the (1) interest payment and (2) interest expense for the period.
19. How does a firm "leverage" its capital structure? When is leverage advantageous? When is it disadvantageous? Who receives the advantage or bears the disadvantage of leverage?
20. Name and describe two kinds of leases.
21. Which type of lease requires that a long-term debt and an asset be recorded at the inception of the lease?
22. Describe how the bond issue price is calculated.

## Multiple-Choice Exercises

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### 9-1 Which of the following statements regarding bonds payable is true?

- a. Generally, bonds are issued in denominations of \$100.
- b. When an issuing company's bonds are traded in the "secondary" market, the company will receive part of the proceeds when the bonds are sold from the first purchaser to the second purchaser.
- c. A debenture bond is backed by specific assets of the issuing company.
- d. The entire principal amount of most bonds mature on a single date.

### 9-2 Bonds are sold at a premium if the

- a. issuing company has a better reputation than other companies in the same business.
- b. market rate of interest was less than the stated rate at the time of issue.
- c. market rate of interest was more than the stated rate at the time of issue.
- d. company will have to pay a premium to retire the bonds.

### 9-3 If bonds are issued at 101.25, this means that

- a. a \$1,000 bond sold for \$101.25.
- b. the bonds sold at a discount.
- c. a \$1,000 bond sold for \$1,012.50.
- d. the bond rate of interest is 10.13 percent of the market rate of interest.

**9-4 What best describes the discount on bonds payable account?**

- a. An asset
- b. An expense
- c. A liability
- d. A contra liability

**9-5 The premium on bonds payable account is shown on the balance sheet as**

- a. a contra asset.
- b. a reduction of an expense.
- c. an addition to a long-term liability.
- d. a subtraction from a long-term liability.

**9-6 When bonds are issued by a company, the accounting entry typically shows an**

- a. increase in liabilities and a decrease in stockholders' equity.
- b. increase in liabilities and an increase in stockholders' equity.
- c. increase in assets and an increase in liabilities.
- d. increase in assets and an increase in stockholders' equity.

**9-7 The Bower Company sold \$100,000 of 20-year bonds for \$95,000. The stated rate on the bonds was 7 percent, and interest is paid annually on December 31. What entry would be made on December 31 when the interest is paid? (Numbers are omitted.)**

- a. Interest Expense  
Cash
- b. Interest Expense  
Discount on Bonds Payable  
Cash
- c. Interest Expense  
Discount on Bonds Payable  
Cash
- d. Interest Expense  
Bonds Payable  
Cash

**9-8 Bonds in the amount of \$100,000 with a life of 10 years were issued by the Roundy Company. If the stated rate is 6 percent and interest is paid semiannually, what would be the total amount of interest paid over the life of the bonds?**

- a. \$60,000
- b. \$120,000
- c. \$30,000
- d. \$6,000

**9-9 Sean Corp. issued a \$40,000, 10-year bond, with a stated rate of 8 percent, paid semiannually. How much cash will the bond investors receive at the end of the first interest period?**

- a. \$800
- b. \$1,600
- c. \$3,200
- d. \$4,000

**9-10 When noninterest-bearing bonds are issued, the discount is**

- disregarded for financial reporting purposes.
- expensed immediately.
- amortized to interest expense each period.
- credited to revenue.

**9-11 When interest-bearing bonds are issued at a discount, the interest expense for the period is**

- the amount of interest payment for the period plus the discount amortization for the period.
- the amount of interest payment for the period minus the discount amortization for the period.
- the amount of interest payment for the period plus the premium amortization for the period.
- the amount of interest payment for the period minus the premium amortization for the period.

**9-12 When interest-bearing bonds are issued at a premium, the interest expense for the period is**

- the amount of interest payment for the period plus the discount amortization for the period.
- the amount of interest payment for the period minus the discount amortization for the period.
- the amount of interest payment for the period plus the premium amortization for the period.
- the amount of interest payment for the period minus the premium amortization for the period.

**9-13 Installment bonds differ from typical bonds in what way?**

- Essentially they are the same.
- Installment bonds do not have a stated rate.
- A portion of each installment bond payment pays down the principal balance.
- The entire principal balance is paid off at maturity for installment bonds.

**9-14 In 2008, Drew Company issued \$200,000 of bonds for \$189,640. If the stated rate of interest was 8 percent and the yield was 6.73 percent, how would Drew calculate the interest expense for the first year on the bonds using the effective interest method?**

- $\$189,640 \times 6.73\%$
- $\$189,640 \times 8\%$
- $\$10,000 \times 6.73\%$
- $\$10,000 \times 8\%$

**9-15 The result of using the effective interest method of amortization of the discount on bonds is that the**

- interest expense for each amortization period is constant.
- a constant interest rate is charged against the debt carrying value.
- amount of interest expense decreases each period.
- cash interest payment is greater than the interest expense.

**9-16 Serenity Company issued \$100,000 of 6 percent, 10-year bonds when the market rate of interest was 5 percent. The proceeds from this bond issue were \$107,732. Using the effective interest method of amortization, which of the following statements is true? Assume interest is paid annually.**

- Interest payments to bondholders each period will be \$6,464.
- Interest payments to bondholders each period will be \$5,000.
- Amortization of the premium for the first interest period will be \$613.
- Amortization of the premium for the first interest period will be \$1,464.

**9-17 Bonds are a popular source of financing because:**

- bond interest expense is deductible for tax purposes, while dividends paid on stock are not.
- financial analysts tend to downgrade a company that has raised large amounts of cash by frequent issues of stock.
- a company having cash flow problems can postpone payment of interest to bondholders.
- the bondholders can always convert their bonds into stock if they choose.

**9-18 Which of the following statements regarding leases is false?**

- Lease agreements are a popular form of financing the purchase of assets because leases do not require a large initial outlay of cash.
- Accounting recognizes two types of leases—operating and capital leases.
- If a lease is classified as an operating lease, the lessee records a lease liability on its balance sheet.
- If a lease is classified as a capital lease, the lessee records a lease liability on its balance sheet.

**9-19 Which of the following lease conditions would result in a capital lease to the lessee?**

- The lessee will return the property to the lessor at the end of the lease term.
- The lessee can purchase the property for \$1 at the end of the lease term.
- The fair market value of the property at the inception of the lease is \$18,000; the present value of the minimum lease payments is \$15,977.
- The lease term is 70 percent of the property's economic life.

**9-20 On January 2, 2007, Sylvester Metals Co. leased a mining machine from EDH Leasing Corp. The lease qualifies as an operating lease. The annual payments are \$4,000 paid at the end of each year, and the life of the lease is 10 years. What entry would Sylvester Metals Co. make when the machine is delivered by EDH Leasing Corp.?**

- |                 |        |        |
|-----------------|--------|--------|
| Leased Asset    | 40,000 |        |
| Lease Liability |        | 40,000 |
- |                 |        |        |
|-----------------|--------|--------|
| Prepaid Rent    | 40,000 |        |
| Lease Liability |        | 40,000 |
- |                 |       |       |
|-----------------|-------|-------|
| Prepaid Rent    | 4,000 |       |
| Lease Liability |       | 4,000 |
- No entry is necessary.

**9-21 WVA Mining Company has leased a machine from Franklin Machinery Company. The annual payments are \$6,000, and the life of the lease is 8 years. It is estimated that the useful life of the machine is 9 years. How would WVA Mining record the acquisition of the machine?**

- The machine would be recorded as an asset with a cost of \$48,000.
- The company would not record the machine as an asset but would record rent expense of \$6,000 per year.
- The machine would be recorded as an asset, at the present value of the annual cash payments, \$6,000 for eight years.
- The machine would be recorded as an asset, at the present value of the annual cash payments, \$6,000 for nine years.

**9-22** Willow Corporation's balance sheet showed the following amounts: Current Liabilities, \$5,000; Bonds Payable, \$1,500; Lease Obligations, 2,300. Total stockholders' equity was \$6,000. The debt-to-equity ratio is:

- a. 0.63.
- b. 0.83.
- c. 1.42.
- d. 1.47.

**9-23** Kinsella Corporation's balance sheet showed the following amounts: Current Liabilities, \$75,000; Total Liabilities, \$100,000; Total Assets, \$200,000. What is the long-term debt to equity ratio?

- a. 0.75
- b. 0.375
- c. 0.25
- d. 0.125

**9-24** McLaughlin Corporation's balance sheet showed the following amounts: Current Liabilities, \$75,000; Total Liabilities, \$100,000; Total Assets, \$200,000. What is the debt to total assets ratio?

- a. 2
- b. 1
- c. 0.875
- d. 0.5

**9-25 (Appendix)** The bond issue price is determined by calculating the:

- a. present value of the stream of interest payments and the future value of the maturity amount.
- b. future value of the stream of interest payments and the future value of the maturity amount.
- c. future value of the stream of interest payments and the present value of the maturity amount.
- d. present value of the stream of interest payments and the present value of the maturity amount.

## Cornerstone Exercises

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### Cornerstone Exercise 9-26 REPORTING LONG-TERM DEBT ON THE BALANCE SHEET

Dennis Corp. has the following bonds:

- a. \$100,000 bond that has \$2,000 of unamortized discount associated with it.
- b. \$100,000 bond that has \$3,000 of unamortized premium associated with it.

#### Required:

Provide the balance sheet presentation for these two bonds.

### Cornerstone Exercise 9-27 ISSUANCE OF LONG-TERM DEBT

Anne Corp. issued \$400,000, 6 percent bonds.

OBJECTIVE > 1  
CORNERSTONE 9-1

OBJECTIVE > 2  
CORNERSTONE 9-1

**Required:**

Provide the necessary journal entry to record the issuance of these bonds assuming:

- The bonds were issued at par.
- The bonds were issued at 104.
- The bonds were issued at 99.

**OBJECTIVE** > **2** **Cornerstone Exercise 9-28 ISSUANCE OF LONG-TERM DEBT**

**CORNERSTONE 9-1** EWO Enterprises issues \$200,000 of bonds payable.

**Required:**

Provide the necessary journal entry to record the issuance of the bonds assuming:

- The bonds were issued at par.
- The bonds were issued at 102.
- The bonds were issued at 97.

**OBJECTIVE** > **2** **Cornerstone Exercise 9-29 ISSUANCE OF LONG-TERM DEBT**

**CORNERSTONE 9-1** M. Nickles Company issued \$500,000 of bonds for \$498,351. Interest is paid semi-annually.

**Required:**

- Provide the necessary journal entry to record the issuance of the bonds.
- Is the yield greater or less than the stated rate? How do you know?

**OBJECTIVE** > **3** **Cornerstone Exercise 9-30 DEBT ISSUED AT PAR**

**CORNERSTONE 9-2** On December 31, 2008, Brock & Co. issued \$250,000 of bonds payable at par. The bonds have a 10 percent stated rate, pay interest on June 30 and December 31, and mature on December 31, 2011.

**Required:**

Provide the journal entries to record the interest payment on June 30, 2010.

**OBJECTIVE** > **3** **Cornerstone Exercise 9-31 ZERO COUPON BONDS (STRAIGHT LINE)**

**CORNERSTONE 9-3** Dean Plumbing issues \$1,000,000 face value, noninterest-bearing bonds on December 31, 2009. The bonds are issued at 65 and mature on December 31, 2013.

**Required:**

Assuming the straight-line amortization method is followed, provide the journal entry on December 31, 2012.

**OBJECTIVE** > **3** **Cornerstone Exercise 9-32 DEBT ISSUED AT A DISCOUNT (STRAIGHT LINE)**

**CORNERSTONE 9-4** On December 31, 2007, Drew Company issued \$170,000, five-year bonds for \$155,000. The stated rate of interest was 6 percent and interest is paid annually on December 31.

**Required:**

Provide the necessary journal entry on December 31, 2009, assuming the straight-line method is followed.

**OBJECTIVE** > **3** **Cornerstone Exercise 9-33 DEBT ISSUED AT A DISCOUNT (STRAIGHT LINE)**

**CORNERSTONE 9-4** Use the information from **Cornerstone Exercise 9-32**.

**Required:**

Prepare the amortization table for Drew Company's bonds.

**OBJECTIVE** > **3** **Cornerstone Exercise 9-34 DEBT ISSUED AT A PREMIUM (STRAIGHT LINE)**

**CORNERSTONE 9-5** On December 31, 2008, Ironman Steel issued \$500,000, eight-year bonds for \$508,000. The stated rate of interest was 9 percent and interest is paid annually on December 31.

**Required:**

Provide the necessary journal entry on December 31, 2012, assuming the straight-line method is followed.

**Cornerstone Exercise 9-35 DEBT ISSUED AT A PREMIUM (STRAIGHT LINE)**

Use the information from **Cornerstone Exercise 9-34**.

**OBJECTIVE** > **3**  
**CORNERSTONE 9-5**

**Required:**

Prepare the amortization table for Ironman Steel's bonds.

**Cornerstone Exercise 9-36 BONDS ISSUED AT A DISCOUNT (EFFECTIVE INTEREST)**

Sicily Corporation issued \$300,000 in 8 percent bonds (payable on December 31, 2018) on December 31, 2008, for \$262,613. Interest is paid on June 30 and December 31. The market rate of interest is 10 percent.

**OBJECTIVE** > **4**  
**CORNERSTONE 9-6**

**Required:**

Prepare the amortization table using the effective interest rate method.

**Cornerstone Exercise 9-37 BONDS ISSUED AT A DISCOUNT (EFFECTIVE INTEREST)**

Use the information from **Cornerstone Exercise 9-36**.

**OBJECTIVE** > **4**  
**CORNERSTONE 9-6**

**Required:**

Record the journal entries for December 31, 2010 and 2011.

**Cornerstone Exercise 9-38 BONDS ISSUED AT A DISCOUNT (EFFECTIVE INTEREST)**

Crafty Corporation issued \$650,000 of 10 percent, seven-year bonds on December 31, 2008, for \$619,371. Interest is paid annually on December 31. The market rate of interest is 11 percent.

**OBJECTIVE** > **4**  
**CORNERSTONE 9-6**

**Required:**

Prepare the amortization table using the effective interest rate method.

**Cornerstone Exercise 9-39 BONDS ISSUED AT A DISCOUNT (EFFECTIVE INTEREST)**

Use the information from **Cornerstone Exercise 9-38**.

**OBJECTIVE** > **4**  
**CORNERSTONE 9-6**

**Required:**

Record the journal entry for December 31, 2009 and 2010.

**Cornerstone Exercise 9-40 BONDS ISSUED AT A PREMIUM (EFFECTIVE INTEREST)**

Cookie Dough Corporation issued \$500,000 in 6 percent, 10-year bonds (payable on December 31, 2018) on December 31, 2008, for \$581,757. Interest is paid on June 30 and December 31. The market rate of interest is 4 percent.

**OBJECTIVE** > **4**  
**CORNERSTONE 9-7**

**Required:**

Prepare the amortization table using the effective interest rate method.

**Cornerstone Exercise 9-41 BONDS ISSUED AT A PREMIUM (EFFECTIVE INTEREST)**

Use the information from **Cornerstone Exercise 9-40**.

**OBJECTIVE** > **4**  
**CORNERSTONE 9-7**

**Required:**

Record the journal entries for December 31, 2010 and 2011.

- OBJECTIVE** > **4** **Cornerstone Exercise 9-42 BONDS ISSUED AT A PREMIUM (EFFECTIVE INTEREST)**  
**CORNERSTONE 9-7** Charger Battery issued \$100,000 of 11 percent, seven-year bonds on December 31, 2008, for \$104,868. Interest is paid annually on December 31. The market rate of interest is 10 percent.
- Required:**  
 Prepare the amortization table using the effective interest rate method.
- OBJECTIVE** > **4** **Cornerstone Exercise 9-43 BONDS ISSUED AT A PREMIUM (EFFECTIVE INTEREST)**  
**CORNERSTONE 9-7** Use the information from **Cornerstone Exercise 9-42**.
- Required:**  
 Record the journal entries for December 31, 2010 and 2011.
- OBJECTIVE** > **4** **Cornerstone Exercise 9-44 INSTALLMENT NOTES**  
**CORNERSTONE 9-8** Thornwood Lanes bought a service vehicle for \$25,000 by issuing a 6 percent installment note on December 31, 2009. Thornwood will make 12 monthly payments of \$2,151.66 at the end of each month.
- Required:**  
 Prepare the amortization table using the effective interest rate method.
- OBJECTIVE** > **4** **Cornerstone Exercise 9-45 INSTALLMENT NOTES**  
**CORNERSTONE 9-8** Use the information from **Cornerstone Exercise 9-44**.
- Required:**  
 Record the journal entries for March 31, and April 30, 2010.
- OBJECTIVE** > **4** **Cornerstone Exercise 9-46 INSTALLMENT NOTE**  
**CORNERSTONE 9-8** ABC bank loans \$250,000 to Yossarian to purchase a new home. Yossarian will repay the note in equal monthly payments over a period of 30 years. The interest rate is 12 percent.
- Required:**  
 If the monthly payment is \$2,571.53, how much of the first payment is interest expense and how much is principal repayment?
- OBJECTIVE** > **5** **Cornerstone Exercise 9-47 COST OF DEBT FINANCING**  
 Barney Corporation's cost of debt financing is 8.5 percent. Its tax rate is 35 percent.
- Required:**  
 Calculate the after-tax interest rate to three decimal places.
- OBJECTIVE** > **5** **Cornerstone Exercise 9-48 COST OF DEBT FINANCING**  
 Diamond Company's cost of debt financing is 9.5 percent. Its tax rate is 35 percent. Diamond has \$2,000,000 of debt.
- Required:**
1. Calculate the after-tax cost amount of interest expense.
  2. How does the tax effect of interest expense affect financial leverage?
- OBJECTIVE** > **6** **Cornerstone Exercise 9-49 LEASES**  
 Southern Airlines has leased an aircraft from BAL Aircraft Company. The annual payments are \$1,000,000, and the life of the lease is 18 years. It is estimated that the useful life of the aircraft is 20 years. The present value of the future lease payments is \$8,755,630.

**Required:**

1. Would Southern Aircraft record the lease as an operating or capital lease? Why?
2. Provide the journal entry to record the acquisition.

**Cornerstone Exercise 9-50 RATIO ANALYSIS**

Watterson Corporation's balance sheet showed the following amounts: Current Liabilities, \$70,000; Bonds Payable, \$150,000; and Lease Obligations, \$20,000. Total stockholders' equity was \$90,000.

**OBJECTIVE** > 7**CORNERSTONE 9-9****Required:**

Calculate the debt-to-equity ratio.

**Cornerstone Exercise 9-51 RATIO ANALYSIS**

Blue Corporation had \$2,000,000 in total liabilities and \$3,500,000 in total assets as of December 31, 2009.

**OBJECTIVE** > 7**CORNERSTONE 9-9****Required:**

Calculate Blue's debt to equity ratio.

**Cornerstone Exercise 9-52 RATIO ANALYSIS**

Red Corporation had \$2,000,000 in total liabilities and \$3,500,000 in total assets as of December 31, 2009. Of Red's total liabilities, \$350,000 is long-term.

**OBJECTIVE** > 7**CORNERSTONE 9-9****Required:**

Calculate Red's debt to assets ratio and its long-term debt to equity ratio.

**Cornerstone Exercise 9-53 (APPENDIX) BOND ISSUE PRICE**

On December 31, 2009, Garner Hot Rods issued \$2,000,000 of 6 percent, 10-year bonds. Interest is payable semiannually on June 30 and December 31.

**OBJECTIVE** > 8**CORNERSTONE 9-10****Required:**

What is the issue price if the bonds are sold to yield 8 percent?

**Cornerstone Exercise 9-54 (APPENDIX) BOND ISSUE PRICE**

On December 31, 2009, Callahan Auto issued \$1,500,000 of 8 percent, 10-year bonds. Interest is payable semiannually on June 30 and December 31.

**OBJECTIVE** > 8**CORNERSTONE 9-10****Required:**

What is the issue price if the bonds are sold to yield 6 percent (round to nearest dollar)?

## Exercises

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**Exercise 9-55 ISSUING AT PAR, A PREMIUM, OR A DISCOUNT**

Kartel Company is planning to issue 500 bonds, each having a face amount of \$1,000.

**OBJECTIVE** > 1 2**Required:**

1. Prepare the journal entry to record the sale of the bonds at par.
2. Prepare the journal entry to record the sale of the bonds at a premium of \$34,000.
3. Prepare the journal entry to record the sale of the bonds at a discount of \$41,000.

**Exercise 9-56 BOND PREMIUM AND DISCOUNT**

Markway, Inc., is contemplating selling bonds. The issue is to be composed of 150 bonds, each with a face amount of \$2,000.

**OBJECTIVE** > 1 2

**OBJECTIVE** > **3****Required:**

1. Calculate how much Markway is able to borrow if each bond is sold at a premium of \$20.
2. Calculate how much Markway is able to borrow if each bond is sold at a discount of \$30.
3. Calculate how much Markway is able to borrow if each bond is sold at 96 percent of par.
4. Calculate how much Markway is able to borrow if each bond is sold at 105 percent of par.
5. Assume that the bonds are sold for \$1,975 each. Prepare the entry to recognize the sale of the 150 bonds.
6. Assume that the bonds are sold for \$2,015 each. Prepare the entry to recognize the sale of the 150 bonds.

**OBJECTIVE** > **2** **3****Exercise 9-57 INTEREST-BEARING BOND AT PAR WITH ANNUAL INTEREST PAYMENTS**

Kiwi Corporation issued at par \$200,000, 8 percent bonds on December 31, 2008. Interest is paid annually on December 31. The principal and the final interest payment are due on December 31, 2010.

**Required:**

1. Prepare the entry to recognize the issuance of the bonds.
2. Prepare the journal entry for December 31, 2009.
3. Prepare the journal entry for December 31, 2010.

**OBJECTIVE** > **2** **3****Exercise 9-58 ISSUANCE AND INTEREST AMORTIZATION FOR ZERO COUPON NOTE (STRAIGHT LINE)**

Kerwin Company borrowed \$10,000 on a two-year, zero coupon note. The note was issued on December 31, 2008. The face amount of the note, \$12,544, is to be paid at maturity on December 31, 2010.

**Required:**

1. Allocate the interest of \$2,544 to the two one-year interest periods, using straight-line interest amortization.
2. Prepare the entries to recognize the borrowing, the first year's interest expense, and the second year's interest expense plus redemption of the note at maturity.

**OBJECTIVE** > **2** **3****Exercise 9-59 INTEREST PAYMENTS AND INTEREST EXPENSE FOR BONDS (STRAIGHT LINE)**

Klamath Manufacturing sold 10-year bonds with a total face amount of \$400,000 and a stated rate of 8.4 percent. The bonds sold for \$424,000 on December 31, 2008, and pay interest semiannually on June 30 and December 31.

**Required:**

1. Prepare the entry to recognize the sale of the bonds.
2. Determine the amount of the semiannual interest payment required by the bonds.
3. Prepare the journal entry made by Klamath at June 30, 2009, to recognize the interest expense and an interest payment.
4. Determine the amount of interest expense for 2009.

**OBJECTIVE** > **2** **3****Exercise 9-60 INTEREST PAYMENTS AND INTEREST EXPENSE FOR BONDS (STRAIGHT LINE)**

On December 31, 2009, Harrington Corporation sold \$100,000 of 10-year, 9 percent bonds. The bonds sold for \$96,000 and pay interest semiannually on June 30 and December 31.

**Required:**

1. Prepare the journal entry to record the sale of the bonds.
2. Calculate the amount of the semiannual interest payment.
3. Prepare the entry at June 30, 2010, to recognize the payment of interest and interest expense.
4. Calculate the annual interest expense for 2010.

**Exercise 9-61 INTEREST PAYMENTS AND INTEREST EXPENSE FOR BONDS (STRAIGHT LINE)**

On December 31, 2007, Philips Corporation issued bonds with a total face amount of \$800,000 and a stated rate of 9 percent.

**Required:**

1. Calculate the interest expense for 2008 if the bonds were sold at par.
2. Calculate the interest expense for 2008 if the bonds were sold at a premium and the straight-line premium amortization for 2008 is \$2,300.
3. Calculate the interest expense for 2008 if the bonds were sold at a discount and the straight-line discount amortization for 2008 is \$1,700.

**Exercise 9-62 COMPLETING A DEBT AMORTIZATION TABLE (STRAIGHT LINE)****OBJECTIVE** 3

Cagney Company sold \$200,000 of bonds on December 31, 2008. A portion of the amortization table appears below.

Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
At issue				\$6,000	\$194,000
6/30/09	\$11,000	\$11,600	\$600	5,400	194,600
12/31/09	11,000	11,600	600	4,800	195,200
6/30/10	?	?	?	?	?

**Required:**

1. Determine the stated interest rate on these bonds.
2. Calculate the interest expense and the discount amortization for the interest period ending June 30, 2010.
3. Calculate the liability balance shown on a balance sheet after the interest payment is recorded on June 30, 2010.

**Exercise 9-63 USING A PREMIUM AMORTIZATION TABLE (STRAIGHT LINE)****OBJECTIVE** 3

For Dingle Corporation, the following amortization table was prepared when \$400,000 of five-year, 7 percent bonds were sold on December 31, 2008, for \$420,000.

Period	Cash Payment (Credit)	Interest Expense (Debit)	Premium on Bonds Payable (Debit)	Premium on Bonds Payable Balance	Carrying Value
At issue				\$20,000	\$420,000
6/30/09	\$14,000	\$12,000	\$2,000	18,000	418,000
12/31/09	14,000	12,000	2,000	16,000	416,000
6/30/10	14,000	12,000	2,000	14,000	414,000
12/31/10	14,000	12,000	2,000	12,000	412,000
6/30/11	14,000	12,000	2,000	10,000	410,000
12/31/11	14,000	12,000	2,000	8,000	408,000
6/30/12	14,000	12,000	2,000	6,000	406,000
12/31/12	14,000	12,000	2,000	4,000	404,000
6/30/13	14,000	12,000	2,000	2,000	402,000
12/31/13	14,000	12,000	2,000	0	400,000

**Required:**

1. Prepare the entry to recognize the issuance of the bonds on December 31, 2008.
2. Prepare the entry to recognize the first interest payment on June 30, 2009.
3. Determine what interest expense for this bond issue Dingle will report in its 2010 income statement.
4. Indicate how these bonds will appear in Dingle's December 31, 2012, balance sheet.

**OBJECTIVE** > **3** **Exercise 9-64 USING A DISCOUNT AMORTIZATION TABLE (STRAIGHT LINE)**

Panamint Candy Company prepared the following amortization table for \$500,000 of five-year, 9.2 percent bonds issued and sold by Panamint on December 31, 2009, for \$472,000:

Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
				\$28,000	\$472,000
6/30/10	\$23,000	\$25,800	\$2,800	25,200	474,800
12/31/10	23,000	25,800	2,800	22,400	477,600
6/30/11	23,000	25,800	2,800	19,600	480,400
12/31/11	23,000	25,800	2,800	16,800	483,200
6/30/12	23,000	25,800	2,800	14,000	486,000
12/31/12	23,000	25,800	2,800	11,200	488,800
6/30/13	23,000	25,800	2,800	8,400	491,600
12/31/13	23,000	25,800	2,800	5,600	494,400
6/30/14	23,000	25,800	2,800	2,800	497,200
12/31/14	23,000	25,800	2,800	0	500,000

**Required:**

1. Prepare the entry to recognize the sale of the bonds on December 31, 2009.
2. Prepare the entry to recognize the first interest payment on June 30, 2010.
3. Determine the interest expense for these bonds that Panamint will report on its 2012 income statement.
4. Indicate how these bonds will appear in Panamint's December 31, 2013, balance sheet.

**OBJECTIVE** > **3** **Exercise 9-65 COMPLETING AN AMORTIZATION TABLE (STRAIGHT LINE)**

Sondrini Corporation sold \$200,000 face value of bonds at 102 on December 31, 2008. These bonds have a 6 percent stated rate and mature in four years. Interest is payable on June 30 and December 31 of each year.

**Required:**

1. Prepare a bond amortization table assuming straight-line amortization.
2. Provide the journal entry for December 31, 2010.
3. Indicate how these bonds will appear in Sondrini's balance sheet at December 31, 2010.

**OBJECTIVE** > **3** **Exercise 9-66 ZERO COUPON BOND**

Johnson Company sold for \$90,000 a \$102,400, two-year zero coupon bond on December 31, 2008. The bond matures on December 31, 2010.

**Required:**

1. Prepare the entry to record the issuance of the bond.
2. Prepare the adjustment to recognize 2009 interest expense.
3. Prepare the entry to recognize the 2010 interest expense and the repayment of the bond on December 31, 2010.

**OBJECTIVE** > **3** **Exercise 9-67 ZERO COUPON NOTE**

Dodge City Products borrowed \$100,000 cash by issuing a 36-month, \$120,880 zero coupon note on December 31, 2009. The note matures on December 31, 2012.

**Required:**

1. Prepare the entry to recognize issuance of the note.
2. Prepare the adjustments to recognize 2010 and 2011 interest.
3. Prepare the entry to recognize 2012 interest and repayment of the note at maturity.

**Exercise 9-68 OPERATING LEASES AND CAPITAL LEASES**

OBJECTIVE &gt; 6

On January 1, 2009, Moody Company leased a warehouse for \$20,000 per year. The first annual payment is due December 31, 2009. The present value of the lease payments, which is also the fair value of the warehouse, is \$113,000.

**Required:**

1. Assume that the lease is an *operating* lease. Prepare the journal entries made by Moody during 2009 and 2010 for the lease.
2. Assume that the lease is a *capital* lease with an effective interest rate of 12 percent per year. Depreciate the cost of the leased warehouse on a straight-line basis over 10 years with zero residual value. Prepare Moody's 2009 entries to recognize expenses and payments for the capital lease.

**Exercise 9-69 NOTE INTEREST PAYMENT AND INTEREST EXPENSE (EFFECTIVE INTEREST)**

OBJECTIVE &gt; 4

Cardinal Company sold \$200,000 of 10-year, 8 percent notes for \$175,075. The notes were sold December 31, 2007, and pay interest semiannually on June 30 and December 31. The effective interest rate was 10 percent. Assume Cardinal uses the effective interest rate method.

**Required:**

1. Prepare the entry to record the sale of the notes.
2. Determine the amount of the semiannual interest payments for the notes.
3. Prepare the amortization table through 2009.
4. Prepare the entry for Cardinal's journal at June 30, 2008 to record the payment of six months' interest and the related interest expense.
5. Determine interest expense for 2009.

**Exercise 9-70 BOND INTEREST PAYMENTS AND INTEREST EXPENSE (EFFECTIVE INTEREST)**

OBJECTIVE &gt; 4

On December 31, 2010, Hawthorne Corporation issued for \$155,989, five-year bonds with a face amount of \$150,000 and a stated (or coupon) rate of 9 percent. The bonds pay interest annually and have an effective interest rate of 8 percent. Assume Hawthorne uses the effective interest rate method.

**Required:**

1. Prepare the entry to record the sale of the bonds.
2. Calculate the amount of the interest payments for the bonds.
3. Prepare the amortization table through 2012.
4. Prepare the journal entry for December 31, 2011 to record the payment of interest and the related interest expense.
5. Calculate the annual interest expense for 2011 and 2012.

**Exercise 9-71 COMPLETING A BOND AMORTIZATION TABLE (EFFECTIVE INTEREST RATE METHOD)**

OBJECTIVE &gt; 4

Cagney Company sold \$200,000 of bonds on June 30, 2010. A portion of the amortization table appears below.

Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
12/31/11	\$9,000	\$9,277	\$277	\$2,340	\$197,660
6/30/12	9,000	9,290	290	2,050	197,950
12/31/12	?	?	?	?	?

**Required:**

1. Indicate the stated interest rate on these bonds.
2. Calculate the effective annual interest rate on these bonds (rounded to the nearest 0.1 percent).

3. Determine the interest expense and discount amortization for the interest period ending December 31, 2012.
4. Determine the liability balance after the interest payment is recorded on December 31, 2012.

**OBJECTIVE** > **4** **Exercise 9-72 COMPLETING A BOND AMORTIZATION TABLE (EFFECTIVE INTEREST RATE METHOD)**

MacBride Enterprises sold \$200,000 of bonds on December 31, 2011. A portion of the amortization table appears below.

Period	Cash Payment (Credit)	Interest Expense (Debit)	Premium on Bonds Payable (Debit)	Premium on Bonds Payable Balance	Carrying Value
At issue				\$6,457	\$206,457
6/30/12	\$9,000	\$8,465	\$535	5,922	205,922
12/31/12	9,000	8,443	557	5,365	205,365
6/30/13	9,000	8,420	580	4,784	204,785
12/31/13	?	?	?	?	?

**Required:**

1. Indicate the stated annual interest rate on these bonds.
2. Calculate the effective annual interest rate on these bonds (rounded to the nearest 0.1 percent).
3. Determine the interest expense and premium amortization for the interest period ending December 31, 2013.
4. Determine when the bonds will mature.

**OBJECTIVE** > **7** **Exercise 9-73 RATIO ANALYSIS**

Rising Stars Academy provided the following information on its 2009 Balance Sheet and Statement of Cash Flows:

Long-term debt	\$ 4,400	Interest expense	\$ 398
Total liabilities	8,972	Net income	559
Total assets	38,775	Interest payments	432
Total equity	29,803	Cash flows from operations	1,015
		Income tax expense	266
		Income taxes paid	150

**Required:**

1. Calculate the following ratios for both companies:
  - a. debt to equity
  - b. debt to total assets
  - c. long-term debt to equity
  - d. times interest earned (accrual basis)
  - e. times interest earned (cash basis)
2. Interpret these results.

**OBJECTIVE** > **8**

**Exercise 9-74 (APPENDIX) CALCULATING BOND ISSUE PRICE**

On December 31, 2008, University Theatres issued \$500,000 face value of bonds. The stated rate is 6 percent, and interest is paid semiannually on June 30 and December 31. The bonds mature in 10 years.

- a. Assuming the market rate of interest is 4 percent, calculate at what price the bonds are issued.
- b. Assuming the market rate of interest is 8 percent, calculate at what price the bonds are issued.

## Problem Set A

### Problem 9-75A REPORTING LONG-TERM DEBT

**OBJECTIVE** > 2

Fridley Manufacturing's accounting records reveal the following account balances after adjusting entries are made on December 31, 2012:

Accounts payable	\$ 62,500
Bonds payable (9.4%, due in 2019)	800,000
Capital lease liability*	41,500
Bonds payable (8.7%, due in 2015)	50,000
Deferred tax liability*	133,400
Discount on bonds payable (9.4%, due in 2019)	12,600
Income taxes payable	26,900
Interest payable	38,700
Installment note payable (8% equal installments due 2013 to 2016)	120,000
Notes payable (7.8%, due in 2017)	400,000
Premium on notes payable (7.8%, due in 2017)	6,100
Zero coupon note payable, \$50,000 face amount, due in 2018	31,900

\*Long-term liability

#### Required:

Prepare the current liabilities and long-term debt portions of Fridley's balance sheet at December 31, 2012. Provide a separate line item for each issue (i.e., do not combine separate bonds or notes payable), but some items may need to be split into more than one item.

### Problem 9-76A ENTRIES FOR, AND FINANCIAL STATEMENT PRESENTATION OF A NOTE

**OBJECTIVE** > 2 3

Perez Company borrowed \$60,000 from the First National Bank on April 1, 2008, on a three-year, 8.7 percent note. Interest is paid annually on March 31.

#### Required:

- Record the borrowing transaction in Perez's journal.
- Prepare the adjustments made at December 31, 2008 and 2009.
- Prepare the necessary journal entry to recognize 2008 interest to date and the first interest payment on March 31, 2009.
- Indicate how the note and associated interest would be presented in Perez's December 31, 2009, balance sheet.
- Prepare the necessary journal entry to record the repayment of the note and the last year's interest on March 31, 2011.

### Problem 9-77A PREPARING A BOND AMORTIZATION TABLE (STRAIGHT LINE)

**OBJECTIVE** > 2 3

On December 31, 2012, Distel Company borrowed \$25,900 by issuing three-year, 8.5 percent bonds with a face amount of \$25,000. The bonds require annual interest payments (each equal to 8.5 percent of \$25,000).



#### Required:

Prepare an amortization table using the following column headings:

Period	Cash Payment (Credit)	Interest Expense (Debit)	Premium on Bonds Payable (Debit)	Premium on Bonds Payable Balance	Carrying Value
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**OBJECTIVE** > **3** **Problem 9-78A NOTE COMPUTATIONS AND ENTRIES (STRAIGHT LINE)**

On December 31, 2008, Sisek Company borrowed \$800,000 with a 10-year, 9.75 percent note, interest payable semiannually on June 30 and December 31. Cash in the amount of \$792,800 was received when the note was issued.

**Required:**

1. Provide the necessary journal entry at December 31, 2008.
2. Provide the necessary journal entry at June 30, 2009.
3. Provide the necessary journal entry at December 31, 2009.
4. Determine the carrying amount of this note at the end of the fifth year (December 31, 2013).

**OBJECTIVE** > **3** **Problem 9-79A PREPARING A BOND AMORTIZATION TABLE (STRAIGHT LINE)**

Edmonton-Alston Corporation issued five-year, 9.5 percent bonds with a total face value of \$700,000 on December 31, 2011, for \$726,000. The bonds pay interest on June 30 and December 31 of each year.

**Required:**

1. Prepare an amortization table.
2. Prepare the entries to recognize the bond issue and the interest payments made on June 30, 2012, and December 31, 2012.

**OBJECTIVE** > **3** **Problem 9-80A PREPARING A BOND AMORTIZATION TABLE (STRAIGHT LINE)**

St. Cloud Manufacturing, Inc., issued five-year, 9.2 percent bonds with a total face value of \$500,000 on December 31, 2008, for \$484,000. The bonds pay interest on June 30 and December 31 of each year.

**Required:**

1. Prepare an amortization table.
2. Prepare the entries to recognize the bond issuance and the interest payments made on June 30, 2009, and December 31, 2009.

**OBJECTIVE** > **3** **Problem 9-81A PREPARING AND USING AN AMORTIZATION TABLE (STRAIGHT LINE)**

Girves Development Corporation has agreed to construct a plant in a new industrial park. To finance the construction, the county government issued \$5,000,000 of 10-year, 4.75 percent revenue bonds for \$5,125,000 on December 31, 2008. Girves will pay the interest and principal on the bonds. When the bonds are repaid, Girves will receive title to the plant. In the interim, Girves will pay property taxes as if it owned the plant. This financing arrangement is attractive to Girves, as state and local government bonds are exempt from federal income taxation and thus carry a lower interest rate. The bonds are attractive to investors, as both Girves and the county are issuers. The bonds pay interest semiannually on June 30 and December 31.

**Required:**

1. Prepare an amortization table through December 31, 2010, for these revenue bonds assuming straight-line amortization.
2. Discuss whether or not Girves should record the plant as an asset after it is constructed.
3. Discuss whether or not Girves should record the liability for these revenue bonds.

**OBJECTIVE** > **3** **Problem 9-82A ZERO COUPON NOTE (STRAIGHT LINE)**

On December 31, 2008, Felix Products borrowed \$80,000 cash on a \$105,800, 24-month zero coupon note. Felix uses the straight-line method of amortization.

**Required:**

1. Record the borrowing in Felix's journal.
2. Prepare the adjusting entries for December 31, 2009.
3. Prepare the entry to recognize the 2010 interest expense and repayment of the note on December 31, 2010.

**Problem 9-83A PREPARING AN AMORTIZATION TABLE FOR A ZERO COUPON BOND (STRAIGHT LINE)**

On December 31, 2009, Georgetown Distributors borrowed \$2,180,000 by issuing four-year, zero coupon bonds. The face value of the bonds is \$3,000,000. Georgetown uses the straight-line method to amortize any premium or discount.

**Required:**

Prepare an amortization table for these bonds, using the following column headings:

Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
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**Problem 9-84A RECORDING CAPITAL AND OPERATING LEASES****OBJECTIVE** 6

Trippler Company has decided to lease its new office building. The following information is available for the lease:

Lease:	
Payments	\$100,000 per year*
Length of lease	15 years
Economic life of building	16 years
Appropriate interest rate	8.4%
Cost of building if purchased	\$875,000

\*The first payment is due at the end of the first year of the lease.

**Required:**

- Determine whether this is a capital lease or an operating lease.
- Regardless of your answer to the preceding question, assume that this is a capital lease and that the present value of the lease payments is \$829,500. Record the liability and corresponding asset for this acquisition.
- Record the interest expense on the capital lease at the end of the first year. Also assume no residual value and a 15-year lease for the building. Record the first year's straight-line depreciation of the cost of the leased asset.

**Problem Set B****Problem 9-75B REPORTING LONG-TERM DEBT****OBJECTIVE** 2

Craig Corporation's accounting records reveal the following account balances after adjusting entries are made on December 31, 2008:

Accounts payable	\$ 73,000
Bonds payable (9.4%, due in 2013)	900,000
Capital lease liability*	30,000
Bonds payable (8.3%, due in 2012)	60,000
Deferred tax liability*	127,600
Discount on bonds payable (9.4%, due in 2013)	11,900
Income taxes payable	28,100
Interest payable	33,400
Installment note payable (9%, equal installments due 2009 to 2015)	110,000
Notes payable (7.8%, due in 2017)	350,000
Premium on notes payable (7.8%, due in 2017)	5,000
Zero coupon note payable, \$50,000 face amount, due in 2019	29,800

\*Long-term liability

**Required:**

Prepare the current liabilities and long-term debt portions of Craig's balance sheet at December 31, 2008. Provide a separate line item for each issue (i.e., do not combine separate bonds or notes payable), but some items may need to be split into more than one item.

**OBJECTIVE** > **2** **3****Problem 9-76B ENTRIES FOR, AND FINANCIAL STATEMENT PRESENTATION OF A NOTE**

Griddley Company borrowed \$80,000 from the East Salvador Bank on February 1, 2008, on a three-year, 7.2 percent note. Interest is paid annually on January 31.

**Required:**

1. Record the borrowing transaction in Griddley's journal.
2. Prepare the adjustments made at December 31, 2008 and 2009.
3. Prepare the necessary journal entry to recognize 2009 interest to date and the first interest payment on January 31, 2009.
4. Indicate how the note and associated interest would be presented in Griddley's December 31, 2008, balance sheet.
5. Prepare the necessary journal entry to record the repayment of the note and the last year's interest on January 31, 2011.

**OBJECTIVE** > **2** **3****Problem 9-77B PREPARING A BOND AMORTIZATION TABLE (STRAIGHT LINE)**

On December 31, 2008, The Rock Restaurant borrowed \$36,000 by issuing three-year, 8.0 percent bonds with a face amount of \$33,000. The bonds require annual interest payments (each equal to 8.0 percent of \$33,000).

**Required:**

Prepare an amortization table using the following column headings:

Period	Cash Payment (Credit)	Interest Expense (Debit)	Premium on Bonds Payable (Debit)	Premium on Bonds Payable Balance	Carrying Value
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**OBJECTIVE** > **3****Problem 9-78B NOTE COMPUTATIONS AND ENTRIES (STRAIGHT LINE)**

On December 31, 2009, Benton Corporation borrowed \$1,000,000 with a 10-year, 8.75 percent note, interest payable semiannually on June 30 and December 31. Cash in the amount of \$985,500 was received when the note was issued.

**Required:**

1. Provide the necessary journal entry at December 31, 2009.
2. Provide the necessary journal entry at June 30, 2010.
3. Provide the necessary journal entry at December 31, 2010.
4. Determine the carrying amount of this note at the end of the fifth year (December 31, 2014).

**OBJECTIVE** > **3****Problem 9-79B PREPARING A BOND AMORTIZATION TABLE (STRAIGHT LINE)**

Dalton Company issued five-year, 7.5 percent bonds with a total face value of \$900,000 on December 31, 2008, for \$950,000. The bonds pay interest on June 30 and December 31 of each year.

**Required:**

1. Prepare an amortization table.
2. Prepare the entries to recognize the bond issue and the interest payments made on June 30, 2009, and December 31, 2009.

**OBJECTIVE** > **3****Problem 9-80B PREPARING A BOND AMORTIZATION TABLE (STRAIGHT LINE)**

Pennington Corporation issued five-year, 8.6 percent bonds with a total face value of \$700,000 on December 31, 2009, for \$680,000. The bonds pay interest on June 30 and December 31 of each year.

**Required:**

1. Prepare an amortization table.
2. Prepare the entries to recognize the bond issuance and the interest payments made on June 30, 2010, and December 31, 2010.

**Problem 9-81B PREPARING AND USING AN AMORTIZATION TABLE (STRAIGHT LINE)****OBJECTIVE** > **3**

Dunn-Whitaker Construction has agreed to construct a plant in a new industrial park. To finance the construction, the county government issued \$4,000,000 of 10-year, 5.25 percent revenue bonds for \$4,100,000 on December 31, 2008. Dunn-Whitaker will pay the interest and principal on the bonds. When the bonds are repaid, Dunn-Whitaker will receive title to the plant. In the interim, Dunn-Whitaker will pay property taxes as if it owned the plant. This financing arrangement is attractive to Dunn-Whitaker, as state and local government bonds are exempt from federal income taxation and thus carry a lower interest rate. The bonds are attractive to investors, as both Dunn-Whitaker and the county are issuers. The bonds pay interest semiannually on June 30 and December 31.

**Required:**

1. Prepare an amortization table through December 31, 2010, for these revenue bonds assuming straight-line amortization.
2. Discuss whether or not Dunn-Whitaker should record the plant as an asset after it is constructed.
3. Discuss whether or not Dunn-Whitaker should record the liability for these revenue bonds.

**Problem 9-82B ZERO COUPON NOTE (STRAIGHT LINE)****OBJECTIVE** > **3**

On December 31, 2008, Sorenson Financing Corporation borrowed \$90,000 cash on a \$110,300, 24-month zero coupon note. Sorenson uses the straight-line method of amortization.

**Required:**

1. Record the borrowing in Sorenson's journal.
2. Prepare the adjusting entries for December 31, 2009.
3. Prepare the entry to recognize the 2010 interest expense and repayment of the note on December 31, 2010.

**Problem 9-83B PREPARING AN AMORTIZATION TABLE FOR A ZERO COUPON BOND (STRAIGHT LINE)****OBJECTIVE** > **3**

On December 31, 2008, Beauty Box Company borrowed \$3,000,000 by issuing three-year, zero coupon bonds. The face value of the bonds is \$3,250,000. Beauty Box uses the straight-line method to amortize any premium or discount.

**Required:**

Prepare an amortization table for these bonds, using the following column headings:

Period	Cash Payment (Credit)	Interest Expense (Debit)	Discount on Bonds Payable (Credit)	Discount on Bonds Payable Balance	Carrying Value
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**Problem 9-84B RECORDING CAPITAL AND OPERATING LEASES****OBJECTIVE** > **6**

Kleinfelder Company has decided to lease its new office building. The following information is available for the lease:

Lease:	
Payments	\$75,000 per year*
Length of lease	15 years
Economic life of building	16 years
Appropriate interest rate	7.3%
Cost of building if purchased	\$750,000

\*The first payment is due at the end of the first year of the lease.

**Required:**

1. Determine whether this is a capital lease or an operating lease.
2. Regardless of your answer to the preceding question, assume that this is a capital lease and that the present value of the lease payments is \$740,000. Record the liability and corresponding asset for this acquisition.
3. Record the interest expense on the capital lease at the end of the first year. Also assume no residual value and a 15-year lease for the building. Record the first year's straight-line depreciation of the cost of the leased asset.

## Cases

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**Case 9-85 LONG-TERM DEBT AND ETHICS**

You are the CFO of Diversified Industries. Diversified has suffered through four or five tough years. This has deteriorated their financial condition to a point that they are in danger of violating two loan covenants related to their largest loan, which is not due for 12 more years. The loan contract says that if Diversified violates any of these covenants, the loan principal becomes immediately due and payable. Diversified would be unable to make this payment, and any additional loans taken to repay this loan would likely be at sufficiently higher rates, forcing Diversified into bankruptcy. An investment banker suggests forming another entity (called “special purpose entities” or SPE) and transferring some debt to this SPE. Structuring the SPE very carefully will have the effect of moving enough debt off Diversified's balance sheet to keep the company in compliance with all their loan covenants. The investment banker assures you that accounting rules permit such accounting treatment.

**Required:**

How do you react to the investment banker?

**Case 9-86 DEBT COVENANTS AND FINANCIAL REPORTING STANDARDS**

Debtholders receive note contracts, one for each note, that describe the payments promised by the issuer of the debt. In addition, the issuing corporation frequently enters a supplementary agreement, called a *note indenture*, with a trustee who represents the debtholders. The provisions or covenants of the indenture may place restrictions on the issuer for the benefit of the debtholders. For example, an indenture may require that the issuer's ratio of total liabilities to total stockholders' equity never rise above a specified level or that periodic payments be made to the trustee who administers a “sinking fund” to provide for the retirement of debt.

Consider Roswell Manufacturing's debt indenture, which requires Roswell's ratio of total liabilities to total stockholders' equity never to exceed 2:1. If Roswell violates this requirement, the debt indenture specifies very costly penalties, and if the violation continues, the entire debt issue must be retired at a disadvantageous price and refinanced. In recent years, Roswell's ratio has averaged about 1.5:1 (\$15 million in total liabilities and \$10 million in total stockholders' equity). However, Roswell has an opportunity to purchase one of its major competitors, Ashland Products. The acquisition will require \$4.5 million in additional capital, but it will double Roswell's net income. Roswell does not believe that a stock issue is feasible in the current environment. The Financial Accounting Standards Board recently issued a new standard concerning accounting for post employment benefits, which is strongly supported by the Securities and Exchange Commission. Implementation of the new standard will add about \$2 million to Roswell's long-term liabilities. Roswell's CEO, Martha Cooper, has written a strong letter of objection to the FASB. The FASB received similar letters from over 300 companies.

**Required:**

1. Write a paragraph presenting an analysis of the impact of the new standard on Roswell Manufacturing.
2. If you were a member of the FASB and met Martha Cooper at a professional meeting, how would you respond to her objection?

**Case 9-87 EVALUATING LEVERAGE**

Gearing Manufacturing, Inc., is planning a \$1,000,000 expansion of its production facilities. The expansion could be financed by the sale of \$1,250,000 in 8 percent notes or by the sale of \$1,250,000 in capital stock, which would raise the number of shares outstanding from 50,000 to 75,000. Gearing pays income taxes at a rate of 30 percent.

**Required:**

1. Suppose that income from operations is expected to be \$550,000 per year for the duration of the proposed debt issue. Should Gearing finance with notes or stock? Explain your answer.
2. Suppose that income from operations is expected to be \$275,000 per year for the duration of the proposed debt issue. Should Gearing finance with notes or stock? Explain your answer.
3. Suppose that income from operations varies from year to year but is expected to be above \$300,000, 40 percent of the time and below \$300,000, 60 percent of the time. Should Gearing finance with notes or stock? Explain your answer.
4. As an investor, how would you use accounting information to evaluate the risk of excessive use of leverage? What additional information would be useful? Explain.

**Case 9-88 LEVERAGE**

Cook Corporation issued financial statements at December 31, 2008, that include the following information:

**Balance sheet at December 31, 2008:**

Assets	\$8,000,000
Liabilities	1,200,000
Stockholders' equity (300,000 shares)	6,800,000

**Income statement for 2008:**

Income from operations	\$1,200,000
Less: Interest expense	<u>100,000</u>
Income before taxes	\$1,100,000
Less: Income taxes expense (0.30)	<u>330,000</u>
Net income	<u>\$ 770,000</u>

The levels of assets, liabilities, stockholders' equity, and operating income have been stable in recent years; however, Cook Corporation is planning a \$1,800,000 expansion program that will increase income from operations by \$350,000 to \$1,550,000. Cook is planning to sell 8.5 percent notes at par to finance the expansion.

**Required:**

1. What earnings per share does Cook report before the expansion?
2. What earnings per share will Cook report if the proposed expansion is undertaken? Would this use of leverage be advantageous to Cook's stockholders? Explain.
3. Suppose income from operations will increase by only \$150,000. Would this use of leverage be advantageous to Cook's stockholders? Explain.
4. Suppose that income from operations will increase by \$200,000 and that Cook could also raise the required \$1,800,000 by issuing an additional 100,000 shares of capital stock. Which means of financing would stockholders prefer? Explain.

**Case 9-89 RESEARCH AND ANALYSIS USING THE ANNUAL 10-K**

Obtain **Marriott's** 2007 10-K through the "Investor Relations" portion of their website. (Using a search engine, search for: Marriott investor relations.) Once at the Investor Relations part of the website look for "SEC Filings." When you see the list of all the filings, either filter for the "Annual Filings" or search for "10-K" when you find the list of all SEC Filings.

Another option is to go to <http://www.sec.gov> and click "Search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

1. What are Marriott's total liabilities for 2007?
2. How much of these liabilities are classified as long-term debt?
3. Look at Marriott's long-term debt footnote and answer the following questions:
  - a. When does their debt with the highest stated rate mature?
  - b. How much of their debt is maturing in each of the next five years? How much is maturing in more than five years?
  - c. How much debt was issued during 2007? What was the stated rate of interest on this debt?
4. Calculate and discuss Marriott's debt to equity and times interest earned (accrual basis) ratios.

**Case 9-90 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

1. Look at Abercrombie & Fitch's and Aeropostale's long-term debt footnotes. Which company has a higher percentage of their long-term debt due within the next five years?
2. Calculate Abercrombie & Fitch's and Aeropostale's times interest earned (accrual basis) for the years ended January 28, 2006 and February 3, 2007.
3. Calculate Abercrombie & Fitch's and Aeropostale's long-term debt to equity ratio for the years ended January 28, 2006 and February 3, 2007.
4. Calculate Abercrombie & Fitch's and Aeropostale's debt to equity ratio for the years ended January 28, 2006 and February 3, 2007.
5. Calculate Abercrombie & Fitch's and Aeropostale's long-term debt to total assets ratio for the years ended January 28, 2006 and February 3, 2007.
6. Calculate Abercrombie & Fitch's and Aeropostale's debt to total assets ratio for the years ended January 28, 2006 and February 3, 2007.
7. Comment on Abercrombie & Fitch's and Aeropostale's debt management.

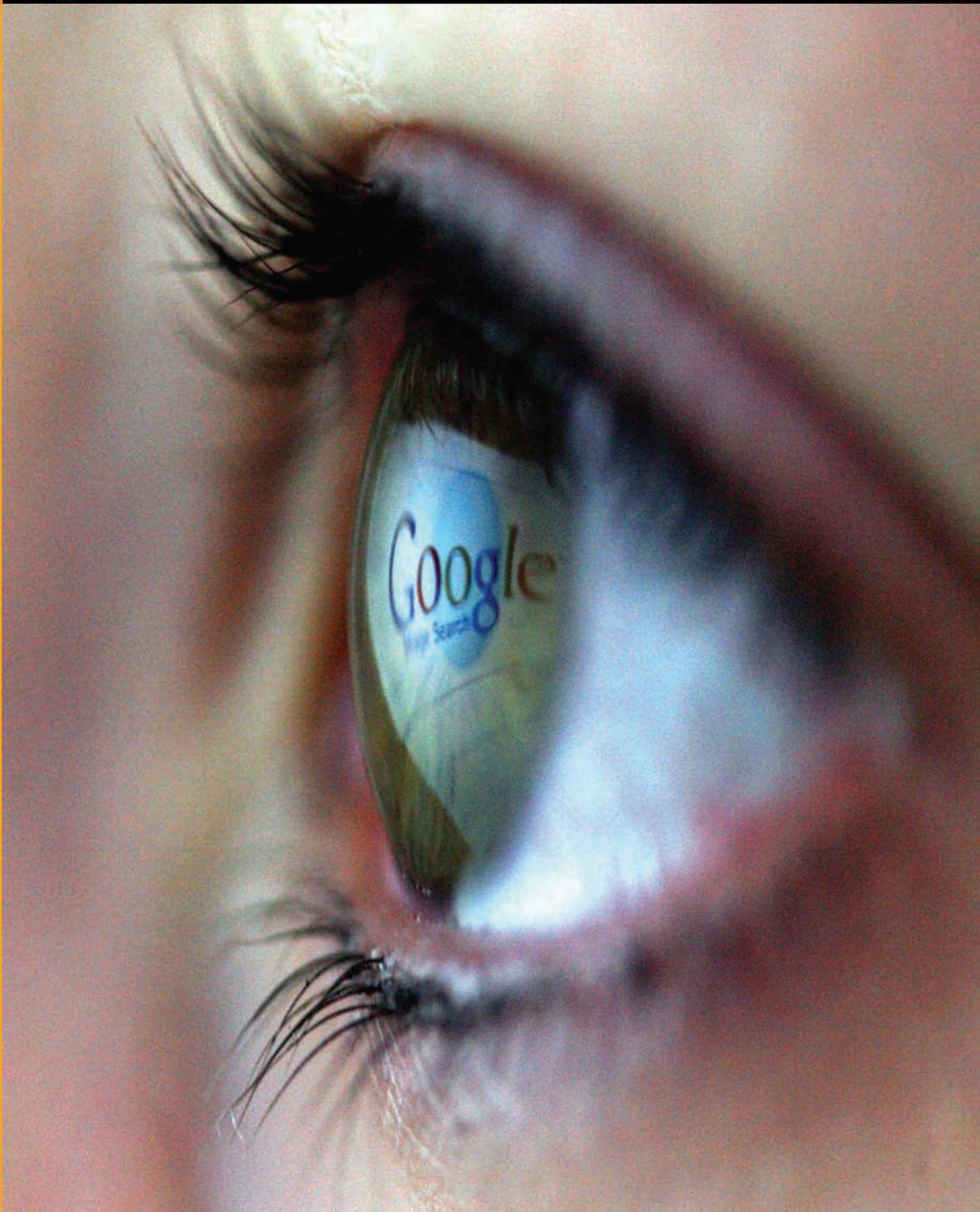
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# 10

## Stockholders' Equity

After studying Chapter 10, you should be able to:

- ▶ **1** Describe the different elements of stockholders' equity and prepare the stockholders' equity section of the balance sheet.
- ▶ **2** Distinguish between the different forms of equity and describe their use in raising capital.
- ▶ **3** Record the issuance of capital stock.
- ▶ **4** Account for the distribution of assets to stockholders.
- ▶ **5** Describe the accounting issues related to retained earnings and accumulated other comprehensive income.
- ▶ **6** Analyze stockholder payout and profitability ratios using information contained in the stockholders' equity section.



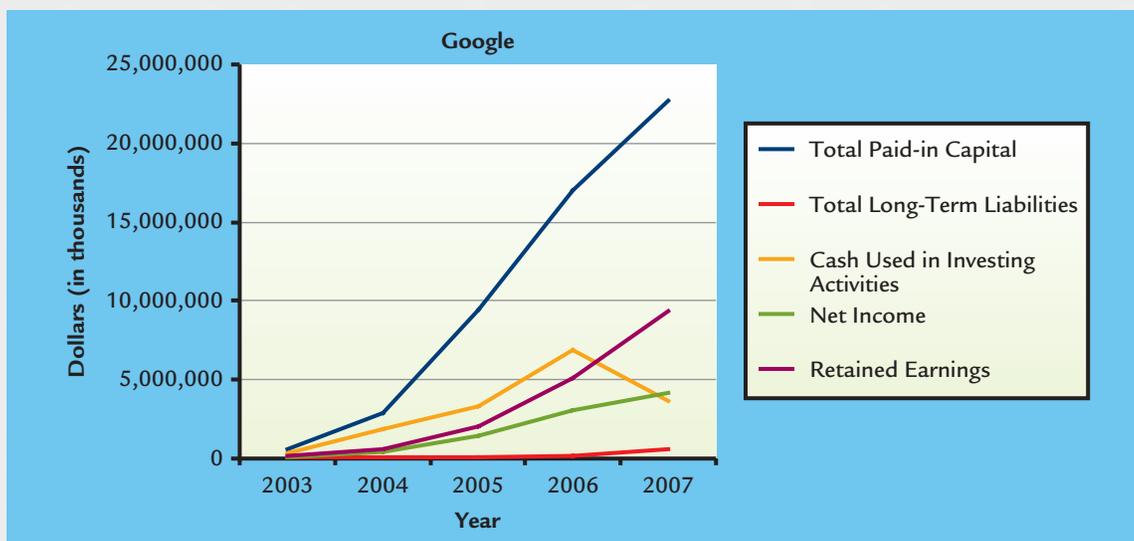
# E xperience Financial Accounting with Google

Although **Google** is only 10 years old, its name has become a verb. Millions of people everyday say, "I googled..." Founded in 1998 by Sergey Brin and Larry Page, two Ph.D. students at Stanford University, by 2006 Google had revenues in excess of \$10.5 billion and net income of over \$3 billion. This revenue figure is up over 300 percent from 2004, while the net income figure is up over 750 percent from 2004.

One way that stockholders earn a return on their investment is by receiving dividends. Despite their profitability, Google has never paid a dividend to stockholders. Why is this?

After reading the chapter, you will realize that instead of paying out dividends to stockholders, corporations may choose to pay down debt or invest in growth oppor-

tunities. A primary strategy fueling Google's growth is investment in growth opportunities. You are likely aware of Google's purchase of **YouTube** and its roll out of features such as Google Maps; however, Google's investments do not stop there. In fact, Google's 2006 statement of cash flows shows that Google spent more than \$6 billion on investing activities. Past investment is responsible for Google's large growth in revenues and net income, and the hope is that the 2006 investments will fuel profitable growth in the coming years. Review the graph below and notice how Google's investing activities increased over the five-year period with very little increase in long-term debt. It is apparent that the investing dollars came from paid-in capital and retained earnings.



**OBJECTIVE** > **1**

Describe the different elements of stockholders' equity and prepare the stockholders' equity section of the balance sheet.

## Elements of Stockholders' Equity

**Stockholders' equity**, which also is called **equity**, represents the owners' claims against the assets of a corporation after all liabilities have been deducted. There are various elements of equity, and the stockholders' equity section of the balance sheet clearly classifies these elements according to their source: (1) capital stock—split between preferred and common stock and the associated paid-in capital in excess of par; (2) retained earnings or deficit; (3) accumulated other comprehensive income; and (4) treasury stock. Further, although it is not a required statement, a vast majority of corporations traded on U.S. stock exchanges also provide a statement of stockholders' equity. This latter statement reconciles the beginning and ending balances for each of the elements of stockholders' equity changes as is illustrated (see Exhibit 10-1) in the following excerpts from **Goldman Sachs'** balance sheet and statement of stockholders' equity.

**Exhibit 10-1**
**Excerpts from Goldman Sachs' 2007 10-K**
**THE GOLDMAN SACHS GROUP, INC. and SUBSIDIARIES  
CONSOLIDATED BALANCE SHEET**

	Year Ended November	
	2007	2006
	(in millions, except per share amounts)	
<b>Stockholders' Equity</b>		
Preferred stock, par value \$0.01 per share; 150,000,000 shares authorized, 124,000 shares issued and outstanding as of both November 2007 and November 2006, with liquidation preference of \$25,000 per share	\$ 3,100	\$ 3,100
Common stock, par value \$0.01 per share; 4,000,000,000 shares authorized, 618,707,032 and 599,697,200 shares issued as of November 2007 and November 2006, respectively, and 390,682,013 and 412,666,084 shares outstanding as of November 2007 and November 2006, respectively	6	6
Restricted stock units and employee stock options	9,302	6,290
Nonvoting common stock, par value \$0.01 per share; 200,000,000 shares authorized, no shares issued and outstanding	—	—
Additional paid-in capital	22,027	19,731
Retained earnings	38,642	27,868
Accumulated other comprehensive income/(loss)	(118)	21
Common stock held in treasury, at cost, par value \$0.01 per share; 228,025,019 and 187,031,116 shares as of November 2007 and November 2006, respectively	(30,159)	(21,230)
<b>Total stockholders' equity</b>	<b>\$ 42,800</b>	<b>\$ 35,786</b>

**THE GOLDMAN SACHS GROUP, INC. and SUBSIDIARIES CONDENSED CONSOLIDATED  
STATEMENTS OF CHANGES IN SHAREHOLDERS' EQUITY**

	Year Ended November		
	2007	2006	2005
	(in millions, except per share amounts)		
<b>Preferred stock</b>			
Balance, beginning of year	\$ 3,100	\$ 1,750	\$ —
Issued	—	1,350	1,750
Balance, end of year	<u>\$ 3,100</u>	<u>\$ 3,100</u>	<u>\$ 1,750</u>
<b>Common stock, par value \$0.01 per share</b>			
Balance, beginning of year	\$ 6	\$ 6	\$ 6
Issued	—	—	—
Balance, end of year	<u>\$ 6</u>	<u>\$ 6</u>	<u>\$ 6</u>

(Continued)

	Year Ended November		
	2007	2006	2005
	(in millions, except per share amounts)		
<b>Restricted stock units and employee stock options</b>			
Balance, beginning of year	\$ 6,290	\$ 3,415	\$ 2,013
Issuance and amortization of restricted stock units and employee stock options	4,684	3,787	1,871
Delivery of common stock underlying restricted stock units	(1,548)	(781)	(423)
Forfeiture of restricted stock units and employee stock options	(113)	(129)	(37)
Exercise of employee stock options	(11)	(2)	(9)
Balance, end of year	<u>\$ 9,302</u>	<u>\$ 6,290</u>	<u>\$ 3,415</u>
<b>Additional paid-in capital</b>			
Balance, beginning of year	\$ 19,731	\$ 17,159	\$ 15,501
Issuance of common stock, including the delivery of common stock underlying restricted stock units and proceeds from the exercise of employee stock options	2,338	2,432	1,580
Cancellation of restricted stock units in satisfaction of withholding tax requirements	(929)	(375)	(163)
Stock purchase contract fee related to automatic preferred enhanced capital securities	(20)	—	—
Preferred stock issuance costs	—	(1)	(31)
Excess net tax benefit related to share-based compensation	908	653	272
Cash settlement of share-based compensation	(1)	(137)	—
Balance, end of year	<u>\$ 22,027</u>	<u>\$ 19,731</u>	<u>\$ 17,159</u>
<b>Retained earnings</b>			
Balance, beginning of year, as previously reported	\$ 27,868	\$ 19,085	\$ 13,970
Cumulative effect of adjustment from adoption of SFAS No. 157, net of tax	51	—	—
Cumulative effect of adjustment from adoption of SFAS No. 159, net of tax	(45)	—	—
Balance, beginning of year, after cumulative effect of adjustments	<u>\$ 27,874</u>	<u>\$ 19,085</u>	<u>\$ 13,970</u>
Net earnings	11,599	9,537	5,626
Dividends and dividend equivalents declared on common stock and restricted stock units	(639)	(615)	(494)
Dividends declared on preferred stock	(192)	(139)	(17)
Balance, end of year	<u>\$ 38,642</u>	<u>\$ 27,868</u>	<u>\$ 19,085</u>
<b>Unearned compensation</b>			
Balance, beginning of year	\$ —	\$ —	\$ (117)
Amortization of restricted stock units	—	—	117
Balance, end of year	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>
<b>Accumulated other comprehensive income/(loss)</b>			
Balance, beginning of year	\$ 21	\$ —	\$ 11
Adjustment from adoption of SFAS No. 158, net of tax	(194)	—	—
Currency translation adjustment, net of tax	39	45	(27)
Minimum pension liability adjustment, net of tax	38	(27)	(11)
Net gains/(losses) on cash flow hedges, net of tax	(2)	(7)	9
Net unrealized gains/(losses) on available-for-sale securities, net of tax	(12)	10	18
Reclassification to retained earnings from adoption of SFAS No. 159, net of tax	(8)	—	—
Balance, end of year	<u>\$ (118)</u>	<u>\$ 21</u>	<u>\$ —</u>
<b>Common stock held in treasury, at cost</b>			
Balance, beginning of year	\$(21,230)	\$(13,413)	\$(6,305)
Repurchased	(8,956)	(7,817)	(7,108)
Reissued	27	—	—
Balance, end of year	<u>\$(30,159)</u>	<u>\$(21,230)</u>	<u>\$(13,413)</u>
<b>Total shareholders' equity</b>	<u><u>\$ 42,800</u></u>	<u><u>\$ 35,786</u></u>	<u><u>\$ 28,002</u></u>

In this chapter, we will first describe the different forms of equity and how equity is used to raise capital for the corporation. This is followed by sections describing how corporations account for the various elements of stockholders' equity, including accounting for capital stock (preferred and common), dividends, stock splits, retained earnings, and accumulated other comprehensive income. The final section of the chapter analyzes stockholder payout and stockholder profitability using information contained in stockholders' equity.

## OBJECTIVE > 2

Distinguish between the different forms of equity and describe their use in raising capital.

## Raising Equity Capital within a Corporation

Recall from Chapter 1, that most large businesses are organized as corporations because incorporation increases the company's ability to raise cash (or capital) by easing the transfer of ownership and limiting the liability of owners. Ownership of a corporation is divided into a large number of equal parts or *shares*. Shares are owned in varying numbers by the owners of the corporation called **stockholders** or **shareholders**.

New corporations are highly risky ventures; many more fail than succeed. Consequently, new corporations rarely have access to the major capital markets. Instead they must rely on *venture capital* provided by wealthy investors and institutions prepared to assume large risks. Businesses whose stock is held by a small group of private investors and are not offered to the general public are called *private* or *privately held corporations*.

Although the risk of loss is high, tremendous profits are possible from an investment in a new business that succeeds. Once a business becomes established, the owners can think about converting to a *public* or *publicly held corporation* that raises equity capital by selling stock to the general public. For example, when Google began active trading in August 2004, cofounders Larry Page and Sergey Brin retained stock worth approximately \$3.85 billion each while raising about \$1.67 billion in cash for the company.

Nonetheless, as an investment, the stock price performance of most initial public offerings (IPOs) are mediocre at best. Research for the years 1970 to 2006 shows that IPO stock bought on the first day of trading under performs similar-sized public companies by 3.7 percent over the subsequent five years. In another study published in the *Journal of Finance*, 34 percent<sup>1</sup> of all IPOs between 1980 and 2001 had earnings per share (EPS) less than zero.

## Authorization to Issue Stock

Corporations are authorized, or *chartered*, in accordance with the provisions of state laws that govern the structure and operation of corporations. These laws differ from state to state and a corporation can charter in any state. For instance, although Google is headquartered in Mountain View, California, it is chartered in Delaware, as are many corporations due to Delaware's favorable laws.

Although the provisions of incorporation laws vary from state to state, all states require persons who wish to form a corporation to apply to a prescribed state official for the issuance of a charter. The **corporate charter**, which is sometimes called the **articles of incorporation**, is a document that authorizes the creation of the corporation, setting forth its name and purpose and the names of the incorporators.

The typical corporate charter contains provisions that describe how stock may be issued by the corporation. First, it authorizes the corporation to issue stock in a limited number of classes. It also sets an upper limit on the number of shares that the corporation may issue in each class. And finally, it sets a lower limit on the amount for which each share must be sold.

Shares of stock are sold, or issued, when a corporation is formed. Additional shares may be issued later. The maximum number of shares the business may issue in each class of stock is referred to as the number of **authorized shares**. This must be distinguished from the number of **issued shares**, which is the number of shares actually sold to stockholders. A corporation rarely issues all of its authorized shares.

<sup>1</sup> J. R. Ritter and I. Welch, "A Review of IPO Activity, Pricing, and Allocations," *The Journal of Finance* 62 (4) (2002), p. 1800.

## Exhibit 10-2

## Determination of Share Quantities

	Corporation established			
	500,000 shares are authorized	200,000 of the authorized shares are sold to the public	10,000 of the issued shares are bought back by the corporation	50,000 of the authorized shares (previously unissued) are sold to the public
<b>Share quantities:</b>				
Authorized	500,000	500,000	500,000	500,000
Issued	0	200,000	200,000	250,000
Issued and outstanding	0	200,000	190,000	240,000

Corporations can buy back their own stock for reasons explained later in this chapter. Thus, the number of shares issued is further distinguished from the number of **outstanding shares**—which is the number of issued shares actually in the hands of stockholders. When firms reacquire their own stock, the reacquired shares are not considered to be outstanding. Exhibit 10-2 illustrates how the share quantities are determined.

These three share quantities—the number of shares authorized, issued, and outstanding—are reported for each class of stock in the balance sheet or its accompanying notes (see Goldman Sachs' stockholders' equity section in Exhibit 10-1).

## Common and Preferred Stock

All classes of stock are designated as either common stock or preferred stock. These come with different financial benefits and provide different rights regarding the governance of the corporation. The primary rights for owners of **common stock** are:

1. Voting in the election of the board of directors. You will recall that the board controls the operating and financial policies of the company.
2. Sharing in the profits and dividends of the company. We will talk more about this below.
3. Keeping the same percentage of ownership if new stock is issued (preemptive right).
4. Sharing in the assets in liquidation in proportion to their holdings. This is referred to as the “residual claim” because common stockholders are only paid after all creditors and preferred stockholders are paid in full (which is very rare in liquidation).

When you hear of someone who “made money by investing in stock” it is almost invariably through an investment in common stock. This is because, although the “residual claim” means common stockholders are only paid after the creditors and preferred stockholders are paid in full, it also means that common stockholders get *everything* that is left over after the creditors and preferred stockholders are paid in full. As such, the common stockholders receive the bulk of the financial gain from a profitable company through stock appreciation and dividends. Stock appreciation means that the value of the stock increases above the price initially paid (of course, it is also possible that the stock's value decreases if the company is unprofitable—this is a risk of owning stock).

Dividends are paid to a company's shareholders from earnings. These payments are usually in the form of cash, but noncash assets and stock can also be given as dividends. Payment of dividends to common shareholders, however, depends on a company's alternatives. The company may elect to pay down debt or, if the company has

growth opportunities, they may elect to keep (or retain) earnings to fund these investment options rather than pay dividends. In fact, many companies do not pay dividends to common shareholders.

**Preferred stock**, on the other hand, generally pays a regular dividend. In this regard, preferred stock is similar to debt, with the preferred stock dividend equating to interest payments for debt. Additionally, the value of preferred stock, like the value of debt, is most closely tied to interest rate levels and the company's overall creditworthiness; the value of common stock, on the other hand, is most closely tied to the performance of the company. In this respect, preferred stock is a less risky investment than common stock. Preferred shareholders also receive priority over common shareholders in the payment of dividends and the distribution of assets in the event of liquidation.

As for corporate governance, common stock ownership allows shareholders to vote on the operating and financial policies of the company and elect the board of directors. In contrast, preferred stock usually does not give voting rights.

Some differences between preferred stock and common stock favor the preferred stockholder; other differences favor the common stockholder. Most differences between preferred and common stock are designated in the company's corporate charter and take one or more of the following forms:

1. **Dividend preferences:** Many preferred stock issues require that the issuing corporation pay dividends to preferred stockholders before paying dividends to common stockholders. This means that common stockholders may be obliged to miss a dividend in order that preferred dividends be paid. In addition, preferred dividends may be *cumulative and participating*, as explained on p. 521.
2. **Conversion privileges:** Some issues of preferred stock may be convertible into common shares if the preferred shareholder elects to do so and certain conditions are satisfied. For example, each share of preferred stock might be convertible into, say, 10 shares of common stock after a certain date.
3. **Liquidation preferences:** If and when a corporation is dissolved, liquidating distributions are made to stockholders. Corporate charters frequently require the claims of preferred stockholders to be satisfied before those of common stockholders. In addition, the charter may specify a liquidating amount for preferred shares.
4. **Call provisions (redeemable):** The corporate charter may authorize or even require the corporation to repurchase (or redeem) any preferred shares that are sold. In such cases, the charter usually fixes the *call price* (the amount to be paid to the preferred stockholders) and specifies a date on or after which the shares may or must be repurchased.
5. **Denial of voting rights:** Most preferred stock does not confer voting rights, which means that preferred stockholders, unlike common stockholders, cannot vote at stockholders' meetings.

Observe that the first three characteristics of preferred stock are advantageous for preferred stockholders. The last two characteristics usually work in the interest of common stockholders.

Because of the relative advantages of different forms of stock, corporations are typically authorized by their charters to issue several classes of preferred stock and several classes of common stock, each with a different set of terms and provisions. The 2007 edition of *Accounting Trends & Techniques* (an American

Institute of Certified Public Accountants publication that surveys accounting practices followed in 600 sampled financial statements) indicates that only 49 of the 600 companies (about 8 percent) had outstanding preferred stock, but all corporations have outstanding common stock.<sup>2</sup>

<sup>2</sup> *Accounting Trends and Techniques for 2007*, 61st edition, Table 2-36, p. 262.

## CONCEPT Q&A

Describe some of the similarities between debt and preferred stock. If preferred stock is similar to debt, why not just issue debt?

Preferred dividends are conceptually similar to interest payments. Specifically, preferred dividends are a contractually defined amount (e.g., some percentage of par) and are typically paid each year. Further, both debt and preferred stock are paid off in full before common stockholders receive anything in liquidation. Finally, neither preferred stock nor debt provides voting rights.

Preferred stock is typically sold to other corporations because these corporations do not pay taxes on the full amount of the dividends (i.e., there is a big tax break relative to receiving interest payments). Further, preferred stock was historically classified on the balance sheet as equity rather than debt, so if the issuer prefers to show lower debt totals, preferred stock will be advantageous. Securities that have both debt and equity characteristics are called "hybrid" securities. Some preferred stock issuances began to look so much like debt that in Accounting for Certain Financial Instruments with Characteristics of Both Liabilities and Equity, they are required to be classified as liabilities. For example, some preferred stock is "mandatorily redeemable" at a certain date. This requires the company to retire the preferred stock by paying the stockholders the face value of the share at a certain date. This mandatory redemption date is conceptually identical to a maturity date on debt.

Possible Answer:

To illustrate, see the two classes of preferred stock and one class of common stock, as taken from **Procter & Gamble's** 10-K.

(in millions)	2007	2006
<b>Capital stock:</b>		
<b>Convertible Class A preferred stock</b> , stated value \$1 per share (600 shares authorized)	\$1,406	\$1,451
<b>Nonvoting Class B preferred stock</b> , stated value \$1 per share (200 shares authorized)	—	—
<b>Common stock</b> , stated value \$1 per share (10,000 shares authorized; issued: 2007—3,989.7, 2006—3,975.8)	3,990	3,976
<b>Total capital stock</b>	\$5,396	\$5,427

## Accounting for Issuance of Capital Stock

### OBJECTIVE > 3

Record the issuance of capital stock.

In examples in previous chapters, we recorded the contributions of stockholders in exchange for stock in a single account. In practice, however, cash or other assets (i.e., capital) contributed by stockholders is usually divided between two accounts, on the basis of the par value of the stock. **Par value** is an arbitrary monetary amount printed on each share of stock that establishes a minimum price for the stock when issued, but does not determine its market value.<sup>3</sup> When a corporation receives more than par value for newly issued stock, as it usually does (stock rarely sells for exactly its par value), the par value and the excess over par are recorded in separate accounts. The par value multiplied by the number of shares sold is recorded in an account that describes the type of stock—for example, common stock or preferred stock. The amount received in excess of the par value is recorded in an account called **paid-in capital in excess of par**. These accounts are the first accounts shown in the stockholders' equity section of the balance sheet and taken together are known as **contributed capital**. **Cornerstone 10-1** illustrates the accounting procedures for recording the sale of stock.

### HOW TO Record the Sale of Capital Stock

#### Concept:

Growing companies almost always need cash to fund expansion. Cash is obtained either by borrowing or by selling an ownership interest. However, the riskiness of new companies makes it relatively expensive to borrow large amounts of cash (i.e., the interest rates are high); instead, such companies often sell part of the company in the form of stock to raise cash. These ownership claims are recorded in the capital stock (including paid-in capital in excess of par) section of stockholders' equity.

#### Information:

Spectator Corporation is authorized by its charter from the state of Delaware to issue 1,000 shares of preferred stock with a 9 percent dividend rate and a par value of \$20 per share and 50,000 shares of common stock with a par value of \$2 per share. On January 2, 2009, Spectator Corporation issues 200 shares of preferred stock at \$22 per share and 20,000 shares of common stock at \$2.50 per share.

#### Required:

1. How much cash did Spectator raise through their stock issuance?
2. Prepare the journal entry necessary to record the sale of stock.
3. Provide the Stockholders' Equity section of Spectator's balance sheet assuming Spectator has yet to engage in any operations.



### CORNERSTONE 10-1



<sup>3</sup>The precise meaning of par value is established by securities laws that vary somewhat from state to state.

**CORNERSTONE**  
**10-1**  
*(continued)*

**Solution:**

1. The cash proceeds are calculated as follows:

Preferred stock (\$22 × 200 shares)	\$ 4,400
Common stock (\$2.50 × 20,000 shares)	50,000
<b>Total proceeds</b>	<b><u>\$54,400</u></b>

2. The journal entry required on January 2, 2009, is:

Date	Account and Explanation	Debit	Credit
Jan. 2	Cash	4,400	
	Preferred Stock (200 shares × \$20 par)		4,000
	Paid-In Capital in Excess of Par—		400
	Preferred Stock [200 shares × (\$22 – \$20)]		
	<i>(Record sale of preferred stock at \$22 per share)</i>		
2	Cash	50,000	
	Common Stock (20,000 shares × \$2 par)		40,000
	Paid-In Capital in Excess of Par—Common		
	Stock [20,000 shares × (\$2.50 – \$2.00)]		10,000
	<i>(Record sale of common stock at \$2.50 per share)</i>		

Assets = Liabilities +	Stockholders' Equity
+4,400	+4,000
	+400

Assets = Liabilities +	Stockholders' Equity
+50,000	+40,000
	+10,000

3. The balance sheet prepared by Spectator Corporation immediately after the issuance of shares on January 2, 2009, would contain the following stockholders' equity section:

Preferred stock, 9 percent, \$20 par, 1,000 shares authorized, 200 shares issued and outstanding	\$ 4,000	
Common stock, \$2 par, 50,000 shares authorized, 20,000 shares issued and outstanding	40,000	
Paid-in capital in excess of par:		
Preferred stock	400	
Common stock	<u>10,000</u>	
Total capital stock		\$54,400
Retained earnings*		<u>—</u>
Total stockholders' equity		<u>\$54,400</u>

\*Note that retained earnings displays a zero balance, because Spectator is a newly formed corporation.

## CONCEPT Q&A

How do we account for stock issued in exchange for noncash assets or services (e.g., legal services in connection with incorporation)?

Possible Answer:  
The amount recorded should be the fair market value of the stock or the fair market value of the asset/service, whichever is more clearly determinable. In the case of a newly organized corporation, the fair market value of the asset/service is usually more clearly determinable. But in the case of established corporations with widely traded stock, the fair market value of the stock is more clearly determinable than the fair market value of the asset/service.

## Stated Capital and No-Par Stock

The stock issued by Spectator Corporation carried a par value that represents the stated capital of the corporation. **Stated capital (legal capital)** is the amount of capital that, under law, cannot be returned to the corporation's owners unless the corporation is liquidated. Even when state law permits the issuance of **no-par stock** (stock without a par value), it frequently requires that no-par stock have a stated (legal) value, set by the corporation, in order to establish the corporation's stated or legal capital. Further, this is a relatively infrequent occurrence.<sup>4</sup>

Stated value, like par value, is recorded in a separate equity account called *common* or (*preferred*) *stock, no-par*. Any

<sup>4</sup>Accounting Trends & Techniques for 2007 indicated that 63 of the 600 companies surveyed (just over 10 percent) had "no par value" common stock.

## DECISION-MAKING & ANALYSIS

### Going Public

Georgian Manufacturing, Inc., is a successful small manufacturer of electronic components for computer hardware. Georgian wishes to double its scale of operations in order to meet both existing and expected demand for its products. Georgian is a *privately held corporation*. High interest rates preclude Georgian from borrowing the necessary expansion capital from its current owners or financial institutions. Consequently, Georgian is forced to consider “going public” by selling common stock to the general public. A final decision has not been made, but the owners are discussing the following questions:

**1.** *What is the impact of going public on corporate control and profit?*

The common stock issue required to double the size of operations would nearly double the number of shares outstanding. In addition, several of the original stockholders wish to sell their shares in the business; thus, the stock sale would be partly a *primary offering* of newly issued shares and partly a *secondary offering* of previously issued shares. Present stockholders would be unable to buy enough new shares to prevent new stockholders from ending up with more than 50 percent of the outstanding shares. If the new owners were sufficiently well-organized and cohesive, they could elect a majority of directors and control the company. On the other hand, if the new shares were purchased by a large number of investors with no organized interest in controlling Georgian, then effective control would remain in the hands of the original owners. Of course, the risk of losing control at some future time would still exist. Furthermore, Georgian expects its expansion to be immensely profitable. The new common stock would transfer more than half of the profit to the new shareholders.

**2.** *What is the impact of going public on the costs of financing the business?*

The major capital markets are very efficient mechanisms for selling outstanding shares and issuing new ones. Thus, stock in public corporations is usually much easier to evaluate and sell than stock in private corporations. Further, capital obtained in a major capital market is likely to be less expensive than capital obtained in private or venture capital markets.

Thus, the choice between operating as a private corporation or a public corporation depends on the current business environment and the circumstances of the firm. New businesses frequently are private corporations; established businesses, on the other hand, usually are public corporations. However, some large businesses operate as private corporations. Private corporations have the capacity to make major decisions quickly, without having to form a consensus among a large, diverse ownership. Further, private corporations need not issue the extensive financial reports and disclosures required of public corporations. The cost of financial reporting for public corporations has become even greater to comply with requirements of the Sarbanes-Oxley Act of 2002. This has led to a record number of companies actually going private as ownership buys back stock from the public and stops having its stock publicly traded.

excess paid for the stock over its stated value is recorded in an equity account called *Paid-In Capital in Excess of Stated Value*.<sup>5</sup>

### Warrants and Options

A **stock warrant** is the right granted by a corporation to purchase a specified number of shares of its capital stock at a stated price and within a stated time period. Corporations issue stock warrants in two situations. First, they may issue warrants along with bonds or preferred stock as an “equity kicker,” to make the bonds or preferred stock more attractive. Such warrants often have a duration of five or more years. Second, they may issue warrants to existing stockholders who have a legal right to purchase a specified share of a new stock issue, in order to maintain their relative level of ownership in the corporation. Such warrants usually have a duration of less than six months.

Corporations also grant employees and executives the right to buy stock at a set price as compensation for their services. These “rights” are called *stock options*. Stock options are frequently given to employees and executives as compensation for their services. For example, the employer may give the executive the right to purchase in two years 5,000 shares of the company’s stock at \$50 per share, today’s market price.

<sup>5</sup>In some states, stated value functions exactly as does the par value of stock to identify the legal capital portion of total paid-in or contributed capital. However, in other states, legal capital is defined as the entire paid-in or contributed capital associated with the no-par stock. In these states, the entire paid-in or contributed capital is recorded in a single common or preferred stock account.

If in two years the market price of the stock is higher than \$50—say, \$62—the executive will purchase the 5,000 shares for \$50 each and receive effective compensation of \$60,000  $[(\$62 - \$50) \times 5,000 \text{ shares}]$ . Of course, if the price is lower than \$50, the executive will not exercise the option.

**ETHICS** The compensation expense recorded by a company when they grant stock options depends on many factors including the price at which employees can buy the stock (called the strike or exercise price) and the market value of the stock on the date of grant. As discussed above, the strike price of the options and the market value of the stock are generally the same on the date of grant. However, during 2006 many companies came under investigation for “back dating” stock options. That is, companies waited to announce the granting of options (this practice has been curtailed by the Sarbanes-Oxley Act) and then picked the date in the past when the stock price was lowest. This maximized the value of each individual option to the employee.

In and of itself, this is not illegal, but if, for example, on December 20 a company backdates options to May 1 (the lowest stock price of the year), the value of each option will be greater on December 20 than on May 1. As such, the company should calculate compensation expense using the market value of the stock on December 20. We will never know exactly how widespread the practice of backdating was, but approximately 80 firms were initially the subject of an SEC probe and research estimates that 29.2 percent of firms backdated grants to top executives between 1996 and 2005. ♦

Corporations elect to grant stock options for two primary reasons. First, stock options allow cash-poor companies to compete for top talent in the employee market. For example, market salary for a manager of systems quality and assurance may be \$200,000 per year—well beyond the means of many start-up companies. However, such a person may agree to work for \$100,000 per year and a significant number of stock options. Second, stock options are believed to better align the incentives of the employee with those of the owners. This concept is easy to understand with a bit of exaggeration. Employees would like to be paid millions of dollars a year to do nothing, while owners would like the employees to work hundreds of hours a week for free. Stock options help align these incentives because now an employee’s personal wealth is tied to the success of the company’s stock price—just like the owners. Although knowledge of these uses of equity are important, further discussion of the complications of accounting for stock warrants and options must wait until later accounting courses.

#### OBJECTIVE > 4

Account for the distribution of assets to stockholders.

## Accounting for Distributions to Capital Stockholders

As discussed above, owners invest in corporations through the purchase of stock. Corporations can distribute cash to shareholders in two ways. First, the corporation can repurchase the shares from owners. Second, the corporation can issue dividends. Historically, dividends were the most common method of distributing cash. Over recent years, however, repurchasing shares has become a more frequent method of cash distribution because it has tax advantages for stockholders relative to dividends.<sup>6</sup> First, dividends are paid to *all* stockholders, thus creating tax consequences for everyone. Stock repurchases, on the other hand, only trigger tax consequences for those stockholders who elect to sell their stock back to the company. Thus, if a stockholder does not want to incur tax consequences in the current year, (s)he can elect not to sell the shares back to the company. Second, dividends have frequently been taxed at higher rates than capital gains, although at the current time this is not the case.<sup>7</sup> Dividends do have the advantage of allowing shareholders to receive assets from the corporation without reducing their ownership share.

<sup>6</sup>In fact, one study shows that the number of stock repurchases increased from 87 and \$1.4 billion in 1988 to 1,570 and \$222 billion in 1998 (Grullon, G. and D. Ikenberry. 2000. “What do we know about stock repurchases?” *Journal of Applied Corporate Finance*. Spring: 31–51.)

<sup>7</sup>However, at the time of this writing, the taxing of dividends at capital gains rates was set to expire at the end of 2010, unless Congress takes additional action.

## Stock Repurchases (Treasury Stock)

When a corporation purchases its own previously issued stock, the stock that it buys is called **treasury stock**. Corporations purchase treasury stock for many reasons:

1. to buy out the ownership of one or more stockholders
2. to reduce the size of corporate operations
3. to reduce the number of outstanding shares of stock in an attempt to increase earnings per share and market value per share
4. to acquire shares to be transferred to employees under stock bonus, stock option, or stock purchase plans
5. to satisfy the terms of a business combination in which the corporation must give a quantity of shares of its stock as part of the acquisition of another business.
6. to reduce vulnerability to an unfriendly takeover.

The stock may be purchased on the open market, by a general offer to the stockholders (called a *tender offer*), or by direct negotiation with a major stockholder. If the objective of acquiring treasury stock is to reduce the size of corporate operations, the treasury shares may be retired after purchase. More frequently, however, repurchased stock is held in the corporation's treasury until circumstances favor its resale, or until it is needed to meet obligations of the corporation that must be satisfied with shares of its stock. Transactions in treasury stock, even very large ones, usually do not require stockholder approval.

The 2007 edition of *Accounting Trends & Techniques* indicates that 405 of the 600 companies surveyed hold treasury shares.<sup>8</sup> Interestingly, a few companies hold a relatively large portion of their issued shares in treasury. For example, at the end of 2007 Coca-Cola Company held approximately 34 percent of its shares in treasury at a repurchase cost of over \$23 billion.

**Purchase** At first thought, one might consider recording the acquisition of treasury stock as an exchange of cash for an investment in stock (an exchange of one asset for another). However, that approach fails to recognize that the treasury stock is already represented by amounts in the corporation's equity accounts. Although the shares would represent an asset to another entity if it acquired them, they cannot represent an asset to the entity that issued them. Thus, the purchase of treasury stock is a reduction of equity rather than the acquisition of an investment. Instead of requiring a debit to an investment account, the reacquisition of treasury stock requires a debit to a contra-equity account, treasury stock. This interpretation is consistent with the provisions of most state incorporation laws, which prohibit the payment of dividends on treasury stock.<sup>9</sup>

**Resale** If the treasury shares are reissued at some point in the future, the original cost of the shares is removed from the treasury stock account. Any excess of proceeds over the cost of the shares is not considered a gain because a corporation cannot generate income by buying and selling its own stock (income is reserved for transactions with nonowners); instead, a credit is made to a special paid-in capital account—*paid-in capital from treasury stock transactions*. If the treasury shares are sold for less than their cost, a debit is first made to “Paid-in Capital from Treasury Stock Transactions.” If the credit balance in Paid-in Capital from Treasury Stock Transactions is not large enough to absorb the shortfall, then the unabsorbed debit reduces retained earnings.

**Cornerstone 10-2** illustrates how to account for treasury stock.

### CONCEPT Q&A

If a corporation buys the stock of another corporation and later sells that stock for a different price, a gain or loss is recorded on the income statement. However, when a corporation buys its own stock and later sells it for a different price, the income statement is not affected. Why is this?

**Possible Answer:** Transactions with a corporation's owners cannot be included on the income statement.

<sup>8</sup> *Accounting Trends and Techniques for 2007*, 61st edition, Table 2-41, p. 272.

<sup>9</sup> The method of accounting for treasury stock demonstrated here is called the *cost method*. This method is used by approximately 95 percent of the companies engaging in treasury stock transactions. An alternative method, called the *par value method*, is demonstrated in intermediate accounting courses.



## CORNERSTONE 10-2



### HOW TO Account for Treasury Stock

#### Concept:

When purchasing its own previously issued stock, corporations record a reduction to stockholders' equity by debiting treasury stock. When purchasing the stock of another corporation, on the other hand, corporations record an investment, which increases assets.

#### Information:

On July 1, 2009, Spectator Corporation repurchases 1,000 shares of its outstanding common stock for \$15 per share. On September 15, 2009, Spectator sells 500 shares of treasury stock for \$18 per share and on December 1, 2009, Spectator sells 400 shares of treasury stock for \$11 per share.

#### Required:

1. Provide the journal entry to record the purchase of treasury stock on July 1, 2009.
2. Provide the journal entry to record the sale of treasury stock on September 15, 2009.
3. Provide the journal entry to record the sale of treasury stock on December 1, 2009.

#### Solution:

1. The journal entry to required on July 1, 2009, is:

Date	Account and Explanation	Debit	Credit
July 1, 2009	Treasury Stock (1,000 shares × \$15)	15,000	
	Cash		15,000
	<i>(Record purchase of treasury shares)</i>		

2. The journal entry required on September 15, 2009, is:

Date	Account and Explanation	Debit	Credit
Sept. 15, 2009	Cash (500 shares × \$18)	9,000	
	Treasury Stock (500 × \$15)		7,500
	Paid-In Capital from Treasury Stock Transactions [500 × (\$18 – \$15)]		1,500
	<i>(Record reissue of treasury shares)</i>		

3. The journal entry required on December 1, 2009, is:

Date	Account and Explanation	Debit	Credit
Dec. 1, 2009	Cash (400 shares × \$11)	4,400	
	Paid-In Capital from Treasury Stock Transactions		1,500*
	Retained Earnings		100**
	Treasury Stock (400 × \$15)		6,000
	<i>(Record reissue of treasury shares)</i>		

\*Paid-in capital from treasury stock transactions can be debited in a journal entry, but the result of the journal entry cannot be a debit balance to the account. Thus, there is a limit of \$1,500 due to the credit in part 2.

\*\*Retained earnings is debited if there is any remaining debit needed after paid-in capital from treasury stock transactions is zeroed out.

Assets	=	Liabilities	+	Stockholders' Equity
-15,000				-15,000

Assets	=	Liabilities	+	Stockholders' Equity
+9,000				+7,500 +1,500

Assets	=	Liabilities	+	Stockholders' Equity
+4,400				-1,500 -100 +6,000

**Transfers among Shareholders** We have been considering the effects on the equity accounts when a corporation buys or sells its own stock. It should be remembered that treasury stock transactions constitute a special case. In general, the purchase or sale of stock after it is first issued does *not* alter the equity accounts of

the issuing corporation, unless that corporation is itself the purchaser or seller. Although the issuing corporation's accounts do not change when shares are sold by one stockholder to another, the corporation's stockholder list must be updated. Large corporations usually retain an independent *stock transfer agent* to maintain their stockholder lists, which include the quantity and serial numbers of the shares held. Stock transfer agents also arrange for the transfer of certificates among stockholders and the issuance of new certificates to stockholders.<sup>10</sup>

**Retirement of Treasury Shares** Occasionally, treasury shares are permanently retired. That is, these particular shares will no longer be traded. In this case the “common stock” account is debited for the par value of the stock and the “paid-in capital in excess of par” account is reduced for any excess of the purchase price of the treasury shares over par. In the Cornerstone example, if Spectator had retired the 1,000 shares it repurchased for \$15/share, it would have made the following entry assuming the par value of the stock was \$2:

Date	Account and Explanation	Debit	Credit
July 1, 2009	Common Stock (1,000 shares × \$2)	2,000	
	Paid-In Capital in Excess of Par	13,000	
	Cash		15,000
	<i>(Record purchase and retirement of shares)</i>		

Assets = Liabilities +	Stockholders' Equity
-15,000	-2,000
	-13,000

## Dividends

A dividend is an amount paid periodically by a corporation to a stockholder as a return on invested capital. Dividends represent distributions of accumulated net income. They are usually paid in cash, but may also be paid in the form of noncash assets or even additional shares of a corporation's own stock. All dividends, whatever their form, reduce retained earnings.

**Cash Dividends** Cash dividends are by far the most common form of dividend. The payment of a cash dividend is preceded by an official announcement or declaration by the board of directors of the company's intention to pay a dividend. The dividend declaration specifies:

1. the **declaration date**—the date on which a corporation announces its intention to pay a dividend on capital stock
2. the dollar amount of the dividend—usually stated as the number of dollars per share
3. the **date of record**—the date on which a stockholder must own one or more shares of stock in order to receive the dividend
4. the **payment date**—the date on which the dividend will actually be paid

Since the stock of most corporations is continually changing hands, it is necessary to set a date on which the ownership of shares is established as a basis for the payment of dividends. If a share of stock is sold between the date of record and the dividend payment date, the former owner of the share, rather than the new owner, receives the dividend. On the other hand, if a share of stock is sold between the declaration date and the date of record, the new owner, rather than the former owner, receives the dividend. As we have mentioned, when stock is widely traded, an independent stock transfer agent usually maintains the corporation's stockholder list. It is the agent's responsibility to determine who holds the outstanding shares on the date of record. The accounting for cash dividends is illustrated in **Cornerstone 10-3**.

## CONCEPT Q&A

Why are dividends not an expense on the income statement?

*Transactions with owners are not included on the income statement.*

**Possible Answer:**

<sup>10</sup> Although the transfer of shares among stockholders does not affect the accounts of the issuing corporation, such transactions obviously require entries into the accounts of the buyers and sellers of the shares.



## CORNERSTONE 10-3



### HOW TO Record Cash Dividends

#### Concept:

Dividends are a common means of distributing cash to owners. State laws governing corporations generally require such payments to be made from current or undistributed past earnings (i.e., retained earnings).

#### Information:

The Kingsmill Corporation has issued 3,000 shares of common stock, all of the same class; 2,800 shares are outstanding and 200 shares are held as treasury stock. On November 15, 2009, Kingsmill's board of directors declares a cash dividend of \$2.00 per share payable on December 15, 2009, to stockholders of record on December 1, 2009.

#### Required:

1. Provide the journal entry at the date of declaration (November 15, 2009).
2. Provide the journal entry at the date of record (December 1, 2009).
3. Provide the journal entry at the payment (December 15, 2009).

#### Solution:

1. Remember that dividends are not paid on treasury stock. Further, a liability is incurred on the date of declaration because the corporation has the legal obligation to pay after declaring the dividend. The journal entry to record the liability on November 15, 2009, is:

Date	Account and Explanation	Debit	Credit
Nov. 15, 2009	Dividends (2,800 × \$2)	5,600*	
	Dividends Payable		5,600
	<i>(Record liability for dividends)</i>		

\*"Dividends" is closed to Retained Earnings at the end of the period.

2. No journal entry is made since the exact number of outstanding shares is generally known on the date of declaration.
3. The journal entry to record payment of the liability on December 15, 2009, is:

Date	Account and Explanation	Debit	Credit
Dec. 15, 2009	Dividends Payable	5,600	
	Cash		5,600
	<i>(Record payment of dividends)</i>		

Assets	=	Liabilities	+	Stockholders' Equity
		+5,600		-5,600

Assets	=	Liabilities	+	Stockholders' Equity
-5,600		-5,600		

**Dividend Policy** The corporation's record of dividends and retained earnings provides useful information to boards of directors and managers who must formulate a dividend policy. In addition, it provides useful information to stockholders and potential investors who wish to evaluate past dividend policies and to assess prospects for future dividends. Historical records and long-term future projections of earnings and dividends are of particular interest to stockholders, because the dividend policies of most large corporations are characterized by long-term stability. In other words, they are designed to produce a smooth pattern of dividends over time. For this reason directors approach increases in the per-share dividend very cautiously, and avoid decreases at all costs—as the following Decision-Making & Analysis shown demonstrates.

**Liquidating Dividends** When retained earnings has been reduced to zero, any additional dividends must come from paid-in capital. Such dividends are called **liquidating dividends**, and must be charged against capital stock accounts—first paid-in capital in excess of par, then par value. The payment of liquidating dividends usually accompanies the dissolution of the corporation, and is regulated by various laws

## DECISION-MAKING & ANALYSIS

### Dividend Policy

Edwardian Products, Inc., is a manufacturer of precision-engineered parts for high-performance engines. Edwardian was founded seven years ago. After several lean years, its net income began to grow at a rate of about 20 percent per year. Two years ago, the dividend was raised to \$1.00 per share. The balance sheet for Edwardian has the following equity section:

<b>Capital stock:</b>	
Preferred stock, 9 percent cumulative, \$100 par, 5,000 shares authorized; 1,000 shares issued and outstanding	\$100,000
Common stock, \$20 par, 20,000 shares authorized; 10,000 shares issued and outstanding	200,000
Paid-in capital in excess of par, common stock	60,000
Retained earnings	120,000
Total equity	<u>\$480,000</u>

Edwardian is required to pay a dividend of \$9,000 to preferred stockholders if any dividend is paid to common stockholders. (If no dividends are paid to common stockholders, the amount of the preferred dividend is added to next year's preferred dividend requirement.) An agreement with bondholders requires at least \$75,000 of retained earnings remain should a dividend be declared. Edwardian is in the process of formulating its cash dividend policy for the current year. The questions that follow bear on Edwardian's decision:

1. How much cash is available for the payment of current dividends?

The board of directors has examined the firm's future cash needs and has determined that current cash dividends to holders of preferred and common shares cannot exceed \$21,500. In determining this limitation, the board considered its plans for growth as well as cash needs arising from normal operations.

2. What limitation is imposed on the current dividend by the restrictions on retained earnings?

The retained earnings balance is \$120,000 but only \$45,000 is available to support current dividends because of the \$75,000 restriction imposed by bondholders. Edwardian's directors believe, however, that it would be imprudent to pay dividends up to the \$45,000 limit. Moreover, the cash limitation prevents it.

3. Should the dividend be increased to the limit of available cash?

After the preferred stock dividend is paid, \$12,500 (\$21,500 – \$9,000) will be available for the payment of common stock dividends. This would permit Edwardian to increase the common stock dividend to \$1.25 per share (\$12,500/10,000 shares)—a 25 percent increase. However, the board decides to leave the dividend at \$1.00 per share and to reconsider the matter next year. Several influential board members believe that there is a chance the firm's expansion plans could lead to several lean years, from a cash-flow standpoint. Although the chance of that occurring is small, being forced to cut the dividend could have disastrous effects on the way stockholders, customers and suppliers view the business. Thus a conservative strategy is deemed advisable.

Scholars could debate the merits of Edwardian's decision. Some even argue that, as a matter of economic theory, the choice among alternative dividend policies makes little difference in the value of a business to stockholders.

designed to protect the interests of creditors and other holders of nonresidual equity. Thus, the presence of significant liabilities will usually prevent, or at least require close monitoring of, liquidating dividends. Since these dividends are a return of paid-in capital, they are not taxed as income to the recipients.

**Stock Dividends** A cash dividend transfers cash from the corporation to its stockholders. In contrast, a **stock dividend** transfers shares of stock from the corporation to its stockholders—additional shares of the corporation's own stock. For each share outstanding, a fixed number of new shares is issued, and an amount of retained earnings is transferred to capital stock accounts in a process known as *capitalization of retained earnings*. While a cash dividend reduces both total assets and total equity, a stock dividend alters neither total assets nor total equity. A stock dividend merely notifies investors that the equity section of the balance sheet has been rearranged.

The amount of retained earnings capitalized for each new share depends on the size of the stock dividend. *Small stock dividends* increase the number of outstanding shares by less than 25 percent; they are capitalized using the stock's market value just before the dividend. *Large stock dividends* increase the number of outstanding shares by 25 percent or more; they are capitalized using the stock's par value, but this is discussed in more advanced accounting courses.

The following illustration demonstrates accounting for a small stock dividend. Arlington Corporation has 6,000 shares of outstanding common stock at a par value of \$10 per share. Arlington's common stock is selling at \$12 per share when the corporation declares and pays a 5 percent stock dividend. This means that 300 shares are issued through the stock dividend ( $6,000 \times 0.05$ ). In practice this means that one new share is issued for each 20 shares of outstanding common stock ( $6,000/300$ ). Thus an investor holding 100 shares of Arlington's common stock would receive five additional shares [ $(0.05 \times 100 \text{ shares})$  or  $(100 \text{ shares}/20)$ ] upon payment of the stock dividend. Declaration and payment of Arlington's stock dividend are summarized in the following journal entry:

Assets = Liabilities +	Stockholders' Equity
	-3,600
	+ 3,000
	+ 600

Account and Explanation	Debit	Credit
Retained Earnings (300 shares $\times$ \$12)	3,600	
Common Stock (300 shares $\times$ \$10)		3,000
Paid-In Capital in Excess of Par—Common Stock		600
<i>(Record stock dividend)</i>		

Note that the stock dividend merely transfers \$3,600 of equity from retained earnings to the capital stock accounts. Since this is a small stock dividend, the amount of equity transferred is based on the current market price of the stock.

Although a stock dividend increases the *number* of shares held by each stockholder, it does not alter the *proportion* of shares held. For example, if an investor held 1,500 out of 6,000 outstanding shares before a 10 percent stock dividend, that investor would hold 1,650 out of 6,600 outstanding shares after the dividend. Thus the investor would hold 25 percent of the outstanding shares both before and after the stock dividend [ $(1,500/6,000) = (1,650/6,600) = 0.25$ ], and would have a 25 percent claim on earnings and stockholders' equity both before and after. Thus, stock dividends do not enhance a stockholder's proportionate ownership.

Further, despite the popular belief to the contrary among stockholders and even some financial managers, research shows that neither stock dividends nor stock splits, which we will consider next, enhance the total market value of a corporation's outstanding common stock. Stock dividends should be distinguished from dividend plans that allow stockholders to choose between receiving a cash dividend and a share of stock with equivalent current value. Such plans may enhance a stockholder's proportionate ownership and also avoid brokerage fees.

**Stock Splits** A stock split, like a stock dividend, increases the number of outstanding shares without altering the proportionate ownership of a corporation. Unlike a stock dividend, however, a stock split involves a *decrease* in the per-share par value (or stated value), with no capitalization of retained earnings. In other words, a **stock split** is a stock issue that increases the number of outstanding shares of a corporation without changing the balances of its equity accounts.

Consider a corporation that has 10,000 common shares outstanding with a par value of \$30 per share. In a two-for-one stock split, stockholders will exchange each of their 10,000 original shares for two new shares; the number of shares will rise from 10,000 to 20,000; and the par value of each share will be reduced to \$15 per share. The total par value of all stock will remain \$300,000 [ $(\$30 \times 10,000 \text{ shares}) = (\$15 \times 20,000 \text{ shares})$ ]. The split has the effect of distributing the par value over a larger number of shares.

Stock splits are used to reduce the per-share price of a stock. If nothing else changes, a two-for-one split should cut the market price of a stock in half. A corporation may wish to reduce the per-share price to encourage trading of its stock. The assumption is that a higher per-share price is an obstacle to purchases and sales of stock, particularly for small investors.

Exhibit 10-3

## Microsoft's Stock Price History



No entry is required to record a stock split, because no account balances change. The changes in the par value and the number of outstanding shares are merely noted in the corporation's records.

To illustrate how companies use stock splits, look at the **Microsoft** data in Exhibit 10-3. Note that Microsoft stock has split nine times in its history. That means if you had owned 1,000 shares of Microsoft stock prior to September 21, 1987 (and if you bought those 1,000 shares on September 20, 1987 they would have cost you approximately \$115,000) and you never bought nor sold a single share, you would now have 288,000 shares ( $1,000 \text{ shares} \times 2 \times 2 \times (3/2) \times (3/2) \times 2 \times 2 \times 2 \times 2 \times 2$ ). These shares would have been worth approximately \$8,100,000 in June 2008. Further, if we assume that splits have no effect on price, the price of a share of Microsoft stock during June 2008, (which was trading slightly below \$30 per share) would have been approximately \$8,100 per share if there had been no stock splits.

Not many individual investors can pay \$8,100 per share, but two notable companies—**Berkshire Hathaway** (Warren Buffett's company) and Google—do not issue stock splits. As a consequence, during August 2008, a share of Google stock was selling for approximately \$500 per share (down from over \$700 in late 2007) while Berkshire Hathaway Class B common was selling for approximately \$3,900 per share and its Class A common was selling for approximately \$116,000 per share (down from over \$150,000 in late 2007). In fact, check to see what Berkshire Hathaway is selling for today, by going to Google Finance or Yahoo Finance and typing in "Berkshire Hathaway."

**Preferred Dividend Preferences** While dividends on common stock are set by the corporation's board of directors, dividends on preferred stock are usually established as one of the terms of the issue. Most preferred stock issues fix their dividend rate as a percentage of the par value. For example, an 8 percent preferred share with a \$100 par value has an annual dividend of \$8 ( $\$100 \text{ par} \times 8\%$ ). Of course, both preferred and common dividends are subject to various restrictions imposed by statute, by corporate charter, by the terms of preferred stock issues, and by contracts with bondholders and others.

Although preferred stockholders have no voting rights, they are “preferred” in the sense that corporations are required to pay dividends to them before paying dividends to common stockholders. Such dividend preferences can take three forms: (1) current dividend preference, (2) cumulative dividend preference, and (3) participating dividend preference. Most preferred stock issues grant a current dividend preference, and some also grant one or both of the other preferences, thereby further enhancing the likelihood of dividend payments. The following sections will describe and illustrate the current dividend preference, first alone and then in combination with the cumulative and participating dividend preferences.

**Current Dividend Preference** Preferred stock always has a **current dividend preference**, which provides that current dividends must be paid to preferred stockholders before any dividends are paid to common stockholders. Although this means that common stockholders might not receive a dividend in a year in which preferred stockholders do, the current dividend preference does not guarantee payment of preferred dividends. In lean years, both common and preferred stockholders may fail to receive dividends.

The following illustration demonstrates the impact of the current dividend preference. During the period 2008 through 2011, Cook Corporation maintained the following capital structure:

**Capital stock:**

Preferred stock, 8 percent, \$10 par, 5,000 shares authorized, 4,000 shares issued and outstanding	\$ 40,000
Common stock, \$5 par, 50,000 shares authorized, 30,000 shares issued and outstanding	150,000
Paid-in capital in excess of par, common stock	<u>60,000</u>
Total capital stock	<u><u>\$250,000</u></u>

Cook’s board of directors determined the total dollar amount available for preferred and common dividends in each year from 2008 through 2011 as shown in the second column of the following schedule:

Year	Amount Available for Dividends	Dividends to Preferred	Dividends to Common
2008	\$12,200	\$3,200*	\$9,000**
2009	7,000	3,200	3,800
2010	2,000	2,000	-0-
2011	-0-	-0-	-0-

\* $0.08 \times \$40,000 = \$3,200$

\*\* $\$12,200 - \$3,200 = \$9,000$

This schedule shows that the common dividend is any positive amount remaining after the full preferred dividend has been paid. If the total amount available for dividends is less than the full preferred dividend, the entire amount is paid to preferred stockholders.

**Cumulative Dividend Preference** Most preferred stock is cumulative. The **cumulative dividend preference** requires the eventual payment of all preferred dividends—both **dividends in arrears** and current dividends—before any dividends are paid to common stockholders. (Preferred stock dividends remaining unpaid for one or more years are considered to be in arrears.) In other words, no dividends can be

paid to common stockholders until all prior and current preferred dividends have been paid. The cumulative dividend preference thus includes the current dividend preference. This is illustrated in **Cornerstone 10-4**.

Dividends do not become a liability of a corporation until they have been declared by the board of directors. If preferred dividends in arrears have not been declared, they are not recorded as liabilities, but are disclosed in a footnote to the financial statements.

**Participating Dividend Preference** For some classes of preferred stock, dividends are not restricted to a fixed rate. Preferred stock that pays dividends in excess of its stated dividend rate is called *participating preferred stock*. (Preferred stock that cannot pay dividends in excess of the current dividend preference plus cumulative dividends in arrears, if any, is called *nonparticipating preferred stock*.)

The **participating dividend preference** provides that stockholders of participating preferred shares receive, in addition to the stated dividend, a share of amounts available for distribution as dividends to other classes of stock. Participating preferred

## HOW TO Calculate Cumulative Preferred Dividends

### Concept:

Preferred stock has more in common with debt than with common stock. In fact, many preferred stockholders are “guaranteed” dividends through the cumulative feature. This feature requires corporations to pay all current and unpaid prior period dividends to preferred stockholders before paying any dividends to common shareholders.

### Information:

Jefferson Manufacturing has a single class of common stock and a single class of cumulative preferred stock. The cumulative preferred stock requires the corporation to pay an annual dividend of \$6,500 to preferred stockholders. On January 1, 2008, Jefferson’s preferred dividends were one year in arrears, which means that Jefferson declared neither preferred nor common dividends in 2007. During the three years 2008–2010, Jefferson’s board of directors determined they would be able to pay \$9,000, \$12,000, and \$15,000, respectively.

### Required:

Show how these anticipated payments will be split between preferred and common stockholders.

### Solution:

Year	Amount Available for Dividends	Dividends to Preferred	Dividends to Common
2008	\$ 9,000	\$ 9,000*	\$ -0-
2009	12,000	10,500**	1,500**
2010	15,000	6,500	8,500

\*The \$9,000 dividend paid to preferred stockholders in 2008 removes the \$6,500 in arrears from 2007, but leaves dividends in arrears at January 1, 2009, of \$4,000—the excess of preferred dividends for 2007 and 2008 over the amount paid in 2008 [(2 × \$6,500) – \$9,000 = \$4,000].

\*\*The \$10,500 dividend to preferred stockholders in 2009 pays the current preferred dividend (\$6,500), removes the \$4,000 in arrears, and leaves \$1,500 to be paid to common stockholders [\$12,000 – \$6,500 – \$4,000 = \$1,500].



## CORNERSTONE 10-4



stock may be either fully participating or partially participating. Fully participating preferred stock receives a share of *all* amounts available for dividends. Common stock is allocated a dividend at the same rate on par as the current dividend preference, and any remainder is divided between preferred and common stockholders—usually in proportion to the total par value of the two classes of stock. Partially participating preferred stock also receives a share of all amounts available for dividends, but the share is limited to a specified percentage of preferred par value.

### OBJECTIVE > 5

Describe the accounting issues related to retained earnings and accumulated other comprehensive income.

## Accounting for Retained Earnings and Accumulated Other Comprehensive Income

---

**Retained earnings (or deficit)** is the accumulated earnings (or losses) over the entire life of the corporation that have not been paid out in dividends. Generally, ending retained earnings is calculated with a simple formula:

$$\begin{array}{r}
 \text{Beginning Retained Earnings} \\
 + \text{Net Income} \\
 - \text{Dividends} \\
 = \text{Ending Retained Earnings}
 \end{array}$$

### Restrictions on Retained Earnings

Under most corporate charters, the balance of a corporation's retained earnings represents an upper limit on the entity's ability to pay dividends. (Dividends cannot reduce retained earnings below zero.) A corporation's capacity to pay dividends may be further restricted by agreements with lenders, by the corporation's board of directors, and by various provisions of state law, as follows:

1. An agreement between the corporation and bondholders may require that retained earnings never fall below a specified level so long as the bonds are outstanding.
2. The firm's board of directors may set aside a portion of retained earnings and declare it unavailable for the payment of dividends. Such an action may be used to communicate to stockholders changes in dividend policy made necessary by expansion programs or other decisions of the board.
3. State law may require that dividends not reduce retained earnings below the cost of treasury stock.

Restrictions of this sort are usually disclosed in footnotes to the financial statements to signify that the restricted amount is unavailable for dividends. In rare cases, a separate "reserve" account is established for the restricted portion of retained earnings. The reserve account is called either *restricted earnings* or *appropriation of retained earnings*. The account title frequently indicates, quite specifically, the nature of the restriction or the appropriation, as, for example, "restricted retained earnings under agreements with bondholders" or "appropriation of retained earnings for plant expansion." When reserve accounts are used, retained earnings is reported on two or more lines in the equity section of the balance sheet (see Exhibit 10-4). One line is devoted to each restriction, and to "unrestricted retained earnings" or "unappropriated retained earnings."

**Error Corrections and Prior Period Adjustments** Errors in recording transactions can distort the financial statements. If errors are discovered and corrected before the closing process, then no great harm is done. However, if errors go undetected, then flawed financial statements are issued. No matter when they are discovered, errors should be corrected.

## Exhibit 10-4

## Information from Deere &amp; Co. 2007 10-K

The following was included in Note 18 of Deere & Co.'s 2007 10-K:

The credit agreement also requires the Equipment Operations to maintain a ratio of total debt to total capital (total debt and stockholders' equity excluding accumulated other comprehensive income (loss)) of 65 percent or less at the end of each fiscal quarter according to accounting principles generally accepted in the U.S. in effect at October 31, 2006. Under this provision, the company's excess equity capacity and retained earnings balance free of restriction at October 31, 2007, was \$6,661 million.

Although Deere & Co. did not choose to show this restriction in the Stockholders' Equity portion of their balance sheet, if they had it would have appeared as follows:

## STOCKHOLDERS' EQUITY

	2007
Common stock, \$1 par value (authorized – 1,200,000,000 shares; issued – 536,431,204 shares in 2007 and 2006), at stated value	2,777.0
Common stock in treasury, 96,795,090 shares in 2007 and 81,965,080 shares in 2006, at cost	(4,015.4)
Retained earnings:	
Restricted for credit agreement	2,370.7
Unrestricted	<u>6,661.0</u>
	9,031.7

If an error resulted in a misstatement of net income, then correction may require a direct adjustment to retained earnings, called a **prior period adjustment**. To illustrate, let us suppose that Byrnes Corporation uses a computer program to calculate depreciation expense. In 2008, a programming error caused the 2008 depreciation expense to be understated by \$16,000. The error was not discovered until August 2009; consequently, 2008 net income after income taxes (which are paid at a rate of 25 percent) was overstated by \$12,000 [ $\$16,000(1 - 0.25)$ ]. The error correction would be recorded in 2009 as follows:

Date	Account and Explanation	Debit	Credit
Aug. 31, 2009	Retained Earnings	12,000	
	Tax Refund Receivable	4,000	
	Accumulated Depreciation		16,000
	(Record prior period adjustment)		

Assets	=	Liabilities	+	Stockholders' Equity
+ 4,000				-12,000
-16,000				

Byrnes Corporation's statement of changes in retained earnings for 2009 incorporates the \$12,000 prior period adjustment as follows:

**BYRNES CORPORATION**  
Statement of Changes in Retained Earnings  
For the Year Ended December 31, 2009

Retained earnings, January 1, 2009	\$157,000
Less: prior period adjustment:	
Correction of error in calculation of 2008 depreciation expense (net of tax)	<u>12,000</u>
Retained earnings as adjusted, December 31, 2008	\$145,000
Add: Net income for 2009	65,000
Less: dividends declared in 2009:	
Cash dividend, preferred stock	\$ 4,000
Stock dividend, common stock	<u>20,000</u>
Retained earnings, December 31, 2009	<u>\$186,000</u>

Notice that the adjustment is deducted from the beginning balance of retained earnings to produce an *adjusted* beginning balance.

Financial accounting standards define prior period adjustments in a way that specifically excludes adjustments arising from estimation errors and changes from one accounting principle to another. These changes are corrected by adjusting the related income accounts for the period in which they are discovered.

## Accounting for Accumulated Other Comprehensive Income

The theory of financial accounting suggests that income represents the changes in the assets and liabilities of the corporation as a result of transactions with nonowners. This is why when a corporation sells treasury stock the “gain” or “loss” goes directly to stockholders’ equity and not to the income statement (see **Cornerstone 10-2**). However, over time the FASB has allowed the effects of certain nonowner transactions to bypass the income statement and go directly to stockholders’ equity. The FASB does, however, require separate disclosure of comprehensive income, which is net income plus/minus these other comprehensive income transactions. Corporations generally comply with this disclosure requirement in a Statement of Stockholders’ Equity (see Exhibit 10-1 on p. 504).

### OBJECTIVE > 6

Analyze stockholder payout and profitability ratios using information contained in the stockholders’ equity section.

## Ratio Analysis

Stockholders want to understand (1) how the value of their shares of stock will change and (2) how the company will distribute any excess cash to stockholders. There is nothing particularly insightful about this statement because we all know that investors buy stock to increase their personal wealth. But how do stockholders use the financial statements to better understand these two dimensions?

## Stockholder Profitability Ratios

A primary driver of an increase in stock price is profitability. Profitability refers to the return that the company earns (in other words, its net income). However, we care about more than the magnitude of the net income because it also matters how much we had to invest to earn the return. That is, would you rather earn \$10 on a \$100 investment or \$20 on a \$500 investment? Although the latter return is twice as large as the former, it also took an investment that was five times bigger. Assuming equal risk, etc., most investors would prefer to invest \$100 to earn \$10 because they then could use the extra \$400 to invest somewhere else.

The two most common ratios used to evaluate stockholder profitability are (1) **return on common equity** and (2) **earnings per share (EPS)**. Return on common equity shows the growth in equity from operating activities. It is calculated as follows:

$$\text{Return on Common Equity} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Avg. Common Stockholders' Equity}}$$

Common stockholders’ equity is calculated by taking total stockholders’ equity and subtracting out preferred stock.

On the other hand, EPS measures the net income earned by each share of common stock. It is calculated as follows:

$$\text{EPS} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Avg. Common Shares Outstanding}}$$

## Stockholder Payout

Stockholders, however, do not only experience an increase in wealth through an increasing stock price, they also may receive cash, or a payout, from the company. The most common stockholder payout ratios relate to dividends. Dividend yield considers the ratio of dividends paid to stock price. This ratio is conceptually similar to an interest rate for debt:

$$\text{Dividend Yield} = \frac{\text{Dividends per Common Share}}{\text{Common Stock Price}}$$

Another common dividend ratio calculates the proportion of dividends to earnings:

$$\text{Dividend Payout} = \frac{\text{Common Dividends}}{\text{Net Income (or Comprehensive Income)}}$$

However, as discussed earlier in the chapter, payouts to stockholders can also take the form of stock repurchases. As such, the total payout ratio is:

$$\text{Total Payout} = \frac{\text{Common Dividends} + \text{Common Stock Repurchases}}{\text{Net Income (or Comprehensive Income)}}$$

By using these two ratios, stockholders can easily calculate the proportion of earnings paid out in stock repurchases:

$$\text{Stock Repurchase Payout} = \text{Total Payout} - \text{Dividend Payout}$$

**Cornerstones 10-5** and **10-6** illustrate how to calculate stockholder profitability and payout ratios, respectively.

### HOW TO Calculate Stockholder Profitability Ratios

#### Concept:

Stockholders are interested in a company's profitability and how such profits are paid out to them. Analysis of information contained in the statement of stockholders' equity allows stockholders to assess profitability and payout.

#### Information:

Consider the following information from Goldman Sachs' financial statements.

Stock price	\$200/share	Avg. common shares	
Common dividends	\$615 million	outstanding	449 million
Preferred dividends	\$139 million	Dividends per	
2006 preferred stock	\$3,100 million	common share	\$1.30/share
2006 total stockholders'		Net income	\$9,537 million
equity	\$35,786 million	2005 preferred stock	\$1,750 million
Purchases of treasury		2005 total stock-	
stock	\$7,817 million	holders' equity	\$28,002 million

#### Required:

Calculate the following stockholder profitability ratios:

- Return on Common Equity
- EPS



### CORNERSTONE 10-5



**CORNERSTONE**  
**10-5**  
*(continued)*

**Solution:**

Although the information to calculate these ratios is given, most of it can be found in the statement of stockholders' equity (and most all of it can be found within the financial statements and accompanying footnotes). Immediately following the calculations below, we discuss where in the financial statements this information can be found.

$$1. \text{ Return on Common Equity} = \frac{\$9,537 - \$139}{[(\$35,786 - \$3,100) + (\$28,002 - \$1,750)]/2} = 31.89\%$$

The numerator is net income less preferred dividends. Both of these totals are found in the retained earnings section of the statement of changes in stockholders' equity. Average common stockholders' equity (denominator) is the average of total stockholders' equity less preferred stock at the end and the beginning of the year. Total stockholders' equity for both 2006 and 2005 is found at the bottom of the statement of changes in stockholders' equity. Total preferred stock for both years is found in the preferred stock section near the top of the statement of changes in stockholders' equity.

$$2. \text{ EPS} = \frac{\$9,537 - \$139}{449} = \$20.93 \text{ per share}$$

Both net income and preferred dividends (numerator) are found in the retained earnings section of the statement of changes in stockholders' equity. The number of average common shares outstanding (denominator) is given in the information section of this Cornerstone. This figure is often difficult to calculate in real world settings. You will learn how to do this in intermediate financial accounting.



**CORNERSTONE**  
**10-6**



**HOW TO Calculate Stockholder Payout Ratios**

**Concept:**

Stockholders are interested in a company's profitability and how such profits are paid out to them. Analysis of information contained in the statement of stockholders' equity allows stockholders to assess profitability and payout.

**Information:**

Consider the following information from Goldman Sachs' financial statements.

Stock price	\$200/share	Avg. common shares outstanding	449 million
Common dividends	\$615 million	Dividends per common share	\$1.30/share
Preferred dividends	\$139 million	Net income	\$9,537 million
2006 preferred stock	\$3,100 million	2005 preferred stock	\$1,750 million
2006 total stockholders' equity	\$35,786 million	2005 total stockholders' equity	\$28,002 million
Purchases of treasury stock	\$7,817 million		

**Required:**

Calculate the following stockholder payout ratios:

1. Dividend yield
2. Dividend payout

3. Total payout
4. Stock repurchase payout

**Solution:**

Although the information to calculate these ratios is given, most of it can be found in the statement of stockholders' equity (and most all of it can be found within the financial statements and accompanying footnotes). Immediately following the calculations below, we discuss where in the financial statements this information can be found.

$$1. \text{ Dividend Yield} = \frac{\$1.30}{\$200} = 0.65\%$$

The dividends per common share (numerator) is disclosed in the footnotes and can be found in the financial press (e.g., Google finance, ticker symbol GS). The common stock price is found at any website quoting stock prices.

$$2. \text{ Dividend Payout} = \frac{\$615}{\$9,537} = 6.45\%$$

Both the common dividends (numerator) and net income (denominator) can be found in the retained earnings section of the statement of changes in stockholders' equity.

$$3. \text{ Total Payout} = \frac{\$615 + \$7,817}{\$9,537} = 88.41\%$$

This is the same as 2 except we add stock repurchases to the numerator. This figure can be found in the "Common stock held in treasury, at cost" near the bottom of the statement of changes in stockholders' equity.

$$4. \text{ Stock Repurchase Payout} = 88.41\% - 6.45\% = 81.96\%$$

$$\text{Or } \frac{\$7,817}{\$9,537} = 81.96\%$$

This can be calculated directly as stock repurchases divided by net income. But if you have already calculated dividend and total payout, you can simply take the difference because dividend payout + stock repurchase payout = total payout.

**CORNERSTONE**  
**10-6**  
*(continued)*

## Summary

Stockholders' equity represents the claims of owners against the net assets of a business entity. Equity takes many different forms but most can be characterized as a type of either common or preferred stock. Common stockholders control the corporation; preferred stockholders have the right to receive dividends before dividends are paid to common stockholders. Accounting reports present useful information about equity to both managers and stock market investors. Both groups use accounting information about equity transactions to evaluate the effects of past decisions and to project the effects of future decisions.

Although common stock usually has a par value, no-par stock is permitted in some states. When stock is issued at amounts in excess of par or stated value, the excess is recorded in a separate capital stock account. In addition to issuing shares of stock, corporations can also issue warrants and options—rights to acquire stock in the future. They may also

## CONCEPT Q&A

What do the stockholder profitability and payout ratios mean?

The results of these ratios are usually used in two ways. First, they are compared over time to evaluate trends. For example, in 2006 Goldman Sachs' EPS was \$20.93. This might be great news if EPS in 2005 were \$11.00 or bad news if it were \$28.00. In fact, EPS for 2004 and 2005 were \$9.30 and \$11.73, respectively, so EPS has more than doubled in two years. This is exceptionally good news. Second, the ratios can be compared to results for other companies in the industry. For example, the 2006 return on common equity for Morgan Stanley was 23.57 percent and for Merrill Lynch it was 21.25 percent, which makes Goldman Sachs' 31.89 percent look very good.

**Possible Answer:**

repurchase their own stock after issuance. Repurchased stock is called *treasury stock* and is recorded in a contra-equity account that is subtracted from the total of stockholders' equity.

Dividends reduce retained earnings. Cash dividends distribute cash to stockholders. Stock dividends distribute additional shares to stockholders, which results in the reclassification of a portion of retained earnings as paid-in capital. Stock splits also transfer additional shares to stockholders but do not produce changes in equity.

Recent changes in equity are summarized in a financial statement called the *statement of changes in stockholders' equity*, which appears in most annual reports. The statement shows changes to all elements of stockholders' equity. The information contained in this statement is useful for assessing stockholder profitability and payout.

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## Summary of Learning Objectives

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**LO1. Describe the different elements of stockholders' equity and prepare the stockholders' equity section of the balance sheet.**

- There are various elements of equity and the stockholders' equity section of the balance sheet clearly classifies these elements according to their source:
  - capital stock—split between preferred and common stock and associated paid-in capital in excess of par;
  - retained earnings or deficit;
  - accumulated other comprehensive income; and
  - treasury stock.
- Corporations split their stockholders' equity into these sections, although most corporations do not have all of these elements.

**LO2. Distinguish between the different forms of equity and describe their use in raising capital.**

- Corporations sell both common stock and preferred stock to raise capital.
- Preferred stock generally guarantees a regular dividend and receives priority over common stock in the payment of dividends and distribution of assets in liquidation.
- Common stock has voting rights and receives all benefits not assigned to the preferred stockholders or creditors.
- Selling different classes of stock (with different features) attracts shareholders with diverse risk preferences and tax situations.

**LO3. Record the issuance of capital stock.**

- Both preferred and common stock are generally recorded at par or stated value.
- Any extra consideration received is recorded as “paid-in capital in excess of par.”

**LO4. Account for the distribution of assets to stockholders.**

- Assets are distributed to stockholders by:
  - repurchasing their shares of stock, or
  - paying dividends.
- Generally the cost of stock repurchases are recorded as a reduction in stockholders' equity (a debit to “treasury stock”).
- Typically the corporation pays dividends with cash.
- Stock dividends and stock splits do not represent a payout to stockholders. These transactions have no effect on total stockholders' equity.
- Preferred stock generally has dividend preferences such as being cumulative or participating.

**LO5. Describe the accounting issues related to retained earnings and accumulated other comprehensive income.**

- Retained earnings represents the earnings that the corporation elects not to pay out in dividends.
- Ending retained earnings is calculated by adding net income and subtracting dividends to beginning retained earnings.
- Retained earnings can be restricted, which communicates to stockholders that this portion of retained earnings is not eligible for dividend payout.

**LO6. Analyze stockholder payout and profitability ratios using information contained in the stockholders' equity section.**

- Stockholders are primarily interested in two things:
  - the creation of value, and
  - the distribution of value.
- Analysis of the stockholders' equity section of the balance sheet in conjunction with the statement of stockholders' equity allows stockholders to separate these concepts.

**CORNERSTONE 10-1** How to record the sale of capital stock, page 509

**CORNERSTONE 10-2** How to account for treasury stock, page 514

**CORNERSTONE 10-3** How to record cash dividends, page 516

**CORNERSTONE 10-4** How to calculate cumulative preferred dividends, page 521

**CORNERSTONE 10-5** How to calculate stockholder profitability ratios, page 525

**CORNERSTONE 10-6** How to calculate stockholder payout ratios, page 526



**CORNERSTONES  
FOR CHAPTER 10**

## Key Terms

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Articles of incorporation, 506	Par value, 509
Authorized shares, 506	Participating dividend preference, 521
Common stock, 507	Payment date, 515
Contributed capital, 509	Preferred stock, 508
Corporate charter, 506	Prior period adjustment, 523
Cumulative dividend preference, 520	Retained earnings (or deficit), 522
Current dividend preference, 520	Return on common equity, 524
Date of record, 515	Shareholders, 506
Declaration date, 515	Stated capital (legal capital), 510
Dividends in arrears, 520	Stock dividend, 517
Earnings per share (EPS), 524	Stock split, 518
Equity, 504	Stock warrant, 511
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Liquidating dividends, 516	Stockholders' equity, 504
No-par stock, 510	Treasury stock, 513
Outstanding shares, 507	
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## Review Problem

### Stockholders' Equity

Grace Industries, a privately held corporation, has decided to go public. The current ownership group has 10,000,000 common shares (purchased at an average price of \$0.50 per share) and the articles of incorporation authorize 50,000,000, \$0.10 par, common shares and 1,000,000, 10%, \$30 par, cumulative, preferred shares. On January 1, 2008, the public offering issues 8,000,000 common shares at \$14 per share and 100,000 preferred shares at \$33 per share.

On October 3, 2009, Grace Industries repurchases 750,000 common shares at \$12 per share. After the repurchase Grace's board of directors decides to declare dividends totaling \$4,050,000 (no dividends were declared or paid in 2008). This dividend will be declared on November 15, 2009, to all shareholders of record on December 8, 2009. This dividend will be paid on December 23, 2009. On December 28, 2009, 100,000 of the treasury shares are reissued for \$15 per share.

At December 31, 2009, Grace Industries has \$12,000,000 of retained earnings and accumulated other comprehensive income of (\$250,000).

#### Required:

1. Provide the journal entry to record the January 1, 2008, issuance of the common and preferred stock.
2. Provide the journal entry to record the October 3, 2009, stock repurchase.
3. Determine how much of the dividend will go to preferred shareholders.
4. Calculate what the dividends per common share will be.
5. Provide the journal entry for the dividend declaration on November 15, 2009.
6. Provide the journal entry on the date of record (December 8, 2009).
7. Provide the journal entry on the dividend payment date (December 23, 2009).
8. Provide the journal entry for the reissuance of treasury shares on December 28, 2009.
9. Prepare the stockholders' equity section of the balance sheet at December 31, 2009.

#### Solution:

1.	Date	Account and Explanation	Debit	Credit
	Jan. 1, 2008	Cash (100,000 × \$33)	3,300,000	
		Preferred Stock (100,000 × \$30 par)		3,000,000
		Paid-in Capital in Excess of Par—Preferred Stock [100,000 × (\$33 – \$30)]		300,000
		<i>(Record issuance of preferred stock)</i>		
		Cash (8,000,000 × \$14)	112,000,000	
		Common Stock (8,000,000 × \$0.10 par)		800,000
		Paid-in Capital in Excess of Par—Common Stock [8,000,000 × (\$14 – \$0.10)]		111,200,000
		<i>(Record issuance of common stock)</i>		

2.	Date	Account and Explanation	Debit	Credit
	Oct. 3, 2009	Treasury Stock (750,000 × \$12)	9,000,000	
		Cash		9,000,000
		<i>(Record repurchase of common stock)</i>		

3. The preferred stock is cumulative, so the preferred shareholders must be paid their annual dividend for 2009 (the current year) and for 2008 (dividends in arrears).

Preferred Dividends  
 [(\$30 par × 10% × 2 years) × 100,000 shares] \$600,000

4. The common stockholders receive any dividend remaining after the preferred dividend has been paid (because the preferred is not participating). Because common dividends are only paid to outstanding stock, the treasury shares must be subtracted from the issued shares. Remember that the ownership group owned 10,000,000 shares then issued 8,000,000 shares in the initial public offering.

Common Dividends \$4,050,000 – \$600,000 ←  
18,000,000 issued shares – 750,000 treasury shares \$0.20 per share

Assets	=	Liabilities	+	Stockholders' Equity
+3,300,000				+3,000,000
+112,000,000				+300,000
				+800,000
				+111,200,000

Assets	=	Liabilities	+	Stockholders' Equity
-9,000,000				-9,000,000

5. Date	Account and Explanation	Debit	Credit
Nov. 15, 2009	Dividends*	4,050,000	
	Cash Dividends Payable		4,050,000
	<i>(Record declaration of cash dividends)</i>		

		Stockholders' Equity	
Assets =	Liabilities +	Equity	
	+4,050,000	-4,050,000	

\*Dividends is closed to retained earnings

6. No entry is necessary on the date of record.

7. Date	Account and Explanation	Debit	Credit
Dec. 23, 2009	Cash Dividends Payable	4,050,000	
	Cash		4,050,000
	<i>(Record payment of cash dividends)</i>		

		Stockholders' Equity	
Assets =	Liabilities +	Equity	
-4,050,000	-4,050,000		

8. Date	Account and Explanation	Debit	Credit
Dec. 28, 2009	Cash (100,000 × \$15)	1,500,000	
	Treasury Stock (100,000 × \$12)		1,200,000
	Paid-in Capital from Treasury Stock		
	Transactions		300,000
	<i>(Record reissuance of treasury shares)</i>		

		Stockholders' Equity	
Assets =	Liabilities +	Equity	
+1,500,000		+1,200,000	+300,000

## 9. Stockholders' equity:

Capital stock:

Preferred stock, 10 percent, \$30 par, 1,000,000 shares authorized, 100,000 shares issued and outstanding	\$ 3,000,000*
Common stock, \$0.10 par, 50,000,000 shares authorized, 18,000,000 shares issued and 17,350,000 outstanding	1,800,000**

Paid-in capital in excess of par:

Preferred stock	300,000***
Common stock	115,200,000 <sup>†</sup>
Treasury stock	300,000 <sup>††</sup>
Total capital stock	\$120,600,000

Retained earnings 12,000,000<sup>†††</sup>

Less:

Accumulated other comprehensive income	(250,000) <sup>‡</sup>
Treasury stock (650,000 shares at cost)	(7,800,000) <sup>‡‡</sup>
Total stockholders' equity	\$124,550,000

\*100,000 shares issued at \$30 par (see journal entry from 1).

\*\*18,000,000 shares issued at \$0.10 par.

\*\*\*100,000 shares issued at \$3 more than par (\$33 selling price less \$30 par) See journal entry from 1.

## Discussion Questions

1. What does stockholders' equity represent?
2. What does a share of stock represent?
3. Why do corporations issue stock?
4. What are the benefits which common stockholders may receive?
5. How do common stock and preferred stock differ?
6. Why would the number of shares issued be different from the number of shares outstanding?
7. Why is preferred stock sometimes regarded as being similar to debt?
8. How is a preferred stock dividend calculated?
9. Why do corporations utilize different forms of equity?
10. On what balance sheet accounts does the issuance of common stock have an effect?
11. What is treasury stock?
12. How would the purchase of treasury stock affect a corporation's balance sheet?
13. What is a stock dividend? How does it differ from a stock split?
14. Compare and contrast cash dividends and liquidating dividends.

15. What are retained earnings?
16. How may a corporation's retained earnings be restricted?
17. Distinguish between retained earnings and accumulated other comprehensive income.
18. How are dividend payout and profitability ratios useful to investors?
19. What is the difference between par value and stated value?
20. What is the difference between a privately- and publicly-held corporation?
21. What is a stock warrant? How are they used by corporations?
22. Give four reasons why a company might purchase treasury stock.
23. What entries are made (if any) at the declaration date, date of record, and date of payment for cash dividends?
24. What is the effect of a stock split on stockholders' equity account balances?
25. Describe the statement of changes in stockholders' equity.
26. When are prior period adjustments used?
27. Describe two ways corporations make payouts to stockholders.
28. Explain each of the following preferred stock dividend preferences: (1) current dividend preference, (2) cumulative dividend preference, and (3) participating dividend preference.
29. Are dividends in arrears reported among the liabilities of the dividend-paying firm? If not, how are they reported, and why?

## Multiple-Choice Exercises

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**10-1** Which of the following is not a direct nor indirect component of stockholders' equity?

- a. dividends payable
- b. loss on sale of equipment
- c. retained earnings
- d. net income

**10-2** Which of the following statements is true with regard to contributed capital?

- a. Preferred stock is stock that has been retired.
- b. It is very unlikely corporations may have more than one class of stock outstanding.
- c. The outstanding number of shares is the maximum number of shares that can be issued by a corporation.
- d. The shares that are in the hands of the stockholders are said to be outstanding.

**10-3** Authorized stock represents the:

- a. maximum number of shares that can be issued.
- b. number of shares that have been sold.
- c. number of shares that are currently held by stockholders.
- d. number of shares that have been repurchased by the corporation.

**10-4** Harvey Corporation shows the following in the stockholders' equity section of its balance sheet: The par value of its common stock is \$0.50 and the total balance in the common stock account is \$37,500. Also noted is that 5,000 shares are currently designated as treasury stock. The number of shares *outstanding* is:

- a. 80,000.
- b. 75,000.
- c. 72,500.
- d. 70,000.

**10-5 With regard to preferred stock,**

- its issuance provides no flexibility to the issuing company because its terms always require mandatory dividend payments.
- no dividends are expected by the stockholders.
- its stockholders may have the right to participate, along with common stockholders, if an extra dividend is declared.
- there is a legal requirement for a corporation to declare a dividend on preferred stock.

**10-6** Murphy Parts Shop began business on January 1, 2007. The corporate charter authorized issuance of 10,000 shares of \$2 par value common stock and 4,000 shares of \$8 par value, 6 percent cumulative preferred stock. Murphy issued 2,400 shares of common stock for cash at \$20 per share on January 2, 2007. What effect does the entry to record the issuance of stock have on total stockholders' equity?

- increase of \$4,800
- decrease of \$4,800
- decrease of \$48,000
- increase of \$48,000

**10-7** Marx Company began business on January 1, 2007. The corporate charter authorized issuance of 5,000 shares of \$1 par value common stock, and 4,000 shares of \$8 par value, 6 percent cumulative preferred stock, of which none were issued. On July 1, Marx issued 1,000 shares of common stock in exchange for two years rent on a retail location. The cash rental price is \$2,400 per month and the rental period begins on July 1. What is the correct entry to record the July 1 transaction?

- Debit to Cash, \$57,600; Credit to Prepaid Rent, \$57,600
- Debit to Prepaid Rent, \$57,600; Credit to Common Stock, \$57,600
- Debit to Prepaid Rent, \$57,600; Credit to Common Stock, \$1,000; Credit to Additional Paid-In Capital—Common, \$56,600
- Debit to Prepaid Rent, \$57,600; Credit to Common Stock, \$5,000; Credit to Additional Paid-In Capital—Common, \$52,600

**10-8** A company would repurchase its own stock for all of the following reasons **except**:

- it needs the stock for employee bonuses.
- it wishes to make an investment in its own stock.
- it wishes to prevent unwanted takeover attempts.
- it wishes to improve the company's financial ratios.

**10-9** When a company purchases treasury stock, which of the following statements is **true**?

- Treasury stock is considered to be an asset because cash is paid for the stock.
- The cost of the treasury stock reduces stockholders' equity.
- Dividends continue to be paid on the treasury stock because it is still issued.
- Since treasury stock is held by the original issuer, it is no longer considered to be issued.

**10-10** If a company purchases treasury stock for \$6,000 and then reissues it for \$5,000, the difference of \$1,000 is:

- treated as a gain on the sale.
- treated as a loss on the sale.
- an increase in stockholders' equity.
- a decrease in stockholders' equity.

**10-11** When a company wishes to purchase and retire its own stock, the company must:

- decrease the stock account balances by the original issue price.
- record a gain or loss depending on the difference between original selling price and repurchase cost.
- get the approval of the state to do so.
- issue a different class of stock to the former stockholders.

**10-12** Which of the following should be considered when a company decides to declare a cash dividend on common stock?

- the retained earnings balance only
- the amount of authorized shares of common stock
- the book value of the company's stock
- the cash available and the retained earnings balance

**10-13** When a company declares a cash dividend, which of the following is true?

- Stockholders' equity is increased.
- Liabilities are increased.
- Assets are decreased.
- Assets are increased.

**10-14** What is the effect of a stock dividend on stockholders' equity?

- Stockholders' equity is decreased.
- Retained earnings is increased.
- Additional paid-in capital is decreased.
- Total stockholders' equity stays the same.

**10-15** As a result of a stock split,

- an entry must be made showing the effect on stockholders' equity.
- the market price of the outstanding stock is increasing because a split is evidence of a profitable company.
- the par value of the stock is changed in the reverse proportion as the stock split.
- the stockholders have a higher proportionate ownership of the company.

**10-16** The balance of the \$0.50 par value common stock account for Patriot Company was \$60,000 before its recent 3-for-1 stock split. The market price of the stock was \$30 per share before the stock split. What occurred as a result of the stock split?

- The balance in the retained earnings account decreased.
- The balance in the common stock account was reduced to \$20,000.
- The market price of the stock was not affected.
- The market price of the stock dropped to approximately \$10 per share.

**10-17** When a company declares a 3-for-1 stock split, the number of outstanding shares:

- is tripled compared to the number of shares that were outstanding prior to the split.
- stays the same, but the number of issued shares triples.
- is tripled, while the number of issued shares is reduced to one-third of the original issued shares.
- is reduced, and the number of issued shares is tripled.

**10-18** Shea Company has 20,000 shares of 5 percent, \$40 par value, cumulative preferred stock. In 2008, no dividends were declared on preferred stock. In 2009, Shea had a profitable year and decided to pay dividends to stockholders of both preferred and common stock. If they have \$150,000 available for dividends in 2009, how much could it pay to the common stockholders?

- a. \$70,000
- b. \$110,000
- c. \$130,000
- d. \$150,000

**10-19** Comprehensive income is:

- a. considered an appropriation of retained earnings when reported in the stockholders' equity section of the balance sheet.
- b. the result of all events and transactions that affect income during the accounting period that are reported on the income statement.
- c. reporting all items that are not under management's control on the statement of retained earnings.
- d. an all-inclusive approach to income that includes transactions that affect stockholders' equity with the exception of those transactions that affect owners.

**10-20** FASB's concept of comprehensive income:

- a. excludes transactions that involve the payment of dividends.
- b. requires that all transactions must be shown on the income statement.
- c. has a primary drawback because it allows management to manipulate the income figure to a certain extent.
- d. allows items that are not necessarily under management's control, such as natural disasters, to be shown as an adjustment of retained earnings.

**10-21** Garner Corporation issued \$100,000 in common stock dividends in 2008. Its net income for 2008 was \$200,000. What is Garner's dividend payout ratio?

- a. 0.5
- b. 2
- c. 1
- d. 5

## Cornerstone Exercises

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### Cornerstone Exercise 10-22 ISSUANCE OF STOCK

OBJECTIVE > 1

Ramsden Corporation shows the following information in the stockholders' equity section of its balance sheet: The par value of common stock is \$2.00 and the total balance in the common stock account is \$150,000. The 8,000 shares are currently designated as treasury stock.

#### Required:

What is the number of shares outstanding?

### Cornerstone Exercise 10-23 CONTRIBUTED CAPITAL

OBJECTIVE > 1

Stahl Company was incorporated as a new business on January 1, 2007. The company is authorized to issue 20,000 shares of \$5 par value common stock and 10,000 shares of 6 percent, \$10 par value, cumulative, participating preferred stock. On January 1, 2007, the company issued 8,000 shares of common stock for \$15 per share and 2,000 shares of preferred stock for \$30 per share. Net income for the year ended December 31, 2007, was \$375,000.

**Required:**

What is the amount of Stahl's total contributed capital at December 31, 2007?

**OBJECTIVE** > **1** **2****Cornerstone Exercise 10-24 PREPARATION OF STOCKHOLDERS' EQUITY SECTION**

Refer to the information provided in **Cornerstone Exercise 10-23**.

**Required:**

Prepare the stockholders' equity section of the balance sheet for Stahl Company.

**OBJECTIVE** > **2****Cornerstone Exercise 10-25 COMMON STOCK vs. PREFERRED STOCK**

Corporations issue two general types of capital stock—common and preferred.

**Required:**

Describe the major differences between common and preferred stock.

**OBJECTIVE** > **3****CORNERSTONE 10-1****Cornerstone Exercise 10-26 RECORDING THE SALE OF COMMON AND PREFERRED STOCK**

Donahue Corporation is authorized by its charter from the state of Illinois to issue 750 shares of preferred stock with a 7 percent dividend rate and a par value of \$50 per share and 22,000 shares of common stock with a par value of \$0.01 per share. On January 1, 2009, Donahue Corporation issues 250 shares of preferred stock at \$55 per share and 12,000 shares of common stock at \$13 per share.

**Required:**

Record the necessary journal entry for January 1, 2009.

**OBJECTIVE** > **3****CORNERSTONE 10-1****Cornerstone Exercise 10-27 RECORDING THE SALE OF COMMON STOCK**

Des Peres Company issues 450 shares of common stock (par value \$0.01) for \$32 per share on June 30, 2009.

**Required:**

Provide the necessary journal entry to record this transaction.

**OBJECTIVE** > **4****Cornerstone Exercise 10-28 DISTRIBUTION TO STOCKHOLDERS**

Owners invest in corporations through the purchase of stock.

**Required:**

Describe two ways that corporations distribute assets to stockholders. Discuss their relative advantages and disadvantages.

**OBJECTIVE** > **4****CORNERSTONE 10-2****Cornerstone Exercise 10-29 ACCOUNTING FOR TREASURY STOCK**

On February 1, 2009, Wild Bill Corporation repurchases 650 shares of its outstanding common stock for \$9 per share. On March 1, 2009, Wild Bill sells 150 shares of treasury stock for \$12 per share. On May 10, 2009, Wild Bill sells the remaining 500 shares of its treasury stock for \$6 per share.

**Required:**

Provide the necessary journal entries to record these transactions.

**OBJECTIVE** > **4****CORNERSTONE 10-2****Cornerstone Exercise 10-30 ACCOUNTING FOR TREASURY STOCK**

On January 1, 2009, Tommyboy Corporation repurchases 12,000 shares of its outstanding common stock for \$26 per share. On May 1, 2009, Tommyboy sells 9,500 shares of treasury stock for \$17 per share. On October 1, 2009, Tommyboy sells 1,500 shares of its treasury stock for \$44 per share.

**Required:**

Provide the necessary journal entries to record these transactions.

**Cornerstone Exercise 10-31 TREASURY STOCK**

A company purchases 2,000 shares of treasury stock for \$5 per share.

**OBJECTIVE** > 4**CORNERSTONE 10-2****Required:**

How will this transaction affect stockholders' equity?

**Cornerstone Exercise 10-32 TREASURY STOCK**

Refer to the information in **Cornerstone Exercise 10-31**.

**OBJECTIVE** > 4**CORNERSTONE 10-2****Required:**

What is the appropriate journal entry to record the transaction?

**Cornerstone Exercise 10-33 CASH DIVIDENDS**

King Tut Corporation has issued 7,000 shares of common stock, all of the same class; 3,800 shares are outstanding and 3,200 shares are held as treasury stock. On December 1, 2009, King Tut's board of directors declares a cash dividend of \$1.75 per share payable on December 15, 2009, to stockholders of record on December 10, 2009.

**OBJECTIVE** > 4**CORNERSTONE 10-3****Required:**

Provide the appropriate journal entries for the date of declaration, date of record, and date of payment.

**Cornerstone Exercise 10-34 DECLARATION OF CASH DIVIDEND**

A corporation declared a cash dividend of \$50,000 on December 31, 2009.

**OBJECTIVE** > 4**CORNERSTONE 10-3****Required:**

What is the appropriate journal entry to record this declaration?

**Cornerstone Exercise 10-35 STOCK SPLIT**

Toy World reported the following information:

Common stock, \$1 par, 200,000 shares authorized, 100,000 shares issued and outstanding.

**OBJECTIVE** > 4**Required:**

What is the typical effect of a 2-for-1 stock split on the information Toy World's reports above? If the market value of the common stock is \$20 per share when the stock split is declared, what would you expect the approximate market value per share to be immediate after the split?

**Cornerstone Exercise 10-36 STOCK DIVIDEND**

Bowman Corporation reported the following information:

Common stock, \$3 par, 10,000 shares authorized, 5,000 shares issued and outstanding.

**OBJECTIVE** > 4**Required:**

What is the appropriate journal entry to record a 10 percent stock dividend, if the market price of the common stock is \$30 per share when the dividend is declared?

**OBJECTIVE** > **4** **Cornerstone Exercise 10-37 PREFERRED AND COMMON STOCK DIVIDENDS**  
**CORNERSTONE 10-4**

Yossarian Corporation has a single class of common stock and a single class of cumulative preferred stock. The cumulative preferred stock requires the corporation to pay an annual dividend of \$3,750 to preferred stockholders. On January 1, 2009, Yossarian's preferred dividends were one year in arrears, which means that Yossarian declared neither preferred nor common dividends in 2008. During the three years (2009–2011), Yossarian's board of directors determined they would be able to pay \$5,000, \$7,000, and \$13,000, respectively.

**Required:**

Show how these anticipated payments will be split between preferred and common stockholders.

**OBJECTIVE** > **4** **Cornerstone Exercise 10-38 PREFERRED STOCK DIVIDENDS**  
**CORNERSTONE 10-4**

Seashell Corporation has 10,000 shares outstanding of 10 percent, \$20 par value, cumulative preferred stock. In 2007 and 2008, no dividends were declared on preferred stock. In 2009, Seashell had a profitable year and decided to pay dividends to stockholders of both preferred and common stock.

**Required:**

If the company has \$200,000 available for dividends in 2009, how much could it pay to the common stockholders?

**OBJECTIVE** > **5** **Cornerstone Exercise 10-39 RETAINED EARNINGS**

Titanic Corporation's net income for the year ended December 31, 2007, is \$235,000. On June 30, 2007, a cash dividend was declared for all common stockholders in the amount of \$0.50 per share. Common stock in the amount of 22,000 shares was outstanding at the time. The market price of Titanic's stock at year-end (12/31/07) is \$27 per share. Titanic had a \$1,250,000 credit balance in retained earnings at December 31, 2006.

**Required:**

Calculate the ending balance (12/31/07) of retained earnings.

**OBJECTIVE** > **5** **Cornerstone Exercise 10-40 RETAINED EARNINGS**

Refer to the information provided in **Cornerstone Exercise 10-39**. Assume that on July 31, 2007, Titanic discovered that 2006 depreciation was overstated by \$50,000.

**Required:**

Provide Titanic's statement of changes in retained earnings for the year ended December 31, 2007, assuming the 2006 tax rate was 30%.

**OBJECTIVE** > **6** **Cornerstone Exercise 10-41 STOCKHOLDER PAYOUT RATIOS**  
**CORNERSTONE 10-6**

The following information pertains to Milo Minderbender Corporation:

Net income	\$46,000
Dividends per common share	\$1.50
Common shares	1,000
Purchases of treasury stock	\$3,700
Common share price	\$37

**Required:**

Calculate the dividend yield, dividend payout, and total payout.

**Cornerstone Exercise 10-42 STOCKHOLDER PROFITABILITY RATIOS****OBJECTIVE** > **6**  
**CORNERSTONE 10-5**

The following information pertains to Montague Corporation:

Net income	\$55,000
Average common equity	\$1,500,000
Preferred dividends	\$7,500
Average common shares outstanding	100,000

**Required:**

Calculate the return on common equity and the earnings per share.

**Exercises****Exercise 10-43 ISSUING COMMON STOCK****OBJECTIVE** > **3**

Thoman Products, Inc., sold 21,250 shares of common stock to stockholders at the time of its incorporation. Thoman received \$24.40 per share for the stock.

**Required:**

1. Assume that the stock has a \$20 par value per share. Prepare the journal entry to record the sale and issue of the stock.
2. Assume that the stock has a \$15 stated value per share. Prepare the journal entry to record the sale and issue of the stock.
3. Assume that the stock has no par value and no stated value. Prepare the journal entry to record the sale and issue of the stock.

**Exercise 10-44 ISSUING AND REPURCHASING STOCK****OBJECTIVE** > **3**

Redbird, Inc., had the following transactions related to its common and preferred stock:

- January 15 Sold 50,000 shares of \$0.50 par common stock for \$12 per share. Sold 2,000 shares of \$10 par preferred stock at \$14 per share.
- October 1 Repurchased 4,000 shares of the common stock at \$20 per share.

**Required:**

Prepare the journal entries for the above transactions.

**Exercise 10-45 PREPARE THE STOCKHOLDERS' EQUITY SECTION****OBJECTIVE** > **1**

Renee Corporation has the following stockholders' equity information:

	\$10 Par Common	\$50 Par Preferred
Paid-in capital in excess of par	\$ 750,000	\$ 30,000
Shares:		
Authorized	1,000,000	100,000
Issued	250,000	15,000
Outstanding	246,500	15,000

Retained earnings is \$109,400, and the cost of treasury shares is \$42,000.

**Required:**

Prepare the stockholders' equity portion of Renee's balance sheet.

**OBJECTIVE** > **1** **Exercise 10-46 PREPARE THE STOCKHOLDERS' EQUITY SECTION**

Wildcat Drilling has the following accounts on its trial balance.

	Debit	Credit
Retained earnings		1,500,000
Cash	125,000	
Paid-in capital in excess of par—common		10,000,000
Paid-in capital in excess of par—preferred		2,000,000
Accounts payable		75,000
Accounts receivable	150,000	
Common stock, \$2 par		800,000
Preferred stock, \$10 par		600,000
Inventory	500,000	
Treasury stock—common (40,000 shares)	250,000	
Accumulated other comprehensive income		50,000

**Required:**

Prepare the stockholders' equity portion of Wildcat's balance sheet.

**OBJECTIVE** > **2** **Exercise 10-47 ACCOUNTING FOR SHARES**

Kress Products' corporate charter authorizes the firm to sell 800,000 shares of \$10 par common stock. At the beginning of 2009, Kress had sold 243,000 shares and had reacquired 1,650 of those shares. The reacquired shares were held as treasury stock. During 2009 Kress sold an additional 16,300 shares and purchased 3,100 more treasury shares.

**Required:**

Determine the number of authorized, issued, and outstanding shares at December 31, 2009.

**OBJECTIVE** > **4** **Exercise 10-48 TREASURY STOCK TRANSACTIONS**

Dennison Service Corporation had no treasury stock at the beginning of 2009. During January 2009, Dennison purchased 7,600 shares of treasury stock at \$21 per share. In April 2009, Dennison sold 4,100 of the treasury shares for \$25 per share. In August 2009, Dennison sold the remaining treasury shares for \$20 per share.

**Required:**

Prepare journal entries for the January, April, and August treasury stock transactions.

**OBJECTIVE** > **4** **Exercise 10-49 CASH DIVIDENDS ON COMMON STOCK**

Berkwild Company is authorized to issue 1,000,000 shares of common stock. At the beginning of 2009, Berkwild had 338,000 issued and outstanding shares. On July 2, 2009, Berkwild purchased 1,310 shares of common stock for its treasury. On March 1 and September 1, Berkwild declared a cash dividend of \$1.10 per share. The dividends were paid on April 1 and October 1.

**Required:**

1. Prepare the entries to record the declaration of the two cash dividends.
2. Prepare the entries to record the payment of the two dividends.
3. Explain why the amounts of the two dividends are different.

**Exercise 10-50 STOCK DIVIDENDS**

OBJECTIVE &gt; 4

Crystal Corporation has the following information regarding its common stock:

Its common stock is \$20 par, with 300,000 shares authorized, 132,000 shares issued, and 130,600 shares outstanding.

In August 2009, Crystal declared and paid a 15 percent stock dividend when the market price of the common stock was \$28 per share.

**Required:**

Prepare the journal entry to record declaration and payment of this stock dividend.

**Exercise 10-51 STOCK DIVIDENDS AND STOCK SPLITS**

OBJECTIVE &gt; 4

The balance sheet of Castle Corporation includes the following equity section:

Capital stock:	
Common stock, \$2 par, 50,000 shares authorized, 30,000 shares issued and outstanding	\$ 60,000
Paid-in capital in excess of par	71,800
Total capital stock	<u>\$131,800</u>
Retained earnings	<u>73,000</u>
Total equity	<u><u>\$204,800</u></u>

**Required:**

1. Assume that Castle issued 30,000 shares for cash at the inception of the corporation and that no new shares have been issued since. Determine how much cash was received for the shares issued at inception.
2. Assume that Castle issued 15,000 shares for cash at the inception of the corporation and subsequently declared a 2-for-1 stock split. Determine how much cash was received for the shares issued at inception.
3. Assume that Castle issued 25,000 shares for cash at the inception of the corporation and that the remaining 5,000 shares issued are the result of stock dividends that capitalized retained earnings of \$21,600. Determine how much cash was received for the shares issued at inception.

**Exercise 10-52 PREFERRED DIVIDENDS**

OBJECTIVE &gt; 4

Nathan Products' equity includes 10.8 percent, \$100 par preferred stock. There are 100,000 shares authorized and 20,000 shares outstanding. Assume that Nathan Products declares and pays preferred dividends quarterly.

**Required:**

1. Prepare the journal entry to record declaration of one quarterly dividend.
2. Prepare the journal entry to record payment of the one quarterly dividend.

**Exercise 10-53 CUMULATIVE PREFERRED DIVIDENDS**

OBJECTIVE &gt; 4

Capital stock of Barr Company includes:

Capital stock:	
Common stock, \$10 par, 150,000 shares outstanding	\$1,500,000
Preferred stock, 12 percent cumulative, \$100 par, 5,000 shares outstanding	500,000

As of December 31, 2009, three years' dividends are in arrears on the preferred stock. During 2009, Barr plans to pay dividends that total \$460,000.

**Required:**

1. Determine the amount of dividends that will be paid to Barr's common and preferred stockholders in 2010.
2. If Barr paid \$280,000 of dividends, determine how much each group of stockholders would receive.

**OBJECTIVE** > **5** **Exercise 10-54 RETAINED EARNINGS**

Gibson Products had beginning retained earnings of \$1,000,000. During the year Gibson paid \$50,000 of cash dividends to preferred shareholders and \$25,000 of cash dividends to common shareholders. Net income for the year was \$385,000.

**Required:**

1. Reproduce the retained earnings T-account for the year starting with the beginning balance.
2. Determine what Gibson's ending retained earnings is assuming that during the year they discover that net income was overstated by \$15,000 in prior years due to an error. The error was corrected and the current year's net income is correct.

**OBJECTIVE** > **1** **5** **Exercise 10-55 RESTRICTIONS ON RETAINED EARNINGS**

At December 31, 2008, Longfellow Clothing had \$107,300 of retained earnings, all unrestricted. During 2009, Longfellow earned net income of \$39,500 and declared and paid cash dividends on common stock of \$12,400. During 2009, Longfellow sold a bond issue with a covenant that required Longfellow to transfer from retained earnings to restricted retained earnings an amount equal to the principal of the bond issue, \$40,000. At December 31, 2009, Longfellow has 10,000 shares of \$10 par common stock issued and outstanding. Paid-in capital in excess of par on the common stock is \$142,500.

**Required:**

Prepare the stockholders' equity portion of Longfellow's December 31, 2009, balance sheet.

**OBJECTIVE** > **6** **Exercise 10-56 RATIO ANALYSIS**

Consider the following information from **Priceline.com**.

Stock price	\$43.61/share	Avg. common shares	
Common dividends	\$0	outstanding	38,650,000
Preferred dividends	\$1,927,000	Dividends per common	
2006 preferred stock	\$13,470,000	share	\$0/share
2006 total stockholders'		Net income	\$74,466,000
equity	\$1,105,648,000	2005 preferred stock	\$13,470,000
Purchases of treasury stock		2005 total stockholders'	
	\$135,840,000	equity	\$754,028,000

**Required:**

1. Calculate the stockholder payout ratios.
2. Calculate the stockholder profitability ratios.

**OBJECTIVE** > **1** **2** **Exercise 10-57 STOCKHOLDERS' EQUITY TERMINOLOGY**

A list of terms and a list of definitions or examples are presented below. Make a list of the numbers 1 through 12 and match the letter of the most directly related definition or example with each number.

**Terms**

1. stock warrant
2. date of record
3. par value
4. stock split
5. treasury stock
6. stock dividend
7. preferred stock
8. outstanding shares
9. authorized shares
10. declaration date
11. comprehensive income
12. retained earnings

### Definitions and Examples

- The state of Louisiana set an upper limit of 1,000,000 on the number of shares that Gump's Catch, Inc., can issue.
- Shares that never earn dividends
- On October 15, 2008, General Electric announced its intention to pay a dividend on common stock.
- Shares issued minus treasury shares
- Common stock divided by the number of shares issued
- A stock issue that requires no journal entry
- Shares that may earn guaranteed dividends
- Capitalizes retained earnings.
- A right to purchase stock at a specified future time and specified price
- Emerson Electric will pay a dividend to all persons holding shares of its common stock on December 15, 2008, even if they just bought the shares and sell them a few days later.
- Any changes to stockholders' equity from transactions with nonowners
- The accumulated earnings over the entire life of the corporation that have not been paid out in dividends

## Problem Set A

### Problem 10-58A PRESENTATION OF STOCKHOLDERS' EQUITY

OBJECTIVE > 1

Yeager Corporation was organized in January 2009. During 2009, Yeager engaged in the following stockholders' equity activities:

- Secured approval for a corporate charter that authorizes Yeager to sell 500,000, \$10 par common shares and 40,000, \$100 par preferred shares
- Sold 60,000 of the common shares for \$16 per share
- Sold 2,000 of the preferred shares for \$102 per share
- Purchased 550 of the common shares for the treasury at a cost of \$18 each
- Earned net income of \$31,300
- Paid dividends of \$6,000

#### Required:

Prepare the stockholders' equity portion of Yeager's balance sheet.

### Problem 10-59A ISSUING COMMON AND PREFERRED STOCK

OBJECTIVE > 3

Klaus Herrmann, a biochemistry professor, organized Bioproducts, Inc., early this year. The firm will manufacture antibiotics using gene splicing technology. Bioproducts' charter authorizes the firm to issue 5,000 shares of 12 percent, \$50 par preferred stock and 100,000 shares of \$10 par common stock. During the year, the firm engaged in the following transactions:

- Issued 25,000 common shares to Klaus Herrmann in exchange for \$275,000 cash.
- Sold 10,000 common shares to a potential customer for \$11 per share.
- Issued 3,000 shares of preferred stock to a venture capital firm for \$52 per share.
- Gave 75 shares of common stock to Margaret Robb, a local attorney, in exchange for Margaret's work in arranging for the firm's incorporation. Margaret usually charges \$900 for an incorporation.

#### Required:

Prepare a journal entry for each of these transactions.

### Problem 10-60A TREASURY STOCK TRANSACTIONS

OBJECTIVE > 4

Hansen, Inc., engaged in the following transactions during the current year:

- Purchased 4,000 shares of its own \$20 par common stock for \$26 per share on January 14.
- Sold 2,400 treasury shares to employees for \$20 per share on January 31.
- Purchased 2,000 common shares for the treasury at a cost of \$27 each on July 24.
- Sold the remaining 1,600 shares from the January 14 purchase and 1,500 of the shares from the July 24 purchase to employees for \$22 per share on August 1.

**Required:**

- Prepare journal entries for each of these transactions.
- Determine what the effect on total stockholders' equity is for each of the four transactions.

**OBJECTIVE** > **1** **3****Problem 10-61A STATEMENT OF STOCKHOLDERS' EQUITY**

At the end of 2009, Jeffco, Inc., had the following equity accounts and balances:

Common stock, \$20 par	\$410,000
Paid-in capital in excess of par, common stock	381,400
Retained earnings	102,470

During 2010, Jeffco engaged in the following transactions involving its equity accounts:

- Sold 2,900 shares of common stock for \$41 per share.
- Sold 1,500 shares of 12 percent, \$100 par preferred stock at \$102 per share.
- Declared and paid cash dividends of \$11,500.
- Purchased 1,000 shares of treasury stock (common) for \$45 per share.
- Sold 600 of the treasury shares for \$43 per share.

**Required:**

- Provide the journal entries for *a* through *e*.
- Assume that 2010 net income was \$51,300. Prepare a statement of stockholders' equity at December 31, 2010.

**OBJECTIVE** > **4****Problem 10-62A COMMON DIVIDENDS**

Papke Payroll Service began 2009 with 1,000,000 authorized and 225,000 issued and outstanding \$10 par common shares. During 2009, Papke entered into the following transactions:

- Declared a \$0.40 per share cash dividend on March 10.
- Paid the \$0.40 per share dividend on April 10.
- Purchased 8,000 common shares for the treasury at a cost of \$24 each on May 2.
- Sold 3,000 unissued common shares for \$26 per share on June 9.
- Declared a \$0.55 per share cash dividend on August 10.
- Paid the \$0.55 per share dividend on September 10.
- Declared and paid a 10 percent stock dividend on October 15 when the market price of the common stock was \$28 per share.
- Declared a \$0.60 per share cash dividend on November 10.
- Paid the \$0.60 per share dividend on December 10.

**Required:**

- Prepare journal entries for each of these transactions.
- Determine the total amount of dividends (cash and stock) for the year.
- Determine the effect on total assets and total stockholders' equity of these dividend transactions.

**OBJECTIVE** > **4****Problem 10-63A STOCK DIVIDENDS AND STOCK SPLITS**

Lance Products' balance sheet includes total assets of \$320,000 and the following equity account balances at December 31, 2009:

Capital stock:	
Common stock, \$5 par, 20,000 shares issued and outstanding	\$100,000
Paid-in capital in excess of par	44,000
Total capital stock	\$144,000
Retained earnings	53,600
Total stockholders' equity	<u>\$197,600</u>

Lance's common stock is selling for \$24 per share on December 31, 2009.

**Required:**

1. How much would Lance Products have reported for total assets and retained earnings on December 31, 2009, if the firm had declared and paid a \$10,000 cash dividend on December 31, 2009? Provide the journal entry for this cash dividend.
2. How much would Lance have reported for total assets and retained earnings on December 31, 2009, if the firm had issued a 10 percent stock dividend on December 31, 2009? Provide the journal entry for this stock dividend.
3. How much would Lance have reported for total assets and retained earnings on December 31, 2009, if the firm had effected a 2-for-1 stock split on December 31, 2009? Is a journal entry needed to record the stock split? Why or why not?

**Problem 10-64A PREFERRED DIVIDENDS**

**OBJECTIVE** > **4**

Magic Conglomerates had the following preferred stock outstanding at the end of a recent year:

\$25 par, 10 percent	6,000 shares
\$40 par, 8 percent, cumulative	11,000 shares
\$50 par, 12 percent, cumulative, convertible	2,000 shares
\$80 par, 11 percent, nonparticipating	15,000 shares

**Required:**

1. Determine the amount of annual dividends on each issue of preferred stock and the total annual dividend on all four issues.
2. Calculate what the amount of dividends in arrears would be if the dividends were omitted for one year.

**Problem 10-65A RATIO ANALYSIS**

**OBJECTIVE** > **6**

Consider the following information taken from the stockholders' equity section:

	(dollar amount in thousands)	
	2010	2009
Preferred stock	\$ 1,000	\$ 1,000
Common stock, 334,328,193 and 330,961,869 shares issued in 2010 and 2009, respectively	3,343	3,310
Paid-in capital in excess of par	766,382	596,239
Retained earnings	5,460,629	4,630,390
Accumulated other comprehensive (loss) income	(206,662)	58,653
Treasury stock (76,275,837 and 56,960,213 shares in 2010 and 2009, respectively) at cost	<u>(3,267,955)</u>	<u>(2,205,987)</u>
Total stockholders' equity	<u>\$ 2,756,737</u>	<u>\$ 3,083,605</u>

Additional Information (all numbers in thousands other than per share information):

Weighted average common shares outstanding	264,453
Price per share	\$ 70.47
Net income	1,123,153
Preferred dividends	80,000
Common dividends	212,914
Common dividends per share	0.81
Stock repurchases	1,061,968

**Required:**

1. Calculate the following:

**Stockholder Payout**

Dividend yield  
Dividend payout  
Total payout  
Stock repurchase payout

**Stockholder Profitability**

Return on common equity  
EPS

2. Assume last year's ratios were:

**Stockholder Payout**

Dividend yield: 1.05%  
Dividend payout: 15.80%  
Total payout: 75.00%  
Stock repurchase payout: 59.20%

**Stockholder Profitability**

Return on common equity: 34.26%  
EPS: \$3.51

and the current year industry averages are:

**Stockholder Payout**

Dividend yield: 0.76%%  
Dividend payout: 42.35%  
Total payout: 88.37%%  
Stock repurchase payout: 46.02%

**Stockholder Profitability**

Return on common equity: 23.81%  
EPS: \$1.23

How do you interpret the company's payout and profitability performance?

## Problem Set B

**OBJECTIVE** > **1** **Problem 10-58B PRESENTATION OF STOCKHOLDERS' EQUITY**

Steven's Restorations was organized in January 2008. During 2008, Steven's engaged in the following stockholders' equity activities:

- Secured approval for a corporate charter that authorizes Steven's to sell 1,000,000 \$5 par common shares and 50,000, \$100 par preferred shares.
- Sold 80,000 of the common shares for \$7 per share.
- Sold 15,000 of the preferred shares for \$104 per share.
- Purchased 700 of the common shares for the treasury at a cost of \$10 each.
- Earned net income of \$49,000.
- Paid dividends of \$9,000.

**Required:**

Prepare the stockholders' equity portion of Steven's balance sheet.

**OBJECTIVE** > **3** **Problem 10-59B ISSUING COMMON AND PREFERRED STOCK**

Tom Smith, a biochemistry professor, organized Biointernational, Inc., earlier this year. The firm will manufacture antibiotics using gene splicing technology. Biointernational's charter authorizes the firm to issue 50,000 shares of 10 percent, \$60 par preferred stock

and 75,000 shares of \$12 par common stock. During the year, the firm engaged in the following transactions:

- Issued 15,000 common shares to Tom Smith in exchange for \$250,000 cash.
- Sold 20,000 common shares to a potential customer for \$13 per share.
- Issued 2,000 shares of preferred stock to a venture capital firm for \$65 per share.
- Gave 75 shares of common stock to Susie Thomas, a local attorney, in exchange for Susie's work in arranging for the firm's incorporation. Susie usually charges \$1,000 for an incorporation.

**Required:**

Prepare a journal entry for each of these transactions.

**Problem 10-60B TREASURY STOCK TRANSACTIONS**

OBJECTIVE > 4

Bentonite Adhesives, Inc., engaged in the following transactions during the current year:

- Purchased 5,000 shares of its own \$15 par common stock for \$17 per share on January 14.
- Sold 2,100 of the treasury shares to employees for \$15 per share on January 31.
- Purchased 1,500 common shares for the treasury at a cost of \$25 each on July 24.
- Sold the remaining 2,900 shares from the January 14 purchase and 1,000 of the shares from the July 24 purchase to employees for \$18 per share on August 1.

**Required:**

- Prepare journal entries for each of these transactions.
- Determine the effect on total stockholders' equity for each of the four transactions.

**Problem 10-61B STATEMENT OF STOCKHOLDERS' EQUITY**

OBJECTIVE > 1 3

At the end of 2009, Stanley Utilities, Inc., had the following equity accounts and balances:

Common stock, \$10 par	\$200,000
Paid-in capital in excess of par, common stock	168,100
Retained earnings	53,500



During 2010, Stanley Utilities engaged in the following transactions involving its equity accounts:

- Sold 2,900 shares of common stock for \$20 per share.
- Sold 1,500 shares of 12 percent, \$50 par preferred stock at \$75 per share.
- Declared and paid cash dividends of \$4,500.
- Purchased 1,000 shares of treasury stock (common) for \$22 per share.
- Sold 600 of the treasury shares for \$24 per share.

**Required:**

- Provide the journal entries for *a* through *e*.
- Assume that 2010 net income was \$36,850. Prepare a statement of stockholders' equity at December 31, 2010.

**Problem 10-62B COMMON DIVIDENDS**

OBJECTIVE > 4

Thompson Payroll Service began in 2008 with 2,000,000 authorized and 450,000 issued and outstanding \$7 par common shares. During 2008, Thompson entered into the following transactions:



- Declared a \$0.25 per share cash dividend on March 24.
- Paid the \$0.25 per share dividend on April 6.
- Purchased 13,000 common shares for the treasury at a cost of \$17 each on May 9.

- d. Sold 4,600 unissued common shares for \$29 per share on June 19.
- e. Declared a \$0.30 per share cash dividend on August 1.
- f. Paid the \$0.30 per share dividend on September 14.
- g. Declared and paid a 20 percent stock dividend on October 25 when the market price of the common stock was \$26 per share.
- h. Declared a \$0.50 per share cash dividend on November 20.
- i. Paid the \$0.50 per share dividend on December 20.

**Required:**

1. Prepare journal entries for each of these transactions.
2. What is the total amount of dividends (cash and stock) for the year?
3. Determine the effect on total assets and total stockholders' equity of these dividend transactions.

**OBJECTIVE** > **4** **Problem 10-63B STOCK DIVIDENDS AND STOCK SPLITS**

Murphy's Products balance sheet includes total assets of \$620,000 and the following equity account balances at December 31, 2008:

Capital stock:	
Common stock, \$8 par, 10,000 shares issued and outstanding	\$ 80,000
Paid-in capital in excess of par	44,000
Total capital stock	<u>\$124,000</u>
Retained earnings	53,600
Total stockholders' equity	<u>\$177,600</u>

Murphy's common stock is selling for \$24 per share on December 31, 2008.

**Required:**

1. Determine how much Murphy's Products would have reported for total assets and retained earnings on December 31, 2008, if the firm had declared and paid a \$10,000 cash dividend on December 31, 2008. Provide the journal entry for this cash dividend.
2. Determine how much Murphy would have reported for total assets and retained earnings on December 31, 2008, if the firm had issued a 10 percent stock dividend on December 31, 2008. Provide the journal entry for this stock dividend.
3. How much would Murphy have reported for total assets and retained earnings on December 31, 2008, if the firm had effected a 2-for-1 stock split on December 31, 2008? Is a journal entry needed to record the stock split? Why or why not?

**OBJECTIVE** > **4** **Problem 10-64B PREFERRED DIVIDENDS**

Steel Corporation had the following preferred stock outstanding at the end of a recent year:

\$20 par, 12 percent	10,000 shares
\$40 par, 6 percent, cumulative	13,000 shares
\$50 par, 10 percent, cumulative, convertible	12,000 shares
\$100 par, 11 percent, nonparticipating	5,000 shares

**Required:**

1. Determine the amount of annual dividends on each issue of preferred stock and the total annual dividend on all four issues.
2. Calculate what the amount of dividends in arrears would be if the dividends were omitted for one year.

**OBJECTIVE** > **6** **Problem 10-65B RATIO ANALYSIS**

Consider the following information taken from the stockholders' equity section:

	(dollar amount in thousands)	
	2009	2008
Preferred stock	\$ 1,000	\$ 2,000
Common stock, 230,000,000 and 176,000,000 shares issued in 2009 and 2008, respectively	2,300	1,760
Paid-in capital in excess of par	567,000	432,000
Retained earnings	4,604,600	3,700,000
Accumulated other comprehensive (loss) income	(454,600)	147,000
Treasury stock (37,000,000 and 19,000,000 shares in 2009 and 2008, respectively) at cost	(1,750,000)	(975,000)
Total stockholders' equity	<u>\$ 2,970,300</u>	<u>\$3,307,760</u>

Additional Information (all numbers in thousands other than per share information):

Weighted average common shares outstanding	204,000
Price per share	\$ 65.31
Net income	1,224,600
Preferred dividends	65,000
Common dividends	255,000
Common dividends per share	1.25
Stock repurchases	775,000

#### Required:

1. Calculate the following:

##### Stockholder Payout

Dividend yield  
Dividend payout  
Total payout  
Stock repurchase payout

##### Stockholder Profitability

Return on common equity  
EPS

2. Assume last year's ratios were:

##### Stockholder Payout

Dividend yield: 2.31%  
Dividend payout: 23.65%  
Total payout: 88.59%  
Stock repurchase payout: 64.94%

##### Stockholder Profitability

Return on common equity: 37.41%  
EPS: \$6.12

and the current year industry averages are:

##### Stockholder Payout

Dividend yield: 2.50%  
Dividend payout: 25.83%  
Total payout: 95.10%  
Stock repurchase payout: 69.27%

##### Stockholder Profitability

Return on common equity: 44.44%  
EPS: \$6.48

How do you interpret the company's payout and profitability performance?

## Cases

### Case 10-66 ETHICS AND EQUITY

Roger and Gordon are middle managers at a large, publicly traded corporation. Roger tells Gordon that the company is about to sign an exclusive product distribution agreement with a small, publicly traded manufacturer. This contract will quadruple the manufacturer's revenue.

Roger mentions to Gordon that the manufacturer's stock price will likely go "through the roof." Gordon says, "Maybe we should buy some stock or, better yet, some call options."

**Required:**

1. Are Roger and Gordon being smart, being unethical but not breaking the law, or breaking the law?
2. How does the SEC monitor such activity?

**Case 10-67 CAPITAL STOCK TRANSACTIONS AND ETHICS**

Charlene Jones is the office manager for MK Corporation. MK constructs, owns, and manages apartment complexes. Charlene has been involved in negotiations between MK and prospective lenders as MK attempts to raise \$425 million that it plans to use to build apartments in a growing area of Kansas City. Based on her experience with past negotiations Charlene knows that lenders are concerned about MK's debt-to-equity ratio. When the negotiations began, MK had debt of \$80 million and equity of \$50 million. Charlene believes that MK's debt-to-equity ratio of 1.6 is probably the minimum that lenders will accept.

Charlene is also aware that MK Corporation issued \$10 million of common stock to a long-time friend of the corporation's president in exchange for some land just before the negotiations with lenders began. The president's friend constructs and sells single family homes. The land is in an area zoned only for single family housing and would be an attractive site for single family homes. Thus, the land is worth at least \$10 million. However, MK does not intend to build any single family homes.

**Required:**

1. What would have been MK's debt-to-equity ratio if the \$10 million of stock had not been issued for the land?
2. If Charlene believes that the \$10 million stock issue was undertaken only to improve MK's debt-to-equity ratio and that it will be reversed whenever the president's friend wants the land back or when MK's debt-to-equity position improves, what should she do?

**Case 10-68 COMMON AND PREFERRED STOCK**

Expansion Company now has \$2,500,000 of equity (100,000 common shares). Current income is \$400,000 and Expansion Company needs \$500,000 of additional capital. The firm's bankers insist that this capital be acquired by selling either common or preferred stock. If Expansion sells common stock, the ownership share of the current stockholders will be diluted by 16.7 percent (20,000 more shares will be sold). If preferred stock is sold, the dividend rate will be 15 percent of the \$500,000. Furthermore, the preferred stock will have to be cumulative, participating, and convertible into 20,000 shares of common stock.

**Required:**

Indicate whether Expansion should sell additional common or preferred stock, and explain the reasons for your choice.

**Case 10-69 LEVERAGE**

Enrietto Aquatic Products' offer to acquire Fiberglass Products for \$2,000,000 cash has been accepted. Enrietto has \$1,000,000 of liquid assets that can be converted into cash and plans to either sell common stock or issue bonds to raise the remaining \$1,000,000. Before this acquisition, Enrietto's condensed balance sheet and condensed income statement were as follows:

**ENRIETTO AQUATIC PRODUCTS**  
**Preacquisition Condensed Balance Sheet**

Assets		Liabilities and Equity	
Assets	<u>\$20,000,000</u>	Liabilities	\$ 8,000,000
		Common stock, \$10 par	6,000,000
		Retained earnings	<u>6,000,000</u>
		Total liabilities & stockholders' equity	<u>\$20,000,000</u>

**ENRIETTO AQUATIC PRODUCTS**  
**Preacquisition Condensed Income Statement**

Income from operations	\$6,000,000
Less: Interest expense	<u>1,000,000</u>
Income before taxes	<u>\$5,000,000</u>
Less: Income taxes expense (0.34)	<u>1,700,000</u>
Net income	<u>\$3,300,000</u>

Enrietto's policy is to pay 60 percent of net income to stockholders as dividends. Enrietto expects to be able to raise the \$1,000,000 it needs for the acquisition by selling 50,000 shares of common stock at \$20 each or by issuing \$1,000,000 of 20-year, 12 percent bonds. Enrietto expects income from operations to grow by \$700,000 after Fiberglass Products has been acquired. (Interest expense will increase if debt is used to finance the acquisition.)

**Required:**

- Determine the return on equity (net income/total equity) before the acquisition and for both financing alternatives.
- If Enrietto sells additional stock, what will be the cash outflow for dividends?
- If Enrietto sells bonds, what will be the net cash outflows for new interest and for all dividends? (Remember that interest is tax-deductible.)
- Assume that Enrietto sells stock and that none of the preacquisition stockholders buy any of the 50,000 new shares. What total amount of dividends will the preacquisition stockholders receive after the acquisition? How does this amount compare with the dividends they receive before the acquisition?
- Which alternative is better for Enrietto's preacquisition stockholders?

**Case 10-70 RESEARCHING AND ANALYSIS USING THE ANNUAL REPORT**

Obtain [Priceline.com](http://www.priceline.com)'s 2006 10-K through the "Investor Relations" portion of their website (do a web search for investor relations), or go to <http://www.sec.gov> and click "Search for company filings" under "Filings & Forms (EDGAR)."

**Required:**

- How many shares of common stock are authorized, issued, and outstanding?
- Why didn't Priceline.com pay dividends to common stockholders in any of the three years shown?
- What is the common stockholders' equity for 2006?
- How many shares of treasury stock were held at the end of 2006?
- Calculate the dividend and stock repurchase payouts.
- Taking the weighted average number of basic common shares outstanding from the EPS information at the bottom of the income statement, calculate the stockholder profitability ratios.

### Case 10-71 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

Common Stock Price	January 28, 2006	February 3, 2007
Abercrombie & Fitch	\$64.06	\$80.77
Aeropostale	20.32	24.05

#### Required:

1. Both Abercrombie & Fitch (Note 13) and Aeropostale (Note 15) have notes that discuss contingencies. What contingencies do they disclose? Do you think any of these contingencies are included in the income statement or on the balance sheet? Why or why not?
2. Calculate Abercrombie & Fitch's and Aeropostale's dividend yield and dividend payout for the years ended February 3, 2007 and January 28, 2006.
3. Calculate Abercrombie & Fitch's and Aeropostale's total payout and stock repurchase payout for the years ended February 3, 2007 and January 28, 2006.
4. Compare Abercrombie & Fitch's and Aeropostale's stockholder payouts based on the values and trends identified in these stockholder payout ratios.
5. Calculate Abercrombie & Fitch's and Aeropostale's return on common equity and earnings per share for the years ended February 3, 2007 and January 28, 2006.
6. Compare the values and trends of these stockholder profitability ratios for Abercrombie & Fitch and Aeropostale.

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# 11

## The Statement of Cash Flows

After studying this chapter, you should be able to:

- **1** Explain the purpose of a statement of cash flows.
- **2** Identify and classify business activities that produce cash inflows and outflows.
- **3** Understand the relationship between changes in cash and the changes in the balance sheet accounts.
- **4** Prepare the cash flows from operating activities section of a statement of cash flows using the indirect method.
- **5** Prepare the cash flows from investing activities section of a statement of cash flows.
- **6** Prepare the cash flows from financing activities section of a statement of cash flows.
- **7** Analyze information contained in the statement of cash flows.
- **8** (Appendix 11A) Prepare the cash flows from operating activities section of a statement of cash flows using the direct method.
- **9** (Appendix 11B) Use a spreadsheet to prepare the statement of cash flows.





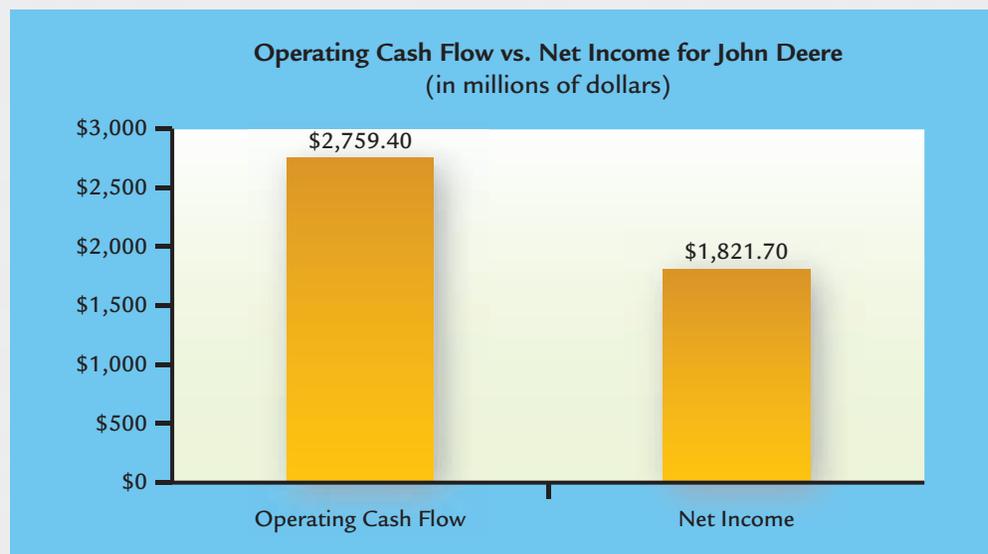
# **E**xperience Financial Accounting with Deere & Company

Founded in 1837, **Deere & Company** (collectively known as John Deere), is an American success story. From humble beginnings as a blacksmith shop in Illinois, John Deere has grown into one of the world's largest corporations, currently standing at 98 in the Fortune 500 ranking of the world's largest corporations. Not only is John Deere the world's leading manufacturer of farm and forestry equipment, John Deere also sells a broad line of lawn tractors and other outdoor consumer products and is one of the world's largest equipment finance companies. Despite its growth, John Deere is still guided by four core values: integrity, quality, commitment, and innovation.

In addition to the income statement, the balance sheet, and the statement of retained earnings, companies are also required to provide a statement of cash flows. The statement of cash flows measures a company's inflows (sources) and outflows (uses) of cash during a period of time. While various insights can be gained from the statement of cash flows, many financial statement users look to cash flow as a means to assess the quality of

earnings—that is, the degree to which a company's reported earnings reflects what the company actually earned. Because the recognition of revenues and expenses can occur at different times than the related cash inflow or outflow, a company's net income does not always equal the amount of cash that it received and spent. When the cash generated from operations is greater than net income, many analysts will consider the earnings to be of high quality.

With operating cash flow more than \$900 million greater than net income, John Deere is considered to have high quality earnings. From this perspective, it is easy to see why some think the color of money is John Deere green!



In addition to being interested in the information in the accrual-basis financial statements, most financial statement users also want to know about the amount, timing, and uncertainties of cash flows. Investors want to know whether a company can pay cash dividends and whether it can continue to expand its productive capacity. Lenders are interested in the company's ability to pay interest and borrowed principal. Employees want to assess the company's ability to pay larger salaries and fringe benefits. Suppliers want to know if the company can pay for goods purchased on credit. The statement of cash flows helps meet these information needs.

The statement of cash flows is one of the primary financial statements. Because the other financial statements—the income statement, the balance sheet, and the statement of retained earnings—provide only limited information about a company's cash flows, the statement of cash flows can be viewed as a complement to these other financial statements. That is, while the income statement provides information about the company's performance on an accrual basis, it does not tell how much cash was generated or used as a result of the company's operations. Similarly, the balance sheet provides information on the changes in net assets, but it doesn't provide information on how much cash was used or received in relation to these changes. The statement of cash flows fills this void by explaining the sources from which a company has acquired cash (inflows of cash) and the uses to which the business has applied cash (outflows of cash).

In this chapter, we will explain how a statement of cash flows is prepared from the information contained in the balance sheet and the income statement. We will explore the measurement, presentation, and analysis of cash flow information and address the following questions:

- How is the information in the statement of cash flows used by investors, creditors, and others?
- What are the principal sources and uses of cash?
- How is the statement of cash flows prepared and reported to external users?
- How is the statement of cash flows used in financial analysis?

## OBJECTIVE > 1

Explain the purpose of a statement of cash flows.

## Role of the Statement of Cash Flows

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The purpose of the **statement of cash flows** is to provide relevant information about a company's cash receipts (inflows of cash) and cash payments (outflows of cash) during an accounting period. The information in a statement of cash flows helps investors, creditors, and others:

1. **Assess a company's ability to produce future net cash inflows.** You may have heard the age-old business expression "cash is king." Cash is certainly the lifeblood of a company and is critical to a company's success. One goal of financial reporting is to provide information that is helpful in predicting the amounts, timing, and uncertainty of a company's future cash flows. While accrual-basis net income is generally viewed to be the best single predictor of future cash flows, information about cash receipts and cash payments can, along with net income, allow users to predict future cash flows better than net income alone.
2. **Judge a company's ability to meet its obligations and pay dividends.** As a company performs its business activities, it will incur various obligations. For example, a company will have to pay its suppliers for merchandise purchased and its employees for work performed. Suppliers, employees, and others who interact with a company are concerned about whether a company has enough cash to pay its obligations as they become due. Similarly, investors often wish to know if a company is generating enough cash to be able to pay dividends. In addition, success or failure in business often depends on whether a company has enough cash to meet unexpected obligations and take advantage of unexpected opportunities. Information about cash receipts and cash payments helps financial statement users make these important judgments.

3. **Estimate the company's needs for external financing.** As companies operate, the various expenditures can be financed through either internally generated funds or by external financing (debt or equity). Knowing the amount of cash that a company generates internally helps financial statement users assess whether a company will have to borrow additional funds from creditors or seek additional cash from investors.
4. **Understand the reasons for the differences between net income and related cash receipts and cash payments.** As you have already noticed, the amount of a company's net income and the amount of cash generated from operations are often different amounts due to the application of accrual accounting concepts. Because of the judgments and estimates involved in accrual accounting, many financial statement users question the usefulness of reported income. However, when provided with cash flow information, these users can gain insights into the quality and reliability of the reported income amounts.
5. **Evaluate the balance sheet effects of both cash and noncash investing and financing transactions.** Not all changes in cash are directly related to a company's operations (e.g., manufacturing a product or selling a good or service). Instead a company may make investments in productive assets as it expands its operations or upgrades its facilities. In addition, a company may seek sources of cash by issuing debt or equity. These activities can be just as crucial to a company's long-term success as its current operations.

In summary, information about a company's cash receipts and cash payments, along with information contained in the balance sheet and the income statement, is critical to understanding and analyzing a company's operations.

## Cash Flow Classifications

### OBJECTIVE 2

Identify and classify business activities that produce cash inflows and outflows.

Because a statement of cash flows describes the cash payments and cash receipts for a period of time, it is important to have a clear understanding of what is included in the term *cash*. For purposes of the statement of cash flows, cash includes both funds on hand (coins and currency) and cash equivalents. **Cash equivalents** are short-term, highly liquid investments that are readily convertible to cash and have original maturities of three months or less. Examples of cash equivalents include money market funds and investments in U.S. government securities (e.g., treasury bills) or commercial paper (a short-term note payable issued by a corporation). Because of their high liquidity or nearness to cash, cash equivalents are treated as cash for the purpose of the statement of cash flows.

During an accounting period, a company engages in many activities that can be categorized as operating activities, investing activities, or financing activities. These three categories represent the fundamental business activities as discussed in Chapter 1. Each of these activities can contribute to (a cash inflow) or reduce (a cash outflow) a company's cash balance. Therefore, the statement of cash flows reconciles the beginning and ending balances of cash by describing the effects of business activities on a company's cash balance. This relationship is shown in Exhibit 11-1.

## Cash Flows from Operating Activities

**Cash flows from operating activities** (or operating cash flows) encompass the cash inflows and outflows that relate to acquiring (purchasing or manufacturing), selling, and delivering goods or services. Cash inflows from operating activities include cash sales and collection of accounts receivable that arise from credit sales. They also include cash dividends or interest received on investments in equity and debt securities. Cash outflows from operating activities include payments for goods and services purchased from suppliers, payments for wages and salaries, payments for property and income taxes, and payments of interest on debt.

Operating cash flows correspond to the *types* of items that determine net income (revenues and expenses). However, the *amounts* are different because the income

## Exhibit 11-1

## How the Statement of Cash Flows Links the Two Balance Sheets

Balance Sheet 12/31/2009	Statement of Cash Flows For the year ended 12/31/2010	Balance Sheet 12/31/2010
<b>Assets</b> Cash <b>\$1,800</b> Other 6,300 Total <u>\$8,100</u>	Operating activities \$3,400 Investing activities (5,100) Financing activities <u>2,300</u> Net change in cash \$ 600 Beginning cash <b>1,800</b> Ending cash <b>\$2,400</b>	<b>Assets</b> Cash <b>\$2,400</b> Other 7,100 Total <u>\$9,500</u>
<b>Liabilities and Equity</b> Liabilities \$4,200 Equity 3,900 Total <u>\$8,100</u>		<b>Liabilities and Equity</b> Liabilities \$4,400 Equity 5,100 Total <u>\$9,500</u>

statement is accrual-based while the statement of cash flows is cash-based. Therefore, to isolate the current period operating cash flow, companies must adjust the current period income statement items for any related noncash items, which can be determined by examining the changes in the related current assets and current liabilities. (The procedure to compute cash flows from operating activities is discussed in a later section of this chapter.) In general, operating cash flows relate to income statement items adjusted by any increases or decreases in current assets or liabilities.

### Cash Flows from Investing Activities

**Cash flows from investing activities** (or investing cash flows) are the cash inflows and outflows that relate to:

- acquiring and disposing of operating assets
- acquiring and selling investments (current and long-term)
- lending money and collecting loans

Cash inflows from investing activities include cash received from the sale of property, plant, and equipment, the collection of the principal amount of loans from borrowers, the issuance of loans made by the company, and the sale of investments in other companies. (Remember that the cash inflows from interest or dividends go into the determination of income and, therefore, are treated as operating cash flows.) Cash outflows from investing activities include payments made to acquire property, plant, and equipment, to purchase the debt or equity securities of another company as an investment, and to make loans to borrowers. In general, investing cash flows relate to increases or decreases of long-term assets and investments.

### Cash Flows from Financing Activities

**Cash flows from financing activities** (or financing cash flows) include obtaining resources from creditors and owners. Cash inflows from financing activities include cash received from the issuance of stock and the issuance of debt (bonds or notes payable). Cash outflows from financing activities include cash payments to repay the principal amount borrowed, to repurchase a company's own stock, and to pay dividends. (Remember that cash outflows related to the payment of interest go into the determination of income and, therefore, are treated as operating cash flows.) In general, financing cash flows involve cash receipts and payments that affect long-term liabilities and stockholders' equity.

## Noncash Investing and Financing Activities

Occasionally, investing and financing activities take place without affecting cash. For example, a company may choose to acquire an operating asset (e.g., building) by issuing long-term debt. Alternatively, a company may acquire one asset by exchanging it for another. These types of activities are referred to as **noncash investing and financing activities**. Because these activities do not involve cash, they are not reported on the statement of cash flows. However, these transactions still provide useful information about a company's overall investing and financing activities. Any significant noncash investing and financing activities are required to be reported in a supplementary schedule that is shown either at the bottom of the statement of cash flows or in the notes to the financial statements. This requirement to disclose any significant noncash investing and financing activities is consistent with the full-disclosure principle—any information that would make a difference to financial statement users should be made known.

**Cornerstone 11-1** shows how business activities can be classified as either operating, investing, financing, or noncash activities.

### CONCEPT Q&A

If we already have the balance sheet and income statement, why is a statement of cash flows so important?

The statement of cash flows provides information about a company's cash inflows and cash outflows separated into three categories (operating, investing, and financing activities) that correspond to a company's business activities. Knowing the sources of cash—especially from operating activities—provides users with a good idea of a company's financial strength and its long-term viability. The decision to invest in a company is much safer if a potential investor—be it a bank or stockholder—knows how much cash is being produced and where it is coming from.

**Possible Answer:**

### HOW TO Classify Business Activities

#### Concept:

Cash flows from operating activities correspond to the cash effects of items that determine net income. Cash flows from investing activities relate to increases or decreases in long-term assets and investments. Cash flows from financing activities involve cash receipts and payments that affect long-term liabilities and stockholders' equity.

#### Information:

Moore Inc. engaged in the following activities during the current year:

- Payment of wages to employees
- Issuance of common stock
- Purchase of property, plant, and equipment
- Collection of cash from customers
- Issuance of bonds
- Retirement of debt by issuing stock
- Purchase of inventory
- Sale of property, plant, and equipment
- Payment of dividends
- Payment of interest

#### Required:

Classify each of the above activities as an operating, investing, or financing activity and indicate whether the activity involved a cash receipt or cash payment. If the transaction does not involve cash, classify it as a noncash investing and financing activity.

#### Solution:

- Wages are an expense on the income statement. Therefore, the payment of wages is classified as a cash payment from an operating activity.
- The issuance of common stock results in an increase of stockholders' equity and cash. Therefore, it is classified as a cash receipt from a financing activity.



### CORNERSTONE 11-1



**CORNERSTONE**  
**11-1**  
*(continued)*

- c. The purchase of property, plant, and equipment results in an increase to a long-term asset and a decrease of cash. Therefore, it is classified as a cash payment from an investing activity.
- d. The collection of cash from customers relates to sales revenue on the income statement. Therefore, it is classified as a cash receipt from an operating activity.
- e. Issuing bonds results in an increase to long-term liabilities and cash. Therefore, it is classified as a cash receipt from a financing activity.
- f. The retirement of debt by issuing stock is a financing activity that does not involve cash. It is classified as a noncash investing and financing activity.
- g. Because inventory is a component of cost of goods sold on the income statement, the purchase of inventory is classified as a cash payment from an operating activity.
- h. The sale of property, plant, and equipment results in a decrease in a long-term asset and an increase in cash. Therefore, it is classified as a cash receipt from an investing activity.
- i. The payment of dividends is a reduction in retained earnings, which is a part of stockholders' equity. Therefore, the payment of dividends is classified as a cash outflow from a financing activity.
- j. Interest is an expense on the income statement. Therefore, the payment of interest is classified as a cash outflow from an operating activity.

Exhibit 11-2 summarizes the classification of business activities as either operating, investing, or financing activities.

**Exhibit 11-2**

**Classification of Cash Flows**

**Cash Inflows**

**Operating Activities**

- Cash received from:
- Customers for cash sales
  - Collections of accounts receivable
  - Dividends
  - Interest

**Investing Activities**

- Cash received from:
- The sale of property, plant, and equipment
  - The collection of principal on a loan
  - The sale or maturity of investments

**Financing Activities**

- Cash received from:
- Issuing stock to owners
  - Issuing notes or bonds (debt) to creditors
  - Selling treasury stock



**Cash Outflows**

**Operating Activities**

- Cash paid to:
- Suppliers of goods and services
  - Employees for salaries and wages
  - Governments for taxes
  - Lenders for interest

**Investing Activities**

- Cash paid to:
- Purchase property, plant, and equipment
  - Make loans to other companies
  - Purchase investments

**Financing Activities**

- Cash paid to:
- Repayment of principal of long-term debt
  - Dividends to owners
  - Purchase of treasury stock

## DECISION-MAKING & ANALYSIS

### Cash Flows and Income

Five years ago, Jester Corporation was a very successful regional clothing retailer. Begun in a single location, Jester had added nineteen additional stores over a period of 40 years. About five years ago, a new management team undertook an aggressive program of expansion financed by the issuance of long-term, high-interest debt. The number of stores increased to 70. The firm acquired several other regional clothing chains and a large national in-store and catalog retailer.

At first, Jester had difficulty meeting its interest payments, but the retail clothing market was growing, and Jester was able to hold its share of the total market. Competition among domestic clothing manufacturers, the tremendous growth in Pacific Rim clothing manufacturing, and a strong U.S. dollar held down Jester's cost of goods sold. After a few years, Jester was able to retire 20 percent of its debt, but interest expense was still 40 percent of gross margin.

Recently, the U.S. dollar has weakened, raising the cost of merchandise from Pacific Rim clothing manufacturers. Further, an economic downturn has depressed the retail clothing market and intensified price competition among retailers. Thus retailers' gross margins have fallen. Jester, however, has been able to maintain approximately the same level of net income as in preceding years.

**1.** *What questions might an investor or creditor raise concerning Jester's cash flows from operating activities?*

Does the statement of cash flows indicate impending problems for Jester, despite its level net income? Did company operations generate enough cash last year to pay the interest on the firm's debt and provide a dividend? If cash flow from operating activities was not sufficient to pay interest and dividends, how did the company make up the difference? Did it reduce dividends, increase liabilities, or dispose of assets? Does the company's cash position appear to be stable?

**2.** *What questions might an investor or creditor raise concerning Jester's cash flows from investing activities?*

Did the company sell any investments during the period to cover a cash shortage? If not, is it likely to do so in the future? How much cash could Jester produce if it sold all of its investments?

**3.** *What questions might an investor or creditor raise concerning Jester's cash flows from financing activities?*

Has the company been retiring its debt at the same rate as in prior years? If debt retirement has slowed, has the company been able to refinance its outstanding debt? Did the company borrow additional amounts to cover a cash shortage? If not, is the company likely to be able to borrow additional amounts in the future?

### Format of the Statement of Cash Flows

Once a company has properly classified its cash inflows and outflows as operating, investing, or financing activities, it reports each of these three categories as shown in Exhibit 11-3.

Note that the three cash flow categories are summed to obtain the net increase or decrease in cash. This change in cash reconciles the beginning and ending balances of cash as noted in Exhibit 11-1.

### Analyzing the Accounts for Cash Flow Data

Accrual-basis accounting requires the recognition of business activities when they occur instead of when cash is received or paid. Therefore, unlike the balance sheet and the income statement, the statement of cash flows cannot be prepared by simply using information obtained from an adjusted trial balance. Instead, each item on the balance sheet and the income statement must be analyzed to *explain* why cash changed by the amount that it did. In other words, the accrual-basis numbers in the balance sheet and the income statement must be adjusted to a cash basis. Notice that our concern is not with determining the change in cash but the *reasons why* cash changed.

The recording of any business activity creates two types of financial measures—*balances and changes*. Balances measure the dollar amount of an asset, liability, or

#### OBJECTIVE 3

Understand the relationship between changes in cash and the changes in the balance sheet accounts.

## Exhibit 11-3

## Format of the Statement of Cash Flows

<b>Brooke Sportswear Inc.</b>			
<b>Statement of Cash Flows</b>			
<b>For the Year Ended December 31, 2009</b>			
<b>Cash flows from operating activities</b>			
Cash inflows	\$ xxx		
Cash outflows	(xxx)		
Net cash provided (used) by operating activities			\$ xxx
<b>Cash flows from investing activities</b>			
Cash inflows	\$ xxx		
Cash outflows	(xxx)		
Net cash provided (used) by investing activities			xxx
<b>Cash flows from financing activities</b>			
Cash inflows	\$ xxx		
Cash outflows	(xxx)		
Net cash provided (used) by financing activities			xxx
Net increase (decrease) in cash and cash equivalents			\$ xxx
Cash and cash equivalents at beginning of year			xxx
Cash and cash equivalents at end of year			<u>\$ xxx</u>
<b>Schedule or note disclosure of noncash investing and financing activities</b>			

equity at a given time. Changes measure the increases or decreases in account balances over a period of time. For example, consider the following T-account:

Accounts Receivable			
Balance, 12/31/2009	11,000		
2010 credit sales	90,000	92,000	Cash collections for 2010
Balance, 12/31/2010	9,000		

This T-account shows two balances and two changes. The beginning and ending balances (\$11,000 and \$9,000) measure accounts receivable at December 31, 2009 and 2010, respectively. The credit sales (\$90,000) and cash collections (\$92,000) are changes that measure the effects of selling goods and collecting cash. Like accounts receivable, every balance sheet account can be described in terms of balances and changes.

To understand a company's cash flows, the relationships between the *changes* in balance sheet accounts and the company's cash flows need to be analyzed. We will begin our analysis with the fundamental accounting equation:

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$$

Next, we will restate this equation in terms of changes ( $\Delta$ ):

$$\Delta \text{ Assets} = \Delta \text{ Liabilities} + \Delta \text{ Stockholders' Equity}$$

Separating assets into cash and noncash accounts:

$$\Delta \text{ Cash} + \Delta \text{ Noncash Assets} = \Delta \text{ Liabilities} + \Delta \text{ Stockholders' Equity}$$

Finally, moving the changes in noncash assets to the right-hand side:

$$\Delta \text{ Cash} = \Delta \text{ Liabilities} + \Delta \text{ Stockholders' Equity} - \Delta \text{ Noncash Assets}$$

Where:

$$\begin{aligned} \text{Increases in Cash} &= \text{Increases in Liabilities} + \text{Increases in Stockholders' Equity} \\ &+ \text{Decreases in Noncash Assets} \end{aligned}$$

$$\begin{aligned} \text{Decreases in Cash} &= \text{Decreases in Liabilities} + \text{Decreases in Stockholders' Equity} \\ &+ \text{Increases in Noncash Assets} \end{aligned}$$

This analysis reveals that **all cash receipts or cash payments are reflected by changes in the balance sheet accounts.** **Cornerstone 11-2** illustrates how to classify specific balance sheet accounts as increases in cash or decreases in cash.

## HOW TO Classify Changes in Balance Sheet Accounts

### Concept:

Increases in cash result from increases in liabilities, increases in stockholders' equity, and decreases in noncash assets. Decreases in cash result from decreases in liabilities, decreases in stockholders' equity, and increases in non-cash assets.

### Information:

The following changes in the balance sheet accounts have been observed for the current period:

Account	1/1/2009	12/31/2009	Change
a. Accounts receivable	\$ 25,000	\$ 18,000	\$ (7,000)
b. Bonds payable	400,000	300,000	(100,000)
c. Equipment	145,000	175,000	30,000
d. Inventory	15,000	18,000	3,000
e. Common stock	150,000	175,000	25,000
f. Retained earnings	75,000	95,000	20,000
g. Accounts payable	12,000	10,000	(2,000)
h. Unearned revenue	17,000	19,000	2,000

### Required:

Classify each change as either an increase in cash or a decrease in cash.

### Solution:

- Increase in cash
- Decrease in cash
- Decrease in cash
- Decrease in cash
- Increase in cash
- Increase in cash
- Decrease in cash
- Increase in cash



## CORNERSTONE 11-2



Exhibit 11-4 integrates the analysis of the relationships between the *changes* in balance sheet accounts and the company's cash flows with the cash flow classifications discussed in the previous section.

Examining Exhibit 11-4, several items are of interest:

- Cash flows from operating activities generally involve income statement items (which are reflected in retained earnings) and changes in current assets or liabilities.
- Investing activities are related to changes in long-term assets.
- Financing activities are related to changes in long-term liabilities and stockholders' equity.

## CONCEPT Q&A

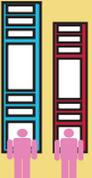
Why do we analyze changes in the balance sheets accounts to determine the inflows and outflows of cash? Wouldn't it be easier to simply look at the cash account in the general ledger?

It is correct that the cash account in the general ledger will contain all cash inflows and cash outflows and a statement of cash flows can be prepared by analyzing this account. However, preparing a statement of cash flows in this manner would require individuals to identify, understand, and classify every single cash receipt or cash payment. With the large volume of cash transactions, this would be an extremely time-consuming and inefficient task. It is much easier to determine cash flows by analyzing the changes in the balance sheet accounts.

Possible Answer:

## Exhibit 11-4

## Cash Flow Classifications and Changes in Balance Sheet Accounts

Classification	Cash Effect	Balance Sheet Items Affected	Example
 <b>Operating</b> 	Inflow (+)	Decreases in current assets Increases in current liabilities Increases in retained earnings	Collecting an accounts receivable Receipt of revenue in advance Making a cash sale
	Outflow (-)	Increases in current assets Decreases in current liabilities Decreases in retained earnings	Purchasing inventory Paying an accounts payable Paying interest
 <b>Investing</b> 	Inflow (+)	Decreases in long-term assets	Selling equipment
	Outflow (-)	Increases in long-term assets	Buying equipment
 <b>Financing</b> 	Inflow (+)	Increases in long-term liabilities Increases in stockholders' equity	Issuing long-term debt Issuing stock
	Outflow (-)	Decreases in long-term liabilities Decreases in stockholders' equity	Retiring long-term debt Paying dividends

- Retained earnings affects both cash flows from operating activities (e.g., revenues, expenses, net income, or a net loss) and cash flows from financing activities (e.g., payment of dividends).
- Each item on the balance sheet and the income statement is analyzed to explain the change in cash.

Now that we have seen how the accounts are analyzed to identify cash inflows and outflows, we turn to the preparation and reporting of a statement of cash flows.

## Preparing a Statement of Cash Flows

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To prepare a statement of cash flows, you need:

- **Comparative balance sheets** used to determine the changes in assets, liabilities, and stockholders' equity during a period.
- A **current income statement** that is used in the determination of cash flows from operating activities.
- **Additional information** about selected accounts that will be useful in determining the reason why cash was received or paid (generally used to explain investing and financing activities).

Using this information, there are five basic steps in preparing the statement of cash flows.

**Step 1: Compute the net cash flow from operating activities.** This involves adjusting the amounts on the income statement for noncash changes reflected in the balance sheet. Two methods, the indirect or direct method (explained below), may be used to determine this amount.

**Step 2: Compute the net cash flow from investing activities.** Information from the balance sheet as well as any additional information provided will need to be analyzed to identify the cash inflows and outflows associated with long-term assets.

**Step 3: Compute the net cash flow from financing activities.** Information from the balance sheet as well as any additional information provided will need to be analyzed to identify the cash inflows and outflows associated with long-term liabilities and stockholders' equity.

**Step 4: Combine the net cash flows from operating, investing, and financing activities to obtain the net change in cash for the period.**

**Step 5: Compute the change in cash for the period and compare this with the change in cash from Step 4.** The change in cash, computed from the beginning balance of cash and the ending balance of cash as shown on the balance sheet, should reconcile with the net cash flow computed in Step 4.

The statement of cash flows for John Deere is shown in Exhibit 11-5.

## Preparing Cash Flows from Operating Activities

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The cash flows from operating activities section of the statement of cash flows may be prepared using either of two methods: the indirect method or the direct method. Both methods arrive at an identical amount—the net cash provided (used) by operating activities. The two methods differ only in how this amount is computed.

The **indirect method** begins with net income and then adjusts it for noncash items to produce net cash flow from operating activities. These adjustments to net income are necessary to (1) eliminate income statement items that do not

### OBJECTIVE > 4

Prepare the cash flows from operating activities section of a statement of cash flows using the indirect method.

## Exhibit 11-5

## Statement of Cash Flows for John Deere

<b>Deere and Company</b>		
<b>Statement of Consolidated Cash Flows*</b>		
<b>For the Year Ended October 31, 2007</b>		
<b>(in millions of dollars)</b>		
<b>Cash flows from operating activities</b>		
Net income	\$ 1,821.7	
Adjustments to reconcile net income to net cash provided by operating activities:		
Bad debt expense	71.0	
Depreciation and amortization	744.4	
Other noncash items	60.7	
Changes in assets and liabilities:		
Decrease in receivables related to sales	131.1	
Increase in inventories	(357.2)	
Increase in accounts payable and accrued expenses	418.6	
Net change in accrued income taxes payable/receivable	10.5	
Net change in retirement benefit accruals/prepaid pension costs	(163.2)	
Other	21.8	
Net cash provided by operating activities	<u>2,759.4</u>	\$ 2,759.4
<b>Cash flows from investing activities</b>		
Collections of notes receivable	\$ 10,335.3	
Proceeds from sales of financing receivables	141.4	
Proceeds from maturities and sales of marketable securities	2,458.5	
Proceeds from sales of equipment on operating leases	355.2	
Cost of notes receivable acquired	(11,388.3)	
Purchases of marketable securities	(2,251.6)	
Purchases of property, plant, and equipment	(1,022.5)	
Cost of equipment on operating leases acquired	(461.7)	
Other	(99.6)	
Net cash used by investing activities	<u>(1,933.3)</u>	(1,933.3)
<b>Cash flows from financing activities</b>		
Increase in short-term borrowings	\$ 99.4	
Proceeds from long-term borrowings	4,283.9	
Payments of long-term borrowings	(3,136.5)	
Proceeds from issuance of common stock	285.7	
Repurchases of common stock	(1,517.8)	
Dividends paid	(386.7)	
Other	91.0	
Net cash provided by (used for) financing activities	<u>(281.0)</u>	(281.0)
Effect of exchange rate changes on cash and cash equivalents		46.0
Net increase (decrease) in cash and cash equivalents		<u>\$ 591.1</u>
Cash and cash equivalents at beginning of year		1,687.5
Cash and cash equivalents at end of year		<u>\$ 2,278.6</u>

\* The statement of cash flow information was taken from the annual report of Deere and Company and has been summarized and reformatted by the authors.

affect cash (e.g., depreciation and gains/losses on sales of assets) and (2) adjust accrual-basis revenues and expenses to cash receipts and cash payments. The changes in the related current asset and current liability accounts contain the information necessary to make the adjustments to revenue and expense accounts. Approximately 99 percent of U.S. companies use the indirect method as shown in Exhibit 11-6.

Generally, companies prefer the indirect method because it is easier and less costly to prepare and focuses on the *differences* between net income and net cash flow from operating activities rather than the individual cash flows.

**ETHICS** By highlighting the differences between cash flows and net income, financial statement users may be able to more easily see attempts at earnings management. If managers try to manage earnings by manipulating the accrual accounting process (e.g., increase revenues or decrease expenses on the income statement to increase income), these actions will often have no cash flow effect but instead reveal themselves by changes in the accrual-basis accounts. When there are growing differences between cash flow from operations and net income, the indirect method allows users to examine the changes in the accrual accounts to judge the cause of these differences. ♦

In the **direct method**, cash inflows and cash outflows are listed for each type of operating activity that a company performs. These cash flows are generally computed by adjusting *each item* on the income statement by the changes in the related current asset or liability accounts. Typical cash flow categories reported are cash collected from customers, cash paid to suppliers, cash paid to employees, cash paid for interest, and cash paid for taxes. The cash inflows are then subtracted from the cash outflows to determine the net cash flow from operating activities. If the direct method is used, companies must also provide a supplementary schedule that shows the reconciliation of net income with net cash flow from operating activities. The FASB prefers the use of the direct method because it is more consistent with the purpose of the statement of cash flows, but it is not widely used.

We will illustrate the preparation of cash flows from operating activities for Brooke Sportswear using the more popular indirect method. The direct method is illustrated in Appendix 11A. However, remember two important points.

- Cash flow from operating activities is the same under either method.
- The indirect and direct methods only apply to the operating activities section of the statement of cash flows. The investing and financing sections will be prepared the same way regardless of which method is used to prepare the operating activities section.

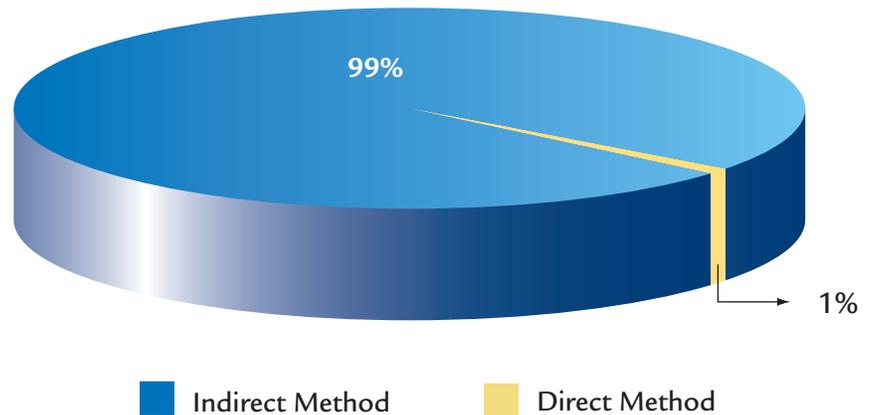
The income statement and comparative balance sheets for Brooke Sportswear are shown in Exhibit 11-7.

## Indirect Method

Because income statements are prepared on an accrual basis, the revenues and expenses recognized on the income statement are not necessarily the same as the cash receipts and cash payments for a period. For example, revenues may include credit sales for which the company has not collected cash and exclude collections of cash from credit sales made in a previous period. Similarly, expenses may have been incurred for which no cash has been paid or cash may have been paid related to

Exhibit 11-6

### Use of the Indirect and Direct Methods



Source: Accounting Trends and Techniques, 2007.

## Exhibit 11-7

## Financial Statements for Brooke Sportswear

Brooke Sportswear Balance Sheets December 31, 2009 and 2008			Brooke Sportswear Income Statement For the Year Ended December 31, 2009	
ASSETS	2009	2008		
Current assets:			Sales revenue	\$ 472,000
Cash	\$ 15,000	\$ 13,000	Less: Cost of goods sold	<u>232,000</u>
Accounts receivable	53,000	46,000	Gross margin	\$ 240,000
Prepaid insurance	1,000	2,000	Less operating expenses:	
Inventory	<u>63,000</u>	<u>51,000</u>	Wages expense	(142,000)
Total current assets	\$ 132,000	\$ 112,000	Insurance expense	(15,000)
Property, plant, and equipment:			Depreciation expense	<u>(40,000)</u>
Land	325,000	325,000	Income from operations	\$ 43,000
Equipment	243,000	210,000	Other income and expenses:	
Accumulated depreciation	(178,000)	(150,000)	Loss on sale of equipment	(6,000)
Investments	<u>53,000</u>	<u>41,000</u>	Gain on sale of investment	15,000
Total assets	<u>\$ 575,000</u>	<u>\$ 538,000</u>	Interest expense	<u>(5,000)</u>
			Income before taxes	\$ 47,000
			Less: Income tax expense	<u>8,000</u>
			Net income	<u>\$ 39,000</u>
<b>LIABILITIES AND EQUITY</b>				
Current liabilities:				
Accounts payable	\$ 13,000	\$ 17,000		
Wages payable	3,500	2,000		
Interest payable	1,500	1,000		
Income taxes payable	<u>3,000</u>	<u>6,000</u>		
Total current liabilities	\$ 21,000	\$ 26,000		
Long-term liabilities:				
Notes payable	<u>109,000</u>	<u>115,000</u>		
Total liabilities	<u>\$ 130,000</u>	<u>\$ 141,000</u>		
Equity:				
Common stock	\$ 165,000	\$ 151,000		
Retained earnings	<u>280,000</u>	<u>246,000</u>		
Total stockholders' equity	<u>\$ 445,000</u>	<u>\$ 397,000</u>		
Total liabilities and equity	<u>\$ 575,000</u>	<u>\$ 538,000</u>		

**Additional Information:**

- Equipment with a cost of \$20,000 and accumulated depreciation of \$12,000 was sold for \$2,000 cash. Equipment was purchased for \$53,000 cash.
- Long-term investments with a cost of \$16,000 were sold for \$31,000 cash. Additional investments were purchased for \$28,000 cash.
- Notes payable in the amount of \$35,000 were repaid, and new notes payable in the amount of \$29,000 were issued for cash.
- Common stock was issued for \$14,000 cash.
- Cash dividends of \$5,000 were paid (obtained from the statement of retained earnings).

expenses incurred in a previous period. Therefore, net income must be adjusted for these timing differences between the recognition of net income and the receipt or payment of cash.

Under the indirect method, four types of adjustments must be made to net income to adjust it to net cash flow from operating activities. These adjustments and the computation of net cash flow from operating activities are illustrated in **Cornerstone 11-3**.

## HOW TO Calculate Net Cash Flow from Operating Activities: Indirect Method

### Concept:

Four types of adjustments are needed to calculate net cash flow from operating activities:

1. Add to net income any noncash expenses and subtract from net income any noncash revenues.
2. Add to net income any losses and subtract from net income any gains.
3. Add to net income any decreases in current assets or increases in current liabilities that are related to operating activities.
4. Subtract from net income any increases in current assets and decreases in current liabilities that are related to operating activities.

### Information:

Refer to the income statement and the current assets and current liabilities sections of Brooke Sportswear's balance sheets found in Exhibit 11-7 (page 568).

### Required:

Compute the net cash flow from operating activities using the indirect method.

### Solution:

Net income		\$39,000
Adjustments to reconcile net income to net cash flow from operating activities:*		
Depreciation expense	\$ 40,000	
Loss of sale of equipment	6,000	
Gain on sale of long-term investment	(15,000)	
Increase in accounts receivable	(7,000)	
Decrease in prepaid insurance	1,000	
Increase in inventory	(12,000)	
Decrease in accounts payable	(4,000)	
Increase in wages payable	1,500	
Increase in interest payable	500	
Decrease in income taxes payable	(3,000)	
Net cash provided by operating activities		<u>8,000</u> <u>\$47,000</u>

\* The explanation of these adjustments is given in the text of this section.



## CORNERSTONE 11-3



The adjustments made in Cornerstone 11-3 are explained below.

**Adjustment of Noncash Revenues and Expenses** The income statement often includes various noncash items such as depreciation expense, amortization expense, and bad debt expense. Noncash expenses reduce net income but they do not reduce cash. Therefore, under the indirect method **noncash expenses are added back to net income**. Similarly, noncash revenues increase income but do not increase cash. Under the indirect method, **noncash revenues are subtracted from net income**.

**Adjustment of Gains and Losses** The sale of a long-term asset or the extinguishment of a long-term liability often produces either a gain or loss that is reported on the income statement. However, the gain or loss does not affect cash flow and should, therefore, not be included as an operating activity. Furthermore, the gain or loss does not reveal the total amount of cash received or paid. Instead, it only

gives the amount received or paid in excess of the book value of the asset or liability. The correct procedure is to eliminate the gain or loss from net income and record the full amount of the cash flow as either an investing activity or a financing activity. Because gains increase net income, under the indirect method, **gains are subtracted from net income.**

Because losses decrease net income, under the indirect method, **losses are added back to net income.**

### Adjustments for Changes in Current Assets and Current Liabilities

As discussed earlier in the chapter, all cash receipts or cash payments are reflected by changes in the balance sheet accounts. Generally, current assets and liabilities are related to the operating activities of a company, and changes in these accounts cause a difference between net income and cash flows from operating activities. Based on the earlier analysis of the balance sheet accounts, two general rules emerge:

- **Increases in current assets and decreases in current liabilities are subtracted from net income.**
- **Decreases in current assets and increases in current liabilities are added to net income.**

To see the logic of these two rules, we will examine the specific changes experienced by Brooke Sportswear.

**Accounts Receivable** The accounts receivable account increases when credit sales are recorded and decreases when cash is collected from customers.

Accounts Receivable			
Beginning balance	46,000		
Credit sales	xxx	xxx	Cash collections
Balance, 12/31/2009	53,000		

The increase of accounts receivable implies that credit sales were \$7,000 greater than the cash collected from customers. Notice that this is consistent with the results of our earlier analysis indicating that increases in noncash assets are related to decreases in cash. Because cash collections were less than the sales reported on in the income statement, the company

would need to subtract the increase in accounts receivable from net income when computing net cash flow from operating activities. (A decrease in accounts receivable would be added to net income when computing net cash flow from operating activities).

**Prepaid Insurance** The prepaid insurance account increases when cash prepayments are made and decreases when expenses are incurred.

Prepaid Insurance			
Balance, 1/1/2009	2,000		
Cash prepayments	xxx	xxx	Expense incurred
Balance, 12/31/2009	1,000		

The decrease in prepaid insurance indicates that expenses recorded on the income statement were \$1,000 higher than the cash payments. Because more expenses were incurred than were paid in cash, the company actually has more cash available at the end of the period than at the beginning of the period (because less cash was paid). This is consistent with the results of

our earlier analysis indicating that decreases in noncash assets are related to increases in cash. Therefore, the decrease in the prepaid insurance account needs to be added to net income when computing net cash flow from operating activities. (Increases in prepaid insurance would be subtracted from net income.)

**Inventory** The inventory account increases when inventory is purchased and decreases as inventory is sold.

Inventory			
Balance, 1/1/2009	51,000		
Purchases	xxx	xxx	Cost of goods sold
Balance, 12/31/2009	63,000		

The increase in inventory implies that purchases of inventory exceeded the cost of the inventory sold reported on the income statement by \$12,000. Therefore, the company made “extra” cash purchases

that were not included in cost of goods sold and subtracted from revenue in determining net income. To adjust net income to net cash flow from operating activities, the increase in the inventory account, which represents the extra cash purchases, needs to be subtracted from net income. (Decreases in inventory would be added to net income)

**Accounts Payable** The accounts payable account increases when purchases are made on credit and decreases when cash payments are made to suppliers.

The decrease in accounts payable indicates that the cash payments to suppliers exceeded the purchases of inventory by \$4,000. Because the purchase of inventory is part of cost of goods sold, this implies that more cash was paid than was reflected in expenses. This is consistent with the results of our earlier analysis indicating that decreases in liabilities are related to decreases in cash. Therefore, the decrease in accounts payable needs to be subtracted from net income when computing the net cash flow from operating activities. (Increases of accounts payable are added to net income.)

Accounts Payable			
		17,000	Balance, 1/1/2009
Cash payments	xxx	xxx	Credit purchases
		13,000	Balance, 12/31/2009

**Wages Payable** The wages payable account increases when wages are accrued (incurred but not yet paid) and decreases when wages are paid.

The increase in wages payable indicates that wages expense recorded on the income statement was greater than the cash paid for wages by \$1,500. Because less cash was paid than expensed, the company actually has more cash available. This is consistent with the results of our earlier analysis indicating that increases in liabilities are related to increases in cash. Therefore, the increase in wages payable is added to net income when computing the net cash flow from operating activities. (Decreases in wages payable are subtracted from net income.)

Wages Payable			
		2,000	Balance, 1/1/2009
Cash payments	xxx	xxx	Wages expense
		3,500	Balance, 12/31/2009

**Interest Payable** Interest payable increases when interest expense is recorded and decreases when interest is paid.

The increase in interest payable implies that interest expense recorded on the income statement was \$500 greater than the cash paid for interest. Therefore, the increase in interest payable is added to net income when computing the net cash flow from operating activities. (Decreases in interest payable are subtracted from net income)

Interest Payable			
		1,000	Balance, 1/1/2009
Cash payments	xxx	xxx	Interest expense
		1,500	Balance, 12/31/2009

**Income Taxes Payable** The income tax payable account increases when income tax expense is incurred and decreases when income taxes are paid.

The decrease in income taxes payable implies that the cash payments for income taxes were \$3,000 greater than the income tax expense reported on the income statement. Therefore, less cash is available at the end of the period and the decrease in income taxes payable is subtracted from net income when computing the net cash flow from operating activities. (Increases in income taxes payable are added to net income.)

Income Taxes Payable			
		6,000	Balance, 1/1/2009
Cash payments	xxx	xxx	Income tax expense
		3,000	Balance, 12/31/2009

## CONCEPT Q&A

Why are there differences between net income and net cash flow from operating activities?

Net income is prepared under the accrual basis of accounting which records business activities when they occur instead of when cash is received or paid. Therefore, all of the adjustments that are made to net income reflect timing differences between the reporting of revenues and expenses and the related inflow or outflow of cash.

Possible Answer:

**OBJECTIVE** 5

Prepare the cash flows from investing activities section of a statement of cash flows.

## Preparing Cash Flows from Investing Activities

The second major section of the statement of cash flows reports the net cash flow from investing activities. Investing activities include buying and selling property, plant, and equipment or other operating assets and purchasing and selling investments in other companies. Investing activities also include lending and collecting the principal amount of loans from borrowers.

Information for preparing the investing activities portion of the statement of cash flows is obtained from the investment and long-term asset accounts. Because all of these accounts are assets, increases that were financed by cash would be treated as outflows of cash. Decreases in the assets that produced cash receipts would be treated as inflows of cash.

Although the beginning and ending balance sheets are useful sources for identifying changes in these accounts, you must refer to any additional data provided to determine the actual amount of investing cash inflows and outflows. For example, a company might purchase land at a cost of \$200,000 and, during the same accounting period, sell land that had a cost of \$145,000. If only the beginning and ending amounts for land are examined, one would erroneously conclude that there had been a single cash outflow of \$55,000 for land, instead of two separate cash flows—a cash outflow of \$200,000 and a cash inflow of \$145,000. The analysis of the general types of investing activities is shown below.

### Analyzing Investing Activities

To analyze investing activities, follow these three basic steps:

Step 1: Recreate the journal entries to describe the activities that took place during the period.

Step 2: Record the cash flows as inflows or outflows of cash in the investing activities section of the statement of cash flows.

Step 3: Enter the information obtained from the financial statements, the additional information, and the recreation of the journal entries into the T-account (or accounts) being analyzed to make sure the account activity has been completely explained.

To illustrate the analysis of the relevant accounts and the recreation of the journal entries, consider the information in Brooke Sportswear’s financial statements found in Exhibit 11-7 (page 568).

**Land** Notice that no change occurred in the land account, nor was any additional information given concerning this account. Therefore, there was no cash flow associated with land for the year.

**Property, Plant, and Equipment** The equipment account is analyzed by examining both the equipment and the related accumulated depreciation account. (For any operating asset that depreciates, you will need to analyze the two related accounts together.) Using the information obtained from the financial statements and the additional information in Exhibit 11-7, you can recreate the activity in the accounts by making the following journal entries.

<b>Assets = Liabilities +</b>	<b>Stockholders’</b>
+2,000	<b>Equity</b>
-12,000	-6,000
-20,000	

<b>Assets = Liabilities +</b>	<b>Stockholders’</b>
+53,000	<b>Equity</b>
-53,000	

<b>Sale of Equipment</b>	Cash	2,000	
	Accumulated Depreciation	12,000	
	Loss on Sale of Equipment	6,000	
	Equipment		20,000
<b>Purchase of Equipment</b>	Equipment	53,000	
	Cash		53,000

Notice that there are only two cash flows related to investing activities—a \$2,000 cash flow associated with the disposal of equipment and a \$53,000 cash flow associated with the purchase of equipment. The loss on the sale of equipment does not involve cash and is included as an adjustment in the operating section of the statement

of cash flows. The analysis performed above is used to reconcile the change in the equipment and accumulated depreciation accounts as shown in the following T-accounts.

Equipment			
Beg. bal.	\$210,000		
Purchase	53,000	20,000	Disposal
End. bal.	243,000		

Accumulated Depreciation			
		150,000	Beg. bal.
Disposal	\$12,000	40,000	Dep. exp.
		178,000	End. bal.
		178,000	End. bal.

**Investments** The investment account is analyzed by recreating the activity in the investment account. Using the information obtained from the financial statements and the additional information in Exhibit 11-7, you can recreate the activity in the investment account by making the following journal entries.

<b>Sale of Investment</b>	Cash	31,000	
	Investment		16,000
	Gain on Sale of Investment		15,000
<b>Purchase of Investment</b>	Investment	28,000	
	Cash		28,000

Assets	= Liabilities +	Stockholders' Equity
+31,000		+15,000
-16,000		

Assets	= Liabilities +	Stockholders' Equity
+28,000		+15,000
-28,000		

Again, notice that two cash flows were related to investing activities—a \$31,000 inflow of cash related to the sale of an investment and a \$28,000 outflow of cash related to the purchase of an investment. The gain is on the sale of the investment does not involve cash and is included as an adjustment in the operating section of the statement of cash flows. The analysis performed above is used to reconcile the change in the investment account as shown in the following T-account.

Investment			
Beg. bal.	41,000		
Purchase	28,000	16,000	Disposal
		53,000	End. bal.

**Cornerstone 11-4** shows how to compute the investing activities section of the statement of cash flows for Brooke Sportswear.

## HOW TO Calculate Net Cash Flow from Investing Activities

### Concept:

The cash flow effects of changes in long-term assets and investments are reported as investing cash flows.

### Information:

Refer to the income statement, the long-term assets sections of Brooke Sportswear's balance sheets, and the first two items of additional information found in Exhibit 11-7 (page 568).

### Required:

Compute the net cash flow from investing activities.

### Solution:

Cash flows from investing activities:	
Cash received from sale of equipment	\$ 2,000
Purchase of equipment	(53,000)
Cash received from sale of investments	31,000
Purchase of investments	(28,000)
Net cash used for investing activities	<u>\$(48,000)</u>



## CORNERSTONE 11-4



**OBJECTIVE** > **6**

Prepare the cash flows from financing activities section of a statement of cash flows.

## Preparing Cash Flows from Financing Activities

The intent of the financing activities section of the statement of cash flows is to identify cash inflows and outflows of cash arising from business activities that either produced capital (long-term debt or equity) for the company or repaid capital supplied to the company. Financing activities include borrowing and repayment of the principal amount of the borrowing (remember that interest expense is classified as an operating cash flow), sale of common or preferred stock, payment of cash dividends, and the purchase and sale of treasury stock.

Information for preparing the financing activities portion of the statement of cash flows is obtained from the long-term debt and equity accounts. Because all of these accounts are liabilities and equity, increases in these accounts suggest that cash has been received and decreases suggest that cash has been paid. (Because treasury stock is a contra-equity account, increases indicate cash outflows and decreases indicate cash inflows).

### Analyzing Financing Activities

To analyze financing activities, the same basic steps used to analyze investing activities are followed:

Step 1: Recreate the journal entries to describe the activities that took place during the period.

Step 2: Record the cash flows as inflows or outflows of cash in the financing activities section of the statement of cash flows.

Step 3: Enter the information obtained from the financial statements, the additional information, and the recreation of the journal entries into the T-account (or accounts) being analyzed to make sure the account activity has been completely explained.

To illustrate the analysis of the relevant accounts and the recreation of the journal entries, consider the information in Brooke Sportswear’s balance sheet found in Exhibit 11-7 (page 568).

**Notes Payable** The notes payable account is analyzed by recreating the activity in the notes payable account. Using information obtained from the financial statements and the additional information in Exhibit 11-7, you can recreate the activity in the investment account by making the following journal entries.

<b>Assets = Liabilities + Stockholders' Equity</b> -35,000    -35,000
<b>Assets = Liabilities + Stockholders' Equity</b> +29,000    +29,000

<b>Repayment of Principal</b>	Note Payable	35,000	
	Cash		35,000
<b>Issuance of Note</b>	Cash	29,000	
	Note Payable		29,000

Notice that there are two cash flows related to investing activities—a \$35,000 cash outflow associated with the repayment of principal and a \$29,000 cash inflow associated with issuing the note. The payment of interest is considered an operating activity and is not relevant to this analysis. The analysis performed above is used to reconcile the change in the note payable account as shown in the following T-account.

Notes Payable			
		115,000	Beg. bal.
Repaid principal	35,000	29,000	Issued note
		109,000	End. bal.

**Common Stock** The common stock account is analyzed by recreating the activity in the common stock account. Using information obtained from the financial

statements and the additional information in Exhibit 11-7, you can recreate activity in the common stock account by making the following journal entry:

<b>Issuance of stock</b>	Cash	14,000	
	Common Stock		14,000

<b>Assets = Liabilities +</b>	<b>Stockholders' Equity</b>
+14,000	+14,000

One cash inflow (\$14,000) has caused the change in common stock. The credit entry to the common stock account is used to reconcile the change in the common stock account as shown in the following T-account.

Common Stock			
		151,000	Beg. bal.
Retired stock	0	14,000	Issued stock
		165,000	End. bal.

**Retained Earnings** Retained earnings must be analyzed by recreating the activity in the retained earnings account. Retained earnings increases with net income (decreases with a net loss) and decreases due to the payment of cash dividends<sup>1</sup> as follows:

<b>Payment of dividends</b>	Retained Earnings	5,000	
	Cash		5,000

<b>Assets = Liabilities +</b>	<b>Stockholders' Equity</b>
-5,000	-5,000

One cash flow, the payment of dividends, is a financing activity. Net income does not affect net cash flow from financing activities because it is considered an operating activity (See Cornerstone 11-3). The following T-account summarizes the activity in the retained earnings account.

Retained Earnings			
		246,000	Beg. bal.
Dividends	5,000	39,000	Net income
		280,000	End. bal.

**Cornerstone 11-5** shows how to compute the financing activities section of the statement of cash flows for Brooke Sportswear.

## HOW TO Calculate Net Cash Flow from Financing Activities

### Concept:

The cash flow effects of changes in long-term liabilities and equity are reported as financing cash flows.

### Information:

Refer to the income statement, long-term assets, liabilities and equity sections of Brooke Sportswear's balance sheet, and items three through five of additional information found in Exhibit 11-7 (page 568).

### Required:

Compute the net cash flow from financing activities.

### Solution:

Cash flows from financing activities:	
Cash paid to retire principal on note payable	\$(35,000)
Cash received from issuing note payable	29,000
Cash received from issuance of common stock	14,000
Cash paid for dividends	(5,000)
Net cash provided by financing activities	<u>\$ 3,000</u>



## CORNERSTONE 11-5



<sup>1</sup> Dividends declared but not paid also reduce retained earnings but are classified as a noncash activity.

Combining Cornerstones 11-3 through 11-5, a complete statement of cash flows is presented in Exhibit 11-8. This exhibit presents cash flows from operating activities using the indirect method. Notice that the statement of cash flows explains the change in cash shown on the balance sheet of Brooke Sportswear in Exhibit 11-7 (page 568).

**Exhibit 11-8**
**Statement of Cash Flows for Brooke Sportswear**

<b>Brooke Sportswear</b>		
<b>Statement of Cash Flows</b>		
<b>For the Year Ended December 31, 2009</b>		
<b>Cash flows from operating activities</b>		
Net income	\$ 39,000	
Adjustments to reconcile net income to net cash flow from operating activities:		
Depreciation expense	40,000	
Loss of sale of equipment	6,000	
Gain on sale of long-term investment	(15,000)	
Increase in accounts receivable	(7,000)	
Decrease in prepaid insurance	1,000	
Increase in inventory	(12,000)	
Decrease in accounts payable	(4,000)	
Increase in wages payable	1,500	
Increase in interest payable	500	
Decrease in income taxes payable	(3,000)	
Net cash provided by operating activities		\$ 47,000
<b>Cash flows from investing activities</b>		
Cash received from sale of equipment	\$ 2,000	
Purchase of equipment	(53,000)	
Cash received from sale of investments	31,000	
Purchase of investments	(28,000)	
Net cash used for investing activities		(48,000)
<b>Cash flows from financing activities</b>		
Cash paid to retire principal on note payable	\$(35,000)	
Cash received from issuing note payable	29,000	
Cash received from issuance of common stock	14,000	
Cash paid for dividends	(5,000)	
Net cash provided by financing activities		3,000
Net change in cash		\$ 2,000
Cash and cash equivalents, 1/1/2009		13,000
Cash and cash equivalents, 12/31/2009		<u>\$ 15,000</u>

**OBJECTIVE** > **7**

Analyze information contained in the statement of cash flows.

## Using the Statement of Cash Flows

Effective analysis of the statement of cash flows requires (1) an examination of the statement of cash flows itself, (2) a comparison of the information on the current statement of cash flows with earlier statements, and (3) a comparison of the information in the current statement of cash flows with information from other companies' statements of cash flow. In this section, we will discuss each of these analyses, beginning with the examination of the statement of cash flows itself.

A number of insights can be gained by inspecting the current period's statement of cash flows. One of the most important is an estimate of how long it will take to recover the cash outflow associated with long-term uses of cash (e.g., purchase of property, plant, and equipment) or permanent uses of cash (e.g., payment of dividends or repayment of debt). Investments in property, plant, and equipment are likely to require several years of successful operation by the company before the investment

is completely recovered through the sale of goods or services. Therefore, prudent managers will seek long-term or permanent sources of cash, such as long-term debt or equity, which will not need to be repaid before the original investment has been recovered through profitable operations.

The sources most frequently used to provide permanent or long-term cash inflows are operations, the sale of long-term debt, and the sale of stock. Of these three, operations is generally considered the least risky, or the most controllable. The sale of debt or equity requires that investors or creditors make sizable commitments to the firm. Although cash inflows from operations also require that an outsider (the customer) make a commitment, the size and timing of a customer's cash commitments are more flexible. Thus, it is more likely that the company can produce cash inflows from customers on a regular basis. For this reason, most companies attempt to secure a sizable portion of their total cash inflows from operations. Generally, analysts view cash flows from operations as the most important section of the statement of cash flows because, in the long-run, this will be a company's source of cash used to provide a return to investors and creditors.

Because the cost of selling large debt or equity issues in the public capital markets is high, most large companies sell debt or equity in relatively large amounts. They also make smaller long-term or short-term borrowings directly from banks, insurance companies, and other financial intermediaries. Many businesses arrange a "preapproved" line of credit that can be used, up to some limit, for borrowing whenever cash is needed. Sales of small amounts of stock to employees through stock option and stock bonus plans also help increase cash inflows.

An analysis of the statement of cash flows also requires a comparison of the company's current statement of cash flows with earlier statements of cash flow. When a series of statements are examined, the analysis should focus on a period of several consecutive years in order to determine trends in cash inflows and cash outflows. The following questions may be helpful in beginning the analysis of a series of cash flow statements:

1. What proportions of cash have come from operating, financing, and investing activities?
2. Are there discernible trends in these proportions?
3. What proportions of long-term uses of cash are financed by long-term sources of cash?
4. How has the company financed any permanent increases in current assets?
5. Has the company begun any investment programs that are likely to require significant cash outflows in the future?
6. What are the probable sources for the cash inflows the company will need in the near future?
7. Are these sources likely to be both able and willing to provide the cash that is needed?
8. If the company is unable to secure all the cash it needs, could cash outflows be restricted to the available supply of cash without seriously affecting operations?

Financial statement users will rely on summary cash flow measures to help them make these assessments. Two such measures are a company's free cash flow and its cash flow adequacy ratio. A company's **free cash flow** represents the cash flow that a company is able to generate after considering the maintenance or expansion of its assets (capital expenditures) and the payment of dividends. Free cash flow is computed as:

$$\text{Free Cash Flow} = \text{Net Cash Flow from Operating Activities} - \text{Capital Expenditures} - \text{Cash Dividends}$$

Having positive free cash flow allows a company to pursue profit-generating opportunities. However, negative free cash flow is not necessarily a bad thing. For example, a company making large investments in productive assets (large capital expenditures) may show negative free cash flow. If these investments provide a high rate of return, this strategy will be good for the company in the long run.

A second useful measure is the **cash flow adequacy ratio**. The cash flow adequacy ratio provides a measure of the company's ability to meet its debt obligations and is calculated as:

$$\text{Cash Flow Adequacy} = \frac{\text{Free Cash Flow}}{\text{Average Amount of Debt Maturing over the Next Five Years}}$$

Cornerstone 11-6 illustrates how to compute these ratios for John Deere.



## CORNERSTONE 11-6



### HOW TO Compute Free Cash Flow and Cash Flow Adequacy

#### Concept:

Cash flow measures can be used to help assess a company's ability to expand its operations, meet its obligations, obtain financing, and pay dividends.

#### Information:

In its October 31, 2007, annual report, John Deere reported net cash provided by operating activities of \$2,759,400,000, capital expenditures of \$1,022,500,000, dividends of \$386,700,000, and average maturities of long-term debt over the next five years of \$2,663,600,000.

#### Required:

1. Compute John Deere's free cash flow for 2007.
2. Compute John Deere's cash flow adequacy ratio for 2007.

#### Solution:

1. John Deere's free cash flow of \$1,350,200,000 is computed as:

$$\begin{aligned} \text{Free Cash Flow} &= \text{Net Cash Flow from Operating Activities} - \text{Capital Expenditures} - \text{Cash Dividends} \\ &= \$2,759,400,000 - \$1,022,500,000 - \$386,700,000 \\ &= \underline{\underline{\$1,350,200,000}} \end{aligned}$$

Having approximately \$1.3 billion in free cash flow indicates that John Deere has the financial flexibility necessary to take advantage of profit-generating opportunities and internally finance its expansion needs.

2. With a cash flow adequacy ratio of 0.51 (computed below), John Deere appears to be able to meet its debt obligations over the next five years.

$$\begin{aligned} \text{Cash Flow Adequacy} &= \frac{\text{Free Cash Flow}}{\text{Average Amount of Debt Maturing over the Next Five Years}} \\ &= \frac{\$1,350,200,000}{\$2,663,600,000} \\ &= \underline{\underline{0.51}} \end{aligned}$$

Finally, the analysis of the statement of cash flows requires comparing information from similar companies. Such comparisons provide good reference points, because similar companies generally secure cash from similar sources and are likely to spend cash for similar activities. Comparative analysis can reveal significant deviations in (1) the amounts of cash inflows, (2) the source of those inflows, and (3) the types of activities to which cash is applied. When significant differences are found among similar companies, an explanation should be sought in the other financial statements, in the notes accompanying the statements, or from management.

## DECISION-MAKING & ANALYSIS

### Analyzing Cash Flows over Time

Slater Toy Company operates retail toy stores in major metropolitan areas in the United States, Canada, and Europe. Summarized cash flow information for the six-year period, 2004–2009 is as follows:

<b>Slater Toy Company Summarized Cash Flow Data For the Years Ended (in thousands)</b>						
	12/31/09	12/31/08	12/31/07	12/31/06	12/31/05	12/31/04
<b>Cash flows from operating activities</b>						
Net earnings	\$ 437,524	\$ 339,529	\$ 325,988	\$ 321,080	\$ 268,024	\$ 203,922
Adjustments:						
Depreciation	119,034	100,701	79,093	65,839	54,564	43,716
Receivables	(5,307)	9,092	(20,072)	14,932	(5,886)	(24,642)
Inventory	(108,066)	(115,436)	(44,775)	(299,274)	(158,287)	(243,894)
Payables	112,232	462,152	(40,130)	92,316	158,802	144,364
Other	9,149	45,090	(21,622)	6,181	11,097	10,206
Net cash from operations	<u>\$ 564,566</u>	<u>\$ 841,128</u>	<u>\$ 278,482</u>	<u>\$ 201,074</u>	<u>\$ 328,314</u>	<u>\$ 133,672</u>
<b>Cash flows from investing activities</b>						
Capital expenditures, net	\$(421,564)	\$(548,538)	\$(485,269)	\$(371,851)	\$(327,010)	\$(314,827)
Other	(22,175)	(17,110)	—	(5,114)	4,463	15,137
Cash used for investment	<u>\$(443,739)</u>	<u>\$(565,648)</u>	<u>\$(485,269)</u>	<u>\$(376,965)</u>	<u>\$(322,547)</u>	<u>\$(299,690)</u>
<b>Cash flows from financing activities</b>						
Short-term borrowing, net	\$(170,887)	\$ (94,811)	\$ 180,957	\$ 129,380	\$ 58,476	\$ 17,663
Long-term borrowing	318,035	197,802	33,152	-0-	693	96,611
Repayment of debt	(7,926)	(1,590)	(10,864)	(1,199)	(3,899)	(1,860)
Sale of stock	86,323	32,707	30,344	19,861	52,429	15,221
Purchase of treasury stock	(27,244)	—	(32,692)	(54,168)	(36,550)	-0-
Cash flow from financing	<u>\$ 198,301</u>	<u>\$ 134,108</u>	<u>\$ 200,897</u>	<u>\$ 93,874</u>	<u>\$ 71,149</u>	<u>\$ 127,635</u>
Increase (decrease) in cash	<u>\$ 319,128</u>	<u>\$ 409,588</u>	<u>\$ (5,890)</u>	<u>\$ (82,017)</u>	<u>\$ 76,916</u>	<u>\$ (38,383)</u>
Beginning of year	444,593	35,005	40,895	122,912	45,996	84,379
End of year	<u>\$ 763,721</u>	<u>\$ 444,593</u>	<u>\$ 35,005</u>	<u>\$ 40,895</u>	<u>\$ 122,912</u>	<u>\$ 45,996</u>

This annual information on cash flows may be further summarized as inflows and outflows. Over the six-year period, Slater secured cash and applied cash in the amounts and proportions that follow:

	Total Six-Year Amount*	Percentage of Total Inflows or Outflows
Inflows of cash:		
Operations	\$2,347,236	64.6
Long-term and short-term borrowing	1,032,769	28.4
Sale of stock	236,885	6.5
Other inflows	19,600	0.5
Total inflows	<u>\$3,636,490</u>	<u>100.0</u>
Outflows of cash:		
Repayment of short and long-term borrowing	\$ 293,036	9.9
Investment in property	2,469,059	83.5
Purchase of treasury stock	150,654	5.1
Other outflows	44,399	1.5
Total outflows	<u>\$2,957,148</u>	<u>100.0</u>
Excess of outflows over inflows	<u>\$ 679,342</u>	

\* Amounts in thousands.

(Continued)

Using this six-year summary and the annual statements of cash flows, we examine the following issues:

1. *What cash sources has Slater employed?*

Operating activities have been the most significant source of cash over this six-year period. Operating activities account for 64.6 percent of total cash inflows. Long-term borrowing and the sale of equity have also produced sizable cash inflows.

2. *What have been the major uses of cash?*

Investment in property has been by far the largest use of cash. Cash has also been used to repay short and long-term borrowings and to purchase treasury stock.

3. *Has Slater matched the time commitments of its cash inflows and outflows?*

The company appears to have matched the time commitment of inflows and outflows adequately. Nearly all the outflows have been for investments in property, a long-term use of cash. Inflows (primarily from operations, long-term borrowing, and the sale of stock) are sources of cash that will be invested in the firm permanently or for the long-term.

4. *Are debt and equity likely to be available as sources of cash in the near future?*

During the six-year period, operations have provided 64.6 percent of the cash inflows. Although Slater has borrowed and sold equity, those two sources have not been overused, and should continue to provide 30 percent or more of the firm's total cash needs. Another important factor in a firm's ability to secure cash from creditors is profitability. Slater has been highly profitable, so one would expect that potential investors and creditors would continue to invest cash in the firm.

5. *What are the trends in inflows and outflows?*

The annual cash inflow from operating activities has grown over the six-year period, although not in every year. In several years, the cash flow from operating activities has been less than the year before due to an increase in inventories. The proportion of cash provided by financing activities has also varied from year to year, generally rising when cash flows from operations have fallen. The investment in property has increased every year until the most recent year, indicating a strong commitment to growth.

6. *What projections would you make regarding inflows and outflows in the near future?*

So long as operations continue to provide a substantial portion of the cash needed for investment in property, Slater is likely to continue to grow. Should profitability decline, however, the company may find it difficult to secure cash from creditors and investors. If cash should become scarce, Slater may have to postpone its expansion into new markets. However, it does appear that Slater has invested wisely and has operated efficiently. Therefore, one would expect that it will continue to be profitable.

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## Summary of Learning Objectives

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**LO1. Explain the purpose of a statement of cash flows.**

- The statement of cash flows is one of the primary financial statements whose purpose is to provide information about a company's cash receipts (inflows of cash) and cash payments (outflows of cash) during an accounting period.
- The statement of cash flows is complementary to the information contained in the income statement and the balance sheet and is critical to understanding and analyzing a company's operations.

**LO2. Identify and classify business activities that produce cash inflows and outflows.**

- The statement of cash flows is divided into three main sections based on the fundamental business activities that a company engages in during a period:
  - cash flows from operating activities which encompass the cash inflows and outflows that relate to the determination of net income;
  - cash flows from investing activities which are related to acquisitions and disposals of long-term assets and investments; and
  - cash flows from financing activities which are related to the external financing of the company (debt or equity).

- Some business activities take place without affecting cash and are referred to as noncash investing and financing activities.

**LO3. Understand the relationship between changes in cash and the changes in the balance sheet accounts.**

- Because of timing issues between the recognition of revenues and expenses and the inflows and outflows of cash, information about a company's cash flows can be obtained by examining the changes in the balance sheet account balances over a period.
- Increases in cash result from increases in liabilities, increases in stockholders' equity, and decreases in noncash assets.
- Decreases in cash result from decreases in liabilities, decreases in stockholders' equity, and increases in noncash assets.

**LO4. Prepare the cash flows from operating activities section of a statement of cash flows using the indirect method.**

- The indirect method for reporting cash flows from operating activities begins with net income and adjusts it for noncash items to produce net cash flow from operating activities.
- The adjustments to net income are necessary to eliminate income statement items that do not affect cash and to adjust accrual-basis revenues and expenses to cash receipts and cash payments.
- Four types of adjustments are necessary:
  - add to net income any noncash expenses and subtract from net income any noncash revenues;
  - add to net income any losses and subtract from net income any gains;
  - add to net income any decreases in current assets or increases in current liabilities that are related to operating activities; and
  - subtract from net income any increases in current assets and decreases in current liabilities that are related to operating activities.

**LO5. Prepare the cash flows from investing activities section of a statement of cash flows.**

- The cash flows from the investing activities section report the net cash flow related to buying and selling property, plant, and equipment or other operating assets, purchasing and selling investments in other companies and lending and collecting the principal amount of loans from borrowers.
- The preparation of the investing activities section of a statement of cash flows involves a careful analysis of the information in the financial statements as well as a recreation of the journal entries that describe the activities that took place during a period.

**LO6. Prepare the cash flows from financing activities section of a statement of cash flows.**

- The cash flows from the financing activities section report the net cash flow related to the borrowing and repayment of the principal amount of long-term debt, the sale of common or preferred stock, the payment of dividends, and the purchase and sale of treasury stock.
- The preparation of the financing activities section of a statement of cash flows involves a careful analysis of the information in the financial statements as well as a recreation of the journal entries that describe the activities that took place during a period.

**LO7. Analyze information contained in the statement of cash flows.**

- Effective analysis of the statement of cash flows requires an examination of the statement of cash flows itself, a comparison of the information on the current statement of cash flows with earlier statements, and a comparison of the information in the current statement of cash flows with information from other companies' statements of cash flow.

- Financial statement users may also rely on summary cash flow measures such as free cash flow (the cash flow that a company is able to generate after considering the maintenance or expansion of its assets) and the cash flow adequacy ratio (a measure of a company's ability to meet its debt obligations).



## CORNERSTONES FOR CHAPTER 11

- CORNERSTONE 11-1** How to classify business activities, page 559
- CORNERSTONE 11-2** How to classify changes in balance sheet accounts, page 563
- CORNERSTONE 11-3** How to calculate net cash flow from operating activities: indirect method, page 569
- CORNERSTONE 11-4** How to calculate net cash flow from investing activities, page 573
- CORNERSTONE 11-5** How to calculate net cash flow from financing activities, page 575
- CORNERSTONE 11-6** How to compute free cash flow and cash flow adequacy, page 578

## Key Terms

Cash equivalents, 557	Free cash flow, 577
Cash flow adequacy ratio, 578	Indirect method, 565
Cash flows from financing activities, 558	Noncash investing and financing activities, 559
Cash flows from investing activities, 558	Statement of cash flows, 556
Cash flows from operating activities, 557	
Direct method, 567	

### OBJECTIVE > 8

Prepare the cash flows from operating activities section of a statement of cash flows using the direct method.

## Appendix 11A: The Direct Method

In the direct method of computing net cash flow from operating activities, inflows and outflows of cash are listed for each type of operating activity that a company performs. This involves adjusting *each item* on the income statement by the changes in the related current asset or liability accounts. Typical operating cash flows and the adjustments necessary to compute them are given below.

**Cash Collected from Customers** Sales revenue includes both cash sales and credit sales. When all sales are for cash, the cash collected from customers equals sales. However, when credit sales are made, the amount of cash that was collected during a period must be determined by analyzing the sales and accounts receivable accounts. The accounts receivable account increases when credit sales are recorded and decreases when cash is collected from customers.

Accounts Receivable	
Beg. balance	
Credit sales	Cash collections from customers
End. balance	

Therefore, to compute cash collections from customers, sales must be adjusted as follows:

$$\text{Cash Collected from Customers} = \text{Sales} \begin{cases} + \text{Decrease in Accounts Receivable} \\ - \text{Increase in Accounts Receivable} \end{cases}$$

**Other Cash Collections** If other revenues exist (e.g., interest or rent), similar adjustments are made to determine the cash collections. For example, interest revenue is adjusted for any change in interest receivable as follows:

$$\text{Cash Collected for Interest} = \text{Interest Revenue} \begin{cases} + \text{Decrease in Interest Receivable} \\ - \text{Increase in Interest Receivable} \end{cases}$$

**Cash Paid to Suppliers** A company pays its suppliers for inventory which it later sells to customers, as represented by cost of goods sold. These purchases of inventory from suppliers may be either cash purchases or credit purchases, reflected as accounts payable. To compute cash paid to suppliers it is necessary to analyze two accounts—inventory and accounts payable—and make two adjustments.

Inventory	
Beg. balance	
Purchases	Cost of goods sold
End. balance	

Accounts Payable	
	Beg. balance
Cash payments	Credit purchases
	End. balance

When inventory increases, purchases are greater than cost of goods sold; a decrease in inventory means purchases are less than cost of goods sold. The first adjustment is to compute the cost of purchases by adjusting cost of goods sold as follows:

$$\text{Cost of Purchases} = \text{Cost of Goods Sold} \begin{cases} + \text{Increases in Inventory} \\ - \text{Decreases in Inventory} \end{cases}$$

Next, we adjust the cost of purchases by the change in accounts payable to compute the cash paid to suppliers. An increase in accounts payable means that cash payments were less than the cost purchase; a decrease in accounts payable means that cash payments were less than the cost of purchases. The second adjustment is:

$$\text{Cash Paid to Suppliers} = \text{Cost of Purchases} \begin{cases} + \text{Decreases in Accounts Payable} \\ - \text{Increases in Accounts Payable} \end{cases}$$

Combining this adjustment with the first adjustment, cost paid to suppliers is computed as follows:

$$\text{Cash Paid to Suppliers} = \begin{cases} + \text{Increases in Inventory} \\ - \text{Decreases in Inventory} \end{cases} \begin{cases} + \text{Decrease in Accounts Payable} \\ - \text{Increase in Accounts Payable} \end{cases}$$

**Cash Paid for Operating Expenses** Recall that operating expenses are the expenses the business incurs in selling goods or providing services and managing the company. These are usually divided into selling and administrative expenses and include items such as advertising expense, salaries and wages, insurance expense, utilities expense, property tax expense, and depreciation. These expenses are recognized when goods and services are used, not when cash is paid. Therefore, the expense amounts reported on the income statement will probably not equal the amount of cash actually paid during the period. Some expenses are paid before they are actually recognized (e.g., prepaid insurance); other expenses are paid for after they are recognized, creating a payable account at the time of the cash payment (e.g., salaries payable).

To determine the amount of cash payments for operating expenses, it is necessary to analyze the changes in the balance sheet accounts that are related to operating

expenses— prepaid expenses and accrued liabilities. A prepaid expense increases when cash prepayments are made and decreases when expenses are incurred. An accrued liability increases when expenses are accrued (incurred but not yet paid) and decreases when cash payments are made.

Prepaid Expenses	
Beg. balance	
Cash prepayments	Expense incurred
End. balance	

Accrued Liabilities	
	Beg. balance
Cash payments	Expense accrued
	End. balance

An increase in prepaid expenses means that cash payments were higher than the expenses recognized on the income statement; a decrease in prepaid expenses indicates that expenses recorded on the income statement were higher than the cash payments. Therefore, increases in prepaid expenses must be added to operating expenses and decreases in prepaid expenses must be subtracted from operating expenses to compute cash paid for operating expenses.

In addition, an increase in accrued liabilities indicates that operating expenses recorded on the income statement were greater than the cash payments. A decrease in accrued liabilities implies that cash payments were greater than the expense recorded on the income statement. Therefore, an increase in accrued liabilities is subtracted from operating expenses and an increase in accrued liabilities is added to operating expenses to compute cash paid for operating expenses.

Combining these two adjustments, the formula to compute cash paid for operating expenses is:

$$\text{Cash Paid for Operating Expenses} = \text{Operating Expenses} \left\{ \begin{array}{l} + \text{Increases in Prepaid Expenses} \\ - \text{Decreases in Prepaid Expenses} \\ \quad \left\{ \begin{array}{l} + \text{Decrease in Accrued Liabilities} \\ - \text{Increase in Accrued Liabilities} \end{array} \right. \end{array} \right.$$

**Cash Paid for Interest and Income Taxes** Computing cash paid for interest and income taxes is similar to that for operating expenses. Interest payable increases when interest expense is recorded and decreases when interest is paid.

Interest Payable	
	Beg. balance
Cash payments	Interest expense
	End. balance

An increase in interest payable implies that interest expense recorded on the income statement was greater than the cash paid for interest; a decrease in interest expense indicates that the cash paid for interest is greater than the interest expense recorded on the income statement. Therefore, the adjustment required to compute cash paid for interest is:

$$\text{Cash Paid for Interest} = \text{Interest Expense} \left\{ \begin{array}{l} + \text{Decreases in Interest Payable} \\ - \text{Increases in Interest Payable} \end{array} \right.$$

The income tax payable account increases when income tax expense is incurred and decreases when income taxes are paid.

Income Taxes Payable	
Cash payments	Beg. balance
	Income tax expense
	End. balance

A decrease in income taxes payable implies that the cash payments for income taxes were greater than the income tax expense reported on the income statement; an increase implies that income tax expense reported on the income statement is greater than the cash paid for income taxes. Therefore, the adjustment required to compute cash paid for income taxes is:

$$\text{Cash Paid for Income Taxes} = \text{Income Tax Expense} \begin{cases} + \text{Decrease in Income Taxes Payable} \\ - \text{Increase in Income Taxes Payable} \end{cases}$$

**Other Items** *Noncash Revenues and Expenses* The income statement often includes various noncash items such as depreciation expense, amortization expense, and bad debt expense. Noncash items do not affect cash flow. Therefore, under the direct method, *noncash items are not reported on the statement of cash flows*. Sometimes, depreciation expense (or some other noncash expense) is included as part of operating expenses. In this case, depreciation expense must be subtracted from operating expenses to compute the cash paid for operating expenses.

**Gains and Losses** The sale of a long-term asset or the extinguishment of a long-term liability often produces either a gain or loss that is reported on the income statement. However, the gain or loss does not affect cash flow and should not be included as an operating activity. Furthermore, the gain or loss does not reveal the total amount of cash received or paid. Instead, it only gives the amount received or paid in excess of the book value of the asset or liability. *Therefore, gains and losses are not reported on the statement of cash flows under the direct method.*

**Application of the Direct Method** **Cornerstone 11-7** illustrates how to compute the net cash flow from operating activities using the direct method. We will base this illustration on the financial statements of Brooke Sportswear given in Exhibit 11-7 (page 568). Because each item on the income statement is adjusted under the direct method, we will begin our analysis with the first item on the income statement (sales) and proceed down the income statement in the order that the accounts are listed.

It is important to note that both the indirect and direct methods arrive at the identical amount for the net cash provided (used) by operating activities. Therefore,

### HOW TO Calculate Net Cash Flows from Operating Activities: Direct Method

**Concept:**

To compute net cash flow from operating activities under the direct method, each item on the income statement must be adjusted for changes in the related asset and liability accounts.

**Information:**

Refer to the financial statements for Brooke Sportswear in Exhibit 11-7.

**Required:**

Compute the net cash flow from operating activities using the direct method.



### CORNERSTONE 11-7



**CORNERSTONE**  
**11-7**  
*(continued)*

**Solution:**

**Cash flows from operating activities**

Cash collected from customers (\$472,000 sales – \$7,000 change in accounts receivable)		\$ 465,000
Cash paid:		
To suppliers of merchandise (\$232,000 cost of goods sold + \$12,000 change in inventory + \$4,000 change in accounts payable)	\$(248,000)	
For wages (\$142,000 wages expense – \$1,500 change in wages payable)	(140,500)	
For insurance (\$15,000 insurance expense – \$1,000 change in prepaid insurance)	(14,000)	
For interest (\$5,000 interest expense – \$500 change in interest payable)	(4,500)	
For income taxes (\$8,000 income tax expense + \$3,000 change in income taxes payable)	(11,000)	(418,000)
Net cash provided by operating activities		<u>\$ 47,000</u>

the net cash provided by operating activities of \$47,000 computed above are the same as the net cash flow from operating activities computed under the indirect method shown in Cornerstone 11-3. The two methods differ only in how this amount is computed and the presentation of the details on the statement of cash flows. In addition, if the direct method is used, companies must also provide a supplementary schedule that shows the reconciliation of net income with net cash flow from operating activities. This supplementary schedule is, in effect, the presentation shown under the indirect method in Cornerstone 11-3 (on page 569).

## Appendix 11A: Summary of Learning Objectives

**LO8. Prepare the cash flows from operating activities section of a statement of cash flows using the direct method.**

- The direct method for reporting cash flows from operating activities lists cash inflows and cash outflows for each type of operating activity that a company performs.
- Cash flows from operating activities are generally computed by adjusting each item on the income statement by the changes in the related current asset or current liability accounts.
- Typical cash flow categories reported under the direct method include cash collected from customers, cash paid to suppliers, cash paid to employees, cash paid for interest, and cash paid for taxes.



**CORNERSTONE 11-7** How to calculate net cash flows from operating activities: direct method, page 585

**CORNERSTONES**  
**FOR APPENDIX 11A**

## Appendix 11B: Using a Spreadsheet to Prepare the Statement of Cash Flows

### OBJECTIVE 9

Use a spreadsheet to prepare the statement of cash flows.

The spreadsheet approach provides a means of systematically analyzing changes in the balance sheet amounts, along with the information from the income statement and any additional information, to produce a statement of cash flows. This approach produces spreadsheet entries (made only on the spreadsheet and not in the general ledger) that simultaneously reconstruct and explain the changes in the balance sheet account balances and identify the cash inflows and outflows. The spreadsheet is based on the same underlying principles as discussed in the chapter. Its primary advantage is that it provides a systematic approach to analyze the data, which is helpful in more complex situations.

To construct the spreadsheet:

**Step 1:** Construct five columns. The first column will contain the balance sheet account titles. Immediately beneath the balance sheet accounts, set up the three sections of the statement of cash flows. The second column will contain the beginning balances of the balance sheet accounts (enter the amounts at this time). The third and fourth column will contain the debit and credit adjustments, respectively. The fifth column will contain the ending balances of the balance sheet accounts (enter the amounts at this time).

**Step 2:** Analyze each change in the balance sheet accounts in terms of debits and credits. Enter the effects in the adjustments column. Note that each entry will adjust both the balance sheet account being considered and either a statement of cash flows section of the spreadsheet or another balance sheet account (other than cash). Note that all inflows of cash are recorded as debits and all outflows of cash are recorded as credits.

**Step 3:** Prepare the statement of cash flows from the information contained in the statement of cash flows section of the spreadsheet.

Exhibit 11-9 illustrates the spreadsheet approach to preparing the statement of cash flows for Brooke Sportswear. You should note that the logic behind the analysis of the changes in the spreadsheet accounts was given earlier in the chapter. You may want to refer to this reasoning as you analyze the items below.

The spreadsheet should begin with net income.

- a. Net income is listed as a cash inflow in the operating activities section. Because net income flows into retained earnings during the closing process, a credit to retained earnings reflects the effect of the closing entry.

Next any noncash items are adjusted.

- b. For Brooke Sportswear, the only noncash item was depreciation expense which is added back to net income in the operating activities section and is reflected as a credit to accumulated depreciation.

The next four entries adjust for gains and/or losses due to investing and financing activities.

- c. The actual proceeds from the sale of equipment are shown as a cash inflow in the investing activities section. The loss on the sale of equipment is added back to net income in the operating activities section. In addition, both equipment and accumulated depreciation should be adjusted to reflect the sale.
- d. The actual proceeds from the sale of equipment are shown as a cash inflow in the investing activities section. At this point, note that the beginning and ending balances of the equipment and accumulated depreciation accounts are reconciled.
- e. The actual proceeds from the sale of an investment are shown as a cash inflow in the investing activities section. The gain on the sale of the investment is subtracted from net income in the operating activities section. In addition, the investment account should be adjusted to reflect the sale.

## Exhibit 11-9

## Spreadsheet to Prepare Statement of Cash Flows

	A	B	C	D	E	F	G
1	<b>Brooke Sportswear</b>						
2	<b>Spreadsheet to Prepare the Statement of Cash Flows</b>						
3	<b>For the Year Ended December 31, 2009</b>						
4							
5		<b>Beginning</b>			<b>Adjustments</b>		<b>Ending</b>
6		<b>Balance</b>		<b>Debit</b>	<b>Credit</b>		<b>Balance</b>
7	<b>Balance Sheet Accounts</b>						
8	Cash	13,000	(r)	2,000			15,000
9	Accounts receivable	46,000	(g)	7,000			53,000
10	Prepaid insurance	2,000			1,000	(h)	1,000
11	Inventory	51,000	(i)	12,000			63,000
12	Land	325,000					325,000
13	Equipment	210,000	(d)	53,000	20,000	(c)	243,000
14	Accumulated depreciation	150,000	(e)	12,000	40,000	(b)	178,000
15	Investments	41,000	(f)	28,000	16,000	(e)	53,000
16							
17	Accounts payable	17,000	(j)	4,000			13,000
18	Wages payable	2,000			1,500	(k)	3,500
19	Interest payable	1,000			500	(l)	1,500
20	Income taxes payable	6,000	(m)	3,000			3,000
21	Notes payable	115,000	(n)	35,000	29,000	(o)	109,000
22	Common stock	151,000			14,000	(p)	165,000
23	Retained earnings	246,000	(g)	5,000	39,000	(a)	280,000
24							
25	<b>Statement of Cash Flows</b>						
26	Cash flow from operating activities						
27	Net income		(a)	39,000			
28	Adjustments to reconcile net						
29	income to net cash flow from						
30	operating activities						
31	Depreciation expense		(b)	40,000			
32	Loss on sale of equipment		(c)	6,000			
33	Gain on sale of investments				15,000	(e)	
34	Increase in accounts receivable				7,000	(g)	
35	Decrease in prepaid insurance		(h)	1,000			
36	Increase in inventory				12,000	(i)	
37	Decrease in accounts payable				4,000	(j)	
38	Increase in wages payable		(k)	1,500			
39	Increase in interest payable		(l)	500			
40	Decrease in income taxes payable				3,000	(m)	
41							
42	Cash flows from investing activities						
43	Sale of equipment		(c)	2,000			
44	Purchase equipment				53,000	(d)	
45	Sale of investments		(e)	31,000			
46	Purchase of investment				28,000	(f)	
47							
48	Cash flows from financing activities						
49	Repaid note payable				35,000	(n)	
50	Issued note payable		(o)	29,000			
51	Issued common stock		(p)	14,000			
52	Paid dividend				5,000	(q)	
53							
54	Net change in cash				2,000	(r)	
55							
56				325,000	325,000		
57							
58							

- f. The actual proceeds from the sale of the investment are shown as a cash inflow in the investing activities section. At this point, note that the beginning and ending balances of the investment account are reconciled.

The next seven items represent adjustment for changes in current assets and current liabilities.

- g. The increase in accounts receivable is subtracted from net income and reconciles the change in the accounts receivable account.
- h. The decrease in prepaid insurance is added to net income and reconciles the change in the prepaid insurance account.
- i. The increase in inventory is subtracted from net income and reconciles the change in the inventory account.
- j. The decrease in accounts payable is subtracted from net income and reconciles the change in the accounts payable account.
- k. The increase in wages payable is added to net income and reconciles the change in the wages payable account.
- l. The increase in interest payable is added to net income and reconciles the change in the interest payable account.
- m. The decrease in income taxes payable is subtracted from net income and reconciles the change in the income taxes payable account.

The next four items represent the cash inflows and outflows associated with financing activities.

- n. The repayment of the notes payable is a cash outflow from a financing activity and adjusts the notes payable account.
- o. The issuance of a notes payable is a cash inflow from a financing activity and reconciles the change in the notes payable account.
- p. The issuance of common stock is a cash inflow from a financing activity and reconciles the change in the common stock account.
- q. The payment of dividends is a cash outflow from a financing activity and, together with the first entry, item (a), reconciles the change in retained earnings. The final entry reconciles the cash balance.
- r. The summation of the three sections of the statement of cash flows equals the change in cash for the period. This amount can be checked by summing the net cash flows from operating, investing, and financing activities computed in the previous steps.

The statement of cash flows can now be prepared from the information developed in the statement of cash flows portion of the spreadsheet. The statement of cash flows for Brooke Sportswear is shown in Exhibit 11-8 (page 576).

## Appendix 11B: Summary of Learning Objectives

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### LO9. Use a spreadsheet to prepare the statement of cash flows.

- A spreadsheet provides a means of systematically analyzing changes in the balance sheet amounts, along with the information from the income statement and any additional information, to produce a statement of cash flows.

## Review Problem

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### The Statement of Cash Flows

#### Concept:

The statement of cash flows measures a company's inflows (sources) and outflows (uses) of cash during a period of time. These cash inflows and cash outflows are classified as operating, investing, and financing activities.

**Information:**

The income statement and comparative balance sheet for Solar System Company are shown below.

<b>Solar System Company Balance Sheets December 31, 2009 and 2008</b>			<b>Solar Systems Company Income Statement For the Year Ended December 31, 2009</b>	
ASSETS	2009	2008		
Current assets:			Sales revenue	\$1,339,000
Cash	\$ 56,000	\$ 47,000	Less: Cost of goods sold	908,000
Accounts receivable	123,000	107,000	Gross margin	<u>\$ 431,000</u>
Prepaid expenses	10,000	9,000	Less operating expenses:	
Inventory	52,000	46,000	Salaries expense	(230,000)
Total current assets	<u>\$ 241,000</u>	<u>\$ 209,000</u>	Depreciation	(24,000)
Property, plant, and equipment:			Other operating expenses	<u>(116,000)</u>
Equipment	270,000	262,000	Income from operations	\$ 61,000
Accumulated depreciation	(118,000)	(109,000)	Other income and expenses:	
Total assets	<u><u>\$ 393,000</u></u>	<u><u>\$ 362,000</u></u>	Gain on sale of equipment	3,000
			Interest expense	<u>(14,000)</u>
LIABILITIES AND EQUITY			Income before taxes	\$ 50,000
Current liabilities:			Less: Income tax expense	12,000
Accounts payable	\$ 18,000	\$ 11,000	Net income	<u><u>\$ 38,000</u></u>
Salaries payable	5,000	9,000		
Income taxes payable	7,000	5,000		
Total current liabilities	<u>\$ 30,000</u>	<u>\$ 25,000</u>		
Long-term liabilities:				
Notes payable	120,000	130,000		
Total liabilities	<u>\$ 150,000</u>	<u>\$ 155,000</u>		
Equity:				
Common stock	\$ 213,000	\$ 200,000		
Retained earnings	30,000	7,000		
Total stockholders' equity	<u>\$ 243,000</u>	<u>\$ 207,000</u>		
Total liabilities and equity	<u><u>\$ 393,000</u></u>	<u><u>\$ 362,000</u></u>		

**Additional Information:**

- Equipment with a cost of \$24,000 and accumulated depreciation of \$15,000 was sold for \$12,000 cash. Equipment was purchased for \$32,000 cash.
- Notes payable in the amount of \$10,000 were repaid.
- Common stock was issued for \$13,000 cash during 2009.
- Cash dividends of \$15,000 were paid during 2009.

**Required:**

Prepare a statement of cash flows for Solar Systems Company using the indirect method.

**Solution:**

**Statement of Cash Flows**  
**Solar Systems Company**  
**For the Year Ended December 31, 2009**

<b>Cash flows from operating activities</b>		
Net income	\$ 38,000	
Adjustments to reconcile net income to net cash flow from operating activities:		
Depreciation expense	24,000	
Gain on sale of equipment	(3,000)	
Increase in accounts receivable	(16,000)	
Increase in prepaid expenses	(1,000)	
Increase in inventory	(6,000)	
Increase in accounts payable	7,000	
Decrease in salaries payable	(4,000)	
Increase in income taxes payable	2,000	
Net cash provided by operating activities		\$ 41,000
<b>Cash flows from investing activities</b>		
Cash received from sale of equipment	\$ 12,000	
Purchase of equipment	(32,000)	
Net cash used by investing activities		(20,000)
<b>Cash flows from financing activities</b>		
Cash paid to retire note payable	\$(10,000)	
Cash received from issuance of common stock	13,000	
Cash paid for dividends	(15,000)	
Net cash used by financing activities		(12,000)
Net change in cash		\$ 9,000
Cash and cash equivalents, 1/1/2009		47,000
Cash and cash equivalents, 12/31/2009		<u>\$ 56,000</u>

## Discussion Questions

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1. What is a statement of cash flows?
2. How do investors, creditors, and others typically use the information in the statement of cash flows?
3. How is a statement of cash flows different from an income statement?
4. What are cash equivalents? How are cash equivalents reported on the statement of cash flows?
5. What are the three categories into which inflows and outflows of cash are divided? Be sure to describe what is included in each of these three categories.
6. Why are companies required to report noncash investing and financing activities? How are these activities reported?
7. Why are direct exchanges of long-term debt for items of property, plant, and equipment included in supplementary information for the statement of cash flows even though the exchanges do not affect cash?
8. Describe the relationship between changes in cash and changes in noncash assets, liabilities, and stockholders' equity.
9. What are two ways to report a company's net cash flow from operating activities? Briefly describe the advantages and disadvantages of each method.
10. Why are depreciation, depletion, and amortization added to net income when the indirect method is used to report net cash flows from operating activities?
11. Where do the components of the changes in retained earnings appear in the statement of cash flows? Assume the indirect method is used to prepare the statement of cash flows.

12. How is the sale of equipment at a loss reported on the statement of cash flows? Assume the indirect method is used to prepare the statement of cash flows.
13. What does an increase in inventory imply? How would this increase in inventory be reported under the indirect method?
14. What does an increase in accounts payable imply? How would this increase in accounts payable be reported under the indirect method?
15. Does the fact that the cash flow from operating activities is normally positive imply that cash and cash equivalents usually increase each year?
16. What are the most common sources of cash inflows from financing and investing activities?
17. What are the most common cash outflows related to investing and financing activities?
18. What balance sheet account changes might you expect to find for a company that must rely on sources other than operations to fund its cash outflows?
19. From what source(s) should most companies secure the majority of cash inflows? Why?
20. Why should companies attempt to secure cash for investment in property, plant, and equipment from long-term or permanent sources?
21. When using the direct method, which items usually constitute the largest components of cash inflows from operating activities?
22. Describe how to compute each of the cash inflows and cash outflows from operating activities under the direct method.
23. Why is depreciation expense not generally reported on the statement of cash flows when using the direct method?
24. Why do companies often use a spreadsheet to prepare the statement of cash flows?

## Multiple-Choice Exercises

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### 11-1 Which of the following is *not* a use of the statement of cash flows?

- a. Aids in the prediction of future cash flow
- b. Helps estimate the amount of funds that will be needed from creditors or stockholders
- c. Provides insights into the quality and reliability of reported income
- d. Provides a measure of the future obligations of the company

### 11-2 Which of the following would be classified as a cash outflow from an operating activity?

- a. Purchase of an investment
- b. Payment of goods purchased from suppliers
- c. Payment of dividends
- d. Purchase of equipment

### 11-3 Which of the following is an example of a cash inflow from an operating activity?

- a. Collection of an account receivable from a credit sale
- b. Collection of cash relating to a note receivable
- c. Sale of property, plant, and equipment
- d. None of the above

### 11-4 Which of the following is an example of a cash outflow from a financing activity?

- a. Payment of interest on a note payable
- b. Payment of cash dividends to stockholders
- c. Payment of wages to employees
- d. Issuance of common stock for cash

**11-5 Which of the following is true?**

- a. A decrease in cash may result from an increase in liabilities
- b. An increase in cash may result from a decrease in stockholders' equity
- c. An increase in cash may result from an increase in noncash assets
- d. An increase in cash may result from an increase in liabilities

**11-6 Which of the following statements is true?**

- a. Many companies prefer the indirect method because it is easier and less costly to prepare.
- b. Cash flow from operating activities must be prepared using the indirect method.
- c. The indirect method adjusts sales for changes in noncash items to produce net cash flow from operating activities.
- d. The FASB prefers the indirect method.

**11-7 Mullinix Inc. reported the following information: net income, \$45,000; increase in accounts receivable, \$10,000; increase in accounts payable \$8,000; and depreciation expense, \$3,000. What amount did Mullinix report as cash flow from operating activities on its statement of cash flows?**

- a. \$24,000
- b. \$30,000
- c. \$40,000
- d. \$46,000

**11-8 Which item is added to net income when computing cash flows from operating activities?**

- a. Gain on the sale of property, plant, and equipment
- b. Increase in wages payable
- c. Increase in inventory
- d. Increase in prepaid rent

**11-9 Cornett Company reported the following information: cash received from the issuance of common stock, \$125,400; cash received from the sale of equipment, \$23,700; cash paid to purchase an investment, \$13,500; cash paid to retire a note payable, \$50,000; cash collected from sales to customers, \$248,000. What amount should Cornett report on its statement of cash flows as net cash flows from investing activities?**

- a. \$10,200
- b. \$75,400
- c. \$85,600
- d. None of the above

**11-10 Use the same information as in Multiple-Choice Exercise 11-9. What amount should Cornett report on its statement of cash flows as net cash flows from financing activities?**

- a. \$10,200
- b. \$75,400
- c. \$85,600
- d. None of the above

**11-11 Chasse Building Supply Inc. reported net cash provided by operating activities of \$256,000, capital expenditures of \$124,900, cash dividends of \$33,200, and average maturities of long-term debt over the next five years of \$134,300. What is Chasse's free cash flow and cash flow adequacy ratio?**

- a. \$97,900 and 0.73, respectively
- b. \$97,900 and 1.91, respectively
- c. \$131,100 and 0.98, respectively
- d. \$164,300 and 1.22, respectively

**11-12** Smoltz Company reported the following information for the current year: cost of goods sold, \$347,000; increase in inventory, \$14,700; and increase in accounts payable, \$8,200. What is the amount of cash paid to suppliers that Smoltz would report on its statement of cash flows under the direct method?

- \$324,100
- \$340,500
- \$353,500
- \$369,900

**11-13** Romo Inc. reported the following information for the current year: operating expenses, \$210,000; decrease in prepaid expenses, \$4,900; and increase in accrued liabilities, \$6,100. What is the amount of cash paid for operating expenses that Romo would report on its statement of cash flows under the direct method?

- \$199,000
- \$208,800
- \$211,200
- \$221,000

## Cornerstone Exercises

### OBJECTIVE > 2

#### CORNERSTONE 11-1

### Cornerstone Exercise 11-14 CLASSIFICATION OF CASH FLOWS

Stanfield Inc. reported the following items in its statement of cash flows presented using the indirect method.

- Purchased equipment for cash
- Depreciation expense
- Declared and paid a cash dividend to stockholders
- Decrease in inventory
- Issued long-term debt
- Sold a building for cash

#### Required:

Indicate whether each item should be classified as a cash flow from operating activities, a cash flow from investing activities, or a cash flow from financing activities.

### OBJECTIVE > 2

#### CORNERSTONE 11-1

### Cornerstone Exercise 11-15 CLASSIFICATION OF CASH FLOWS

Patel Company reported the following items in its statement of cash flows presented using the indirect method.

- Sold equipment for cash
- Issuance of common stock
- Cash paid for interest
- Repayment of principal on long-term debt
- Loss on sale of equipment.
- Receipt of cash dividend on investment

#### Required:

Indicate whether each item should be classified as a cash flow from operating activities, a cash flow from investing activities, or a cash flow from financing activities.

### OBJECTIVE > 3

#### CORNERSTONE 11-2

### Cornerstone Exercise 11-16 ANALYZING THE ACCOUNTS

A review of the balance sheet of Peterson Inc. revealed the following changes in the account balances:

- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| a. Decrease in long-term investment | e. Decrease in accounts payable   |
| b. Decrease in accounts receivable  | f. Decrease in supplies inventory |
| c. Increase in common stock         | g. Increase in prepaid insurance  |
| d. Increase in long-term debt       | h. Decrease in retained earnings  |

**Required:**

Indicate whether each of the changes above produces a cash inflow, a cash outflow, or is a noncash activity.

**Cornerstone Exercise 11-17 CLASSIFICATION OF CASH FLOWS**

Refer to the information in **Cornerstone Exercise 11-16**.

**OBJECTIVE** > **2****CORNERSTONE 11-1****Required:**

Classify each change in the balance sheet account as a cash flow from operating activities (indirect method), a cash flow from investing activities, a cash flow from financing activities, or a noncash investing and financing activity.

**Cornerstone Exercise 11-18 COMPUTING NET CASH FLOW FROM OPERATING ACTIVITIES**

An analysis of the balance sheet and income statement of Sanchez Company revealed the following: net income, \$15,400; depreciation expense, \$45,000; decrease in accounts receivable, \$32,500; increase in inventory, \$12,100; increase in accounts payable, \$15,200; and a decrease in interest payable of \$800.

**OBJECTIVE** > **4****CORNERSTONE 11-3****Required:**

Compute the net cash flows from operating activities using the indirect method.

**Cornerstone Exercise 11-19 COMPUTING NET CASH FLOW FROM OPERATING ACTIVITIES**

Brandon Inc. reported the following items in its balance sheet and income statement: net income, \$85,600; gain on sale of equipment, \$12,800; increase in accounts receivable, \$15,400; decrease in accounts payable, \$25,900, and increase in common stock, \$40,000.

**OBJECTIVE** > **4****CORNERSTONE 11-3****Required:**

Compute the net cash flows from operating activities using the indirect method.

**Cornerstone Exercise 11-20 COMPUTING NET CASH FLOW FROM INVESTING ACTIVITIES**

Davis Inc. reported the following information for equipment:

	12/31/2009	12/31/2008
Equipment	\$160,000	\$115,000
Accumulated depreciation	(85,000)	(59,000)
Long-term investment	10,000	14,600

In addition, Davis sold equipment costing \$10,000 with accumulated depreciation of \$8,000 for \$2,200 cash, producing a \$200 gain. Davis reported net income for 2009 of \$110,000.

**Required:**

Compute net cash flow from investing activities.

**Cornerstone Exercise 11-21 COMPUTING NET CASH FLOW FROM FINANCING ACTIVITIES**

Hebert Company reported the following information for 2009:

Repaid long-term debt	\$30,000
Paid interest on note payable	1,200
Issued common stock	50,000
Paid dividends	5,000

**Required:**

Compute net cash flow from financing activities.

**OBJECTIVE** > **5****CORNERSTONE 11-4****OBJECTIVE** > **6****CORNERSTONE 11-5**

**OBJECTIVE** > **7** **Cornerstone Exercise 11-22 ANALYZING THE STATEMENT OF CASH FLOWS**  
**CORNERSTONE 11-6** Rollins Inc. is considering expanding its operations into different regions of the country; however this expansion will require significant cash flow as well as additional financing. Rollins reported the following information for 2009: cash provided by operating activities, \$425,000; cash provided by investing activities, \$115,000; average debt maturing over the next five years, \$380,000; capital expenditures, \$240,000; dividends, \$40,000.

**Required:**

Compute free cash flow and the cash flow adequacy ratio. Comment on Rollins' ability to expand its operations.

**OBJECTIVE** > **8** **Cornerstone Exercise 11-23 (APPENDIX 11A) CASH RECEIPTS FROM CUSTOMERS**  
**CORNERSTONE 11-7** Singleton Inc. had accounts receivable of \$365,000 at January 1, 2009, and \$410,000 at December 31, 2009. Net income for 2009 was \$550,000 and sales revenue was \$925,000.

**Required:**

Compute the amount of cash collected from customers.

**OBJECTIVE** > **8** **Cornerstone Exercise 11-24 (APPENDIX 11A) CASH PAYMENTS TO SUPPLIERS**  
**CORNERSTONE 11-7** Blackmon Company reported net income of \$805,000 and cost of goods sold of \$1,525,000 on its 2009 income statement. In addition, Blackmon reported an increase in inventory of \$65,000, a decrease in prepaid insurance of \$12,000, and a decrease in accounts payable of \$51,000.

**Required:**

Compute the amount of cash payments to suppliers.

**OBJECTIVE** > **8** **Cornerstone Exercise 11-25 (APPENDIX 11A) CASH PAYMENTS FOR OPERATING EXPENSES**  
**CORNERSTONE 11-7** Luna Inc. reported operating expenses of \$130,000, excluding depreciation expense of \$36,000 for 2009. During 2009, Luna reported a decrease in prepaid expenses of \$12,500 and a decrease in accrued liabilities of \$18,200.

**Required:**

Compute the amount of cash payments for operating expenses.

## Exercises

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**OBJECTIVE** > **2** **Exercise 11-26 CLASSIFICATION OF CASH FLOWS**

A review of the financial records for Rogers, Inc., uncovered the following items:

- a. Received cash from the issuance of bonds
- b. Collected accounts receivable
- c. Paid cash to purchase equipment
- d. Paid rent on building for the current period
- e. Issued common stock for land
- f. Paid interest on long-term debt
- g. Depreciation on equipment
- h. Declared and paid dividends to stockholders
- i. Sold equipment at book value
- j. Paid cash to settle an accounts payable
- k. Received cash dividend on investment
- l. Amortization of a copyright
- m. Repaid the principal amount of long-term debt
- n. Sold a long-term investment at a gain

Rogers, Inc., uses the indirect method to prepare the operating activities of its statement of cash flows.

**Required:**

Indicate whether each item should be classified as a cash flow from operating activities, a cash flow from investing activities, a cash flow from financing activities, or a noncash investing and financing activity.

**Exercise 11-27 CLASSIFICATION OF CASH FLOWS**

**OBJECTIVE** > **2**

The following are several items that might be disclosed on a company's statement of cash flows presented using the indirect method.

- a. Depreciation expense
- b. Issuance of common stock
- c. Net income
- d. Loss on sale of equipment
- e. Converted bonds into common stock
- f. Purchase of a building
- g. Decrease in accounts payable
- h. Increase in inventory
- i. Sale of long-term investment
- j. Payment of interest

**Required:**

Indicate whether each item should be classified as a cash flow from operating activities, a cash flow from investing activities, a cash flow from financing activities, or a noncash investing and financing activity.

**Exercise 11-28 ANALYZING THE ACCOUNTS**

**OBJECTIVE** > **3**

A review of the balance sheet of Mathews Company revealed the following changes in the account balances:

- a. Increase in accounts receivable
- b. Increase in retained earnings
- c. Decrease in salaries payable
- d. Increase in common stock
- e. Decrease in inventory
- f. Increase in accounts payable
- g. Decrease in long-term debt
- h. Increase in property, plant, and equipment

**Required:**

1. For each of the above items, indicate whether it produces a cash inflow or a cash outflow.
2. Classify each change as a cash flow from operating activities (indirect method), a cash flow from investing activities, or a cash flow from financing activities.

**Exercise 11-29 ANALYZING THE ACCOUNTS**

**OBJECTIVE** > **3**

Casey Company engaged in the following transactions:

- a. Made credit sales of \$600,000. The cost of the merchandise sold was \$410,000
- b. Collected accounts receivable in the amount of \$580,000
- c. Purchased goods on credit in the amount of \$425,000
- d. Paid accounts payable in the amount of \$392,000

**Required:**

Recreate the journal entries necessary to record the transactions. Indicate whether each transaction increased cash, decreased cash, or had no effect on cash.

**OBJECTIVE** > **3****Exercise 11-30 ANALYZING THE ACCOUNTS**

The controller for Summit Sales, Inc., provides the following information on transactions that occurred during the year:

- a. Purchased supplies on credit, \$30,000
- b. Paid \$22,600 cash toward the purchase in transaction *a*
- c. Provided services to customers on credit, \$37,800
- d. Collected \$47,000 cash from accounts receivable
- e. Recorded depreciation expense, \$7,350
- f. Employees earned salaries, \$9,200
- g. Paid \$9,200 cash to employees for salaries earned
- h. Accrued interest expense on long-term debt, \$2,400
- i. Paid a total of \$15,000 on long-term debt, that includes \$2,400 interest from transaction *h*
- j. Paid \$1,850 cash for one-year's insurance coverage in advance
- k. Recognized insurance expense, \$925, that was paid in a previous period
- l. Sold old equipment with a book value of \$3,900 for \$3,900 cash
- m. Declared cash dividend, \$5,000
- n. Paid cash dividend declared in transaction *m*
- o. Purchased new equipment for \$14,300 cash
- p. Issued common stock for \$20,000 cash
- q. Used \$28,100 of supplies to produce revenues

Summit Sales, Inc., uses the indirect method to prepare its statement of cash flows.

**Required:**

1. Construct a table similar to the one shown. Analyze each transaction and indicate its effect on the fundamental accounting equation. If the transaction increases a financial statement element, write the amount of the increase preceded by a plus sign (+) in the appropriate column. If the transaction decreases a financial statement element, write the amount of the decrease preceded by a minus sign (−) in the appropriate column.
2. Indicate whether each transaction results in a cash inflow or a cash outflow in the “Effect on Cash Flows” column. If the transaction has no effect on cash flow, then indicate this by placing “none” in the “Effect on Cash Flows” column.
3. For each transaction that affected cash flows, indicate whether the cash flow would be classified as a cash flow from operating activities, a cash flow from investing activities, or a cash flow from financing activities. If there is no effect on cash flows, indicate this as a noncash activity.

Transaction	Effect on Accounting Equation						Effect on Cash Flows
	Assets		Liabilities and Equity				
	Current	Noncurrent	Current Liabilities	Noncurrent Liabilities	Equity		

**OBJECTIVE** > **4****Exercise 11-31 REPORTING NET CASH FLOW FROM OPERATING ACTIVITIES**

The following information is available for Cornelius Inc.:

Selected Income Statement Information	Amount
Depreciation expense	\$11,000
Net income	38,000

Selected Balance Sheet Information	Beginning Balance	Ending Balance
Accounts receivable	\$21,000	\$27,000
Inventory	47,000	43,000
Accounts payable	24,000	32,000

**Required:**

1. Prepare the net cash flows from operating activities using the indirect method.
2. Explain why Cornelius was able to report net cash flow from operating activities that was higher than net income. Explain why this is important to financial statement users.

**Exercise 11-32 REPORTING NET CASH FLOW FROM OPERATING ACTIVITIES****OBJECTIVE** > 4

The following information is available for Bernard Corporation:

Net income	\$206,000
Decrease in accounts receivable	4,900
Increase in inventory	15,300
Decrease in prepaid rent	2,100
Increase in salaries payable	14,400
Increase in income taxes payable	11,200
Increase in notes payable	20,000
Depreciation expense	42,000
Loss on sale of equipment	5,000

**Required:**

1. Prepare the net cash flows from operating activities using the indirect method.
2. What are the causes of the major differences between net income and net cash flow from operating activities?

**Exercise 11-33 DETERMINING CASH FLOWS FROM INVESTING ACTIVITIES****OBJECTIVE** > 5

Burns Company's 2009 and 2008 balance sheets presented the following data for equipment:

	12/31/2009	12/31/2008
Equipment	\$260,000	\$225,000
Accumulated depreciation	115,000	92,000
Book value	<u>\$145,000</u>	<u>\$133,000</u>

During 2009, equipment costing \$35,000 with accumulated depreciation of \$30,000 was sold for cash, producing a \$4,400 gain.

**Required:**

1. Calculate the amount of depreciation expense for 2009.
2. Calculate the amount of cash spent for equipment during 2009.
3. Calculate the amount that should be included as a cash inflow from the sale of equipment.

**Exercise 11-34 DETERMINING CASH FLOWS FROM INVESTING ACTIVITIES****OBJECTIVE** > 5

Airco owns several aircraft and its balance sheet indicated the following amounts for its aircraft accounts at the end of 2009 and 2008:

	12/31/2009	12/31/2008
Equipment, aircraft	\$28,500,000	\$21,750,000
Accumulated depreciation	11,900,000	10,100,000
Book value	<u>\$16,600,000</u>	<u>\$11,650,000</u>

**Required:**

1. Assume that Airco did not sell any aircraft during 2009. Determine the amount of depreciation expense for 2009 and the cash spent for aircraft purchases in 2009.
2. If Airco sold for cash aircraft that cost \$4,100,000 with accumulated depreciation of \$3,500,000, producing a gain of \$300,000, determine (a) the amount of depreciation expense, (b) the cash paid for aircraft purchases in 2009 and (c) the cash inflow from the sale of aircraft.

**OBJECTIVE** > **6** **Exercise 11-35 DETERMINING CASH FLOWS FROM FINANCING ACTIVITIES**

Solomon Construction Company reported the following amount on its balance sheet at the end of 2009 and 2008 for notes payable:

	12/31/2009	12/31/2008
Notes payable	\$180,000	\$150,000

**Required:**

1. If Solomon did not repay any notes payable during 2009, determine how much cash Solomon received from the issuance of notes payable.
2. If Solomon repaid \$60,000 of notes payable during 2009, determine what amounts Solomon would report in the financing activities section of the statement of cash flows.

**OBJECTIVE** > **6** **Exercise 11-36 DETERMINING CASH FLOWS FROM FINANCING ACTIVITIES**

Nichols Inc. reported the following amounts on its balance sheet at the end of 2009 and 2008 for equity:

	12/31/2009	12/31/2008
Common stock	\$130,000	\$110,000
Retained earnings	458,000	385,000

**Required:**

Assume that Nichols did not retire any stock during 2009, it reported \$94,000 of net income for 2009, and any dividends declared were paid in cash. Determine the amounts Nichols would report in the financing section of the statement of cash flows.

**OBJECTIVE** > **4** **5** **6** **Exercise 11-37 PARTIAL STATEMENT OF CASH FLOWS**

Service Company had net income during the current year of \$111,000. The following information was obtained from the balance sheet of Service Company:

Accounts receivable	\$20,000 increase
Inventory	25,000 increase
Accounts payable	16,000 decrease
Interest payable	9,000 increase
Accumulated depreciation, equipment*	27,000 increase
Accumulated depreciation, building	12,000 increase
Retained earnings**	

\* Equipment with accumulated depreciation of \$15,000 was sold during the year.

\*\* Includes net income of \$111,000 and cash dividends paid of \$36,000

**Required:**

1. Prepare the net cash flows from operating activities using the indirect method.
2. How would the cash proceeds from the sale of equipment be reported on the statement of cash flows?
3. How would the cash dividends be reported on the statement of cash flows?

**OBJECTIVE** > **7** **Exercise 11-38 ANALYZING THE STATEMENT OF CASH FLOWS**

Information for Ditka Inc. and McMahon Company is given below:

	Ditka Inc	McMahon Company
Cash provided by operating activities	\$2,475,000	\$1,639,000
Capital expenditures	1,157,000	748,000
Dividends	285,000	189,000
Average debt maturity over next 5 years	1,988,000	1,212,000

**Required:**

Compare Ditka Inc. and McMahon Company by computing and analyzing the following cash-based performance measures for each company: (a) free cash flow and (b) cash flow adequacy ratio.

**Exercise 11-39 PREPARING THE STATEMENT OF CASH FLOWS**OBJECTIVE > 4 5 6 7

The comparative balance sheets for Beckwith Products Company are presented below.

	2009	2008
<b>Assets:</b>		
Cash	\$ 36,400	\$ 25,000
Accounts receivable	63,000	78,000
Inventory	45,300	36,000
Property, plant, and equipment	221,000	153,000
Accumulated depreciation	(30,000)	(20,000)
Total assets	<u>\$335,700</u>	<u>\$272,000</u>
<b>Liabilities and Equity:</b>		
Accounts payable	\$ 13,100	\$ 11,000
Interest payable	13,500	8,000
Wages payable	4,100	9,000
Notes payable	75,000	90,000
Common stock	90,000	50,000
Retained earnings	140,000	104,000
Total liabilities and equity	<u>\$335,700</u>	<u>\$272,000</u>

**Additional information:**

- Net income for 2009 was \$52,000.
- Cash dividends of \$16,000 were declared and paid during 2009.
- During 2009, Beckwith issued \$20,000 of notes payable and repaid \$35,000 principal relating to notes payable.
- Common stock was issued for \$40,000 cash.
- Depreciation expense was \$10,000, and there were no disposals of equipment.

**Required:**

- Prepare a statement of cash flows (indirect method) for Beckwith Products for 2009.
- Compute the following cash-based performance measures:
  - Free cash flow
  - Cash flow adequacy (assume that the average amount of debt maturing over the next five years is \$85,000).
- List the major reasons for the difference between net income and net cash flow from operating activities.

**Exercise 11-40 (APPENDIX 11A) PREPARING NET CASH FLOWS FROM OPERATING ACTIVITIES—DIRECT METHOD**OBJECTIVE > 8

Colassard Industries has the following data available for preparation of its statement of cash flows:

Sales revenue	\$345,000	Inventory, increase	\$ 9,700
Cost of goods sold	182,500	Prepaid insurance, increase	6,100
Wages expense	34,400	Accounts payable, increase	11,600
Insurance expense	12,000	Notes payable, increase	32,000
Interest expense	20,800	Interest payable, increase	5,000
Income taxes expense	16,200	Wages payable, decrease	5,400
Accounts receivable, decrease	14,300		



**Required:**

Prepare the cash flows from operating activities section of the statement of cash flows, using the direct method.

**OBJECTIVE** > **8****Exercise 11-41 (APPENDIX 11A) PREPARING A STATEMENT OF CASH FLOWS—DIRECT METHOD**

The controller of Newstrom Software, Inc., provides the following information as the basis for a statement of cash flows:

Cash collected from customers	\$794,000
Cash paid for interest	22,100
Cash paid to employees and other suppliers of goods and services	215,000
Cash paid to suppliers of merchandise	388,000
Cash received from the issuance of long-term debt	12,700
Cash received from sale of equipment	44,000
Cash received from sale of long-term investments	71,400
Income taxes paid	58,300
Payment of dividends	24,000
Principal payments on mortgage payable	50,000
Principal payments on long-term debt	15,000
Proceeds from the issuance of common stock	85,000
Purchase of equipment	120,000
Purchase of long-term investments	83,000

**Required:**

- Using the information provided above, calculate the net cash provided (used) by operating activities.
- Using the information provided above, calculate the net cash provided (used) by investing activities.
- Using the information provided above, calculate the net cash provided (used) by financing activities.

**OBJECTIVE** > **8****Exercise 11-42 (APPENDIX 11A) PREPARING A STATEMENT OF CASH FLOWS—DIRECT METHOD**

Financial statements for Rowe Publishing Company are presented below.

<b>Rowe Publishing Company</b>		
<b>Balance Sheets</b>		
<b>December 31, 2009 and 2008</b>		
<b>ASSETS</b>	<b>2009</b>	<b>2008</b>
Current assets:		
Cash	\$ 85,000	\$ 66,000
Accounts receivable	240,000	231,000
Inventory	190,000	170,000
Total current assets	<u>\$515,000</u>	<u>\$467,000</u>
Property, plant, and equipment:		
Building	\$ 400,000	\$ 400,000
Equipment	155,000	130,000
	<u>\$ 555,000</u>	<u>\$ 530,000</u>
Accumulated depreciation	<u>(375,000)</u>	<u>(350,000)</u>
Net property, plant, and equipment	180,000	180,000
Total assets	<u><u>\$695,000</u></u>	<u><u>\$647,000</u></u>

LIABILITIES AND EQUITY	2009	2008
Current liabilities:		
Accounts payable	\$ 133,000	\$ 121,000
Salaries payable	15,000	11,000
Income taxes payable	<u>10,000</u>	<u>17,000</u>
Total current liabilities	\$158,000	\$149,000
Long-term liabilities:		
Notes payable	\$ 115,000	\$ 150,000
Bonds payable	<u>50,000</u>	<u>0</u>
Total long-term liabilities	<u>165,000</u>	<u>\$150,000</u>
Total liabilities	<u>\$323,000</u>	<u>\$299,000</u>
Equity:		
Common stock	\$ 300,000	\$ 300,000
Retained earnings	<u>72,000</u>	<u>48,000</u>
Total equity	<u>372,000</u>	<u>348,000</u>
Total liabilities and equity	<u><u>\$695,000</u></u>	<u><u>\$647,000</u></u>

**Rowe Publishing Company**  
**Income Statement**  
**For the Year Ended December 31, 2009**

Sales		\$1,051,000
Less: Cost of goods sold		<u>578,000</u>
Gross margin		\$ 473,000
Less operating expenses:		
Salaries	\$351,000	
Depreciation	<u>25,000</u>	<u>376,000</u>
Income from operations		\$ 97,000
Less: Interest expense		<u>16,000</u>
Income before taxes		\$ 81,000
Less: Income tax expense		<u>22,000</u>
Net income		<u><u>\$ 59,000</u></u>

**Additional information:**

- No buildings nor equipment were sold during 2009. Equipment was purchased for \$25,000 cash.
- Notes payable in the amount of \$35,000 were repaid during 2009.
- Bonds payable of \$50,000 were issued for cash during 2009.
- Rowe Publishing declared and paid dividends of \$35,000 during 2009.

**Required:**

Prepare a statement of cash flows for 2009, using the direct method to determine net cash flow from operating activities.

**Exercise 11-43 (APPENDIX 11B) USING A SPREADSHEET TO PREPARE A STATEMENT OF CASH FLOWS**

Comparative balance sheets for Cincinnati Health Club are presented below.

**OBJECTIVE** > 9



<b>Cincinnati Health Club</b>			
<b>Balance Sheets</b>			
<b>December 31, 2009 and 2008</b>			
<b>ASSETS</b>	<b>2009</b>	<b>2008</b>	
Current assets:			
Cash	\$ 5,300		\$ 9,200
Accounts receivable	10,500		8,900
Inventory	19,800		18,600
Total current assets	<u>\$ 35,600</u>		<u>\$ 36,700</u>
Property, plant, and equipment:			
Building	\$ 490,000		\$ 490,000
Equipment	280,000		270,000
	<u>\$ 770,000</u>		<u>\$ 760,000</u>
Accumulated depreciation	(148,000)		(120,000)
Net property, plant, and equipment		<u>622,000</u>	<u>640,000</u>
Total assets		<u><u>\$657,600</u></u>	<u><u>\$676,700</u></u>
<b>LIABILITIES AND EQUITY</b>			
Current liabilities:			
Accounts payable	\$ 55,300		\$ 36,100
Salaries payable	9,500		11,700
Income taxes payable	1,100		9,900
Total current liabilities		<u>\$ 65,900</u>	<u>\$ 57,700</u>
Long-term liabilities:			
Bonds payable		<u>350,000</u>	<u>400,000</u>
Total liabilities		<u>\$415,900</u>	<u>\$457,700</u>
Equity:			
Common stock	\$ 180,000		\$ 150,000
Retained earnings	61,700		69,000
Total equity		<u>241,700</u>	<u>219,000</u>
Total liabilities and equity		<u><u>\$657,600</u></u>	<u><u>\$676,700</u></u>

**Additional information:**

- Cincinnati Health Club reported net income of \$2,700 for 2009.
- No buildings nor equipment were sold during 2009. Equipment was purchased for \$10,000 cash.
- Depreciation expense for 2009 was \$28,000.
- Bonds payable of \$50,000 were issued for cash during 2009.
- Common stock of \$30,000 was issued during 2009.
- Cash dividends of \$10,000 were declared and paid during 2009.

**Required:**

Using a spreadsheet, prepare a statement of cash flows for 2009. Assume Cincinnati Health Club uses the indirect method.

**Problem Set A****OBJECTIVE** > **2** **3****Problem 11-44A CLASSIFYING AND ANALYZING BUSINESS ACTIVITIES**

CTT Inc. reported the following business activities during 2009:

- Purchased merchandise inventory for cash
- Recorded depreciation on property, plant, and equipment
- Purchased merchandise inventory on credit

- d. Collected cash sales from customers
- e. Purchased a two-year insurance policy for cash
- f. Paid salaries of employees
- g. Borrowed cash by issuing a note payable
- h. Sold property, plant, and equipment for cash
- i. Paid cash dividends
- j. Purchased property, plant, and equipment for cash
- k. Issued common stock
- l. Paid cash for principal amount of mortgage
- m. Paid interest on mortgage

**Required:**

1. Indicate whether each activity should be classified as a cash flow from operating activities, a cash flow from investing activities, a cash flow from financing activities, or a noncash investing and financing activity. Assume that CTT Inc. uses the indirect method.
2. For each activity that is reported on the statement of cash flows, indicate whether each activity produces a cash inflow, a cash outflow, or has no cash effect.

**Problem 11-45A REPORTING NET CASH FLOW FROM OPERATING ACTIVITIES****OBJECTIVE** > **4**

The income statement for Granville Manufacturing Company is presented below.

<b>Granville Manufacturing Company</b>		
<b>Income Statement</b>		
<b>For the Year Ended December 31, 2009</b>		
Sales		\$4,200,000
Cost of goods sold		1,720,000
Gross margin		<u>\$2,480,000</u>
Operating expenses:		
Salaries expense	\$720,000	
Administrative expense	131,000	
Bad debt expense	156,000	
Depreciation expense	610,000	
Other expenses	<u>255,000</u>	<u>1,872,000</u>
Net income		<u><u>\$ 608,000</u></u>

The following balance sheet changes occurred during the year:

- Accounts receivable increased by \$900,000.
- Inventory decreased by \$110,000.
- Prepaid expenses increased by \$49,000.
- Accounts payable increased by \$132,000.
- Salaries payable decreased by \$58,000.

**Required:**

1. Prepare the net cash flows from operating activities using the indirect method.
2. What are the causes of the major differences between net income and net cash flow from operating activities.

**Problem 11-46A CLASSIFICATION OF CASH FLOWS****OBJECTIVE** > **2 3 4**

Rolling Meadows Country Club, Inc., is a privately owned corporation that operates a golf club. Rolling Meadows reported the following inflows and outflows of cash during 2009:

Net income	\$106,000
Decrease in accounts receivable, dues	4,000
Increase in pro shop inventory	28,600

Increase in prepaid insurance	\$ 15,800
Increase in accounts payable	11,400
Decrease in wages payable	10,400
Increase in income taxes payable	7,500
Cash paid for new golf carts	123,000
Cash received from sale of used golf carts	7,000
Depreciation expense, buildings	49,000
Depreciation expense, golf carts	23,000
Proceeds from issuance of note payable	35,000
Payment on mortgage payable	45,000
Cash received from issuance of common stock	38,500
Payment of cash dividends	40,000

Rolling Meadows had cash on hand at 1/1/09 of \$10,300.

**Required:**

Prepare a properly formatted statement of cash flows using the indirect method.

**OBJECTIVE** > **4** **5** **6**

**Problem 11-47A PREPARING A STATEMENT OF CASH FLOWS**

Erie Company reported the following comparative balance sheets for 2009:

	2009	2008
<b>Assets:</b>		
Cash	\$ 33,200	\$ 12,000
Accounts receivable	53,000	45,000
Inventory	29,500	27,500
Prepaid rent	2,200	6,200
Long-term investments	17,600	31,800
Property, plant, and equipment	162,000	150,000
Accumulated depreciation	<u>(61,600)</u>	<u>(56,200)</u>
Total assets	<u>\$235,900</u>	<u>\$216,300</u>
<b>Liabilities and Equity:</b>		
Accounts payable	\$ 16,900	\$ 18,000
Interest payable	3,500	4,800
Wages payable	9,600	7,100
Income taxes payable	5,500	3,600
Notes payable	28,000	53,000
Common stock	100,000	70,000
Retained earnings	<u>72,400</u>	<u>59,800</u>
Total liabilities and equity	<u>\$235,900</u>	<u>\$216,300</u>

**Additional information:**

- Net income for 2009 was \$20,500.
- Cash dividends of \$7,900 were declared and paid during 2009.
- Long-term investments with a cost of \$35,000 were sold for cash at a gain of \$4,100. Additional long-term investments were purchased for \$20,800 cash.
- Equipment with a cost of \$15,000 and accumulated depreciation of \$13,500 was sold for \$3,800 cash. New equipment was purchased for \$27,000 cash.
- Depreciation expense was \$18,900.
- A principal payment of \$25,000 was made on long-term notes.
- Common stock was sold for \$30,000 cash.

**Required:**

Prepare a statement of cash flows for Erie, using the indirect method to compute net cash flow from operating activities.

**Problem 11-48A PREPARING A STATEMENT OF CASH FLOWS**

Monon Cable Television Company reported the following financial statements for 2009:

**OBJECTIVE** > 4 5 6


**Monon Cable Television Company**  
**Income Statement**  
**For the Year Ended December 31, 2009**

Sales		\$519,000
Less operating expenses:		
Royalty expense	\$240,000	
Salaries expense	26,000	
Utilities expense	83,000	
Supplies expense	13,000	
Rent expense	79,000	
Depreciation expense	<u>28,000</u>	<u>469,000</u>
Income from operations		\$ 50,000
Other income (expenses):		
Gain on sale of antenna	\$ 800	
Interest expense	<u>(1,800)</u>	<u>(1,000)</u>
Income before taxes		\$ 49,000
Less: Income taxes expense		<u>9,000</u>
Net income		<u>\$ 40,000</u>

**Monon Cable Television Company**  
**Balance Sheets**  
**December 31, 2009 and 2008**

ASSETS	2009	2008
Current assets:		
Cash	\$ 2,000	\$ 3,000
Accounts receivable	11,300	11,000
Supplies inventory	1,200	1,700
Total current assets	<u>\$ 14,500</u>	<u>\$ 15,700</u>
Property, plant, and equipment:		
Antenna	\$ 60,000	\$ 35,000
Equipment	210,000	190,000
Cable system	81,000	75,000
	<u>\$ 351,000</u>	<u>\$ 300,000</u>
Accumulated depreciation	<u>(125,000)</u>	<u>(131,000)</u>
Net property, plant, and equipment	<u>226,000</u>	<u>169,000</u>
Total assets	<u>\$240,500</u>	<u>\$184,700</u>
<b>LIABILITIES AND EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 6,500	\$ 8,000
Rent payable	4,900	13,600
Royalties payable	<u>3,300</u>	<u>3,100</u>
Total current liabilities	\$ 14,700	\$ 24,700
Long-term liabilities:		
Long-term notes payable	<u>40,000</u>	<u>0</u>
Total liabilities	\$ 54,700	\$ 24,700
Equity:		
Common stock	\$ 100,000	\$ 100,000
Retained earnings	<u>85,800</u>	<u>60,000</u>
Total equity	<u>185,800</u>	<u>160,000</u>
Total liabilities and equity	<u>\$240,500</u>	<u>\$184,700</u>

**Additional information:**

- The old antenna with a cost of \$35,000 and accumulated depreciation of \$34,000 was taken down and sold as scrap for \$1,800 cash during 2009. A new antenna was purchased for cash at an installed cost of \$60,000.
- Additional equipment was purchased for \$20,000 cash.
- Wiring for 300 additional homes was purchased for \$6,000 cash.
- Depreciation expense for 2009 was \$28,000.
- A long-term note payable was issued for \$40,000 cash.
- Dividends of \$14,200 were paid during 2009.

**Required:**

Prepare a statement of cash flows, using the indirect method to compute net cash flow from operating activities.

**OBJECTIVE** > **8** **Problem 11-49A (APPENDIX 11A) PREPARING NET CASH FLOWS FROM OPERATING ACTIVITIES—DIRECT METHOD**

Yogurt Plus, a restaurant, collected the following information on inflows and outflows for 2009:

<b>Inflows</b>	
Sales (all for cash)	\$379,000
Cash received from sale of common stock	50,000
Proceeds from issuance of long-term notes payable	40,000
Proceeds from sale of used restaurant fixtures	13,000
Proceeds from issuance of short-term note payable	35,000
Notes payable issued in exchange for kitchen equipment	30,000
<b>Outflows</b>	
Cash payments made for merchandise sold	\$203,000
Cash payments for operating expenses	125,000
Cash payments for interest	22,000
Cash payments for income taxes	8,000
Purchase of restaurant fixtures for cash	105,000
Principal payment on mortgage	35,000
Payment of dividends	6,000
Cost of kitchen equipment acquired in exchange for note payable	30,000

Yogurt Plus had a cash balance of \$21,800 at 1/1/09.

**Required:**

Prepare a statement of cash flows, using the direct method to determine net cash flow from operating activities.

**OBJECTIVE** > **8** **Problem 11-50A (APPENDIX 11A) PREPARING NET CASH FLOWS FROM OPERATING ACTIVITIES—DIRECT METHOD**

Refer to the information for Granville Manufacturing Company in Problem 11-45A.

**Required:**

Prepare the cash flows from operating activities section of the statement of cash flows, using the direct method.

**OBJECTIVE** > **9** **Problem 11-51A (APPENDIX 11B) USING A SPREADSHEET TO PREPARE A STATEMENT OF CASH FLOWS**

Jane Bahr, a controller of Endicott & Thurston, prepared the following balance sheets at the end of 2009 and 2008:

**Endicott & Thurston Associates**  
**Balance Sheets**  
**December 31, 2009 and 2008**

ASSETS	2009	2008
Current assets:		
Cash	\$ 2,000	\$ 17,000
Accounts receivable	78,000	219,000
Prepaid rent	29,000	104,000
Total current assets	<u>\$109,000</u>	<u>\$340,000</u>
Long-term investments	51,000	40,000
Property, plant, and equipment:		
Equipment, computing	\$ 488,000	\$ 362,000
Equipment, office furniture	400,000	365,000
	<u>\$ 888,000</u>	<u>\$ 727,000</u>
Accumulated depreciation	<u>(366,000)</u>	<u>(554,000)</u>
Net property, plant, and equipment	<u>522,000</u>	<u>173,000</u>
Total assets	<u><u>\$682,000</u></u>	<u><u>\$553,000</u></u>
<b>LIABILITIES AND EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 56,000	\$ 58,000
Salaries payable	89,000	105,000
Total current liabilities	\$145,000	\$163,000
Long-term liabilities:		
Long-term notes payable	80,000	105,000
Bonds payable	140,000	0
Total liabilities	\$365,000	\$268,000
Equity:		
Common stock	\$ 225,000	\$ 225,000
Retained earnings	92,000	60,000
Total equity	<u>317,000</u>	<u>285,000</u>
Total liabilities and equity	<u><u>\$682,000</u></u>	<u><u>\$553,000</u></u>

**Additional information:**

- a. Computing equipment with a cost of \$250,000 and accumulated depreciation of \$230,000 was sold for \$5,000. New computing equipment was purchased for \$376,000.
- b. New office furniture was purchased at a cost of \$35,000.
- c. Depreciation expense for 2009 was \$42,000.
- d. Investments costing \$20,000 were sold for cash at a loss of \$2,000. Additional investments were purchased for \$31,000 cash.
- e. A \$25,000 principal payment on the long-term note was made during 2009.
- f. A portion of the cash needed to purchase computing equipment was secured by issuing bonds payable for \$140,000 cash.
- g. Net income was \$70,000 and dividends were \$38,000.

**Required:**

1. Using a spreadsheet, prepare a statement of cash flows for 2009. Assume Endicott & Thurston use the indirect method.
2. Discuss whether Endicott & Thurston appear to have matched the timing of inflows and outflows of cash.

## Problem Set B

### OBJECTIVE > 2 3

#### Problem 11-44B CLASSIFYING AND ANALYZING BUSINESS ACTIVITIES

Cowell Company had the following business activities during 2009:

- a. Paid cash for inventory
- b. Paid cash dividend to shareholders
- c. Issued common stock for cash
- d. Purchased equipment for cash
- e. Paid interest on long-term debt
- f. Acquired land in exchange for common stock
- g. Received cash from the sale of merchandise
- h. Issued bonds payable in exchange for cash
- i. Paid salaries to employees
- j. Sold equipment for cash
- k. Purchased inventory on account
- l. Recorded amortization related to an intangible asset

Cowell Company uses the indirect method to prepare its statement of cash flows.

#### Required:

1. Indicate whether each activity should be classified as a cash flow from operating activities, a cash flow from investing activities, a cash flow from financing activities, or a noncash investing and financing activity. Assume that Cowell Company uses the indirect method.
2. For each activity that is reported on the statement of cash flows, indicate whether each activity produces a cash inflow, a cash outflow, or has no cash effect.

### OBJECTIVE > 4

#### Problem 11-45B REPORTING NET CASH FLOW FROM OPERATING ACTIVITIES

The income statement for Dunn Products Inc. is presented below.

Dunn Products Inc. Income Statement For the Year Ended December 31, 2009		
Sales		\$3,700,000
Cost of goods sold		<u>2,157,000</u>
Gross margin		\$1,543,000
Operating expenses:		
Salaries expense	\$358,000	
Administrative expense	147,000	
Bad debt expense	37,000	
Depreciation expense	485,000	
Other expenses	<u>328,000</u>	1,355,000
Net income		<u>\$ 188,000</u>

The following balance sheet changes occurred during the year:

- Accounts receivable decreased by \$80,000
- Inventory increased by \$150,000
- Prepaid expenses increased by \$99,000
- Accounts payable decreased by \$54,000
- Salaries payable increased by \$21,000

#### Required:

1. Prepare the net cash flows from operating activities using the indirect method.
2. What are the causes of the major differences between net income and net cash flow from operating activities.

**Problem 11-46B CLASSIFICATION OF CASH FLOWS**

OBJECTIVE &gt; 2 3 4

Fannin Company is a manufacturer of premium athletic equipment. Fannin reported the following inflows and outflows of cash during 2009.

Net income	\$589,000
Increase in accounts receivable	32,000
Decrease in inventory	59,400
Decrease in prepaid insurance	45,800
Decrease in accounts payable	59,600
Decrease in income taxes payable	11,200
Increase in wages payable	21,600
Cash received from sale of investment	9,000
Cash paid for property, plant, and equipment	102,000
Depreciation expense	103,300
Proceeds from issuance of note payable	55,000
Payment on bonds payable	50,000
Cash received from issuance of common stock	25,000
Payment of cash dividends	55,000

Fannin had cash on hand at 1/1/09 of \$218,500.

**Required:**

Prepare a properly formatted statement of cash flows using the indirect method.

**Problem 11-47B PREPARING A STATEMENT OF CASH FLOWS**

OBJECTIVE &gt; 4 5 6

Volusia Company reported the following comparative balance sheets for 2009:

	2009	2008
<b>Assets:</b>		
Cash	\$ 28,100	\$ 18,000
Accounts receivable	26,500	32,000
Inventory	24,100	28,200
Prepaid rent	3,900	1,800
Long-term investments	37,200	25,500
Property, plant, and equipment	115,000	102,000
Accumulated depreciation	(47,100)	(38,600)
Total assets	<u>\$187,700</u>	<u>\$168,900</u>
<b>Liabilities and Equity:</b>		
Accounts payable	\$ 24,900	\$ 21,200
Interest payable	4,700	3,300
Wages payable	4,600	6,900
Income taxes payable	3,500	5,200
Notes payable	35,000	30,000
Common stock	72,900	65,000
Retained earnings	42,100	37,300
Total liabilities and equity	<u>\$187,700</u>	<u>\$168,900</u>

**Additional information:**

- Net income for 2009 was \$15,300.
- Cash dividends of \$10,500 were declared and paid during 2009.
- Long-term investments with a cost of \$18,000 were sold for cash at a loss of \$1,500. Additional long-term investments were purchased for \$29,700 cash.
- Equipment with a cost of \$20,000 and accumulated depreciation of \$16,300 was sold for \$4,500 cash. New equipment was purchased for \$33,000 cash.
- Depreciation expense was \$24,800.
- A principal payment of \$8,000 was made on long-term notes. Volusia issued notes payable for \$13,000 cash.
- Common stock was sold for \$7,900 cash.

**Required:**

Prepare a statement of cash flows for Volusia, using the indirect method to compute net cash flow from operating activities.

**OBJECTIVE** > **4** **5** **6****Problem 11-48B PREPARING A STATEMENT OF CASH FLOWS**

SDPS, Inc., provides airport transportation services in southern California. An income statement for 2009 and balance sheets for 2009 and 2008 appear below.

Sales		\$937,000
Less operating expenses:		
Wages expense	\$278,000	
Rent expense	229,000	
Fuel expense	83,000	
Maintenance expense	138,000	
Depreciation expense	<u>215,000</u>	<u>943,000</u>
Income (loss) from operations		\$ (6,000)
Other income (expenses):		
Loss on sale of vehicles	\$ (3,000)	
Interest expense	<u>(14,000)</u>	<u>(17,000)</u>
Net loss		<u><u>\$ (23,000)</u></u>

ASSETS	2009	2008
Current assets:		
Cash	\$ 40,000	\$ 82,000
Accounts receivable	126,000	109,000
Inventory, fuel	11,000	25,000
Total current assets	<u>\$177,000</u>	<u>\$216,000</u>
Property, plant, and equipment:		
Equipment, vehicles	\$ 524,000	\$ 409,000
Accumulated depreciation	<u>(174,000)</u>	<u>(136,000)</u>
Net property, plant, and equipment	<u>350,000</u>	<u>273,000</u>
Total assets	<u><u>\$527,000</u></u>	<u><u>\$489,000</u></u>
<b>LIABILITIES AND EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 103,000	\$ 58,000
Wages payable	22,000	29,000
Maintenance service payable	41,000	34,000
Rent payable	<u>92,000</u>	<u>51,000</u>
Total current liabilities	\$258,000	\$172,000
Long-term liabilities:		
Long-term notes payable	<u>100,000</u>	<u>125,000</u>
Total liabilities	\$358,000	\$297,000
Equity:		
Common stock	\$ 150,000	\$ 150,000
Retained earnings	<u>19,000</u>	<u>42,000</u>
Total equity	<u>169,000</u>	<u>192,000</u>
Total liabilities and equity	<u><u>\$527,000</u></u>	<u><u>\$489,000</u></u>

**Additional information:**

- Vehicles with a cost of \$310,000 and accumulated depreciation of \$177,000 were sold for \$130,000 cash. New vehicles were purchased for \$425,000 cash.
- A \$25,000 principal payment on the long-term note was made during 2009.
- No dividends were paid during 2009.

**Required:**

- Prepare a statement of cash flows, using the indirect method to compute net cash flow from operating activities.
- Explain what has been responsible for the decrease in cash.
- Determine whether an examination of the changes in the current liability accounts suggest how SDPS financed its increase in net property, plant, and equipment during a period in which it had a substantial net loss.

**Problem 11-49B (APPENDIX 11A) PREPARING NET CASH FLOWS FROM OPERATING ACTIVITIES—DIRECT METHOD****OBJECTIVE** > 8

Befuddled Corporation collected the following information on inflows and outflows for 2009:

**Inflows**

Cash collections from sales	\$941,500
Proceeds from sale of equipment	7,000
Proceeds received from issuance of notes payable	50,000

**Outflows**

Cash payments for cost of goods sold	\$523,900
Cash payments for operating expenses	173,200
Cash payments for interest	38,600
Cash payments for income taxes	41,300
Cash payments for purchases of equipment	209,000
Repayment of short-term notes payable	15,000
Payment of cash dividends	48,000

Befuddled had a cash balance of \$89,200 on 1/1/09.

**Required:**

Prepare a statement of cash flows, using the direct method to determine net cash flow from operating activities.

**Problem 11-50B (APPENDIX 11A) PREPARING NET CASH FLOWS FROM OPERATING ACTIVITIES—DIRECT METHOD****OBJECTIVE** > 8

Refer to the information for Dunn Products Inc. in **Problem 11-45B**.

**Required:**

Prepare the cash flows from operating activities section of the statement of cash flows, using the direct method.

**Problem 11-51B (APPENDIX 11B) USING A SPREADSHEET TO PREPARE A STATEMENT OF CASH FLOWS****OBJECTIVE** > 9

Fleet Limousine Service Inc. began operations in late March 2009. At the end of 2009, the following balance sheet was prepared for Fleet.

Fleet Limousine Service Inc. Balance Sheets December 31, 2009			
ASSETS			
Current assets:			
Cash	\$ 7,200		
Accounts receivable	15,900		
Supplies inventory	3,100		
Total current assets		\$ 26,200	
Long-term investments			15,000
Property, plant, and equipment:			
Land	\$ 11,000		
Building	175,000		
Equipment	233,400		
		\$419,400	
Accumulated depreciation	(35,500)		
Net property, plant, and equipment			383,900
Total assets			\$425,100
LIABILITIES AND EQUITY			
Current liabilities:			
Accounts payable	\$ 12,700		
Unearned revenue	21,800		
Salaries payable	4,600		
Rent payable	8,200		
Total current liabilities		\$ 47,300	
Long-term liabilities:			
Long-term notes payable			95,000
Total liabilities			\$142,300
Equity:			
Common stock	\$300,000		
Retained earnings	(17,200)		
Total equity			282,800
Total liabilities and equity			\$425,100

**Additional information:**

- a. During 2009, land was purchased for \$11,000, a building was purchased for \$175,000, and equipment was purchased for \$233,400.
- b. Depreciation expense for 2009 was \$35,500.
- c. The long-term note was issued for \$100,000, and a principal payment of \$5,000 was made during 2009.
- d. Common stock was issued for \$300,000 cash during 2009.
- e. During 2009, there was a net loss of 17,200 and no dividends were paid.

**Required:**

1. Using a spreadsheet, prepare a statement of cash flows for 2009. Assume Fleet Limousine uses the indirect method.
2. Discuss whether Fleet Limousine appears to have matched the timing of inflows and outflows of cash.

## Cases

### Case 11-52 THE STATEMENT OF CASH FLOWS AND CREDIT ANALYSIS

June's Camera Shop sells cameras and photographic supplies of all types to retail customers. June's also repairs cameras and provides color prints. To compete with other camera departments, June's offers fast, efficient, and effective repairs and photographic processing. For fiscal 2009 and 2008, June's accountant prepared the following statements of cash flows:

June's Camera Shop Statements of Cash Flows For the Years Ended January 31, 2009 and 2008		
	2009	2008
<b>Cash flows from operating activities</b>		
Net income	\$ 87,000	\$ 63,000
Adjustments to reconcile net income to net cash provided by operating activities:		
Increase in accounts receivable	\$(17,000)	\$(12,000)
Increase in inventory	(19,000)	(11,000)
Increase in accounts payable	15,000	14,000
Increase in wages payable	11,000	5,000
Increase in income taxes payable	6,000	3,000
Depreciation expense	<u>41,000</u>	<u>37,000</u>
Total adjustments	37,000	36,000
Net cash provided by operating activities	<u>\$124,000</u>	<u>\$ 99,000</u>
<b>Cash flows from investing activities</b>		
Purchase of long-term investments	\$(15,000)	\$(10,000)
Purchase of equipment	<u>(45,000)</u>	<u>(40,000)</u>
Net cash used by investing activities	(60,000)	(50,000)
<b>Cash flows from financing activities</b>		
Principal payments on mortgage	\$(15,000)	\$(15,000)
Payment of dividends	<u>(12,000)</u>	<u>(10,000)</u>
Net cash used by financing activities	<u>(27,000)</u>	<u>(25,000)</u>
Net increase in cash and cash equivalents	\$ 37,000	\$ 24,000
Cash and cash equivalents at beginning of year	158,000	134,000
Cash and cash equivalents at end of year	<u>\$195,000</u>	<u>\$158,000</u>

#### Required:

- Does June's Camera Shop appear to have grown in size during the past two years?
- June's president, June Smith, would like to open a second store. Smith believes that \$225,000 is needed to equip the facility properly. The business has \$100,000 of cash and liquid investments to apply toward the \$225,000 required. Do the data in the 2009 and 2008 statements of cash flow suggest whether or not June's Camera Shop is likely to be able to secure a loan for the remaining \$125,000 needed for the expansion?
- How long should it take June's Camera Shop to pay back the \$125,000?

### Case 11-53 PROFITABILITY DECLINES AND THE STATEMENT OF CASH FLOWS

The Bookbarn, Inc., is a retail seller of new books in a moderate-sized city. Although initially very successful, The Bookbarn's sales volume has declined since the opening

of two competing bookstores two years ago. The accountant for The Bookbarn prepared the following statement of cash flows at the end of the current year:

<b>The Bookbarn, Inc.</b>		
<b>Statement of Cash Flows</b>		
<b>For the Year Ended December 31, 2009</b>		
<b>Cash flows from operating activities</b>		
Net income		\$ 26,500
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation expense	\$ 38,500	
Loss on sale of equipment	2,100	
Increase in accounts receivable	(1,200)	
Increase in inventory	(3,800)	
Increase in accounts payable	6,700	
Decrease in wages payable	<u>(1,200)</u>	
Total adjustments		<u>41,100</u>
Net cash provided by operating activities		\$ 67,600
<b>Cash flows from investing activities</b>		
Equipment purchase	\$(12,000)	
Proceeds from sale of equipment	<u>2,300</u>	
Net cash used by investing activities		\$ (9,700)
<b>Cash flows from financing activities</b>		
Payment of dividends	\$ (4,000)	
Repayment of mortgage	<u>(10,000)</u>	
Net cash used by financing activities		<u>(14,000)</u>
Net increase in cash		<u>\$ 43,900</u>

Your analysis suggests that The Bookbarn's net income will continue to decline by \$8,000 per year to \$18,500 as sales continue to fall. Thereafter, you expect sales to stabilize.

**Required:**

1. What will happen to the amount of cash provided by operations as net income decreases?
2. Assume that equipment is nearly fully depreciated but that it will be fully serviceable for several years. What will happen to cash flows from operations as depreciation declines?
3. Do the operations of businesses experiencing declining sales volumes always consume cash? Explain your answer.
4. Can current assets and current liabilities buffer operating cash flows against the impact of declines in sales volume in the short run? In the long run? Explain your answer.

**Case 11-54 PREPARING A PROSPECTIVE STATEMENT OF CASH FLOWS**

Jane and Harvey Wentland have decided to open a retail athletic supply store, Fitness Outfitters, Inc. They will stock clothing, shoes, and supplies used in running, swimming, bicycling, weight lifting, and other exercise and athletic activities. During their first year of operations, 2009, they expect the following results. (Subsequent years are expected to be more successful.)

Sales revenue	\$629,000
Less: Cost of goods sold	<u>291,000</u>
Gross margin	\$338,000
Less: Operating expenses	<u>355,000</u>
Net loss	<u>\$ (17,000)</u>

By the end of 2009, Fitness Outfitters needs to have a cash balance of \$5,000 and is expected to have the following partial balance sheet:

<b>ASSETS</b>		
Inventory		\$ 53,000
Store equipment	\$97,000	
Accumulated depreciation, store equipment	<u>15,000</u>	82,000
<b>LIABILITIES AND EQUITY</b>		
Accounts payable		\$ 37,000
Common stock		100,000
Retained earnings		(17,000)

Assume that all sales will be for cash and that store equipment will be acquired for cash.

**Required:**

1. Prepare as much of the statement of cash flows for 2009 as you can. Use the direct method to determine cash flows from operations.
2. In the statement that you prepared for requirement 1, by how much does the prospective cash balance exceed or fall short of the desired cash balance? If a shortfall occurs, where would you suggest that Jane and Harvey seek additional cash?
3. Does the preparation of a prospective statement of cash flows seem worthwhile for an ongoing business? Why?

**Case 11-55 INCOME, CASH FLOW, AND FUTURE LOSSES**

On January 1, 2007, Cermack National Bank loaned \$5,000,000 under a two-year, zero coupon note to a real estate developer. The bank recognized interest revenue on this note of approximately \$400,000 per year. Due to an economic downturn, the developer was unable to pay the \$5,800,000 maturity amount on December 31, 2008. The bank convinced the developer to pay \$800,000 on December 31, 2008, and agreed to extend \$5,000,000 credit to the developer despite the gloomy economic outlook for the next several years. Thus, on December 31, 2008, the bank issued a new two-year, zero coupon note to the developer to mature on December 31, 2010 for \$6,000,000. The bank recognized interest revenue on this note of approximately \$500,000 per year.

The bank's external auditor insisted that the riskiness of the new loan be recognized by increasing the allowance for uncollectible notes by \$1,500,000 on December 31, 2008, and \$2,000,000 on December 31, 2009. On December 31, 2010, the bank received \$1,200,000 from the developer and learned that the developer is in bankruptcy and that no additional amounts would be recovered.

**Required:**

1. Prepare a schedule showing annual cash flows for the two notes in each of the four years.
2. Prepare a schedule showing the effect of the notes on net income in each of the four years.
3. Which figure, net income or net cash flow, does the better job of telling the bank's stockholders about the effect of these notes on the bank? Explain by reference to the schedules prepared in requirements 1 and 2.
4. A commonly used method for predicting future cash flows is to predict future income and adjust it for anticipated differences between net income and net cash flow. Does the Cermack National Bank case shed any light on the justification for using net income in this way rather than simply predicting future cash flows by reference to past cash flows?

**Case 11-56 RESEARCHING ACCOUNTING STANDARDS: DISSENTING VIEWS AND THE STATEMENT OF CASH FLOWS**

The preparation of cash flow statements is required by Statement of Financial Accounting Standards No. 95, “The Statement of Cash Flows,” adopted by a four-to-three vote of the FASB. Several members of the Board took exception to various aspects of the statement, including (1) the classification of interest and dividends received and interest paid as cash flows from operations and (2) the use of the indirect method.

**Required:**

Obtain a copy of Statement of Financial Accounting Standards No. 95 (FAS 95) from the FASB website. This can be obtained by:

- a. Entering the following web address in your browser: <http://www.fasb.org>
- b. Selecting “Pronouncements and EITF Abstracts” from the menu at the left.
- c. Selecting “Statement of Accounting Standards No. 95”

Answer the following questions:

1. How did dissenting members of the FASB prefer that interest and dividends received and interest paid be classified? (See the section following paragraph 34 of the full text of Statement No. 95.) How did the FASB justify classifying these items as cash flows from operations? (See paragraph 90 of Statement No. 95.)
2. Why did dissenting members of the FASB take exception to the indirect method? (See the section following paragraph 34 of the full text of Statement No. 95.) How did the FASB justify permitting use of the indirect method? (See paragraphs 108, 109, and 119 of Statement No. 95.)

**Case 11-57 RESEARCH AND ANALYSIS USING THE ANNUAL REPORT**

Obtain John Deere’s 2007 annual report either through the “Investor Relations” portion of their website (do a web search for John Deere investor relations) or go to <http://www.sec.gov> and click “Search for company filings” under “Filings & Forms (EDGAR).”

**Required:**

Answer the following questions:

1. What method of computing net cash flow from operating activities did John Deere use?
2. What was the amount of net cash provided by operating activities for the two most current years? What were the most significant adjustments that caused a difference between net income and net cash provided by operating activities?
3. What amount did the company pay for interest during the most current year? For taxes during the most current year? (Hint: You may need to refer to the notes to the financial statements.)
4. Why was the provision for depreciation and amortization added to net income to compute the net cash provided by operating activities?
5. Refer to John Deere’s investing and financing activities. What were some of John Deere’s significant uses of cash? What were some of John Deere’s significant sources of cash?
6. What was the amount of cash dividends paid by John Deere for the most current year?
7. Are the time commitments of inflows and outflows well matched by John Deere?
8. Are debt and equity likely to be available as inflows of cash in the near future?

**Case 11-58 COMPARATIVE ANALYSIS: ABERCROMBIE & FITCH vs. AEROPOSTALE**

Refer to the financial statements of **Abercrombie & Fitch** and **Aeropostale** that are supplied with this text.

**Required:**

Answer the following questions:

1. What method of computing net cash flow from operating activities did Abercrombie & Fitch use? What method of computing net cash flow from operating activities did Aeropostale use? Would you expect these to be the same? Why or why not?
2. Find net cash provided by operating activities for each company:
  - a. What was the amount of cash provided by operating activities for the year ending February 3, 2007 (fiscal 2006) for Abercrombie & Fitch? What was the amount of cash provided by operating activities for the year ending February 3, 2007, for Aeropostale?
  - b. What was the most significant adjustment that caused a difference between net income and net cash provided by operating activities?
  - c. Comparing net income to net cash provided by operating activities, can you draw any conclusions as to the quality of each company's earnings?
3. Refer to each company's investing and financing activities. What were some of the more significant uses of cash? What were some of the more significant sources of cash?
4. Refer Does each company match the time commitments of inflows and outflows of cash well?
5. Refer Are debt and equity likely to be available as inflows of cash in the near future?

# 12

## Financial Statement Analysis

After studying Chapter 12, you should be able to:

- ▶ **1** Explain how creditors, investors, and others use financial statements in their decisions.
- ▶ **2** Become familiar with the most important SEC filings.
- ▶ **3** Understand the difference between cross sectional and time series analysis.
- ▶ **4** Analyze financial statements using horizontal and vertical analysis.
- ▶ **5** Calculate and use financial statement ratios to evaluate a company.
- ▶ **6** Understand the effect accounting policies may have on financial statement analysis.





**E**xperience Financial Accounting  
with Abercrombie & Fitch

The **Abercrombie & Fitch** brand was established in 1892. Originally an outdoor store, it became well known for supplying Admiral Byrd's expeditions to the North and South Poles and safaris for Teddy Roosevelt and Ernest Hemingway. As such, A&F products gained a reputation for being rugged, high-quality outdoor gear.

One hundred years later, in 1992, Abercrombie & Fitch was repositioned as a fashion-oriented, casual apparel brand. Marketing was aimed at both male and female college students to reflect East Coast/Ivy League traditions.

Since 1992, the target market has been expanded down to teens and children and now also includes the abercrombie, Hollister, and RUEHL brands. Certainly most of us have seen these brands being worn around our campuses and towns. Yet, how do we know whether Abercrombie & Fitch would be a good company in which to invest? In reading this chapter, you will learn about a number of tools used by investors and creditors to analyze the financial status of Abercrombie & Fitch and other companies.

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UNITED STATES SECURITIES AND EXCHANGE COMMISSION  
Washington, D. C. 20549

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**FORM 10-K**

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended February 3, 2007

OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number 1-12107

**ABERCROMBIE & FITCH CO.**

(Exact name of registrant as specified in its charter)

Throughout this book, you have learned how to record (i.e., the debits and the credits) many of the most common transactions in which a company engages. You have also studied how these debits and credits are summarized in the financial statements and how this information is useful to those interested in the company.

In this chapter, we review, extend, and summarize the role of financial statements in business decision-making. The types of decisions facing customers, suppliers, employees, creditors, and investors are discussed. However, we concentrate primarily on investment and credit decisions.

Potential investors and creditors typically restate financial statements into percentage terms to facilitate comparison to other companies and previous years. Techniques such as horizontal analysis, vertical analysis, and ratio analysis use percentages for comparison purposes. A comparison of a company's performance in one time period with its performance in different time periods is called time series, or trend analysis. When the performance of a company is compared with similar companies, in either current or past periods, it is referred to as cross sectional analysis. These comparisons are useful because very few analysis techniques involve comparison with an absolute standard that can be applied to a large variety of companies for multiple periods.

In this chapter, we will examine these various techniques in detail. We will begin with a discussion of the various groups of decision makers who use financial statements as well as a discussion of the SEC filings required for all publicly traded corporations. Then, after exploring various financial-statement analysis techniques, the chapter closes with a discussion of the impact that different accounting methods can have on the analysis of financial statements.

Reading this chapter will help you answer the following questions:

- What decision-making groups use financial statements and what questions are they able to answer by analyzing the financial statements?
- What information can be found in SEC filings?
- Where can various information be found in the Form 10-K?
- How are financial statements analyzed?

## OBJECTIVE > 1

Explain how creditors, investors, and others use financial statements in their decisions.

## Use of Financial Statements in Decisions

The role of financial statements is to provide information that will help creditors, investors, and others make judgments which serve as the foundation for various decisions. While customers, suppliers, employees, creditors, and investors all use financial statement data to make decisions, as shown in Exhibit 12-1, each group uses the

### Exhibit 12-1

#### Users of Financial Statements and Typical Questions



accounting information to answer different questions. In this section, we briefly examine the decisions made by each group and the financial statement data that are used. We will then concentrate on how investors and creditors analyze a company.

## Customer Decisions

Customers want to buy from companies that will (1) continue to produce goods or provide services in the future, and (2) provide repair or warranty service if required. The financial statements contain data describing the profitability and efficiency of a company's operations. These data can be used by customers to estimate the likelihood that a potential supplier will be able to deliver goods or services now and in the future.

## Supplier Decisions

A company that is considering selling goods or providing services to another company wants to know whether its customer will (1) pay for the purchase as agreed and (2) be able to continue to purchase and pay for goods and services. In the short term, a supplier is actually a short-term creditor. Suppliers, therefore, are concerned about the resources available to pay for items purchased, as well as other claims against those resources. In the long term, a supplier is much like a long-term creditor or investor, in that the long-term supplier must invest in the resources necessary to produce goods for or provide services to customers.

Suppliers use balance sheet data to estimate the likelihood that a customer will be able to pay for current purchases. They use income statement data to analyze whether a customer will be able to continue purchasing and paying for goods or services in the future.

## Employment Decisions

When you select an employer, you want to be sure that the company will provide (1) competitive salary and benefits, (2) experiences that will prepare you to assume increased responsibility, and (3) a secure position for the foreseeable future. Employees invest their time, energy, and expertise in an organization. In the short term, they realize returns from the same resources used to satisfy the claims of short-term creditors—the excess of the company's current assets over the claims against those assets. In the long term, salary and advancement will come from the profit and growth of the company—the same factors considered by creditors, investors, customers, and suppliers. Income statement data can help a prospective employee assess the likelihood that a company will provide the growth and profits necessary to support a successful career.

In related decisions, unions representing employees use the financial statements. For example, when the employer's income statement suggests the employer is performing very well, the union will seek greater wages and benefits. Conversely, when the income statement suggests the employer is performing poorly (e.g., the airline industry), unions may accept lower wages and benefits to help the employer stay in operation.

## Credit Decisions

An individual or an organization that is considering making a loan needs to know whether the borrower will be able to repay the loan and its interest. For short-term loans (those of one year or less), the principal and interest will be repaid from current assets—cash on hand and cash that can be secured by selling inventory and collecting accounts receivable. A short-term lender, then, is most interested in the composition and amounts of a borrowing company's current assets and current liabilities. The excess of the current assets over current liabilities, an amount called *working capital*, is particularly important.

For a long-term loan, the principal and interest will be repaid from cash provided by profits earned over the period of the loan. A long-term lender, then, is most interested in estimating (1) the future profits of the enterprise and (2) the amount of other claims against those profits, such as dividends to stockholders, payments to other lenders, and future investments by the firm.

Information from three different statements is useful in making credit decisions. An analysis of the balance sheet can provide information about the borrower's current liquidity. Profitability data developed from current and previous income statements are often helpful in forecasting future profitability. And sources and uses of cash presented in the statement of cash flows are helpful in forecasting the amount and timing of future claims against profits.

## Investment Decisions

Investors who buy stock in a corporation expect to earn returns on their investment from (1) dividends and (2) an increase in the value of the stock (a capital gain). Both dividends and increases in the value of the stock depend on the future profitability of the company. The larger the profits, the more resources the company has available for payment of dividends and for investment in new assets to use in creating additional profits.

Although detailed analysis of the corporation is where you find the best information for predicting (or forecasting) future profits, this cannot be done in a vacuum. You must also understand economic and industry factors. For example, if you ignore how economic factors such as rising interest rates affect home construction (it slows it down), then forecasts of corporations whose performances are tied to this industry, such as **Lowe's** or **Home Depot**, may be overly optimistic. As such, most analysts take a top-down approach when trying to predict future profits. This approach starts with gathering economic and industry data. In fact, professional analysts typically specialize in certain industries so that their knowledge of how the economy and industry interact will be applicable to all the corporations they analyze (or "follow"). Yet, at some point, you must begin to analyze the corporation itself.

### OBJECTIVE 2

Become familiar with the most important SEC filings.

## SEC Filings

Publicly traded corporations must file a variety of financial information, including audited financial statements, with the Securities and Exchange Commission (SEC) on an ongoing basis. For example, annual reports on **Form 10-K**, quarterly reports on **Form 10-Q**, and current reports for numerous specified events on **Form 8-K**, as well as many other disclosure requirements must be submitted to the SEC in a timely manner. These filings are the most important and complete source of financial information about the corporation and are the major source of information about the business for most investors (and creditors). A summary of the most important SEC filings is provided in Exhibit 12-2. A complete list of mandatory filings with more detailed descriptions is provided at <http://www.sec.gov/about/forms/secforms.htm>.

## Format and Content of Form 10-K

The most useful filing is Form 10-K, which is filed after each fiscal year end. We provide excerpts from Abercrombie & Fitch's and **Aeropostale's** 10-Ks at the end of the book in Appendices 1 and 2, respectively. The 10-K includes audited financial statements, but there is also a wealth of additional information. As seen in Appendices 1 and 2, 10-Ks are quite long (frequently well over 100 pages, remember these are just excerpts); however, all 10-Ks must follow a format mandated by the SEC. If you familiarize yourself with the mandated format, you will be able to find information of interest more efficiently.

Item 1 outlines the history of the company, discusses recent developments, and provides an overview of its industry and competitors. There is a detailed discussion of such things as major products, major suppliers and sources of raw materials, key customers, seasonalities, government regulations, and risk factors. A thorough read of this section is a good way to better understand the business and determine whether the company has a good strategy for creating profits.

Typically there is little important information in Items 2, 3, and 4. However, you should scan these items for anything of interest. Item 2 describes the property holdings of the company; Item 3 discusses lawsuits in which the company is involved;

## Exhibit 12-2

## The Most Important SEC Filings

Filing	Description
Form 10-K	The annual report on Form 10-K provides a comprehensive overview of the corporation's business and financial condition and includes <u>audited</u> financial statements. Although similarly named, the annual report on Form 10-K is <u>distinct</u> from the "annual report to shareholders," which a corporation must send to its shareholders when it holds an annual meeting to elect directors. For larger filers the 10-K must be filed within 60 days of their fiscal year end.
Form 10-Q	The Form 10-Q includes <u>unaudited</u> financial statements and provides a continuing view of the corporation's financial position during the year. The report must be filed for each of the first three fiscal quarters of the corporation's fiscal year. For larger filers this must be done within 40 days of the end of the quarter.
Form 8-K	In addition to filing Forms 10-K and 10-Q, public corporations must report material corporate events on a more current basis. Form 8-K is the "current report" companies must file with the SEC to announce major events that are important to investors and creditors.
Form DEF 14A (Proxy Statement)	The Proxy Statement notifies shareholders of issues that will be voted on at the annual shareholders' meeting. For example, shareholders commonly vote on the audit firm, executive compensation issues, and representation on the Board of Directors.
Forms 3, 4, and 5	Corporate officers, directors, and 10+ percent shareholders are collectively known as "insiders." Form 3 must be filed upon becoming an officer, director, or 10+ percent shareholder. Insiders must file Form 4 within two days of buying or selling the corporation's stock. Form 5 is a special annual filing.
Forms S-1 and S-2 (Registration Statements) Rule 424 (Prospectus)	Corporations must file these forms to "register" their securities with the SEC prior to offering them to investors. Contains information for potential investors related to the sale of stock by the corporation. When the corporation sells stock to the public for the first time it is called an "Initial Public Offering" or IPO. Subsequent offerings are referred to as Secondary Offerings.

\*Descriptions taken from the SEC website

Item 4 discusses anything brought to a shareholder vote in the fourth quarter (the 10-Qs handle this matter for the first three quarters). Item 3 is likely the most important of these items, as you will want to be aware of any serious litigation facing the company. However, most companies are parties to multiple lawsuits at any point in time, and a vast majority of these lawsuits will not materially affect the company. For example, if you look at Note 14 of Abercrombie & Fitch's 10-K (p. 727), you will see that Abercrombie & Fitch is aware of 20 lawsuits filed against it.

Item 5 provides a summary of recent stock price and dividend activity, while Item 6 summarizes financial data for the last five years. There is not much detail to these sections, but they do provide a nice overview. Further, Item 6 often provides information about key performance indicators, such as sales per square foot in the retail industry or revenues per passenger mile in the airline industry, which are not included in the financial statements.

Item 7 is Management's Discussion and Analysis, more frequently referred to as **MD&A**. This is one of the key parts of the 10-K. In this section, management discusses their views of the financial condition and performance of the company. Management is required to disclose trends, events, or known uncertainties that would materially affect the company. Included in this section are many statements about what will likely happen in the future. Although there is obviously uncertainty about whether these future events will happen, this information is designed to provide investors with information management believes necessary to understand the company and predict, or forecast, future performance. Item 7A is where the effect of market risk factors, such as fluctuating interest rates or currency exchange rates, on the company's financial performance is discussed. It is important to read the MD&A.

Item 8 contains the corporation's balance sheets for the last two years and income statements and statements of cash flows for the last three years. These three financial statements are the primary sources of information for analysts. Specifically, as discussed in other chapters and later in this chapter, financial statement ratio analysis provides analysts with a wealth of information to evaluate such things as the corporation's

profitability, asset and debt management, and short-term liquidity. One part of Item 8 that should not be ignored is the footnotes provided as a supplement to the financial statements. This is where you will find information about the corporation's accounting policies (e.g., does the company use LIFO or FIFO?), as well as disclosures providing additional detail about various accounts listed on the financial statements. Unfortunately, a detailed analysis of the footnotes is beyond the scope of this course, but much information can be gained through a careful reading of this section.

Finally, Item 8 also includes the auditor's opinions on (1) the effectiveness of the corporation's system of internal controls over financial reporting and (2) the appropriateness of the financial statements and accompanying footnotes. Although these opinions are typically "unqualified" indicating no major problems, you should definitely look at these opinions to ensure this is true. Auditing financial statements is one of the primary services provided by CPAs and is the focus of multiple courses for accounting majors.

Item 9 is reserved for changes in or disagreements with the auditors. This item also rarely indicates a problem, but you should look at it just in case. Item 9A is a recent addition to 10-K's in response to requirements made by the passage of the Sarbanes-Oxley Act. Here management acknowledges their responsibility for establishing and maintaining a system of internal controls over financial reporting, their testing of this system's effectiveness, and their opinion of its effectiveness. It is this system of internal controls on which the auditors provide an opinion, although as discussed in the previous paragraph, the opinion is frequently included in Item 8.

Items 10 through 14 provide information that is usually provided in the proxy statement (see Form DEF 14A in Exhibit 12-2) because shareholders typically vote on whether to retain directors, officers, and auditors (i.e., principal accountants). Of course, the names of the parties are disclosed, as are their business experience or any family relationships with other directors or officers. Finally, Item 15 is a listing of the financial statements (discussed as part of Item 8) and other required filings.

### OBJECTIVE 3

Understand the difference between cross sectional and time series analysis.

## Analyzing Financial Statements with Cross Sectional and Time Series Analysis

As with many things in life, context is all important in financial statement analysis. For example, how well do you believe a corporation with \$3.3 billion in net sales is performing? Your answer should be that it depends. That is, if net sales for the previous two years were \$4.5 billion and \$3.9 billion, respectively, you would say the trend is quite negative. However, if net sales for the previous two years were \$2.0 billion and \$2.8 billion, respectively, then you would conclude the trend is quite positive. Or, you could see how this corporation's sales growth stacks up against a major competitor's.

The context with which we placed our hypothetical corporation's net sales and sales growth demonstrates the two general comparisons we make when analyzing financial statements—cross sectional analysis and time series (or trend) analysis.

**Cross sectional analysis** compares one corporation to another corporation and to industry averages. Although this method is useful, it is often difficult to find a good comparison corporation, and even corporations classified in the same industry frequently have different aspects to their operations. For example, the Retail (Apparel) Industry in which Abercrombie & Fitch and Aeropostale are placed also includes The Shoe Carnival. Nonetheless, it is useful to highlight similarities, differences, strengths, and weaknesses of the corporation as compared to the competition and the industry as a whole. For example, for the year ended February 3, 2007, A&F's sales and net income grew by 19.2 percent and 26.4 percent, respectively. This sounds good, but we would be less impressed if Aeropostale's growth rates were far better than A&F's. In fact, over the same period, Aeropostale's sales and net income grew by 17.3 percent and 27.0 percent, respectively. So, these corporations' performance—at least along these two dimensions—are quite comparable. We will discuss more comparisons between A&F and Aeropostale later in the chapter.

**Time series (or trend) analysis** compares a single corporation across time. For example, if you look at Abercrombie & Fitch's Income Statement (p. 704), you see

that its net sales were \$2.02 billion in fiscal 2004, \$2.78 billion in fiscal 2005, and \$3.32 billion in fiscal 2006 (fiscal years end around the end of January of the following year), which shows a positive trend. Year-to-year comparisons of important accounts and account groups help to identify the causes of changes in a company's income or financial position. Knowing the causes of these changes is helpful in forecasting a company's future profitability and financial position. In fact, the SEC requires comparative financial statements (two years for the balance sheet and three years for both the income statement and statement of cash flows) in the 10-K, which facilitates trend analysis. Cross sectional and time series analysis are demonstrated in **Cornerstone 12-1**.

## HOW TO Interpret Cross Sectional and Time Series (or Trend) Analysis

### Concept:

Two common ways to analyze a corporation's financial statements are (1) cross sectional analysis and (2) time series (or trend) analysis. In cross sectional analysis, you compare the corporation's financial statements to a competitor or industry averages. In time series analysis, you compare specific line items of the financial statements over multiple years to see if the trends are positive or negative.

### Information:

Below is some information taken from Abercrombie & Fitch's and Aeropostale's financial statements.

#### Abercrombie & Fitch (in thousands)

	Fiscal Year Ended		
	2/3/07	1/28/06	1/29/05
Net sales	\$3,318,158	\$2,784,711	\$2,021,253
Cost of goods sold	1,109,152	933,295	680,029
Gross profit	\$2,209,006	\$1,851,416	\$1,341,224

#### Aeropostale (in thousands)

	Fiscal Year Ended		
	2/3/07	1/28/06	1/29/05
Net sales	\$1,413,208	\$1,204,347	\$964,212
Cost of goods sold	957,791	841,872	644,305
Gross profit	\$ 455,417	\$ 362,475	\$319,907

### Required:

- Using time series analysis, comment on the trend of A&F's cost of goods sold and gross profit.
- What are some weaknesses of using time series analysis alone?
- What is the primary weakness of using raw financial statement numbers in cross sectional analysis? What can you do about it?
- Using cross sectional analysis, compare A&F's gross profit to that of Aeropostale's.

### Solution:

- A&F's cost of goods sold increased by \$253,266 ( $\$933,295 - \$680,029$ ) from 2005 to 2006 and by \$175,857 between 2006 and 2007. In isolation this may seem bad, but of course, the primary reason for this increase is that sales were also increasing. In fact, A&F has a positive trend in gross profit, which increased by \$510,192 and \$357,590 between 2005 and 2006 and 2006 and 2007, respectively.



## CORNERSTONE 12-1



**CORNERSTONE**  
**12-1**  
*(continued)*

2. Two primary weaknesses come to mind. First, it is difficult to know the significance of changes without knowing the relative change. For example, a \$500,000 increase in gross profit is much more impressive if it is from \$1,000,000 to \$1,500,000 than if it is from \$100,000,000 to \$100,500,000. Second, it is difficult to evaluate the changes without knowing how the competition or industry is doing. For example, this growth in gross profit would be very impressive in years when industry growth is negative and the primary competitors' gross profits are declining, but less impressive if the converse were true.
3. The primary weakness is really a restatement of the first weakness mentioned in the solution for 2. Namely, raw financial statement numbers are virtually impossible to compare because even the closest competitors are often vastly different in size.

Using percentage changes from year to year or between two financial statement line items controls for differences in the relative sizes of items of interest. This is discussed in more detail in the horizontal, vertical, and ratio analysis sections that follow.

4. If we use raw financial statement numbers, it appears that A&F's gross profit grew much more than did Aeropostale's. Specifically, while A&F's grew by approximately \$510,192 and \$357,590 in the two years, Aeropostale's only grew by \$42,568 and \$92,942, respectively. However, when we put these in percentage terms we discover the following:

Growth in Gross Profit:	2006 to 2007*	2005 to 2006**
A&F	19.3%	38.0%
Aeropostale	25.6%	13.3%

\* $(2007 \text{ Gross Profit} - 2006 \text{ Gross Profit}) / 2006 \text{ Gross Profit}$

\*\* $(2006 \text{ Gross Profit} - 2005 \text{ Gross Profit}) / 2005 \text{ Gross Profit}$

This analysis suggests that A&F had a far better 2006, while Aeropostale had a better 2007—at least with respect to gross profit.

The comparative financial statements included in the 10-K report the results in dollar amounts. This makes it easy to detect large changes between years in accounts or groups of accounts. These changes may indicate that the corporation is changing or that the conditions under which the corporation operates are changing. However, while comparative financial statements show changes in the amounts of financial statement items, analysts often prefer to restate the financial statements in percentages. Typically, this is done with horizontal analysis, vertical analysis, and ratio analysis.

**OBJECTIVE** > **4**

Analyze financial statements using horizontal and vertical analysis.

## Analyzing the Financial Statements with Horizontal and Vertical Analysis

As mentioned previously, size differences (in dollars) from year to year or between companies can make time series and cross sectional analysis difficult. To combat this problem, many analysts use common size statements. **Common size statements** express each financial statement line item in percentage terms, which highlights differences.

In **horizontal analysis** each financial statement line item is expressed as a percent of the base year (typically the first year shown). **Cornerstone 12-2** shows how to prepare a common size income statement for horizontal analysis, while **Cornerstone 12-3** shows how to prepare a common size income statement and balance sheet for vertical analysis.

## HOW TO Prepare Common Size Statements for Horizontal Analysis

### Concept:

Horizontal analysis expresses each financial statement line item as a percent of the base year.

### Information:

Below is Aeropostale's income statement from its 2007 10-K.



## CORNERSTONE 12-2



Aeropostale, Inc. Consolidated Statements of Income (In thousands)			
	Fiscal Year Ended		
	Feb. 3, 2007	Jan. 28, 2006	Jan. 29, 2005
Net sales	\$1,413,208	\$1,204,347	\$ 964,212
Cost of goods sold	957,791	841,872	644,305
Gross profit	<u>\$ 455,417</u>	<u>\$ 362,475</u>	<u>\$ 319,907</u>
Selling, general, and administrative expenses	(289,736)	(227,044)	(183,977)
Other income, net	2,085	—	—
Income from operations	<u>\$ 167,766</u>	<u>\$ 135,431</u>	<u>\$ 135,930</u>
Interest income	7,064	3,670	1,438
Income before taxes	<u>\$ 174,830</u>	<u>\$ 139,101</u>	<u>\$ 137,368</u>
Income taxes	68,183	55,147	53,256
Net income	<u><u>\$ 106,647</u></u>	<u><u>\$ 83,954</u></u>	<u><u>\$ 84,112</u></u>

### Required:

Prepare a common size income statement to be used in horizontal analysis for Aeropostale.

### Solution:

Aeropostale, Inc. Consolidated Statements of Income			
	Fiscal Year Ended		
	Feb. 3, 2007	Jan. 28, 2006	Jan. 29, 2005
Net sales	146.6%	124.9%	100.0%
Cost of goods sold	148.7%	130.7%	100.0%
Gross profit	<u>142.4%</u>	<u>113.3%</u>	<u>100.0%</u>
Selling, general, and administrative expenses	(157.5%)	(123.4%)	(100.0%)
Other income, net	—*	—	—
Income from operations	<u>123.4%</u>	<u>99.6%</u>	<u>100.0%</u>
Interest Income	<u>491.2%</u>	<u>255.2%</u>	<u>100.0%</u>
Income before taxes	<u>127.3%</u>	<u>101.3%</u>	<u>100.0%</u>
Income taxes	<u>128.0%</u>	<u>103.6%</u>	<u>100.0%</u>
Net Income	<u><u>126.8%</u></u>	<u><u>99.8%</u></u>	<u><u>100.0%</u></u>

\*Because the base year value for other income is \$0, the common-size value is technically infinite. In this case you should consider what created this unusual item. In the MD&A section of the 10-K (p. 18), Aeropostale states, "Other income of \$2.1 million in fiscal 2006 was the result of the resolution of a dispute with a vendor regarding the enforcement of our intellectual property rights."



## CORNERSTONE 12-3



### HOW TO Prepare Common Size Statements for Vertical Analysis

#### Concept:

Vertical analysis expresses each financial statement line item as a percent of the largest amount on the statement.

#### Information:

Below are Aeropostale's income statements and balance sheets taken from its 2007 10-K.

#### Aeropostale, Inc. Consolidated Statements of Income (In thousands)

	Fiscal Year Ended		
	Feb. 3, 2007	Jan. 28, 2006	Jan. 29, 2005
Net sales	\$1,413,208	\$1,204,347	\$ 964,212
Cost of goods sold	957,791	841,872	644,305
Gross profit	\$ 455,417	\$ 362,475	\$ 319,907
Selling, general, and administrative expenses	(289,736)	(227,044)	(183,977)
Other income, net	2,085	—	—
Income from operations	\$ 167,766	\$ 135,431	\$ 135,930
Interest income	7,064	3,670	1,438
Income before taxes	\$ 174,830	\$ 139,101	\$ 137,368
Income taxes	68,183	55,147	53,256
Net income	\$ 106,647	\$ 83,954	\$ 84,112

#### Aeropostale, Inc. Consolidated Balance Sheet (In thousands)

	Feb. 3, 2007	Jan. 28, 2006
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 200,064	\$ 205,235
Short-term investments	76,223	20,037
Merchandise inventory	101,476	91,908
Prepaid expenses	12,175	12,314
Deferred income taxes	1,185	—
Other current assets	7,670	9,845
Total current assets	\$ 398,793	\$ 339,339
Fixtures, equipment and improvements (net)	175,591	160,229
Intangible assets	1,400	2,455
Deferred income taxes	3,784	—
Other assets	1,596	1,928
Total assets	\$ 581,164	\$ 503,951

**CORNERSTONE**  
**12-3**  
*(continued)*

	Feb. 3, 2007	Jan. 28, 2006
<b>LIABILITIES &amp; STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 63,918	\$ 57,165
Deferred income taxes		5,195
Accrued expenses	100,880	63,993
Total current liabilities	\$ 164,798	\$ 126,353
Deferred rent and tenant allowances	88,344	81,499
Retirement benefit plan liabilities	15,906	8,654
Deferred income taxes	—	2,655
Commitments and contingent liabilities	—	—
Total liabilities	\$ 269,048	\$ 219,161
Stockholders' equity:		
Common stock	\$ 593	\$ 586
Preferred stock	—	—
Additional paid-in capital	101,429	88,213
Other comprehensive income	(5,274)	(1,557)
Deferred compensation	—	(2,577)
Retained earnings	414,916	308,269
Treasury stock	(199,548)	(108,144)
Total stockholders' equity	\$ 312,116	\$ 284,790
Total liabilities and stockholders' equity	\$ 581,164	\$ 503,951

**Required:**

Prepare common size income statements and balance sheets to be used in vertical analysis for Aeropostale.

**Solution:**

<b>Aeropostale, Inc.</b>			
<b>Consolidated Statements of Income</b>			
<b>(In thousands)</b>			
	<b>Fiscal Year Ended</b>		
	Feb. 3, 2007	Jan. 28, 2006	Jan. 29, 2005
Net sales	100.0%	100.0%	100.0%
Cost of goods sold	<u>67.8%</u>	<u>69.9%</u>	<u>66.8%</u>
Gross profit	32.2%	30.1%	33.2%
Selling, general, and administrative	(20.5%)	(18.9%)	(19.1%)
Other income, net	<u>0.1%</u>	<u>0.0%</u>	<u>0.0%</u>
Income from operations	11.9%	11.2%	14.1%
Interest income	<u>0.5%</u>	<u>0.3%</u>	<u>0.1%</u>
Income before taxes	12.4%	11.5%	14.2%
Income taxes	<u>4.8%</u>	<u>4.6%</u>	<u>5.5%</u>
Net income	<u>7.5%*</u>	<u>7.0%*</u>	<u>8.7%</u>

\*The sum of the percentages in this column may be off slightly due to rounding.

**CORNERSTONE**  
**12-3**  
*(continued)*

**Aeropostale, Inc.**  
**Consolidated Balance Sheet**  
**(In thousands)**

	Feb. 3, 2007	Jan. 28, 2006
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	34.4%	40.7%
Short-term investments	13.1%	4.0%
Merchandise inventory	17.5%	18.2%
Prepaid expenses	2.1%	2.4%
Deferred income taxes	0.2%	0.0%
Other current assets	1.3%	2.0%
Total current assets	<u>68.6%</u>	<u>67.3%</u>
Fixtures, equipment and improvements (net)	30.2%	31.8%
Intangible assets	0.2%	0.5%
Deferred income taxes	0.7%	0.0%
Other assets	0.3%	0.4%
Total assets	<u>100.0%</u>	<u>100.0%</u>
<b>LIABILITIES &amp; STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	11.0%	11.3%
Deferred income taxes	0.0%	1.0%
Accrued expenses	17.4%	12.7%
Total current liabilities	<u>28.4%</u>	<u>25.1%*</u>
Deferred rent and tenant allowances	15.2%	16.2%
Retirement benefit plan liabilities	2.7%	1.7%
Deferred income taxes	0.0%	0.5%
Commitments and contingent liabilities	0.0%	0.0%
Total liabilities	<u>46.3%</u>	<u>43.5%</u>
Stockholders' equity:		
Common stock	0.1%	0.1%
Preferred stock	0.0%	0.0%
Additional paid-in capital	17.5%	17.5%
Other comprehensive income	(0.9%)	(0.3%)
Deferred compensation	0.0%	(0.5%)
Retained earnings	71.4%	61.2%
Treasury stock	(34.3%)	(21.5%)
Total stockholders' equity	<u>53.7%*</u>	<u>56.5%</u>
Total liabilities and stockholders' equity	<u>100.0%</u>	<u>100.0%</u>

\*The sum of the percentages in this column may be off slightly due to rounding.

Horizontal analysis is good for highlighting the growth (or shrinkage) in financial statement line items from year to year and is particularly useful for trend analysis. For example, looking at Aeropostale's common-size income statement in Cornerstone 12-3, we see that cost of goods sold has grown slightly faster than sales when comparing 2007 to 2005. This has resulted in the gross profit growth trailing the sales growth and raises the question of why the gross profit margin is shrinking.

**Vertical analysis**, on the other hand, expresses each financial statement line item as a percent of the largest amount on the statement. On the income statement, this is net sales and on the balance sheet it is total assets. Vertical analysis helps distinguish between changes in account balances that result from growth and changes that are likely to have arisen from other causes.

Identifying nongrowth changes and their causes can help forecast a company's future profitability or its future financial position. For example, we see that selling, general and administrative expenses (SG&A) have grown from approximately 19 percent of net sales in 2005 and 2006 to 20.5 percent of net sales in 2007. Because much of SG&A is essentially fixed (e.g., salaries and store costs), we might expect SG&A to decrease as a percentage of net sales in a period when net sales increased by almost 50 percent. Further, vertical analysis of the balance sheet reveals an essentially stable condition; a vast majority of the accounts, and all of the large dollar accounts, are about the same percentage of total assets in each year.

Of course, you can, and should, get much more in depth with such analysis. A careful horizontal and vertical analysis serves as a starting point for an inquiry into the causes of these changes, with the objective of forecasting the corporation's future financial statements.

## Analyzing the Financial Statements with Ratio Analysis

### OBJECTIVE > 5

Calculate and use financial statement ratios to evaluate a company.

**Ratio analysis** is an examination of financial statements conducted by preparing and evaluating a series of ratios. **Ratios** (or **financial ratios**), like other financial analysis data, normally provide meaningful information only when compared with ratios from previous periods for the same firm (i.e., time series/trend analysis) or similar firms (i.e., cross sectional analysis). As discussed previously, ratios help by removing most of the effects of size differences. When dollar amounts are used, size differences between firms may make a meaningful comparison impossible. However, properly constructed financial ratios permit the comparison of firms regardless of size.

We discuss six categories of ratio analysis: *Short-term liquidity ratios* are particularly helpful to short-term creditors, but all investors and creditors have an interest in these ratios. *Debt management ratios* and *profitability ratios* provide information for long-term creditors and stockholders. *Asset efficiency (or operating) ratios* help management operate the firm and indicate to outsiders the efficiency with which certain of the company's activities are performed. *Stockholder ratios* are of interest to a corporation's stockholders. Finally, *Dupont analysis* decomposes return on equity into margin, turnover, and leverage. All these ratios are shown and defined in Exhibit 12-4 on page 654.

We will use data from Abercrombie & Fitch's financial statements (pp. 704-708) to illustrate each of these types of financial statement ratios. We turn first to an examination of the ratios used to judge short-term liquidity.

### Short-Term Liquidity Ratios

Analysts want to know the likelihood that a company will be able to pay its current obligations as they come due. Failure to pay current liabilities can lead to suppliers refusing to sell needed inventory and employees leaving. As such, even companies with good business models can be forced into bankruptcy by their inability to pay current liabilities.

The cash necessary to pay current liabilities will come from existing cash or from receivables and inventory, which should turn into cash approximately at the same time the current liabilities become due. Property, plant, and equipment and other long-lived assets are much more difficult to turn into cash in time to meet current obligations without harming future operations. Accordingly, the **short-term liquidity ratios** compare some combination of current assets or operations to current liabilities.

**Current Ratio** Since a company must meet its current obligations primarily by using its current assets, the current ratio is especially useful to short-term creditors. The **current ratio** is computed by dividing current assets by current liabilities. Expressed as an equation, this ratio is:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Looking at Abercrombie & Fitch's 2007 balance sheet we find current assets and current liabilities and calculate the current ratio as follows:

	2007	2006
Total current assets	\$1,092,078	\$947,084
Total current liabilities	510,627	491,554
<b>Current ratio</b>	<b>2.14</b>	<b>1.93</b>

A&F's current ratio increased because current assets increased more rapidly than current liabilities. In fact, if you look at the details of A&F's current assets you see that although receivables were about the same in 2007 as in 2006, cash, marketable securities, and inventories all increased. On the current liabilities side, increases in accounts payable and accrued expenses were essentially offset by decreases in outstanding checks, deferred lease credits, and income taxes payable.

There are no absolute standards for ratios, so a company's ratios are typically compared to the industry averages and/or competitors. The average for the Retail - Apparel & Accessories is 2.07. By these standards, A&F's current ratio was somewhat weak in 2006. Does this mean that there is short-term liquidity risk? No, but it does mean that you should investigate further (perhaps looking harder at the more conservative short-term liquidity ratios discussed below).

**Quick Ratio** Some analysts believe that the current ratio overstates short-term liquidity. They argue that prepaid expenses (expenses for which payments are made before consumption) often cannot be converted into cash. Further, inventories must be sold and receivables collected from those sales before cash is obtained to pay maturing current liabilities. Both the sale of inventory and collection of receivables can require a lengthy period. Conservative analysts argue that only those current assets that can be turned into cash almost immediately should be used to measure short-term liquidity.

A more conservative measure of short-term liquidity is based on *quick assets* (usually cash, receivables, and short-term investments) and current liabilities. Expressed in equation form, the **quick ratio** (or *acid test ratio*, as it is sometimes called) is calculated as shown:

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Short-Term Investments} + \text{Receivables}}{\text{Current Liabilities}}$$

Looking at the detail of Abercrombie & Fitch's current assets, we can find the quick assets and liabilities and calculate the quick ratio as follows:

	2007	2006
Current assets:		
Cash and equivalents	\$ 81,959	\$ 50,687
Marketable securities	447,793	411,167
Receivables	43,240	41,855
Inventories	427,447	362,536
Deferred income taxes	33,170	29,654
Other current assets	58,469	51,185
Total current assets	\$1,092,078	\$947,084
Quick assets	572,992	503,709
Total current liabilities	\$ 510,627	\$491,554
<b>Quick ratio</b>	<b>1.12</b>	<b>1.02</b>

Generally, a quick ratio above 1.0 is considered adequate because there are enough liquid assets available to meet current obligations. Using this guideline, we see that A&F had little difficulty meeting its current obligations in 2006 or 2007. Further, A&F is well above the industry average of 0.92.

**Cash Ratio** An even more conservative short-term liquidity ratio is the **cash ratio**. Specifically, while the current and quick ratios assume that receivables will be collected, the cash ratio does not make this assumption. This ratio may be more appropriate for industries in which collectibility is uncertain or for corporations with high credit risk receivables. Expressed in equation form, the cash ratio is:

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Short-Term Investments}}{\text{Current Liabilities}}$$

Although Abercrombie & Fitch does not have high credit risk receivables, we can calculate the cash ratio as follows:

	2007	2006
Current assets:		
Cash and equivalents	\$ 81,959	\$ 50,687
Marketable securities	447,793	411,167
Receivables	43,240	41,855
Inventories	427,447	362,536
Deferred income taxes	33,170	29,654
Other current assets	58,469	51,185
Total current assets	<u>\$1,092,078</u>	<u>\$947,084</u>
Cash and marketable securities	→ 529,752	→ 461,854
Total current liabilities	\$ 510,627	\$491,554
<b>Cash ratio</b>	<b>1.04</b>	<b>0.94</b>

If you questioned the collectability of A&F's receivables, you may have been slightly concerned with its short-term liquidity in 2006 because there was not enough cash and marketable securities to pay off the current liabilities. Fortunately, this condition improved in 2007. Obviously, a cash ratio above 1.0 clearly indicates the ability to meet short-term obligations.

**Operating Cash Flow Ratio** The **operating cash flow ratio** takes a slightly different approach than the other three ratios. This ratio looks at the ability of operations to generate cash, which recognizes the more general concept that current obligations will be paid through operations (after all, selling inventory and collecting receivables is a big part of operations). This ratio is calculated as:

$$\text{Operating Cash Flow Ratio} = \frac{\text{Cash Flows from Operating Activities}}{\text{Current Liabilities}}$$

Looking at A&F's statement of cash flows and balance sheet we can obtain the necessary information and calculate the operating cash flow ratio as follows:

	2007	2006
Cash flows from operating activities	\$582,171	\$453,590
Total current liabilities	510,627	491,554
<b>Operating cash flow ratio</b>	<b>1.14</b>	<b>0.92</b>

In this case, we see similar results to what was calculated for the quick ratio (of course, they are not always similar). However, the conclusions are a bit more definitive. In 2006, A&F's operations did not generate enough cash to meet the current obligations due at the end of the year. That means that A&F's operations were going

to have to improve in 2007 (obviously they did) or A&F would need to obtain cash through additional borrowing or selling of stock.

All the ratios increased in 2007, which indicates an improvement in A&F's short-term liquidity. For creditors, this is clearly good news. Creditors typically prefer all these measures of short-term liquidity be as high as possible. However, because investments in current assets (especially cash, receivables, and inventory) earn very small returns compared with the returns on investments in noncurrent assets, management must minimize the proportion of capital invested in current assets if it is to maximize profit. **Cornerstone 12-4** illustrates how to calculate and interpret short-term liquidity ratios for Aeropostale.

## Debt Management Ratios

**Debt management ratios** provide information on two aspects of debt. First, they provide information on the relative mix of debt and equity financing (often referred to as its capital structure). The primary advantages of debt over equity are (1) interest payments are tax-deductible and (2) creditors do not share in profits. Debt, however, is riskier than equity, because unless the interest and principal payments are made when due, the firm may fall into bankruptcy. In most corporations, management attempts to achieve an appropriate balance between the cost advantage of debt and its extra risk.

Second, debt management ratios also try to show the corporation's ability to meet, or cover, its debt obligations through operations because interest and principal payments must be made as scheduled, or a company can be declared bankrupt. The times interest earned ratio is an example of the latter type of measurement.



### CORNERSTONE 12-4



## HOW TO Calculate and Interpret Short-Term Liquidity Ratios

### Concept:

Short-term liquidity ratios compare some or all of current assets, as well as cash flows from operations, to current liabilities in order to assess the corporation's ability to meet its current obligations. The logic of the current ratio is that current liabilities need to be paid over approximately the same time frame that current assets are turned into cash. Both the quick and cash ratios recognize that some current assets are harder to liquidate. The quick ratio excludes inventories because including inventories assumes that sales will be made; however, the quick ratio assumes that accounts receivable are easily turned into cash (i.e., liquid). This is true when customers have low credit risk and pay in relatively short amounts of time. Of course, such an assumption is not true for all industries. Consequently, the use of the cash ratio may be more appropriate in these cases because it excludes receivables in addition to inventories. In fact, the only current assets included are cash and marketable securities. The operating cash flow ratio, on the other hand, looks at the ability of cash generated from operating activities to meet current obligations. As with the current ratio, the operating cash flow ratio assumes that sales will continue into the future.

### Information:

Use Aeropostale's income statement and balance sheet in Exhibit 12-3 (on page 638) to calculate short-term liquidity ratios. You will also need to know that Aeropostale's cash flows from operations were (in thousands) \$144,384 and \$177,445 in 2006 and 2007, respectively.

### Required:

1. Calculate Aeropostale's current ratio for 2006 and 2007.
2. Calculate Aeropostale's quick ratio for 2006 and 2007.
3. Calculate Aeropostale's cash ratio for 2006 and 2007.
4. Calculate Aeropostale's operating cash flow ratio for 2006 and 2007 (operating cash flows are provided in the Information section above).
5. Comment on Aeropostale's short-term liquidity compared to the Abercrombie & Fitch ratios shown in the body of the text.

**Solution:****CORNERSTONE**  
**12-4**  
*(continued)*

$$1. \text{ Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

	2007	2006
Current Ratio	$\frac{\$398,793}{\$164,798} = 2.42$	$\frac{\$339,339}{\$126,353} = 2.69$

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Short-Term Investments} + \text{Accounts Receivable}}{\text{Current Liabilities}}$$

2.

	2007	2006
Quick Ratio	$\frac{\$200,064 + \$76,223 + 0}{\$164,798} = 1.68$	$\frac{\$205,235 + 20,037 + 0}{\$126,353} = 1.78$

$$3. \text{ Cash Ratio} = \frac{\text{Cash} + \text{Short-Term Investments}}{\text{Current Liabilities}}$$

	2007	2006
Cash Ratio	$\frac{\$200,064 + \$76,223}{\$164,798} = 1.68$	$\frac{\$205,235 + 20,037}{\$126,353} = 1.78$

$$\text{Operating Cash Flow Ratio} = \frac{\text{Cash Flows from Operating Activities}}{\text{Current Liabilities}}$$

4.

	2007	2006
Operating Cash Flow Ratio	$\frac{\$177,445^*}{\$164,798} = 1.08$	$\frac{\$144,384^*}{\$126,353} = 1.14$

\*Taken from the statement of cash flows. The numbers were provided in the Information Section of this Cornerstone.

5. Aeropostale's current ratio is well above the industry average of 2.07. Further, its quick and cash ratios are far above the 1.0 threshold considered adequate and its operating cash flow ratio, although weaker than the others, is adequate.

Aeropostale's short-term liquidity ratios are stronger than Abercrombie & Fitch's. This suggests that Aeropostale's risk of short-term insolvency is lower, although neither corporation is in much danger. Nonetheless, while A&F's ratios were all stronger in 2007 than in 2006, Aeropostale's ratios have all weakened. Investigation of Aeropostale's balance sheet indicates that the primary reason for the weakening ratios is the large increase in accrued expenses. Investigation of Note 7 shows that accrued expenses are made up of items such as wages and salaries payable, rent payable, outstanding gift cards, income taxes payable, etc. These items can fluctuate depending on the timing of year end. For example, if year end falls on a pay day, then wages and salaries payable will be much lower than if it does not. Obviously, Aeropostale must still pay these amounts, but given the strength of their ratios, their ability to pay is not the concern—rather it is the negative trend. Thus, concern about the negative trend is minimized because of the nature of the items that appear to drive the weakening ratios.

## Exhibit 12-3

## Aeropostale, Inc. Income Statement and Balance Sheet

Aeropostale, Inc. Consolidated Statements of Income (In thousands)			
	Fiscal Year Ended		
	Feb. 3, 2007	Jan. 28, 2006	Jan. 29, 2005
Net sales	\$1,413,208	\$1,204,347	\$ 964,212
Cost of goods sold	957,791	841,872	644,305
Gross profit	<u>\$ 455,417</u>	<u>362,475</u>	<u>319,907</u>
Selling, general, and administrative expenses	(289,736)	(227,044)	(183,977)
Other income, net	2,085	—	—
Income from operations	<u>\$ 167,766</u>	<u>\$ 135,431</u>	<u>\$ 135,930</u>
Interest income	7,064	3,670	1,438
Income before taxes	<u>\$ 174,830</u>	<u>\$ 139,101</u>	<u>\$ 137,368</u>
Income taxes	68,183	55,147	53,256
Net income	<u><u>\$ 106,647</u></u>	<u><u>\$ 83,954</u></u>	<u><u>\$ 84,112</u></u>
<b>Aeropostale, Inc.</b> <b>Consolidated Balance Sheets</b> (In thousands)			
	Feb. 3, 2007	Jan. 28, 2006	Jan. 29, 2005
<b>ASSETS</b>			
<b>Current assets:</b>			
Cash and cash equivalents	\$200,064	\$205,235	\$106,128
Short-term investments	76,223	20,037	76,224
Merchandise inventory	101,476	91,908	81,238
Prepaid expenses	12,175	12,314	10,138
Deferred income taxes	1,185	—	—
Other current assets	7,670	9,845	5,759
Total current assets	<u>\$398,793</u>	<u>\$339,339</u>	<u>\$279,487</u>
Fixtures, equipment and improvements (net)	175,591	160,229	122,651
Intangible assets	1,400	2,455	2,529
Deferred income taxes	3,784	—	—
Other assets	1,596	1,928	1,152
Total assets	<u><u>\$581,164</u></u>	<u><u>\$503,951</u></u>	<u><u>\$405,819</u></u>
<b>LIABILITIES &amp; STOCKHOLDERS' EQUITY</b>			
<b>Current liabilities:</b>			
Accounts payable	\$ 63,918	\$ 57,165	\$ 44,858
Deferred income taxes	—	5,195	893
Accrued expenses	100,880	63,993	51,243
Total current liabilities	<u>\$ 164,798</u>	<u>\$ 126,353</u>	<u>\$ 96,994</u>
Deferred rent and tenant allowances	88,344	81,499	63,065
Retirement benefit plan liabilities	15,906	8,654	6,158
Deferred income taxes	—	2,655	1,351
Total liabilities	<u>\$ 269,048</u>	<u>\$ 219,161</u>	<u>\$ 167,568</u>
Stockholders' equity:			
Common stock	\$ 593	\$ 586	\$ 581
Preferred stock	—	—	—
Additional paid-in capital	101,429	88,213	79,069
Other comprehensive income	(5,274)	(1,557)	(1,271)
Deferred compensation	—	(2,577)	(817)
Retained earnings	414,916	308,269	224,315
Treasury stock	(199,548)	(108,144)	(63,626)
Total stockholders' equity	<u>\$ 312,116</u>	<u>\$ 284,790</u>	<u>\$ 238,251</u>
Total liabilities and stockholders' equity	<u><u>\$ 581,164</u></u>	<u><u>\$ 503,951</u></u>	<u><u>\$ 405,819</u></u>

**Times Interest Earned Ratio** Some liabilities, like accounts payable, have flexible payment schedules that can be modified when necessary. Other liabilities—primarily short-term and long-term debt—have specific payment schedules that must be met. The cash used to make these payments must come from operations. Analysts use the **times interest earned ratio**, which measures the excess of net income over interest to gauge a firm's ability to repay its debt. The larger the excess of net income over interest, the greater the probability that a firm will be able to meet the interest payments on current or contemplated obligations. The concept is similar to when you hear statements about how much of the government's tax revenues are used to pay off debt.

In the times interest earned ratio, interest expense and income tax expense are added back to net income. The use of this subtotal is so common that it is known by its own acronym EBIT (earnings before interest and taxes). Taxes are excluded because they are paid after interest payments. In other words, if income were just large enough to cover interest payments, taxes would be zero. The equation used to calculate the ratio is:

$$\text{Times Interest Earned Ratio} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

Note that you often have to go to the financial-statement footnotes to find interest expense because many corporations net interest income with interest expense on the face of the income statement. Nonetheless, Abercrombie & Fitch does not have any interest expense (or if they do it is so insignificant they do not disclose it separately), thus their times interest earned ratio is infinite. The industry average is 4.97; obviously, Abercrombie & Fitch compares very well to the industry average on this dimension.

Now let us turn to the second type of debt-management ratio. We will consider four different ways of measuring the proportion of debt within a corporation's capital structure.

**Long-Term Debt-to-Equity Ratio** Despite its apparent misnomer, we prefer to define long-term debt as the sum of long-term debt and the debt-like obligations in current liabilities (notes or short-term loans). It is called the long-term debt-to-equity ratio because historically when corporations borrowed money, they locked themselves into long-term debt contracts. The **long-term debt-to-equity ratio** provides information on the proportion of capital provided by this type of debt and by stockholders. Of course, this type of debt also includes any current portion (i.e., long-term debt principal that must be repaid within the next 12 months). Additionally, it includes more flexible borrowing arrangements, such as lines of credit, that may be classified as current liabilities. The equation used in calculating this ratio is:

$$\text{Long-Term Debt-to-Equity Ratio} = \frac{\text{Long-Term Debt (including current portion)}}{\text{Total Equity}}$$

**Debt-to-Equity Ratio** Debt is also occasionally defined as the sum of long-term debt and all current liabilities. This is a more inclusive view of debt recognizing that if corporations did not have current liabilities such as accounts payable, they would have to take out other borrowings or sell stock to finance its assets. The equation used in calculating the **debt-to-equity ratio** is:

$$\text{Debt-to-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Total Equity}}$$

**Long-Term Debt or Debt-to-Total Assets** The proportion of total capital provided by creditors is also shown by the **long-term debt-to-total assets ratio** and the **debt-to-total assets ratio**. These measures are more useful when equity is small or subject to substantial changes. The ratio is computed as the sum of long-term and short-term debt divided by total assets (or by total liabilities plus equity):

$$\text{Long-Term Debt-to-Total Assets Ratio} = \frac{\text{Long-Term Debt (including current portion)}}{\text{Total Assets}}$$

$$\text{Debt-to-Total Assets Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

**Cornerstone 12-5** demonstrates how to calculate and interpret debt management ratios.



## CORNERSTONE 12-5



### HOW TO Calculate and Interpret Debt Management Ratios

#### Concept:

Debt management ratios provide information on two aspects of debt. First, they provide information on the relative mix of debt and equity financing (often referred to as its capital structure). Second, debt management ratios also try to show the corporation's ability to meet its debt obligations through operations because interest and principal payments must be made as scheduled, or a company can be forced into bankruptcy.

#### Information:

The following information is taken from **American Airlines'** 2007 10-K:

	2007	2006
Current liabilities:		
Accounts payable	\$ 1,083	\$ 987
Accrued salaries and wages	520	516
Accrued liabilities	1,608	1,648
Air traffic liability	3,986	3,782
Payable to affiliates	1,610	1,071
Current maturities of long-term debt	382	1,012
Other current liabilities	147	101
<b>Total current liabilities</b>	<b>\$ 9,336</b>	<b>\$ 9,117</b>
Long-term debt, less current maturities	6,600	7,787
Other long-term debt	8,005	10,012
<b>Total long-term liabilities</b>	<b>\$14,605</b>	<b>\$17,799</b>
<b>Total liabilities</b>	<b>\$23,941</b>	<b>\$26,916</b>
Total stockholders' equity	\$ 1,444	\$ (1,066)
Total assets	25,385	25,850
Interest expense	708	795
Net income	356	164
Income tax expense	0	0

#### Required:

1. Calculate American Airlines' times interest earned ratio for 2006 and 2007.
2. Calculate American Airlines' long-term debt-to-equity ratio for 2006 and 2007.
3. Calculate American Airlines' debt-to-equity ratio for 2006 and 2007.
4. Calculate American Airlines' long-term debt-to-total assets ratio for 2006 and 2007.
5. Calculate American Airlines' debt-to-total assets ratio for 2006 and 2007.
6. Comment on American Airlines' debt management.

#### Solution:

$$1. \text{ Times Interest Earned Ratio} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

	2007	2006
Times Interest Earned Ratio	$\frac{(\$356 + \$0 + \$708)}{\$708} = 1.50$	$\frac{(\$164 + \$0 + \$795)}{\$795} = 1.21$

$$2. \text{ Long-Term Debt-to-Equity Ratio} = \frac{\text{Long-Term Debt (including current portion)}}{\text{Total Equity}}$$

	2007	2006
Long-Term Debt to Equity	$\frac{\$6,600 + \$382}{\$1,444} = 4.84$	$\frac{\$7,787 + \$1,012}{\$(1,066)} = (8.25)$

**CORNERSTONE**  
**12-5**  
*(continued)*

$$3. \text{ Debt-to-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Total Equity}}$$

	2007	2006
Debt-to-Equity	$\frac{\$23,941}{\$1,444} = 16.58$	$\frac{\$26,916}{\$(1,066)} = (25.25)$

$$4. \text{ Long-Term Debt-to-Total Assets Ratio} = \frac{\text{Long-Term Debt (including current portion)}}{\text{Total Assets}}$$

	2007	2006
Long-Term Debt-to-Total Assets	$\frac{\$6,600 + \$382}{\$25,385} = 0.28$	$\frac{\$7,787 + \$1,012}{\$25,850} = 0.34$

$$5. \text{ Debt-to-Total Assets Ratio} = \text{Total Liabilities/Total Assets}$$

	2007	2006
Debt-to-Total Assets	$\frac{\$23,941}{\$25,385} = 0.94$	$\frac{\$26,916}{\$25,850} = 1.04$

6. From the times interest earned ratio, you can see that the bulk of American Airlines' net income is necessary to cover its interest expense in 2006 and 2007. Of course, this is a risky situation that must be investigated further. For example, now you may want to consider recurring income that is not in income from operations (e.g., interest income) and look at cash flows from operations and interest payments.

The long-term debt-to-equity and debt-to-equity ratios paint a similar picture. Specifically, American Airlines has a lot more debt financing than equity financing. The debt-to-equity ratio reveals that there is over 16 times more debt than equity in 2007.

Although the debt-to-equity ratios are improving, the negative equity in 2006 makes it more difficult to evaluate. In this case, a good option is to look at the debt-to-total asset ratios. The long-term debt-to-total asset ratio shows that approximately 28 percent of total assets are financed with long-term debt in 2007. The debt-to-total asset ratio shows that liabilities are 94 percent of total assets in 2007 and the ratio of above 1.0 in 2006 indicates negative equity. These ratios also suggest improvement and the percentage improvement is more meaningful. Namely, the long-term debt-to-total assets improved by about 18 percent and the debt-to-total assets improved by approximately 10 percent.

## Asset Efficiency Ratios

**Asset efficiency ratios** (or **operating ratios**) are measures of how efficiently a company uses its assets. The principal operating ratios are measures of **turnover**, that is, the average length of time required for assets to be consumed or replaced. The faster an asset is turned over, the more efficiently it is being used. These ratios provide managers and other users of a corporation's financial statements with easily interpreted measures of the time required to turn receivables into cash, inventory into cost of goods sold, or total assets into sales.

But managers are not the only people interested in asset efficiency ratios. Since well-managed, efficiently operated companies are usually among the most profitable, and since profits are the sources of cash from which long-term creditors receive their interest and principal payments, creditors seek information about the corporation's profit prospects from operating ratios. And stockholders find that larger profits are usually followed by increased dividends and higher stock prices, so they, too, are concerned with indicators of efficiency.

**Accounts Receivable Turnover Ratio** The length of time required to collect the receivable from a credit sale is the time required to turn over accounts receivable. The **accounts receivable turnover ratio** indicates how many times accounts receivable is turned over each year. The more times accounts receivable turns over each year, the more efficient are the firm's credit-granting and credit-collection activities.

Receivables turnover is computed by dividing net credit sales (credit sales less sales returns and allowances) by the average receivables balance. While some firms make all their sales on credit, many also make a substantial proportion of their sales for cash (or on credit cards which are essentially cash sales). It is unusual for a company making cash and credit sales to report the proportion that is credit sales. For that reason, the accounts receivable turnover ratio is often computed using whatever number the firm reports for sales.

$$\text{Accounts Receivable Turnover Ratio} = \frac{\text{Net Credit Sales or Net Sales}}{\text{Average Accounts Receivable}}$$

To find the average balance for any financial statement account, divide the sum of the beginning and ending balances by two.

Careful analysts examine quarterly or monthly financial statements, when available, to determine whether the amount of receivables recorded in the annual statements is representative of the receivables carried during the year. For example, retailers often have much larger receivables after the Christmas selling season than during other parts of the year. Using net sales, Abercrombie & Fitch's receivables turnover ratios were 69.95 and 77.99 for 2006 and 2007, respectively, so they are very efficient at collecting cash from their sales. This is far better than the industry average of 46.93. This superior ratio probably means that a vast majority of their sales are for cash (or third party credit cards that are collected very quickly). Although their 10-K does not discuss it in detail, A&F also has an in-store credit card, which, as discussed in Chapter 9, will increase receivables balances and reduce third-party credit card fees.

**Inventory Turnover Ratio** Inventory turnover is the length of time required to sell inventory to customers. The more efficient a firm, the more times inventory will be turned over. The **inventory turnover ratio** indicates the number of times inventory is sold during the year. It is computed by dividing the cost of goods sold by the average inventory. (Average inventory is beginning inventory plus ending inventory divided by 2.)

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

Abercrombie & Fitch's inventory turnover ratios were 3.25 and 2.81 for 2006 and 2007, respectively. This means that A&F turns over its inventory about three times per year or once every four months. Remember that inventory sitting in the warehouse or on the shelf is not earning a return. The weakening inventory turnover deserves some attention. For example, does the slower moving inventory indicate weakening sales? Further, the industry average is 4.68, so Abercrombie & Fitch is relatively inefficient with its inventory.

Now that we have examined both receivables and inventory turnover, let us combine these measurements to approximate the length of the operating cycle (the length of time required for an investment in inventory to produce cash). Abercrombie & Fitch's 2007 operating cycle can be estimated by adding the number of days needed to turn over both receivables and inventory. The inventory turns over in approximately 130 days ( $365 \text{ days} / 2.81 \text{ inventory turnover ratio}$ ) and the receivables turn over in approximately 4.7 days ( $365 \text{ days} / 77.99 \text{ receivables turnover ratio}$ ), which gives an operating cycle of approximately 135 days.

The longer the operating cycle, the larger the investment necessary in receivables and inventory. When assets are larger, more liabilities and equity are required to finance them. Large amounts of capital negatively affect net income and cash flows for dividends. Therefore, firms attempt to maintain as short an operating cycle as possible. A&F's operating cycle is relatively long.

**Asset Turnover Ratio** Another measure of the efficiency of a corporation's operations is the **asset turnover ratio**. This ratio measures the efficiency with which a corporation's assets are used to produce sales revenues. The more sales dollars produced by each dollar invested in assets, the more efficiently a firm is considered to be operating. The ratio is computed by dividing net sales by average total assets (beginning total assets plus ending total assets divided by 2):

$$\text{Asset Turnover Ratio} = \frac{\text{Net Sales}}{\text{Average Total Assets}}$$

It is important to note that turnover ratios must be interpreted carefully. A company's ability to increase its receivables turnover is limited by competitive considerations. If competitors allow customers a lengthy period before payment is expected, then the firm must offer similar credit terms or lose customers. In periods of high interest rates, the cost of carrying customers' receivables should not be underestimated. For example, a firm with credit sales of \$10,000 per day that collects in 30 rather than 90 days would save \$72,000 per year at a 12 percent interest rate [ $(60 \text{ days})(\$10,000 \text{ sales per day})(12\%)$ ].

However, a corporation's ability to increase its inventory turnover is also affected by its strategy and what the competition is doing. For example, if its strategy is to offer a wide selection or if its competitors stock large quantities of inventory, a corporation will be forced to keep more inventory on hand. This, of course, leads to lower inventory turnover.

Care must be exercised when evaluating the asset turnover ratio. Some industries (such as electric utilities and capital intensive manufacturers) require a substantially larger investment in assets to produce a sales dollar than do other industries (such as fast-food restaurants or footwear and catalog merchants). And obviously, a company's total assets turn over much more slowly than its inventories and receivables. Abercrombie & Fitch's asset turnover ratios were 1.75 and 1.64 in 2006 and 2007, respectively, which means about every 223 days ( $365 / 1.64$ ) in 2007. The asset turnover average for the industry is 1.96, so Abercrombie & Fitch is well below the average. But, it is not as far below on asset turnover as it is on accounts receivable turnover. **Cornerstone 12-6** illustrates how to calculate and interpret asset efficiency ratios.

Operating ratios measure the efficiency of a corporation's operations—a factor ultimately related to the corporation's profits. Let us now examine some direct measures of a corporation's profitability.



## CORNERSTONE 12-6



### HOW TO Calculate and Interpret Asset Efficiency Ratios

#### Concept:

Asset efficiency ratios are measures of how efficiently a corporation uses its assets. The principal operating ratios are measures of the average length of time required for assets to be consumed or replaced, or what the ratio calls turnover. The faster an asset is turned over, the more efficiently it is being used. These ratios provide managers and other users of a corporation's financial statements with easily interpreted measures of the time required to turn receivables into cash, inventory into cost of goods sold, or total assets into sales.

#### Information:

Use Aeropostale's income statement and balance sheet in Exhibit 12-3 to calculate asset efficiency ratios.

#### Required:

1. Calculate Aeropostale's accounts receivable turnover ratio for 2006 and 2007.
2. Calculate Aeropostale's inventory turnover ratio for 2006 and 2007.
3. Calculate Aeropostale's asset turnover ratio for 2006 and 2007.
4. Comment on Aeropostale's asset efficiency ratios comparing them to the Abercrombie & Fitch ratios shown in the body of the text.

#### Solution:

$$\text{Note: Average Balance} = \frac{\text{Beginning Balance} + \text{Ending Balance}}{2}$$

1. Accounts Receivable Turnover Ratio =  $\frac{\text{Net Sales}}{\text{Average Accounts Receivable}}$

	2007	2006
Accounts Receivable Turnover Ratio	$\frac{\$1,413,208}{\$0} = \text{Infinite}$	$\frac{\$1,204,347}{\$0} = \text{Infinite}$

2. Inventory Turnover Ratio =  $\frac{\text{Cost of Good Sold}}{\text{Average Inventories}}$

	2007	2006
Inventory Turnover Ratio	$\frac{\$957,791}{(\$101,476 + \$91,908)/2} = 9.91$	$\frac{\$841,872}{(\$91,908 + \$81,238)/2} = 9.72$

3. Asset Turnover Ratio =  $\frac{\text{Net Sales}}{\text{Average Total Assets}}$

	2007	2006
Asset Turnover Ratio	$\frac{\$1,413,208}{(\$581,164 + \$503,951)/2} = 2.60$	$\frac{\$1,204,347}{(\$503,951 + \$405,819)/2} = 2.65$

4. Aeropostale does not have significant receivables. This is because all its sales are made with cash or third-party credit cards. Although its accounts receivable turnover is obviously stronger than A&F's, A&F does have a strong accounts receivable turnover ratio. Aeropostale's inventory turnover ratios of 9.72 and 9.91 are much stronger than A&F's ratios of 3.25 and 2.81 (and well above the industry averages). These two ratios imply an operating cycle of approximately 36 days for Aeropostale compared to 135 days for A&F. All this information is also consistent with the asset turnover ratio, which is much stronger for Aeropostale.

Does this mean that Aeropostale is a much better run corporation? Perhaps it does, but we will discuss alternative explanations for these differences in the Dupont Analysis section.

## Profitability Ratios

**Profitability ratios** measure two aspects of a corporation's profits: (1) those elements of operations that contribute to profit and (2) the relationship of profit to total investment and investment by stockholders. The first group of profitability ratios [gross profit (or gross margin) percentage, operating margin percentage, and net profit margin percentage] expresses income statement elements as percentages of net sales. The second group of profitability ratios (return on assets and return on equity) divides measures of income by measures of investment. The gross profit percentage is explained first.

**Gross Profit (or Gross Margin) Percentage** **Gross profit percentage** is a measurement of the proportion of each sales dollar that is available to pay other expenses and provide profit for owners. The gross profit percentage indicates the effectiveness of pricing, marketing, purchasing, and production decisions. It is computed by dividing gross margin by net sales:

$$\text{Gross Profit Percentage} = \frac{\text{Gross Profit}}{\text{Net Sales}}$$

Abercrombie & Fitch's gross profit percentage was 66.5 percent in 2006 and 66.6 percent in 2007. This means that for every dollar in sales the merchandise cost approximately 33 cents, which results in approximately 67 cents in gross profit. This is far above the industry average of 37.7 percent.

In evaluating the gross profit, operating margin, and net profit margin percentage, it is important to recognize that there is substantial variation in profit margins from industry to industry. For example, retail grocery stores earn a relatively small amount of gross profit, operating margin, and net income per sales dollar. Pharmaceutical manufacturers, on the other hand, earn much more per sales dollar. Since the magnitude of these percentages is affected by many factors, changes from period to period must be investigated to determine the cause.

**Operating Margin Percentage** The **operating margin percentage** measures the profitability of a company's operations in relation to its sales. All operating revenues and expenses are included in income from operations, but expenses, revenues, gains, and losses that are unrelated to operations are excluded. For example, a retailer would exclude interest revenues produced by its credit activities from income from operations. The operating margin percentage is expressed as follows:

$$\text{Operating Margin Percentage} = \frac{\text{Income from Operations}}{\text{Net Sales}}$$

Abercrombie & Fitch's operating margin percentage was 19.5 percent in 2006 and 19.8 percent in 2007. The difference between the gross profit and operating margin percentage of approximately 47 percent (66.6 percent gross margin percentage – 19.8 percent operating margin percentage) means that approximately 47 cents on every dollar of sales are spent on operating expenses. Abercrombie & Fitch's operating margin percentage is well above the industry average of 10.0 percent.

**Net Profit Margin Percentage** The **net profit margin percentage** measures the proportion of each sales dollar that is profit. The ratio is determined by dividing net income by net sales:

$$\text{Net Profit Margin Percentage} = \frac{\text{Net Income}}{\text{Net Sales}}$$

Abercrombie & Fitch's net profit margin percentage was 12.0 percent in 2006 and 12.7 percent in 2007, which exceeds the industry average of 6.4 percent. Unlike the previous two percentages, which were essentially unchanged, there is slight improvement in the net profit margin percentage. Now let us examine two profitability measures that are based on income per dollar of investment.

**Return on Assets** The **return on assets** ratio measures the profit earned by a corporation through use of all its capital, or the total of the investment by both creditors and owners. Profit, or return, is determined by adding interest expense net of tax to net income. Interest expense net of tax is calculated as follows:

$$\text{Interest Net of Tax} = \text{Interest Expense} \times (1 - \text{Tax Rate})$$

Interest expense is added to net income because it is a return to creditors for their capital contributions. Because the actual capital contribution made by creditors is included in the denominator (average total assets), the numerator must be computed on a comparable basis. The equation is:

$$\text{Return on Assets} = \frac{\text{Net Income} + [\text{Interest Expense} \times (1 - \text{Tax Rate})]}{\text{Average Total Assets}}$$

Abercrombie & Fitch's return on assets was 21.03 percent in 2006 and 20.86 percent in 2007. As with the percentages discussed above, appropriate values for this ratio vary from industry to industry because of differences in risk. Over a several-year period, the average return on assets for an electric utility ought to be smaller than the average return on assets for a company that makes and sells home appliances. Companies in the home appliance industry have a much larger variability of net income because their operations are more sensitive to economic conditions. The average for the Retail—Apparel industry is 12.0 percent, so Abercrombie & Fitch is also well above the mean for this ratio.

**Return on Equity** The **return on equity** ratio measures the profit earned by a firm through the use of capital supplied by stockholders. Return on equity is similar to return on assets, except that the payments to creditors are removed from the numerator and the creditors' capital contributions are removed from the denominator. Therefore, return on equity is simply net income divided by average equity:

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Average Equity}}$$

One of the primary objectives of the management of a firm is to maximize returns for its stockholders. Although the link between a corporation's net income and increases in dividends and share price return is not perfect, the return on equity ratio is still an effective measure of management's performance for the stockholders. As is the case with return on assets, firms often differ in return on equity because of differences in risk. For example, the average several-year return on equity for a grocery store should be lower than the average return on equity for a retail department store because of the lower sensitivity to economic conditions. The return on equity for Abercrombie & Fitch was 40.1 percent and 35.2 percent in 2006 and 2007, respectively, which is substantially above the industry average of 26.2 percent. **Cornerstone 12-7** demonstrates how to calculate and interpret profitability ratios.



## CORNERSTONE 12-7



### HOW TO Calculate and Interpret Profitability Ratios

#### Concept:

Profitability ratios measure two aspects of a corporation's profits: (1) those elements of operations that contribute to profit and (2) the relationship of profit to total investment and investment by stockholders. The first group of profitability ratios [gross profit (or gross margin) percentage, operating margin percentage, and net profit margin percentage] express income statement elements as percentages of net sales. The second group of profitability ratios (return on assets and return on equity) divide measures of income by measures of investment.

#### Information:

Use Aeropostale's income statement and balance sheet in Exhibit 12-3 to calculate profitability ratios. In Aeropostale's Income Statement, interest expense is netted with interest income.

**Required:**

1. Calculate Aeropostale's gross profit percentage for 2006 and 2007.
2. Calculate Aeropostale's operating margin percentage for 2006 and 2007.
3. Calculate Aeropostale's net profit margin percentage for 2006 and 2007.
4. Calculate Aeropostale's return on assets for 2006 and 2007. Assume that Aeropostale's interest expense is \$1,560 and \$1,813 in 2006 and 2007, respectively.
5. Calculate Aeropostale's return on equity for 2006 and 2007.
6. Comment on Aeropostale's profitability ratios comparing them to the Abercrombie & Fitch ratios shown in the body of the text.

**CORNERSTONE**  
**12-7**  
*(continued)*

**Solution:**

Note: Average Balance =  $\frac{\text{Beginning Balance} + \text{Ending Balance}}{2}$

1. Gross Profit Percentage = Gross Profit/Net sales

	2007	2006
Gross Profit Percentage	$\frac{\$455,417}{\$1,413,208} = 32.2\%$	$\frac{\$362,475}{\$1,204,347} = 30.1\%$

2. Operating Margin Percentage = Income from Operations/Net Sales

	2007	2006
Operating Margin Percentage	$\frac{\$167,766}{\$1,413,208} = 11.9\%$	$\frac{\$135,431}{\$1,204,347} = 11.2\%$

3. Net Profit Margin Percentage = Net Income/Net Sales

	2007	2006
Net Profit Margin Percentage	$\frac{\$106,647}{\$1,413,208} = 7.5\%$	$\frac{\$83,954}{\$1,204,347} = 7.0\%$

4. Return on Assets =  $\frac{\text{Net Income} + [\text{Interest Expense} \times (1 - \text{Tax Rate})]}{\text{Average Total Assets}}$

	2007	2006
Return on Assets	$\frac{\$106,647 + [1,813^* \times (1 - 0.39)]}{(\$581,164 + \$503,951)/2} = 19.9\%$	$\frac{\$83,594 + [1,560^* \times (1 - 0.396)]}{(\$503,951 + \$405,819)/2} = 18.6\%$

Note: (Tax Rate = Income Taxes/Income before Taxes)

\* Provided in the part 4 of the Required section of this cornerstone.

5. Return on Equity = Net Income/Average Equity

	2007	2006
Return on Equity	$\frac{\$106,647}{(\$312,116 + \$284,790)/2} = 35.7\%$	$\frac{\$83,954}{(\$284,790 + \$238,251)/2} = 32.1\%$

6. Abercrombie & Fitch's gross profit percentage is more than twice as high as Aeropostale's. Specifically, A&F makes over 30 cents more in gross profit on every sales dollar than does Aeropostale [(66.6% × \$1) – (32.2% × \$1)]. However, much of this advantage is wiped out by the time we reach operating margin, as A&F's operating margin and net income are only about eight cents and five cents better, respectively, than Aeropostale's on every sales dollar. The return ratios, on the other hand, are virtually identical as both corporations earn a return of about 19 percent on assets and about 35 percent on equity.

We now turn to the stockholder ratios.

## Stockholder Ratios

Stockholders are primarily interested in two things: (1) the creation of value, and (2) the distribution of value. **Stockholder ratios** such as earnings per share and return on common equity provide information about the creation of value for shareholders. As discussed in Chapter 10, value is distributed to shareholders in one of two ways. Either the corporation issues dividends or repurchases stock. The remainder of the stockholder ratios—dividend yield, dividend payout, stock repurchase payout, and total payout—address this distribution of value.

**Earnings per Share (EPS)** **Earnings per share ratio**, or **EPS**, measures the income available for common stockholders on a per-share basis. EPS is one item that is examined by nearly all statement users. Conceptually, it is very simple: net income less preferred dividends divided by the average number of common shares outstanding. (Remember that treasury shares are not considered to be outstanding.) Preferred dividends are subtracted from net income because those payments are a return to holders of shares other than common stock. In fact, the numerator, net income less preferred dividends, is often called *income available for common shareholders*. The equation for the earnings per share ratio is:

$$\text{Earnings per Share Ratio} = \frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Number of Common Shares Outstanding}}$$

Although this formula allows you to calculate EPS on your own, corporations are also required to disclose EPS on the income statement. For example, Abercrombie & Fitch's EPS was \$3.83 in 2006 and \$4.79 in 2007, which represents 25 percent growth.

**Return on Common Equity** The **return on common equity ratio** is basically the same as the return on equity discussed in the profitability ratio section. We place this ratio here because it is arguably the most important ratio for investors. Plus, it gives us the opportunity to modify the ratio slightly by calculating the return on *common* equity rather than equity. To calculate common equity you subtract any contributed capital from preferred stock from total stockholders' equity (Total Equity – Preferred Stock – Paid-in Capital–Preferred Stock).

$$\text{Return on Common Equity} = \frac{\text{Net Income}}{\text{Average Common Equity}}$$

**Dividend Yield Ratio** The **dividend yield ratio** measures the rate at which dividends provide a return to stockholders, by comparing dividends with the market price of a share of stock. This ratio is conceptually similar to an interest rate on debt where the dividend is like the interest payment and the cost of the share of stock is the principal.

This ratio is affected by both the corporation's dividend policy and the behavior of its stock price. Because stock prices often change by substantial amounts over short periods, the dividend yield ratio is not stable. In fact, when a stock is traded regularly, the market price is likely to change many times each day. For this reason, some analysts compute dividend yield based on the average stock price for a given period. Others use the highest and the lowest prices for a period and present the dividend yield as a range. For ease, we calculate dividend yield using the closing market price for the year.

$$\text{Dividend Yield Ratio} = \frac{\text{Dividends per Common Share}}{\text{Closing Market Price per Share for the Year}}$$

For the year ended February 3, 2007, Abercrombie & Fitch paid dividends of \$0.70 per share and the closing market value of their common shares was \$80.77. This gives a dividend yield ratio of 0.9 percent, which is below the industry average of 1.8 percent.

**Dividend Payout Ratio** The **dividend payout ratio** measures the proportion of a corporation's profits that are returned to the stockholders immediately as dividends. To calculate this ratio, we will look at common dividends and net income.

$$\text{Dividend Payout Ratio} = \frac{\text{Common Dividends}}{\text{Net Income}}$$

You could calculate dividend payout using per share amounts (i.e., dividends per share/EPS), but this makes it more difficult to combine with the stock repurchases, so we use the total dollar amounts. You can find the dividends paid in the retained earnings column of the statement of stockholders' equity. For A&F, the common dividends paid were \$52,218 in 2006 and \$61,623 in 2007. With net income of \$333,986 in 2006 and \$422,186 in 2007, this produces dividend payout ratios of 15.6 percent and 14.6 percent in 2006 and 2007, respectively.

The dividend payout ratio varies from corporation to corporation, even within a given industry. Most corporations attempt to pay some stable proportion of earnings as dividends. Corporations are reluctant to reduce dividends unless absolutely necessary. The result of these two tendencies is that dividends per share are usually increased only when management is confident that higher earnings per share can be sustained. An increase in the dividend payout ratio is usually a signal that management expects future net income to be larger and sustainable.

**Total Payout Ratio** The **total payout ratio** adds stock repurchases to common dividends and compares this to net income. You can find stock repurchases by looking at the treasury stock column of the statement of stockholders' equity.

$$\text{Total Payout Ratio} = \frac{\text{Common Dividends} + \text{Common Stock Repurchases}}{\text{Net Income}}$$

Abercrombie & Fitch had \$103,296 in stock repurchases during 2006 and none in 2007. When coupled with the dividends and net income of \$333,986 in 2006 and \$422,186 in 2007, this produces total payout ratios of 46.6 percent and 14.6 percent in 2006 and 2007, respectively.

**Stock Repurchase Payout Ratio** The **stock repurchase payout ratio** can be calculated directly by taking:

$$\text{Stock Repurchase Payout Ratio} = \frac{\text{Common Stock Repurchases}}{\text{Net Income}}$$

or, indirectly by taking:

$$\text{Stock Repurchase Payout Ratio} = \text{Total Payout Ratio} - \text{Dividend Payout Ratio}$$

Using this latter formula, we see that A&F had a stock repurchase payout ratio of 31 percent in 2006 and 0 percent in 2007. **Cornerstone 12-8** demonstrates how to calculate and interpret the stockholder ratios.

## Dupont Analysis

Return on equity/return on common equity (hereafter, ROE) is the most important measure of profitability for investors. It represents the amount of income generated

per dollar of book value of equity or common equity. In that way it is conceptually similar to an interest rate. Recall that ROE is calculated as:

$$\text{ROE} = \frac{\text{Net Income}}{\text{Average Equity}}$$

In earlier sections of this chapter, we learned that Abercrombie & Fitch and Aeropostale had very similar ROEs in 2007 (both return on equity and return on common equity because neither corporation had preferred stock), although A&F's ROE was down from 2006 while Aeropostale's was up:

	2007 ROE	2006 ROE
Abercrombie & Fitch	35.2%	40.1%
Aeropostale	35.7%	32.1%

**Dupont analysis** recognizes that ROE can be broken down into three important aspects of return—net profit margin, asset turnover, and leverage.

$$\begin{aligned} &= \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Total Assets}} \times \frac{\text{Average Total Assets}}{\text{Average Equity}} \\ &= \text{Net Profit Margin} \times \text{Asset Turnover} \times \text{Total Leverage} \end{aligned}$$

The logic of this breakdown is compelling. First, profitability requires that the corporation is able to earn an adequate gross profit margin. That is, Abercrombie & Fitch and Aeropostale must be able to sell their products for more than it costs to buy them. Net profit margin carries this idea down the income statement from gross profit to net income. As we learned earlier in the chapter, the net profit margin represents how many cents of profit there are on every sales dollar.

Second, how efficient is the corporation with its net assets? The desire for asset efficiency is obvious. Everyone knows that you would rather earn \$1,000,000 on an investment of \$5,000,000 than an investment of \$50,000,000. Before discussing leverage, we will focus a little more closely on net profit margin and asset turnover, which taken together give us return on assets (Net Income/Average Total Assets), albeit ignoring the after tax effect of interest expense in the numerator (see p. 646). To illustrate, consider Abercrombie & Fitch and Aeropostale for 2007. Their net profit margins and asset turnovers were:

	Net Profit Margin	Asset Turnover	Return on Assets
Abercrombie & Fitch	12.72%	1.64	20.86%
Aeropostale	7.55%	2.60	19.63%*

\*This differs from the return on assets shown in part 4 of Cornerstone 12-7 because Dupont analysis does not add back the after tax effect of interest expense to net income (see discussion on p. 646).

Remember, although Abercrombie & Fitch and Aeropostale have quite different net profit margins and asset turnovers, their ROEs were very similar for 2007. This highlights different strategies for achieving profitability. Aeropostale is more efficient with their assets. This is consistent with a corporation that is seeking to compete on price because to keep costs down you must be efficient with net assets. Abercrombie & Fitch, on the other hand, is a product differentiator. A successful product differentiator can earn higher margins on their products because customers view their products as sufficiently different from the competition's to warrant paying higher prices. Although not specifically part of the Dupont analysis, this is illustrated by Abercrombie & Fitch's gross profit margin percentage (66.6 percent) being more than double Aeropostale's (32.2 percent).

Most product differentiators experience lower asset turnover. You can probably think of these distinctions within and between industries. For example, **Wal-Mart** is a cost leader. They have very low margins, but make up for it by being extremely efficient with their assets. **Nordstrom's**, on the other hand, has much higher margins, but this is offset by lower turnover. Grocery stores have low margins and high turnover; auto dealers and jewelry stores have high margins and low turnover. Further, the trade-off between margins and turnover is evident in a number of decisions. For example, if a store puts an item on sale, it sacrifices margins and hopes to make up for it with higher turnover.

Although Abercrombie & Fitch has a higher return on assets than Aeropostale, as we can see in **Cornerstone 12-9**, Aeropostale ends up with a slightly higher ROE because of its higher leverage (1.82 for Aeropostale and 1.68 for Abercrombie & Fitch). Return on *equity* can be made larger than return on *assets* by leveraging these assets through the use of debt. The idea of leverage is simple. For example, if you can borrow at 8 percent and earn 10 percent (assuming the same tax rates on the interest and return), then you win. If you could guarantee these two figures after taxes, you should borrow all you can because you are netting 2 percent on every dollar. That is, if you borrow \$1,000,000 you will make \$20,000 (a \$100,000 return less \$80,000 in interest); of course, if you can borrow \$1,000,000,000, then you will make \$20,000,000.

## HOW TO Calculate and Interpret Stockholder Ratios

### Concept:

Stockholder ratios measure (1) the creation of value and (2) the distribution of value to shareholders. Earnings per share and return on common equity provide information about the creation of value for shareholders. Value is distributed to shareholders in two ways; either the corporation issues dividends or repurchases stock. Dividend yield, dividend payout, stock repurchase payout, and total payout address the distribution of value.

### Information:

Use Aeropostale's income statement and balance sheet in Exhibit 12-3 to calculate stockholder ratios. Aeropostale's average common shares for 2007 and 2006 were 53,285 and 54,994, respectively. They paid no dividends in 2007 or 2006. Aeropostale repurchased \$91,404 of common shares in 2007 and \$44,518 of common shares in 2006. (Average common shares are typically disclosed on the income statement. Information regarding dividends and stock repurchases can be found in the statement of stockholders' equity.)

### Required:

1. Calculate Aeropostale's earnings per share for 2006 and 2007.
2. Calculate Aeropostale's return on common equity for 2006 and 2007.
3. Calculate Aeropostale's dividend yield for 2006 and 2007.
4. Calculate Aeropostale's dividend payout for 2006 and 2007.
5. Calculate Aeropostale's total payout for 2006 and 2007.
6. Calculate Aeropostale's share repurchase payout for 2006 and 2007.
7. Comment on Aeropostale's shareholder ratios comparing them to the Abercrombie & Fitch ratios shown in the body of the text.

### Solution:

1. Earnings per Share Ratio = 
$$\frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Number of Common Shares Outstanding}}$$

	2007	2006
EPS	$\frac{\$106,647}{53,285} = \$2.00$	$\frac{\$83,954}{54,994} = \$1.53$

2. Return on Common Equity = 
$$\frac{\text{Net Income}}{\text{Average Common Equity}^*}$$

\*Common Equity = Total Equity - Preferred Stock - Paid-in capital from Preferred Stock

	2007	2006
Return on Common Equity	$\frac{\$106,647}{[(\$312,116 - \$0 - \$0) + (\$284,790 - \$0 - \$0)]/2} = 35.7\%$	$\frac{\$83,954}{[(\$284,790 - \$0 - \$0) + (\$238,251 - \$0 - \$0)]/2} = 32.1\%$



## CORNERSTONE 12-8



**CORNERSTONE**  
**12-8**  
*(continued)*

$$3. \text{ Dividend Yield Ratio} = \frac{\text{Dividends per Common Share}^*}{\text{Closing Market Price per Share for the Year}}$$

\*Dividends per share are taken from the Statement of Stockholders' Equity

	2007	2006
Dividend Yield Ratio	$\frac{\$0}{\$24.03} = 0.0\%$	$\frac{\$0}{\$20.31} = 0.0\%$

$$4. \text{ Dividend Payout Ratio} = \text{Common Dividends/Net Income}$$

	2007	2006
Dividend Payout Ratio	$\frac{\$0}{\$106,647} = 0.0\%$	$\frac{\$0}{\$83,954} = 0.0\%$

$$5. \text{ Total Payout Ratio} = \frac{\text{Common Dividends} + \text{Common Stock Repurchases}}{\text{Net Income}}$$

	2007	2006
Total Payout Ratio	$\frac{\$0 + \$91,404}{\$106,647} = 85.7\%$	$\frac{\$0 + \$44,518}{\$83,954} = 53.0\%$

$$6. \text{ Stock Repurchase Payout Ratio} = \text{Total Payout Ratio} - \text{Dividend Payout Ratio}$$

	2007	2006
Stock Repurchase Payout Ratio	$85.7\% - 0.0\% = 85.7\%$	$53.0\% - 0.0\% = 53.0\%$

7. Aeropostale's 2007 EPS of \$2.00 is much lower than A&F's EPS of \$4.79. However, its growth in EPS of 30.7 percent was quite a bit better than A&F's growth of 25 percent. Both corporations' return on common equity was approximately 35 percent in 2007, but Aeropostale's 2007 ROE was up by about 11 percent, whereas A&F's was down by about 12 percent from 2006.

As for shareholder payout, the firms pursued quite different strategies. Aeropostale did not pay any dividends, but spent 85 percent of net income in 2007 and 53 percent of net income in 2006 on share repurchases. A&F, on the other hand, paid dividends of approximately 15 percent of net income in 2006 and 2007. Additionally, in 2007 they spent 31 percent of net income on share repurchases, which resulted in a total payout ratio of approximately 47 percent.

This effect is captured by the total leverage component of the Dupont analysis. Recall that a company can raise money to finance its business by either selling stock or borrowing. If they choose to sell stock, then shareholders are entitled to their share of the returns. If they borrow the money, on the other hand, the creditors do not share in the returns. So why don't all corporations use debt instead of equity? First, they may not be able to find a low enough interest rate. Second, while interest is guaranteed, returns are not. That is, while the returns may seem better than the interest right now, in a few years it may not be so. For evidence of this, consider stories of people who borrowed money at 15+ percent on credit cards to invest in the stock market in the late 1990s. [Cornerstone 12-9](#) illustrates how to perform and interpret Dupont Analysis.

## HOW TO Perform and Interpret Dupont Analysis

### Concept:

Dupont analysis decomposes a corporation's ROE into net profit margin, asset turnover, and total leverage.

### Information:

Use Aeropostale's income statement and balance sheet in Exhibit 12-3 and the following information for Abercrombie & Fitch:

Net income	\$ 422,186
Sales	3,318,158
Beginning total assets	1,789,718
Ending total assets	2,248,067
Beginning stockholders' equity	995,117
Ending stockholders' equity	1,405,297

### Required:

1. Perform Dupont analysis for both corporations for 2007.
2. What do you learn about the two corporations' ROE from this analysis?

### Solution:

#### 1. Aeropostale

$$\begin{aligned} \text{Dupont Analysis: ROE} &= \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Total Assets}} \times \frac{\text{Average Total Assets}}{\text{Average Equity}} \\ &= (\$106,647/\$1,413,208) \times \\ &\quad \{(\$1,413,208/\{[(\$503,951 + \$581,164)/2]\}) \times \\ &\quad \{[(\$503,951 + \$581,164)/2]/[(\$284,790 + \$312,116)/2]\} \\ &= 7.55\% \times 2.60 \times 1.82 \\ &= 35.7\%* \end{aligned}$$

\*Note that this equals the ROE of 35.7% calculated in Cornerstone 12-6.

#### Abercrombie & Fitch

$$\begin{aligned} &= (\$422,186/\$3,318,158) \times \\ &\quad \{(\$3,318,158/[(\$1,789,718 + \$2,248,067)/2]\} \times \\ &\quad \{[(\$1,789,718 + \$2,248,067)/2]/[(\$995,117 + \$1,405,297)/2]\} \\ &= 12.72\% \times 1.64 \times 1.68 \\ &= 35.0\%* \end{aligned}$$

\*Does not equal ROE of 35.2% (shown on p. 650) because of rounding in the individual components.

2. The Dupont analysis shows that Abercrombie & Fitch has a far better net profit margin (12.72 percent versus 7.55 percent), but Aeropostale has far better asset turnover (2.60 versus 1.64). This suggests that Abercrombie & Fitch has done a better job differentiating its products from the competition because its customers are willing to pay prices that support higher margins. Aeropostale, on the other hand, is much more efficient with its assets, as shown by its superior asset turnover. This is consistent with a cost leader (i.e., offering the lower prices) because asset efficiency helps contain costs and cost containment is necessary to compete on price.

Multiplying the net profit margin by asset turnover gives return on assets, which is 20.86 percent for Abercrombie & Fitch and 19.63 percent for Aeropostale. However, Aeropostale has slightly higher leverage (1.82 versus 1.68), which means Aeropostale has a higher proportion of debt financing. This higher proportion of debt financing "leverages" its return on assets to produce a higher ROE than Abercrombie & Fitch despite its lower return on assets.



## CORNERSTONE 12-9



## Exhibit 12-4

**Summary of Financial Ratios****Short-Term Liquidity Ratios**

1. Current Ratio =  $\frac{\text{Current Assets}}{\text{Current Liabilities}}$
2. Quick Ratio =  $\frac{\text{Cash} + \text{Short-Term Investments} + \text{Receivables}}{\text{Current Liabilities}}$
3. Cash Ratio =  $\frac{\text{Cash} + \text{Short-Term Investments}}{\text{Current Liabilities}}$
4. Operating Cash Flow Ratio =  $\frac{\text{Cash Flows from Operating Activities}}{\text{Current Liabilities}}$

**Debt-Management Ratios**

5. Times Interest Earned Ratio =  $\frac{\text{EBIT}}{\text{Interest Expense}}$
6. Long-Term Debt-to-Equity Ratio =  $\frac{\text{Long-Term Debt (including current portion)}}{\text{Total Equity}}$
7. Debt-to-Equity Ratio =  $\frac{\text{Total Liabilities}}{\text{Total Equity}}$
8. Long-Term Debt-to-Total Assets Ratio =  $\frac{\text{Long-Term Debt (including current portion)}}{\text{Total Assets}}$
9. Debt-to-Total Assets Ratio =  $\frac{\text{Total Liabilities}}{\text{Total Assets}}$

**Asset Efficiency Ratios**

10. Accounts Receivable Turnover Ratio =  $\frac{\text{Net Credit Sales or Net Sales}}{\text{Average Accounts Receivable}}$
11. Inventory Turnover Ratio =  $\frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$
12. Asset Turnover Ratio =  $\frac{\text{Net Sales}}{\text{Average Total Assets}}$

**Profitability Ratios**

13. Gross Profit Percentage =  $\frac{\text{Gross Profit}}{\text{Net Sales}}$
14. Operating Margin Percentage =  $\frac{\text{Income from Operations}}{\text{Net Sales}}$
15. Net Profit Margin Percentage =  $\frac{\text{Net Income}}{\text{Net Sales}}$
16. Return on Assets =  $\frac{\text{Net Income} + [\text{Interest Expense} \times (1 - \text{Tax Rate})]}{\text{Average Total Assets}}$
17. Return on Equity =  $\frac{\text{Net Income}}{\text{Average Equity}}$

**Stockholder Ratios**

18. Earnings per Share (EPS) =  $\frac{(\text{Net Income} - \text{Preferred Dividends})}{\text{Average Number of Common Shares Outstanding}}$
19. Return on Common Equity =  $\frac{\text{Net Income}}{\text{Average Common Equity}}$
20. Dividend Yield Ratio =  $\frac{\text{Dividends per Common Share}}{\text{Closing Market Price per Share for the Year}}$
21. Dividend Payout Ratio =  $\frac{\text{Common Dividends Paid}}{\text{Net Income}}$
22. Total Payout Ratio =  $\frac{(\text{Common Dividends} + \text{Common Stock Repurchases})}{\text{Net Income}}$
23. Stock Repurchase Payout = Total Payout Ratio – Dividend Payout Ratio

**Dupont Analysis**

24. Return on Equity =  $\left(\frac{\text{Net Income}}{\text{Sales}}\right) \times \left(\frac{\text{Sales}}{\text{Average Total Assets}}\right) \times \left(\frac{\text{Average Total Assets}}{\text{Average Equity}}\right)$

Exhibit 12-4 summarizes the financial ratios presented in this chapter.

More advanced accounting texts may present additional ratios; however, those introduced here are among the most widely used. Two important steps in ratio analysis are developing data for comparisons and interpreting the effect of accounting alternatives on the data (and thereby the ratios). We will discuss these topics in the next section.

## Data for Ratio Comparisons

As we pointed out earlier in the chapter, developing information from financial ratios requires that comparisons be made among the ratios of (1) the same corporation over time, (2) similar corporations over time, and (3) similar corporations at the present time. Analysts rely on several sources to fulfill their need for a broad range of data for individual corporations as well as for industries and the economy.

We believe the best source of information about the corporation starts with the investor relations section of their website. This part of the website should contain links to the corporation's 10-K (and other SEC filings), analyst conference calls, and press releases. However, you can also gain information through the financial press (e.g., *The Wall Street Journal*, etc.) and investor discussion boards, although the latter must be evaluated with a critical eye.

Information on the industry can be obtained from industry guides such as Standard & Poor's and IBIS World. These are often available through your university library website or in hard copy at the library. We also like websites like Google Finance, Yahoo! Finance, BizStats, and MSN.

## Accounting Policy and Financial Statement Analysis

### OBJECTIVE 6

Understand the effect accounting policies may have on financial statement analysis.

We indicated early in the text that accounting amounts are often not precise statements of a company's assets, liabilities, equity, revenues, and expenses. In many cases, the amounts are estimates. In other cases, amounts are determined largely by the accounting policies adopted by management. Certain portions of the financial statements can be substantially affected by accounting policy choices or estimates. Careful analysts examine the items in these sections closely, noting the particular accounting policies and estimates that underlie the data. Following is a list of the questions analysts are most likely to ask about accounting policies and the treatment of specific items in the financial statements.

### Revenues

1. *The policy employed for recognizing revenues on installment sales:* Are revenues recognized at the time of the sale, or are they recognized over the collection period?
2. *The tax component of sales revenue:* Are sales, value-added, excise, or producers' taxes included in revenues?
3. *Interest revenues:* Are customers' finance charges included as a revenue, or are they treated as an offset against interest expense or some other expense?

### Expenses

1. *Inventory accounting policy:* Is inventory valued on a FIFO, LIFO, or weighted-average basis?
2. *Depreciation:* What estimates are used for expected life and residual value? What depreciation method is used?
3. *Depletion:* Are the estimates of recoverable reserves reasonable?
4. *Uncollectible accounts:* What method is used to estimate uncollectibles? Are the estimates appropriate?
5. *Warranties:* Do warranty provisions cover actual expenditures?
6. *Pensions:* Does the firm expense the minimum or maximum amount for pensions?
7. *Postretirement benefits:* How does the company estimate the cost of postretirement benefits?

### Balance Sheet

1. *Receivables*: Is the allowance for uncollectible accounts large enough?
2. *Inventories*: What inventory method is used? Are obsolete or unmarketable items written off as soon as the decline in value is apparent?
3. *Property, plant, and equipment*: Will these assets provide future services that are sufficient to recover the undepreciated cost?
4. *Intangibles*: Do intangible assets represent real economic advantages that justify their unamortized cost?
5. *Liabilities*: Are all liabilities reported? Are they properly classified? Are estimated liabilities large enough?

Most firms assist statement users in identifying items that are affected by accounting policy choices by including a list of the company's important choices in the first note to the financial statements.

## Summary

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Customers, suppliers, potential employees, creditors, and investors use financial statements to make decisions. However, the principal users are investors and creditors. To analyze a corporation you must understand how economic conditions will affect the industry and corporation itself, but at some point you must begin to understand the corporation.

The primary sources of information about the corporation are its SEC filings, and the most important of these filings is the 10-K. The 10-K includes the audited financial statements as well as a wealth of other information and is often hundreds of pages long. However, you can find information of interest more efficiently if you learn the required format of the 10-K.

Analyzing a corporation's financial statements involves comparison to its primary competitors and industry averages. This is called cross sectional analysis. Analysis also involves comparisons of the current year to previous years. This is called time series, or trend, analysis. Often, differences exist in the size of two corporations or even in the same corporation from year to year (perhaps due to the acquisition of another corporation). Analysts address this problem by restating the financial statements in percentage terms.

This restatement is typically done with horizontal analysis, vertical analysis, and ratio analysis. In horizontal analysis each financial statement line item is expressed as a percent of the base year (typically the least recent year shown). In vertical analysis, on the other hand, each financial statement line item is expressed as a percent of the largest statement amount—net sales on the income statement and total assets on the balance sheet.

Ratio analysis is an examination of financial statements conducted by preparing and evaluating a series of ratios. We classify ratios as follows: *Short-term liquidity ratios* are particularly helpful to short-term creditors, but all investors and creditors have an interest in these ratios. *Debt management ratios* and *profitability ratios* provide information for long-term creditors and stockholders. *Asset efficiency (or operating) ratios* help management operate the firm and indicate to outsiders the efficiency with which certain of the company's activities are performed. *Stockholder ratios* are of interest to a corporation's stockholders. Finally, *Dupont analysis* decomposes return on equity into margin, turnover, and leverage. However, when performing ratio analysis, or any financial statement analysis, you must understand how the corporation's accounting policies affect the financial statement. For example, inventory on the balance sheet and cost of goods sold on the income statement are affected by the corporation's decision to use LIFO instead of FIFO.

## Summary of Learning Objectives

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**LO1. Explain how creditors, investors, and others use financial statements in their decisions.**

- The role of financial statements is to provide information for
  - creditors
  - investors
  - customers
  - suppliers
  - employees

This information will help these groups form judgments, which will serve as the foundation for various decisions.

**LO2. Become familiar with the most important SEC filings.**

- Publicly traded corporations must file a variety of financial information, including audited financial statements, with the Securities and Exchange Commission (SEC) on an ongoing basis. For example,
  - annual reports on Form 10-K
  - quarterly reports on Form 10-Q
  - current reports for numerous specified events on Form 8-K
- The annual report on Form 10-K provides a comprehensive overview of the corporation's business and financial condition and includes *audited* financial statements.
- Although similarly named, the annual report on Form 10-K is distinct from the “annual report to shareholders,” which a corporation must send to its shareholders when it holds an annual meeting to elect directors.
- For larger filers, the 10-K must be filed within 60 days of their fiscal year end.

**LO3. Understand the difference between cross sectional and time series analysis.**

- Cross sectional analysis entails comparing a corporation's financial statements to its primary competitors and industry averages.
- Time series (or trend) analysis involves comparisons of the current year to previous years.
- Differences may exist in the size of two corporations or even in the same corporation from year to year (perhaps due to the acquisition of another corporation). Analysts address this problem by restating the financial statements in percentage terms.

**LO4. Analyze financial statements using horizontal and vertical analysis.**

- In horizontal analysis, each financial statement line item is expressed as a percent of the base year (typically the least recent year shown).
- In vertical analysis, each financial statement line item is expressed as a percent of the largest statement amount—net sales on the income statement and total assets on the balance sheet.

**LO5. Calculate and use financial statement ratios to evaluate a company.**

- Ratios help remove the effects of size differences (as measured in dollars).
- Six categories of ratios are discussed:
  - short-term liquidity
  - debt management
  - profitability
  - asset efficiency (or operating)
  - stockholder
  - Dupont
- More advanced accounting and finance texts may present additional ratios; however, those introduced here are among the most widely used.

**LO6. Understand the effect accounting policies may have on financial statement analysis.**

- Financial statement ratios are affected by the accounting policies selected by the corporation. For example, all else held equal, a corporation that uses LIFO will have different inventory turnover and gross margin ratios than a corporation that uses FIFO.



### CORNERSTONES FOR CHAPTER 12

- CORNERSTONE 12-1** How to interpret cross sectional and time series (or trend) analysis, page 627
- CORNERSTONE 12-2** How to prepare common size statements for horizontal analysis, page 629
- CORNERSTONE 12-3** How to prepare common size statements for vertical analysis, page 630
- CORNERSTONE 12-4** How to calculate and interpret short-term liquidity ratios, page 636
- CORNERSTONE 12-5** How to calculate and interpret debt management ratios, page 640
- CORNERSTONE 12-6** How to calculate and interpret asset efficiency ratios, page 644
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## Key Terms

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## Review Problem

### Ratio Analysis

Following are comparative balance sheets and income statements for **Under Armour**:

Under Armour, Inc. and Subsidiaries Consolidated Balance Sheets (In thousands)			
	December 31,		
	2007	2006	2005
<b>ASSETS</b>			
<b>Current assets:</b>			
Cash and cash equivalents	\$ 40,588	\$ 70,655	\$ 62,977
Accounts receivable, net	93,515	71,867	53,132
Inventories	166,082	81,031	53,607
Income taxes receivable	614	4,310	—
Other current assets	11,028	8,944	5,252
Deferred income taxes	10,418	8,145	6,822
<b>Total current assets</b>	<b>\$322,245</b>	<b>\$244,952</b>	<b>\$181,790</b>
Property and equipment, net	52,332	29,923	20,865
Intangible assets, net	6,470	7,875	—
Deferred income taxes	8,173	5,180	—
Other noncurrent assets	1,393	1,438	1,032
<b>Total assets</b>	<b>\$390,613</b>	<b>\$289,368</b>	<b>\$203,687</b>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>			
<b>Current liabilities:</b>			
Accounts payable	\$ 55,012	\$ 42,718	\$ 31,699
Accrued expenses	36,111	25,403	11,449
Income taxes payable	—	—	716
Current maturities of long-term debt	4,111	2,648	1,967
Current maturities of capital lease obligations	465	794	1,841
<b>Total current liabilities</b>	<b>\$ 95,699</b>	<b>\$ 71,563</b>	<b>\$ 47,672</b>
Long-term debt, net of current maturities	9,298	1,893	2,868
Capital lease obligations, net of current maturities	458	922	1,715
Deferred income taxes	—	—	330
Other long-term liabilities	4,673	602	272
<b>Total liabilities</b>	<b>\$ 110,128</b>	<b>\$ 74,980</b>	<b>\$ 52,857</b>
<b>Stockholders' equity:</b>			
Class A common stock	\$ 12	\$ 12	\$ 10
Class B common stock	4	4	5
Additional paid-in capital	162,362	148,562	124,803
Retained earnings	117,782	66,376	28,067
Unearned compensation	(182)	(463)	(1,889)
Notes receivable from stockholders	—	—	(163)
Accumulated other comprehensive income	507	(103)	(3)
<b>Total stockholders' equity</b>	<b>\$280,485</b>	<b>\$214,388</b>	<b>\$150,830</b>
<b>Total liabilities and stockholders' equity</b>	<b>\$390,613</b>	<b>\$289,368</b>	<b>\$203,687</b>

Under Armour, Inc. and Subsidiaries Consolidated Statements of Income (In thousands)			
	December 31,		
	2007	2006	2005
Net sales	\$ 606,561	\$ 430,689	\$ 281,053
Cost of goods sold	301,517	215,089	145,203
<b>Gross profit</b>	<b>\$305,044</b>	<b>\$215,600</b>	<b>\$135,850</b>
Operating expenses			
Selling, general and administrative expenses	218,779	158,682	100,040
<b>Income from operations</b>	<b>\$ 86,265</b>	<b>\$ 56,918</b>	<b>\$ 35,810</b>
Interest income	1,549	2,231	273
Interest expense	(800)	(774)	(3,188)
Other income, net	2,029	712	79
<b>Income before income taxes</b>	<b>\$ 89,043</b>	<b>\$ 59,087</b>	<b>\$ 32,974</b>
Income tax expense	36,485	20,108	13,255
<b>Net income</b>	<b>\$ 52,558</b>	<b>\$ 38,979</b>	<b>\$ 19,719</b>
Cumulative preferred dividends on preferred stock	—	—	5,307
<b>Net income available to common shareholders</b>	<b>\$ 52,558</b>	<b>\$ 38,979</b>	<b>\$ 14,412</b>

Additionally, you will need the following information:

Weighted average common shares outstanding	48,021	46,983	37,199
Cash flows from operating activities	(14,628)	10,701	15,795
Dividends per share	0	0	0
Dividends	0	0	0
Stock repurchases	0	0	0
Market price per share at year end	\$43.67	\$50.45	\$38.31

**Required:**

1. Calculate the short-term liquidity ratios for Under Armour for 2006 and 2007.
2. Calculate the debt management ratios for Under Armour for 2006 and 2007.
3. Calculate the asset efficiency ratios for Under Armour for 2006 and 2007.
4. Calculate the profitability ratios for Under Armour for 2006 and 2007.
5. Calculate the stockholder ratios for Under Armour for 2006 and 2007.

**Solution:**

1. Short-term liquidity ratios

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

	2007	2006
Current assets	\$322,245	\$244,952
Current liabilities	95,699	71,563
<b>Current ratio</b>	<b>3.37</b>	<b>3.42</b>

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Short-Term Investments} + \text{Accounts Receivable}}{\text{Current Liabilities}}$$

	2007	2006
Cash	\$40,588	\$70,655
Short-Term investments	—	—
Accounts receivable	93,515	71,867
Current liabilities	95,699	71,563
<b>Quick ratio</b>	<b>1.40</b>	<b>1.99</b>

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Short-Term Investments}}{\text{Current Liabilities}}$$

	2007	2006
Cash	\$40,588	\$70,655
Short-term investments	—	—
Current liabilities	95,699	71,563
<b>Cash ratio</b>	<b>0.42</b>	<b>0.99</b>

$$\text{Operating Cash Flow Ratio} = \frac{\text{Cash Flows from Operating Activities}}{\text{Current Liabilities}}$$

	2007	2006
Cash flows from operating activities	\$(14,628)*	\$10,701*
Current liabilities	95,699	71,563
<b>Operating cash flow ratio</b>	<b>(0.15)</b>	<b>0.15</b>

\*Provided in the Information section

## 2. Debt management ratios

$$\text{Times Interest Earned} = \text{EBIT} / \text{Interest Expense}$$

	2007	2006
Net income	\$52,558	\$38,979
Income tax expense	36,485	20,108
Interest expense	800	774
<b>Times interest earned</b>	<b>112.30</b>	<b>77.34</b>

$$\text{Long-Term Debt-to-Equity Ratio} = \frac{\text{Long-Term Debt (including current portion)}}{\text{Total Equity}}$$

	2007	2006
Long-term debt	\$ 9,298	\$ 1,893
Current portion of long-term debt	4,111	2,648
Total equity	280,485	214,388
<b>Long-term debt-to-equity</b>	<b>0.05</b>	<b>0.02</b>

$$\text{Debt to Equity Ratio} = \text{Total Liabilities} / \text{Total Equity}$$

	2007	2006
Total liabilities	\$110,128	\$ 74,980
Total equity	280,485	214,388
<b>Debt-to-equity</b>	<b>0.39</b>	<b>0.35</b>

$$\text{Long-Term Debt-to-Total Assets Ratio} = \frac{\text{Long-Term Debt (including current portion)}}{\text{Total Assets}}$$

	2007	2006
Long-term debt	\$ 9,298	\$ 1,893
Current portion of long-term debt	4,111	2,648
Total assets	390,613	289,368
<b>Long-term debt-to-total assets</b>	<b>0.03</b>	<b>0.02</b>

$$\text{Debt-to-Total Assets Ratio} = \text{Total Liabilities} / \text{Total Assets}$$

	2007	2006
Total liabilities	\$110,128	\$ 74,980
Total assets	390,613	289,368
<b>Debt-to-total assets</b>	<b>0.28</b>	<b>0.26</b>

## 3. Asset efficiency ratios

Note: Average Balance = (Beginning Balance + Ending Balance)/2

Accounts Receivable Turnover Ratio = Net Sales/Average Accounts Receivable

	2007	2006	2005
Net sales	\$606,561	\$430,689	\$281,053
Receivables	93,515	71,867	53,132
<b>Accounts receivable turnover ratio</b>	<b>7.34</b>	<b>6.89</b>	

Inventory Turnover Ratio = Cost of Goods Sold/Average Inventories

	2007	2006	2005
Cost of goods sold	\$301,517	\$215,089	\$145,203
Inventories	166,082	81,031	53,607
<b>Inventory turnover ratio</b>	<b>2.44</b>	<b>3.20</b>	

Asset Turnover Ratio = Net Sales/Average Total Assets

	2007	2006	2005
Net sales	\$606,561	\$430,689	\$281,053
Total assets	390,613	289,368	203,687
<b>Asset turnover ratio</b>	<b>1.78</b>	<b>1.75</b>	

## 4. Profitability ratios

Note: Average Balance = (Beginning Balance + Ending Balance)/2

Gross Profit Percentage = Gross Profit/Net Sales

	2007	2006
Net sales	\$606,561	\$430,689
Gross profit	305,044	215,600
<b>Gross profit percentage</b>	<b>50.29%</b>	<b>50.06%</b>

Operating Margin Percentage = Income from Operations/Net Sales

	2007	2006
Net sales	\$606,561	\$430,689
Income from operations	86,265	56,918
<b>Operating margin percentage</b>	<b>14.22%</b>	<b>13.22%</b>

Net Profit Margin Percentage = Net Income/Net Sales

	2007	2006
Net sales	\$606,561	\$430,689
Net income	52,558	38,979
<b>Net profit margin percentage</b>	<b>8.67%</b>	<b>9.05%</b>

Return on Assets =  $\frac{\text{Net Income} + [\text{Interest Expense} \times (1 - \text{Tax Rate})]}{\text{Average Total Assets}}$

	2007	2006	2005
Total assets	\$390,613	\$289,368	\$203,687
Income taxes	36,485	20,108	
Net Income	52,558	38,979	
Interest Expense	800	774	
Income before taxes	89,043	59,087	
Tax rate*	40.97%	34.03%	
<b>Return on assets</b>	<b>15.60%</b>	<b>16.02%</b>	

\*Income Taxes/Income before Taxes

Return on Equity = Net Income/Average Equity

	2007	2006	2005
Net income	\$ 52,558	\$ 38,979	
Stockholders' equity	280,485	214,388	\$150,830
<b>Return on equity</b>	<b>21.24%</b>	<b>21.35%</b>	

#### 5. Stockholder ratios

Earnings per Share Ratio =  $\frac{\text{Net Income} - \text{Preferred Dividends}}{\text{Average Number of Common Shares Outstanding}}$

	2007	2006
Net income	\$52,558	\$38,979
Preferred dividends	0	0
Average common shares*	48,021	46,983
<b>EPS</b>	<b>\$1.09</b>	<b>\$0.83</b>

\*Provided in the information section.

Return on Common Equity = Net Income/Average Common Equity\*

\*Common Equity = Total Equity – Preferred Stock – Paid-in capital from preferred stock

	2007	2006	2005
Net income	\$ 52,558	\$ 38,979	
Stockholders' equity	280,485	214,388	\$150,830
Preferred stock	0	0	0
Paid-in capital—preferred stock	0	0	0
<b>Return on common equity</b>	<b>21.24%</b>	<b>21.35%</b>	

Dividend Yield Ratio =  $\frac{\text{Dividends per Common Share}}{\text{Closing Market Price per Share for the Year}}$

	2007	2006
Dividends per share*	\$ 0	\$ 0
Closing market price for year*	43.67	50.45
<b>Dividend yield ratio</b>	<b>0.0%</b>	<b>0.0%</b>

\*Provided in the information section.

Dividend Payout Ratio = Common Dividends/Net Income

	2007	2006
Common dividends*	\$ 0	\$ 0
Net income	52,558	38,979
<b>Dividend yield ratio</b>	<b>0.0%</b>	<b>0.0%</b>

\*Provided in the information section.

Total Payout Ratio =  $\frac{\text{Common Dividends} + \text{Common Stock Repurchases}}{\text{Net Income}}$

	2007	2006
Common dividends*	\$ 0	\$ 0
Common stock repurchases*	0	0
Net income	52,558	38,979
<b>Total payout ratio</b>	<b>0%</b>	<b>0%</b>

\*Provided in the information section.

## Discussion Questions

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1. Describe how some of the primary groups of users use financial statements.
2. What is a 10-K?
3. How does the 10-K differ from the 10-Q?
4. Describe the information provided in Item 1 of the 10-K.
5. Describe the information provided in Item 7 of the 10-K.
6. Describe the information provided in Item 8 of the 10-K.
7. What is the difference between time series and cross sectional analysis?
8. What is the difference between horizontal and vertical analysis?
9. How do the current and quick ratios differ? Which is a more conservative measure of short-term liquidity? Support your answer.
10. How does the operating cash flow ratio differ from the current, quick, and cash ratios?
11. What are you trying to learn by calculating debt-management ratios?
12. Why are higher asset turnover ratios considered to be better than lower turnover ratios?
13. What two aspects of a company's profitability are measured by profitability ratios?
14. What are the two major categories of stockholder ratios?
15. Dupont analysis breaks down return on equity into what three components?
16. Why must you analyze the accounting policies of a company when performing financial-statement analysis? Provide an example of how knowledge of accounting policies would affect your analysis of inventory.

## Multiple-Choice Exercises

---

**12-1** Which of the following use financial statement data to make decisions?

- a. customers
- b. investors
- c. suppliers
- d. all of the above

**12-2** Which statement would best provide information about a company's current liquidity?

- a. balance sheet
- b. income statement
- c. statement of cash flows
- d. none of the above

**12-3** A banker is analyzing a company that operates in the petroleum industry. Which of the following might be a major consideration in determining whether the company should receive a loan?

- a. The petroleum industry suffers from political pressures concerning the selling price of its products.
- b. Inflation has been high for several years in a row.
- c. All companies in the petroleum industry use the same accounting principles.
- d. The company has a large amount of interest payments related to many outstanding loans.

**12-4** Which of the following filings includes unaudited financial statements, provides a continuing view of the corporation's financial position during the year, and must be filed for each of the first three fiscal quarters of the corporation's fiscal year?

- a. 8-K
- b. 10-K
- c. 10-Q
- d. Form 13F

**12-5** Which of the following filings is known as the “current report” that companies must file with the SEC to announce major events that are important to investors and creditors?

- a. 8-K
- b. 10-K
- c. 10-Q
- d. Form 13F

**12-6** Which section of the Form 10-K includes an analysis of the company’s financial condition and performance of the company?

- a. Item 4—Submission of Matters to Vote
- b. Item 5—Market for Common Stock
- c. Item 6—Selected Financial Data
- d. Item 7—Management Discussion and Analysis

**12-7** Which of the following are required to be included in the Form 10-K?

- a. a list of all financial statements and exhibits required to be filed
- b. the name of every person or group who owns more than 5 percent of a class of stock
- c. information on the salary and other forms of compensation paid to executive officers and directors
- d. all of the above

**12-8** Which type of analysis compares a single corporation across time?

- a. cross sectional analysis
- b. time series analysis
- c. timetable analysis
- d. company analysis

**12-9** Which of the following types of analysis compares one corporation to another corporation and to industry averages?

- a. cross sectional analysis
- b. time series analysis
- c. timetable analysis
- d. company analysis

**12-10** Which of the following types of analysis is particularly useful for trend analysis?

- a. vertical analysis
- b. timetable analysis
- c. trend-setting analysis
- d. horizontal analysis

**12-11** Vertical analysis expresses each financial statement line item as a percent of:

- a. the average statement amount
- b. the smallest statement amount
- c. the largest statement amount
- d. the mean statement amount

**12-12** Horizontal analysis expresses each financial statement line item as a percent of:

- a. net income
- b. total assets
- c. base year
- d. stockholders’ equity

**12-13 How is the current ratio calculated?**

- Current Assets/Current Liabilities
- (Cash + Marketable Securities + Accounts Receivable)/Current Liabilities
- (Cash + Marketable Securities)/Current Liabilities
- Cash Flows from Operating Activities/Current Liabilities

**12-14 Partial information from Blain Company's balance sheet is as follows:**

<b>Current Assets:</b>	
Cash	\$ 1,200,000
Marketable securities	3,750,000
Accounts receivable	28,800,000
Inventories	33,150,000
Prepaid expenses	600,000
Total current assets	<u>\$67,500,000</u>
<b>Current Liabilities:</b>	
Notes payable	\$ 750,000
Accounts payable	9,750,000
Accrued expenses	6,250,000
Income taxes payable	250,000
Total current liabilities	<u>\$17,000,000</u>

**What is Blain's current ratio?**

- 0.25
- 3.0
- 1.8
- 3.97

**12-15 Hilton Inc. has \$30,000 in current assets and \$15,000 in current liabilities. What is Hilton Inc.'s current ratio?**

- 0.5
- 1
- 2
- 3

**12-16 How is the cash ratio calculated?**

- Current Assets/Current Liabilities
- (Cash + Marketable Securities + Accounts Receivable)/Current Liabilities
- (Cash + Marketable Securities)/Current Liabilities
- Cash Flows from Operating Activities/Current Liabilities

**12-17 A firm's quick ratio is typically computed as follows:**

- Total Liabilities/Total Assets
- (Cash + Short-Term Investments + Receivables)/Current Liabilities
- Current Liabilities/Current Assets
- Current Assets/Current Liabilities

**12-18 ABC Company has \$40,000 in current liabilities, \$20,000 in cash, and \$25,000 in marketable securities. What is the cash ratio for ABC Company?**

- 1.125
- 0.889
- 1.6
- 0.625

**12-19** What ratio is used to measure a firm's liquidity?

- a. debt ratio
- b. asset turnover
- c. current ratio
- d. return on equity

**12-20** Which of the following transactions could increase a firm's current ratio?

- a. purchase of inventory for cash
- b. payment of accounts payable
- c. collection of accounts receivable
- d. purchase of temporary investments for cash

**12-21** Total Liabilities/Total Equity equals:

- a. Times Interest Earned Ratio
- b. Accounts Payable Turnover Ratio
- c. Debt-to-Equity Ratio
- d. Receivables Turnover Ratio

**12-22** Which of the following ratios is not a debt management ratio?

- a. times interest earned
- b. debt-to-equity ratio
- c. long-term debt-to-equity ratio
- d. return on equity ratio

**12-23** The balance sheet for Parker Inc. at the end of the first year of operations indicates the following:

	2009
Total current assets	\$600,000
Total investments	85,000
Total property, plant, and equipment	900,000
Current portion of long-term debt	250,000
Total long-term liabilities	350,000
Common stock, \$10 par	600,000
Paid-in capital in excess of par—common stock	60,000
Retained earnings	325,000

**What is the long-term debt to total assets ratio for 2009 (rounded to one decimal place)?**

- a. 37.9%
- b. 40.0%
- c. 22.1%
- d. 41.7%

**12-24** When analyzing a company's debt-to-equity ratio, if the ratio has a value that is greater than one, then the company has:

- a. less debt than equity
- b. more debt than equity
- c. equal amounts of debt and equity
- d. none of these are correct

**12-25** Cost of goods sold divided by average inventory is the formula to compute:

- a. accounts receivable turnover
- b. inventory turnover
- c. gross profit percentage
- d. return on sales percentage

**12-26** A firm's asset turnover ratio is typically computed as follows:

- Net Sales/Average Total Assets
- Gross Profit/Net Sales
- Operating Income/Net Sales
- $\text{Net Income} + [\text{Interest Expense} \times (1 - \text{Tax Rate})] / \text{Average Total Assets}$

**12-27** Which of the following ratios is used to measure a firm's efficiency at using its assets?

- current ratio
- asset turnover ratio
- return on sales ratio
- return on equity

**12-28** Which of the following ratios is used to measure a firm's efficiency?

- Net Income/Equity
- Sales/Assets
- Assets/Equity
- Net Income/Sales

**12-29** United Corporation has \$65,000 of cost of goods sold and average inventory of \$30,000. What is United Corporation's inventory turnover ratio?

- 0.46
- 1.17
- 1.46
- 2.17

**12-30** If a company has an inventory turnover of 7.3 and a receivables turnover of 9.6, approximately how long is its operating cycle?

- 72 days
- 88 days
- 95 days
- There is not enough information to calculate the operating cycle.

**12-31** Which of the following ratios is used to measure the profit earned on each dollar invested in a firm?

- current ratio
- asset turnover ratio
- return on sales ratio
- return on equity

**12-32** Which of the following is the formula to compute the net profit margin percentage?

- Net Income/Net Sales
- Operating Income/Net Sales
- Net Income/Average Equity
- $\text{Net Income} + [\text{Interest Expense} \times (1 - \text{Tax Rate})] / \text{Average Total Assets}$

**12-33** Selected information for Henry Company is as follows:

Average common stock	\$600,000
Average additional paid-in capital	250,000
Average retained earnings	370,000
Sales revenue for year	915,000
Net income for year	240,000

Henry's return on equity, rounded to the nearest percentage point, is

- a. 20 percent
- b. 21 percent
- c. 28 percent
- d. 40 percent

**12-34** Which of the following ratios is used to measure a firm's profitability?

- a. Liabilities/Equity
- b. Sales/Assets
- c. Assets/Equity
- d. Net Income/Sales

**12-35** Why might an industry group have higher five-year average returns on equity than do other industries?

- a. It is a higher-risk industry.
- b. It is a lower-risk industry.
- c. It is a high-growth industry.
- d. None of the above.

**12-36** The dividend yield ratio measures:

- a. the income available for common stockholders on a per-share basis
- b. the rate at which dividends provide a return to stockholders
- c. the proportion of a corporation's profits that are returned to the stockholders immediately as dividends
- d. the profit earned by a firm through the use of capital supplied by stockholders

**12-37** Corporations are required to disclose earnings per share on which of the following statements?

- a. balance sheet
- b. income statement
- c. statement of cash flows
- d. all of the above

**12-38** Jackson Company has preferred dividends of \$15,000, a net income of \$40,000, and average common shares outstanding of 8,000. What is Jackson Company's earnings per share?

- a. \$2.67
- b. \$5.00
- c. \$3.13
- d. \$2.13

**12-39** Which of the following are NOT part of common equity?

- a. common stock
- b. treasury stock
- c. retained earnings
- d. preferred stock

**12-40** Dupont analysis recognizes that return on equity can be broken down into three important aspects of return, which are:

- a. net profit margin, asset turnover, and leverage
- b. net profit margin, asset turnover, and average assets
- c. sales, income, and leverage
- d. sales, income, and equity

**12-41** If a company has a higher net profit margin than most of its competitors, this means that:

- the company is more efficient with its assets
- the company has more loyal customers
- the company has a lower proportion of debt financing
- the company has a higher proportion of each sales dollar that is profit

**12-42** Which of the following ratios is decomposed using the Dupont framework?

- return on equity
- asset turnover
- assets-to-equity ratio
- return on sales

**12-43** Which of the following is NOT included in the Dupont framework?

- a measure of profitability
- a measure of efficiency
- a measure of market share
- a measure of leverage

**12-44** When Dupont analysis reveals that a company has much higher than average asset turnover and much lower than average profit margin, what can be concluded about the company's strategy?

- It is a product differentiator.
- It is a low-cost provider.
- It has no strategy.
- It needs to concentrate on improving its profit margins.

**12-45** Which of the following questions would be appropriate for an analyst to investigate regarding a company's liabilities?

- Are all liabilities reported?
- Are the liabilities properly classified?
- Are estimated liabilities large enough?
- all of the above

## Cornerstone Exercises

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**OBJECTIVE** > **3**

**CORNERSTONE 12-1**

**Cornerstone Exercise 12-46 CROSS SECTIONAL ANALYSIS**

Cross sectional analysis entails comparing a company to its competitors.

**Required:**

Indicate one of the biggest weaknesses of using cross sectional analysis when analyzing a company.

**OBJECTIVE** > **3**

**CORNERSTONE 12-1**

**Cornerstone Exercise 12-47 TIME SERIES ANALYSIS**

Time series analysis involves comparing a company's income statement and balance sheet for the current year to the its previous years' income statements and balance sheets.

**Required:**

Explain whether it is always bad if a company's cost of goods sold is increasing from year to year.

**OBJECTIVE** > **4**

**CORNERSTONE 12-2**  
**CORNERSTONE 12-3**

**Cornerstone Exercise 12-48 HORIZONTAL AND VERTICAL ANALYSIS**

Use the following selected data from the financial statements of Harry's Hardware Company to answer the questions that follow.

	2009	2008
Accounts receivable	\$ 60,000	\$ 38,000
Merchandise inventory	12,000	16,000
Total assets	450,000	380,000
Net sales	380,000	270,000
Cost of goods sold	160,000	210,000

**Required:**

1. Calculate how much accounts receivable, merchandise inventory, total assets, net sales, and cost of goods sold increased or decreased from 2008 to 2009.
2. Indicate what happened from 2008 to 2009 to accounts receivable and merchandise inventory as a percentage of total assets. Indicate what happened from 2008 to 2009 to cost of goods sold as a percentage of net sales.

**Cornerstone Exercise 12-49 SHORT-TERM LIQUIDITY RATIOS****OBJECTIVE** > **5**

Below are three ratios calculated for Huey, Louie, and Dewey Companies for 2008 and 2009.

**CORNERSTONE 12-4**

<i>(In millions)</i>		Huey	Louie	Dewey
Current ratio	12/31/09	2.8 to 1	2.3 to 1	1.8 to 1
	12/31/08	2.0 to 1	1.5 to 1	2.2 to 1
Inventory turnover ratio	12/31/09	6.9 times	5.8 times	8.0 times
	12/31/08	7.6 times	5.8 times	9.6 times
Quick ratio	12/31/09	2.5 to 1	2.1 to 1	0.5 to 1
	12/31/08	1.0 to 1	1.4 to 1	1.2 to 1

**Required:**

Explain which company appears to be the most liquid.

**Cornerstone Exercise 12-50 DEBT MANAGEMENT RATIOS****OBJECTIVE** > **5**

Below are selected data from the financial statements of Jewell Company for 2008 and 2009.

**CORNERSTONE 12-5**

	2009	2008
Total liabilities	\$1,205,000	\$952,000
Common stock (\$30 par)	250,000	225,000
Paid-in capital in excess of par—common stock	150,000	135,000
Retained earnings	155,000	145,000

**Required:**

Determine whether the debt-to-equity ratio is increasing or decreasing and whether the company should be concerned.

**Cornerstone Exercise 12-51 DEBT MANAGEMENT AND SHORT-TERM LIQUIDITY RATIOS****OBJECTIVE** > **5**

The following items appear on the balance sheet of Lawless Company at the end of 2008 and 2009:

**CORNERSTONE 12-4**  
**CORNERSTONE 12-5**

	2009	2008
Current assets	\$6,000	\$3,000
Long-term assets	7,000	4,000
Current liabilities	2,000	3,000
Long-term liabilities	7,000	0
Stockholders' equity	4,000	4,000

**Required:**

Between 2008 and 2009, indicate whether Lawless Company's debt-to-equity ratio increased or decreased. Also, indicate whether the company's current ratio increased or decreased. Interpret these ratios.

**OBJECTIVE** > **5** **Cornerstone Exercise 12-52 ASSET EFFICIENCY RATIOS****CORNERSTONE 12-6** Selected financial statement numbers for Frederick Company are given below.

Net sales	\$277,480
Cost of goods sold	179,000
Average accounts receivable	20,730
Average inventory	4,145
Average property, plant, and equipment	75,705
Average total assets	126,127

**Required:**

- Using this information, calculate Frederick's receivable turnover ratio (round to two decimal places).
- Using this information, calculate Frederick's asset turnover ratio and also convert the ratio into days.

**OBJECTIVE** > **5** **Cornerstone Exercise 12-53 PROFITABILITY RATIOS****CORNERSTONE 12-7** The following data came from the financial statements of the Bradshaw Company:

Revenue	\$900,000
Expenses	600,000
Net income	300,000
Assets	600,000
Liabilities	100,000
Average Equity	500,000

**Required:**

Compute the return on equity.

**OBJECTIVE** > **5** **Cornerstone Exercise 12-54 PROFITABILITY RATIOS****CORNERSTONE 12-7** Brimfield Corporation's balance sheet indicates the following balances as of December 31, 2009.

Cash	\$ 70,000
Accounts receivable	80,000
Inventory	55,000
Property, plant, and equipment	500,000
Accounts payable	75,000
Bonds payable (due in 2015)	100,000
Common stock (12/31/2008)	275,000
Common stock (12/31/2009)	325,000
Retained earnings (12/31/2008)	200,000
Retained earnings (12/31/2009)	260,000

**Required:**

If Brimfield's 2009 net income is \$80,000, determine its return on equity.

**OBJECTIVE** > **5** **Cornerstone Exercise 12-55 PROFITABILITY RATIOS****CORNERSTONE 12-7** Presented below are selected data from the financial statements of Eagle's Nest Corp. for 2009 and 2008.

	2009	2008
Net income	\$150,000	\$120,000
Cash dividends paid on preferred stock	15,000	15,000
Cash dividends paid on common stock	42,000	38,000
Weighted average number of preferred shares outstanding	20,000	20,000
Weighted average number of common shares outstanding	105,000	95,000

**Required:**

Calculate the earnings per share as it would be reported on the 2009 income statement.

**Cornerstone Exercise 12-56 STOCKHOLDER RATIOS**

Presented below are selected data from the financial statements of Debonair Corp. for 2009 and 2008.

**OBJECTIVE** > **5**  
**CORNERSTONE 12-8**

	2009	2008
Net income	\$110,000	\$123,000
Cash dividends paid on common stock	42,000	38,000
Market price per share of common stock at the end of the year	16.00	13.00
Shares of common stock outstanding	140,000	140,000

**Required:**

Calculate the dividend payout ratio for 2009.

## Exercises

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**Exercise 12-57 FINANCIAL STATEMENT USERS**

**OBJECTIVE** > **1**

Many groups analyze financial statements to make decisions.

**Required:**

1. Explain why a person who is selecting an employer should be sure to view and analyze the company's financial statements.
2. Explain why a business that is considering selling goods or providing services to another business should review the company's financial statements.

**Exercise 12-58 SEC FILINGS**

**OBJECTIVE** > **2**

The SEC requires publicly-traded companies to file many different forms.

**Required:**

Describe the Form 10-Q.

**Exercise 12-59 FORM 10-K**

**OBJECTIVE** > **2**

Form 10-K has many different items.

**Required:**

1. Indicate what is included in the Management's Discussion and Analysis section of the 10-K.
2. List five important things that are included in the Form 10-K.

**Exercise 12-60 GETTING FAMILIAR WITH THE FORMAT OF THE 10-K**

**OBJECTIVE** > **2**

Use Aeropostale's 10-K for the year ended February 3, 2007 (filed April 2, 2007), to answer the following questions. You should look up the 10-K online (which allows you to search and reference the entire 10-K) by searching for "Aeropostale investor relations." Once at that site, click on "SEC Filings," move the "Groupings Filter (View SEC Groupings descriptions)" pull down menu to "Annual Filings," and click the "Search" button.

**Required:**

Answer the following questions and include in which item number of the 10-K the information was found:

1. Who does Aeropostale principally target with their merchandise?
2. How many stores did Aeropostale plan to open during fiscal 2007 (which will end in February 2008)? How many of these stores will be in Canada?
3. Describe the seasonality of Aeropostale's business.

4. Is Aeropostale involved in any litigation that may materially affect its financial position?
5. What are some “key indicators” of financial condition and operational performance that Aeropostale uses to analyze its business?
6. What are three of Aeropostale’s most critical accounting estimates?
7. Who audits Aeropostale?

**OBJECTIVE** > **3** **4**

**Exercise 12-61 HORIZONTAL ANALYSIS OF INCOME STATEMENTS**

Consolidated income statements for Peach Computer appear below:

<b>PEACH COMPUTER, INC.</b>			
<b>Consolidated Statements of Income</b>			
(In thousands except per share amounts)			
Three fiscal years ended December 31	2009	2008	2007
Sales	\$9,188,748	\$7,976,954	\$7,086,542
Costs and expenses:			
Cost of goods sold	\$6,844,915	\$5,248,834	\$3,991,337
Research and development	564,303	664,564	602,135
Selling, general, and administrative	1,384,111	1,632,362	1,687,262
Restructuring costs and other	(126,855)	320,856	—
	<u>\$8,666,474</u>	<u>\$7,866,616</u>	<u>\$6,280,734</u>
Operating income	\$ 522,274	\$ 110,338	\$ 805,808
Interest and other income, net	(21,988)	29,321	49,634
Income before income taxes	\$ 500,286	\$ 139,659	\$ 855,442
Provision for income taxes	190,108	53,070	325,069
Net income	<u>\$ 310,178</u>	<u>\$ 86,589</u>	<u>\$ 530,373</u>
Earnings per common and common equivalent share	<u>\$2.61</u>	<u>\$0.73</u>	<u>\$4.33</u>
Common and common equivalent shares used in the calculations of earnings per share	<u>118,735</u>	<u>119,125</u>	<u>122,490</u>

**Required:**

1. Prepare common size income statements for horizontal analysis.
2. Explain why net income decreased in 2008 and increased in 2009.

**OBJECTIVE** > **3** **4**

**Exercise 12-62 HORIZONTAL ANALYSIS OF BALANCE SHEETS**

Consolidated balance sheets for Peach Computer appear below:

<b>Peach Computer, Inc.</b>		
<b>Consolidated Balance Sheets</b>		
<b>December 31, 2009 and 2008</b>		
(Dollars in thousands)		
ASSETS	2009	2008
Current assets:		
Cash and cash equivalents	\$1,203,488	\$ 676,413
Short-term investments	54,368	215,890
Accounts receivable, net of allowance for doubtful accounts of \$90,992 (\$83,776 in 2008)	1,581,347	1,381,946
Inventories	1,088,434	1,506,638
Deferred tax assets	293,048	268,085
Other current assets	255,767	289,383
Total current assets	<u>\$4,476,452</u>	<u>\$4,338,355</u>
Property, plant, and equipment:		
Land and buildings	\$ 484,592	\$ 404,688
Machinery and equipment	572,728	578,272
Office furniture and equipment	158,160	167,905

ASSETS		
	2009	2008
Leasehold improvements	236,708	261,792
	<u>\$1,452,188</u>	<u>\$1,412,657</u>
Accumulated depreciation and amortization	(785,088)	(753,111)
Net property, plant, and equipment	<u>\$ 667,100</u>	<u>\$ 659,546</u>
Other assets	<u>\$ 159,194</u>	<u>\$ 173,511</u>
Total assets	<u><u>\$5,302,746</u></u>	<u><u>\$5,171,412</u></u>
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Short-term borrowings	\$ 292,200	\$ 823,182
Accounts payable	881,717	742,622
Accrued compensation and employee benefits	136,895	144,779
Accrued marketing and distribution	178,294	174,547
Accrued restructuring costs	58,238	307,932
Other current liabilities	396,961	315,023
Total current liabilities	<u>\$1,944,305</u>	<u>\$2,508,085</u>
Long-term debt	304,472	7,117
Deferred tax liabilities	670,668	629,832
Total liabilities	<u>\$2,919,445</u>	<u>\$3,145,034</u>
Shareholders' equity:		
Common stock, no par value: 320,000,000 shares authorized; 119,542,527 shares issued and outstanding in 2009 (116,147,035 shares in 2008)	\$ 297,929	\$ 203,613
Retained earnings	2,096,206	1,842,600
Accumulated translation adjustment	(10,834)	(19,835)
Total shareholders' equity	<u>\$2,383,301</u>	<u>\$2,026,378</u>
Total liabilities and shareholders' equity	<u><u>\$5,302,746</u></u>	<u><u>\$5,171,412</u></u>

**Required:**

1. Prepare common size balance sheets for horizontal analysis.
2. Indicate from what sources Peach appears to have secured the resources for its asset increase.

**Exercise 12-63 HORIZONTAL ANALYSIS USING INCOME STATEMENTS****OBJECTIVE** 3 4

The consolidated 2009, 2008, and 2007 income statements for Cola, Inc., and Subsidiaries appear below.

Cola, Inc., and Subsidiaries Consolidated Statement of Income (In millions except per share amounts)			
	December 31,		
	2009	2008	2007
Net sales	\$ 25,020.7	\$ 21,970.0	\$19,292.2
Costs and expenses:			
Cost of goods sold	(11,946.1)	(10,611.7)	(9,366.2)
Selling, general, and administrative expenses	(9,864.4)	(8,721.2)	(7,605.9)
Amortization of intangible assets	(303.7)	(265.9)	(208.3)
Operating profit	<u>\$ 2,906.5</u>	<u>\$ 2,371.2</u>	<u>\$ 2,111.8</u>
Interest expense	(572.7)	(586.1)	(613.7)
Interest income	88.7	113.7	161.6
Income before income taxes	<u>\$ 2,422.5</u>	<u>\$ 1,898.8</u>	<u>\$ 1,659.7</u>
Provision for income taxes	834.6	597.1	597.5
Net income	<u><u>\$ 1,587.9</u></u>	<u><u>\$ 1,301.7</u></u>	<u><u>\$ 1,062.2</u></u>

**Required:**

1. Prepare common size income statements for horizontal analysis.
2. Indicate what Cola's 2009, 2008, and 2007 tax rates were on its income before taxes.
3. Explain why net income increased by a larger percentage than sales in 2009 and 2008.

**OBJECTIVE** > **3** **4****Exercise 12-64 HORIZONTAL ANALYSIS USING BALANCE SHEETS**

The consolidated 2009 and 2008 balance sheets for Cola, Inc., and Subsidiaries appear below.

<b>Cola, Inc., and Subsidiaries</b> <b>Consolidated Balance Sheet</b> (In millions except per share amounts)		
<b>ASSETS</b>	<b>December 31,</b>	
	<b>2009</b>	<b>2008</b>
<b>Current assets:</b>		
Cash and cash equivalents	\$ 226.9	\$ 169.9
Short-term investments at cost which approximates market	1,629.3	1,888.5
Accounts and notes receivable, less allowance: \$128.3 in 2009 and \$112.0 in 2008	1,883.4	1,588.5
Inventories	924.7	768.8
Prepaid expenses, taxes, and other current assets	499.8	426.6
Total current assets	<u>\$ 5,164.1</u>	<u>\$ 4,842.3</u>
Investments in affiliates and other assets	1,756.6	1,707.9
Property, plant, and equipment, net	8,855.6	7,442.0
Intangible assets, net	7,929.5	6,959.0
Total assets	<u><u>\$23,705.8</u></u>	<u><u>\$20,951.2</u></u>
<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>		
<b>Current liabilities:</b>		
Short-term borrowings	\$ 2,191.2	\$ 706.8
Accounts payable	1,390.0	1,164.8
Income taxes payable	823.7	621.1
Accrued compensation and benefits	726.0	638.9
Accrued marketing	400.9	327.0
Other current liabilities	1,043.1	1,099.0
Total current liabilities	<u>\$ 6,574.9</u>	<u>\$ 4,557.6</u>
Long-term debt	7,442.6	7,964.8
Other liabilities	1,342.0	1,390.8
Deferred income taxes	2,007.6	1,682.3
Total liabilities	<u>\$17,367.1</u>	<u>\$15,595.5</u>
<b>Shareholders' equity:</b>		
Capital stock, par value $1\frac{2}{3}$ ¢ per share: authorized 1,800.0 shares, issued 863.1 shares	14.4	14.4
Capital in excess of par value	879.5	667.6
Retained earnings	6,541.9	5,439.7
Currency translation adjustment and other	(183.9)	(99.0)
Less: Treasury stock, at cost: 64.3 shares in 2009 and 2008	(913.2)	(667.0)
Total shareholders' equity	<u>6,338.7</u>	<u>5,355.7</u>
Total liabilities and shareholders' equity	<u><u>\$23,705.8</u></u>	<u><u>\$20,951.2</u></u>

**Required:**

1. Calculate the percentage that Cola's total assets increased by during 2009.
2. Determine whether any of the asset categories experienced larger increases than others.
3. Indicate where Cola acquired the capital to finance its asset growth.
4. Indicate whether any of the individual liability or equity items increased at a rate different from the rate at which total liabilities and equity increased.

**Exercise 12-65 PREPARATION OF COMMON SIZE STATEMENTS FOR VERTICAL ANALYSIS****OBJECTIVE** 3 4

Financial statements for Apparel, Inc., appear below.

<b>Apparel, Inc.</b>			
<b>Consolidated Statements of Income</b>			
(In thousands except per share amounts)			
	2009	2008	2007
Net sales	\$ 7,245,088	\$ 6,944,296	\$ 6,149,218
Cost of goods sold	(5,286,253)	(4,953,556)	(4,355,675)
Gross income	<u>\$ 1,958,835</u>	<u>\$ 1,990,740</u>	<u>\$ 1,793,543</u>
General and administrative expenses	(1,259,896)	(1,202,042)	(1,080,843)
Special and nonrecurring items	2,617	—	—
Operating income	<u>\$ 701,556</u>	<u>\$ 788,698</u>	<u>\$ 712,700</u>
Interest expense	(63,685)	(62,398)	(63,927)
Other income	7,308	10,080	11,529
Gain on sale of investments	—	9,117	—
Income before income taxes	<u>\$ 645,179</u>	<u>\$ 745,497</u>	<u>\$ 660,302</u>
Provision for income taxes	254,000	290,000	257,000
Net income	<u><u>\$ 391,179</u></u>	<u><u>\$ 455,497</u></u>	<u><u>\$ 403,302</u></u>
Net income per share	\$1.08	\$1.25	\$1.11

<b>Apparel, Inc.</b>		
<b>Consolidated Balance Sheets</b>		
(In thousands)		
ASSETS	Dec. 31, 2009	Dec. 31, 2008
Current assets:		
Cash and equivalents	\$ 320,558	\$ 41,235
Accounts receivable	1,056,911	837,377
Inventories	733,700	803,707
Other	109,456	101,811
Total current assets	<u>\$2,220,625</u>	<u>\$1,784,130</u>
Property and equipment, net	1,666,588	1,813,948
Other assets	247,892	248,372
Total assets	<u><u>\$4,135,105</u></u>	<u><u>\$3,846,450</u></u>

LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities		
Accounts payable	\$ 250,363	\$ 309,092
Accrued expenses	347,892	274,220
Certificates of deposit	15,700	—
Income taxes	93,489	137,466
Total current liabilities	<u>\$ 707,444</u>	<u>\$ 720,778</u>
Long-term debt	\$ 650,000	\$ 541,639
Deferred income taxes	275,101	274,844
Other long-term liabilities	61,267	41,572
Total liabilities	<u><u>\$1,693,812</u></u>	<u><u>\$1,578,833</u></u>

### LIABILITIES AND SHAREHOLDERS' EQUITY

Shareholders' equity:		
Common stock	\$ 189,727	\$ 189,727
Paid-in capital	128,906	127,776
Retained earnings	<u>2,397,112</u>	<u>2,136,794</u>
	\$2,715,745	\$2,454,297
Less: Treasury stock, at cost	<u>(274,452)</u>	<u>(186,680)</u>
Total shareholders' equity	<u>\$2,441,293</u>	<u>\$2,267,617</u>
Total liabilities and shareholders' equity	<u><u>\$4,135,105</u></u>	<u><u>\$3,846,450</u></u>

**Required:**

1. Prepare common size income statements and balance sheets for Apparel to be used in vertical analysis.
2. Indicate whether gross margin grew as much as sales between 2007 and 2008 and between 2008 and 2009 and if so why it grew.
3. Indicate whether the relative proportion of Apparel's assets changed between 2008 and 2009 and if so, explain the change.
4. Indicate whether the relative proportion of Apparel's liabilities and equity changed between 2008 and 2009 and if so, explain the change.
5. Explain how Apparel appears to have financed the 7.5 percent increase in assets that occurred between 2008 and 2009.

**OBJECTIVE** > 3 4**Exercise 12-66 COMMON SIZE STATEMENTS FOR VERTICAL ANALYSIS**

The following comparative percentage income statements and balance sheets are available for Charger Products:

Charger Products Statements of Income						
	Year Ended December 31,					
	2009		2008		2007	
	Amount	%	Amount	%	Amount	%
Revenues	\$901,170	100.0	\$728,035	100.0	\$661,850	100.0
Costs and expenses:						
Cost of good sold	\$539,801	59.9	\$439,005	60.3	\$401,743	60.7
Selling and administrative	318,113	35.3	206,034	28.3	176,052	26.6
Interest	17,122	1.9	18,201	2.5	17,208	2.6
Other expenses (income)	<u>9,913</u>	<u>1.1</u>	<u>2,912</u>	<u>0.4</u>	<u>(1,324)</u>	<u>(0.2)</u>
Total costs and expenses	<u>\$884,949</u>	<u>98.2</u>	<u>\$666,152</u>	<u>91.5</u>	<u>\$593,679</u>	<u>89.7</u>
Income before provision for income taxes	16,221	1.8	61,883	8.5	68,171	10.3
Provision for income taxes	<u>4,506</u>	<u>0.5</u>	<u>22,569</u>	<u>3.1</u>	<u>23,827</u>	<u>3.6</u>
Net income	<u><u>\$ 11,715</u></u>	<u><u>1.3</u></u>	<u><u>\$ 39,314</u></u>	<u><u>5.4</u></u>	<u><u>\$ 44,344</u></u>	<u><u>6.7</u></u>

Charger Products Comparative Balance Sheets						
ASSETS	December 31,					
	2009		2008		2007	
	Amount	%	Amount	%	Amount	%
Current assets	\$147,129	31.4	\$ 62,417	14.3	\$ 66,927	16.1
Investment	30,925	6.6	95,589	21.9	91,453	22.0
Property, plant, and equipment (net)	270,831	57.8	261,015	59.8	241,519	58.1
Other assets	19,680	4.2	17,459	4.0	15,796	3.8
Total assets	<u>\$468,565</u>	<u>100.0</u>	<u>\$436,480</u>	<u>100.0</u>	<u>\$415,695</u>	<u>100.0</u>
LIABILITIES AND STOCKHOLDERS' EQUITY						
Current liabilities	\$ 68,410	14.6	\$ 29,244	6.7	\$ 28,683	6.9
Long-term debt	152,284	32.5	162,807	37.3	152,976	36.8
Total liabilities	<u>\$220,694</u>	<u>47.1</u>	<u>\$192,051</u>	<u>44.0</u>	<u>\$181,659</u>	<u>43.7</u>
Common stock	\$183,209	39.1	\$182,332	41.8	\$171,266	41.2
Retained earnings	64,662	13.8	62,097	14.2	62,770	15.1
Total stockholders' equity	<u>\$247,871</u>	<u>52.9</u>	<u>\$244,429</u>	<u>56.0</u>	<u>\$234,036</u>	<u>56.3</u>
Total liabilities and stockholders' equity	<u>\$468,565</u>	<u>100.0</u>	<u>\$436,480</u>	<u>100.0</u>	<u>\$415,695</u>	<u>100.0</u>

**Required:**

1. Explain why income from operations decreased in 2008 and 2009 while sales increased.
2. Determine whether the proportion of resources invested in the various asset categories changed.
3. Determine whether the proportion of capital supplied by creditors changed.
4. Indicate from what sources Charger secured the capital to finance its increase in current assets in 2009.

**Exercise 12-67 SHORT-TERM LIQUIDITY RATIOS**

The financial statements for Retail Corporation appear below.

Retail Corporation Consolidated Results of Operations			
(Millions of dollars, except per share data)	December 31		
	2009	2008	2007
Revenues	\$19,233	\$17,927	\$16,115
Costs and expenses:			
Cost of retail sales, buying, and occupancy	\$14,164	\$13,129	\$11,751
Selling, publicity, and administration	3,175	2,978	2,801
Depreciation	498	459	410
Interest expense, net	446	437	398
Taxes other than income taxes	343	313	283
Total costs and expenses	<u>\$18,626</u>	<u>\$17,316</u>	<u>\$15,643</u>
Earnings before income taxes	\$ 607	\$ 611	\$ 472
Provision for income taxes	232	228	171
Net earnings	<u>\$ 375</u>	<u>\$ 383</u>	<u>\$ 301</u>

**OBJECTIVE 5**

<b>Retail Corporation</b>		
<b>Consolidated Statements of Financial Position</b>		
<b>(Millions of dollars)</b>		
<b>ASSETS</b>	<b>December 31,</b>	
	<b>2009</b>	<b>2008</b>
Current assets:		
Cash and cash equivalents	\$ 321	\$ 117
Accounts receivable	1,536	1,514
Merchandise inventories	2,497	2,618
Other	157	165
Total current assets	<u>\$ 4,511</u>	<u>\$ 4,414</u>
Property and equipment:		
Land	\$ 1,120	\$ 998
Buildings and improvements	4,753	4,342
Fixtures and equipment	2,162	2,197
Construction-in-progress	248	223
Accumulated depreciation	(2,336)	(2,197)
Net property and equipment	<u>\$ 5,947</u>	<u>\$ 5,563</u>
Other	320	360
Total assets	<u><u>\$10,778</u></u>	<u><u>\$10,337</u></u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Notes payable	\$ 200	\$ 23
Accounts payable	1,654	1,596
Accrued liabilities	903	849
Income taxes payable	145	125
Current portion of long-term debt	173	371
Total current liabilities	<u>\$ 3,075</u>	<u>\$ 2,964</u>
Long-term debt	4,279	4,330
Deferred income taxes and other	536	450
Loan to ESOP	(217)	(267)
Total liabilities	<u>\$ 7,673</u>	<u>\$ 7,477</u>
Stockholders' equity:		
Preferred stock	\$ 368	\$ 374
Common stock	72	71
Additional paid-in capital (common)	73	58
Retained earnings	2,592	2,357
Total stockholders' equity	<u>\$ 3,105</u>	<u>\$ 2,860</u>
Total liabilities and stockholders' equity	<u><u>\$10,778</u></u>	<u><u>\$10,337</u></u>

**Required:**

1. Compute the four short-term liquidity ratios for 2008 and 2009 assuming operating cash flows are \$281 million and \$483 million, respectively.
2. Indicate which ratios appear to be most appropriate for a retail organization. Indicate what other information you would like to know to comment on Retail's short-term liquidity.

**OBJECTIVE** > **5****Exercise 12-68 DEBT MANAGEMENT RATIOS**

Use Apparel's financial statements in **Exercise 12-65** to respond to the following requirements.



**Required:**

1. Compute the five debt-management ratios for 2008 and 2009.
2. Indicate whether the ratios have changed and whether the ratios suggest that Apparel is more or less risky for long-term creditors at December 31, 2009 than at December 31, 2008.

**Exercise 12-69 ASSET EFFICIENCY RATIOS**

Use Apparel's financial statements in **Exercise 12-65** and the information below to respond to the following requirements.

Statement Item	January 1, 2008 (In Thousands)
Accounts receivable	\$ 752,945
Inventories	698,604
Total assets	3,485,233

**Required:**

1. Compute the three asset efficiency ratios for 2008 and 2009.
2. Indicate Apparel's operating cycle for the years ended December 31, 2009, and December 31, 2008.

**Exercise 12-70 PROFITABILITY RATIOS**

Use Apparel's financial statements in **Exercise 12-65** and the information below to respond to the following requirements.

Statement Item	January 1, 2008 (In Thousands)
Total assets	\$3,485,233
Total stockholders' equity	2,083,122

**Required:**

1. Compute the five profitability ratios for 2008 and 2009.
2. Explain what these ratios suggest about Apparel's profitability. Indicate what other information you would like to know to further assess Apparel's profitability.

**Exercise 12-71 STOCKHOLDER RATIOS**

Use Apparel's financial statements in **Exercise 12-65** and the information below to respond to the following requirements.

Item	Year Ended December 31,	
	2009	2008
Average number of common shares outstanding (thousands)	362,202	364,398
Preferred dividends (thousands)	\$ 24,000	\$ 24,000
Dividends per common share	\$ 0.36	\$ 1.54
Dividends (thousands)	130,861.00	561,172.30
Common stock repurchases	0	0
Market price per share:		
High	\$ 83.25	\$ 79.10
Low	63.25	59.00
Close	78.42	66.36
At January 1, 2008, total stockholders' equity was \$2,083,122 and there was no preferred stock.		

**OBJECTIVE** > 5**OBJECTIVE** > 5**OBJECTIVE** > 5

**Required:**

1. Compute the four stockholder ratios for 2008 and 2009.
2. Indicate whether there were significant changes in these ratios between the years ended December 31, 2009, and December 31, 2008. Determine whether the stockholder ratios suggest that Apparel was a better investment at December 31, 2009, or December 31, 2008.

**OBJECTIVE** > **5****Exercise 12-72 DUPONT ANALYSIS**

Use Apparel's financial statements in **Exercise 12-65** to respond to the following requirements.

Statement Item	January 1, 2008 (In Thousands)	
	Total assets	\$3,485,233
Total stockholders' equity	2,083,122	

Industry Averages	Year Ended December 31,	
	2009	2008
Return on equity	5.31%	12.54%
Profit margin	4.00%	6.21%
Asset turnover	0.83	1.96
Leverage	1.60	1.03

**Required:**

1. Perform Dupont analysis for 2008 and 2009.
2. Explain what you learn about Apparel's trends from 2008 to 2009 by comparing its performance to the industry averages.

**OBJECTIVE** > **6****Exercise 12-73 ACCOUNTING ALTERNATIVES AND FINANCIAL RATIOS**

The 2008 annual report for Zimmer Cable included the following information on a change in the procedure for amortizing its investment in pay-TV programming:

*In the first quarter of 2008, the Company changed the rate of amortization of its pay-TV programming costs to more closely reflect audience viewing patterns. The effect of this change was to reduce programming costs by \$58 million and \$57 million, resulting in increased net income of \$35 million and \$31 million, or \$0.58 per share and \$0.49 per share, during 2008 and 2007, respectively.*

**Required:**

1. Indicate which financial ratios would be affected by this change.
2. Explain whether you would expect this change in amortization policy to affect the accounts by a larger or smaller amount in future years and why.

**OBJECTIVE** > **6****Exercise 12-74 ACCOUNTING POLICY CHOICE**

Accounting policies can affect financial statement analysis.

**Required:**

1. Name a few accounting policies concerning the balance sheet that could affect financial statement analysis.
2. Name a few accounting policies related to expenses that could affect financial statement analysis.

## Problem Set A

### Problem 12-75A USING COMMON SIZE DATA FOR CREDIT ANALYSIS

**OBJECTIVE** > 3 4

You are the credit manager for Materials Supply Company. One of your sales staff has made a \$50,000 credit sale to Stewart Electronics, a manufacturer of small computers. Your responsibility is to decide whether to approve the sale. You have the following data for the computer industry and Stewart Electronics:

For the Years 2005–2009	Industry	Stewart Electronics
Average annual sales growth	13.4%	17.6%
Average annual operating income growth	10.8%	9.7%
Average annual net income growth	14.4%	9.9%
Average annual asset growth	10.3%	14.2%
Average debt to equity ratio	0.32	0.26
Average current ratio	4.04	3.71
Average inventory turnover ratio	2.53	2.06
Average accounts receivable turnover ratio	3.95	4.18

For Stewart Electronics, you have the following data for the year ended December 31, 2009:

Sales revenue	\$3,908,000
Net income	359,000
Total assets	3,626,000
Current ratio	1.82
Debt to equity ratio	0.37
Inventory turnover ratio	1.79
Accounts receivable turnover ratio	3.62

The salesperson believes that Stewart Electronics would order about \$200,000 per year of materials that would provide a gross margin of \$35,000 to Materials Supply if reasonable credit terms could be arranged.

#### Required:

State whether or not you would grant authorization for Stewart to purchase on credit and support your decision.

### Problem 12-76A USING COMMON SIZE DATA FOR INVESTMENT ANALYSIS

**OBJECTIVE** > 3 4

Assume that you are a trust officer for the West Side Bank. You are attempting to select a pharmaceutical manufacturer's stock for a client's portfolio. You have secured the following data:

	Five-Year Averages				
	Industry Average	Firm A	Firm B	Firm C	Firm D
Sales growth	8.3%	9.8%	7.9%	7.2%	10.1%
Net income growth	13.0	12.0	10.7	4.2	16.1
Asset growth	5.0	6.1	4.6	4.4	6.2
	Current Year				
Return on equity	16.2%	17.5%	17.5%	19.4%	21.6%
Return on assets	8.5	7.8	12.7	8.4	11.4
Dividend payout	43.0	40.0	23.0	31.0	31.0

#### Required:

Comment on the relative performance of these firms.

### Problem 12-77A USING COMMON SIZE INCOME STATEMENT DATA

**OBJECTIVE** > 3 4

The 2009, 2008, and 2007 income statements for Entertainment Enterprises appear on the following page.

<b>Entertainment Enterprises</b>			
<b>Income Statement</b>			
<b>Year Ended December 31,</b>			
	<b>2009</b>	<b>2008</b>	<b>2007</b>
<b>Revenues</b>			
Theme parks and resorts	\$3,440.7	\$3,306.9	\$2,794.3
Filmed entertainment	3,673.4	3,115.2	2,593.7
Consumer products	1,415.1	1,081.9	724.0
	<u>\$8,529.2</u>	<u>\$7,504.0</u>	<u>\$6,112.0</u>
<b>Costs and Expenses</b>			
Theme parks and resorts	\$2,693.8	\$2,662.9	\$2,247.7
Filmed entertainment	3,051.2	2,606.9	2,275.6
Consumer products	1,059.7	798.9	494.2
	<u>\$6,804.7</u>	<u>\$6,068.7</u>	<u>\$5,017.5</u>
<b>Operating Income</b>			
Theme parks and resorts	\$ 746.9	\$ 644.0	\$ 546.6
Filmed entertainment	622.2	508.3	318.1
Consumer products	355.4	283.0	229.8
	<u>\$1,724.5</u>	<u>\$1,435.3</u>	<u>\$1,094.5</u>
<b>Corporate Activities</b>			
General and administrative expenses	\$ 164.2	\$ 148.2	\$ 160.8
Interest expense	157.7	126.8	105.0
Investment and interest income	(186.1)	(130.3)	(119.4)
	<u>\$ 135.8</u>	<u>\$ 144.7</u>	<u>\$ 146.4</u>
Income (loss) on investment in Asian theme park	\$ (514.7)	\$ 11.2	\$ 63.8
Income before income taxes	\$1,074.0	\$1,301.8	\$1,011.9
Income taxes	402.7	485.1	375.3
Net income	<u>\$ 671.3</u>	<u>\$ 816.7</u>	<u>\$ 636.6</u>

**Required:**

1. Calculate how much each of the revenues and expenses changed from 2007 through 2009.
2. Explain what were the primary causes of Entertainment Enterprises' increase in net income in 2008 and the decrease in 2009.

**OBJECTIVE** > **3** **4****Problem 12-78A USING COMMON SIZE STATEMENTS**

The following income statement and vertical analysis data are available for Robbins Audio Products:

<b>Robbins Audio Products</b>						
<b>Comparative Statements of Income</b>						
<b>Year Ended June 30,</b>						
	<b>2009</b>		<b>2008</b>		<b>2007</b>	
(in thousands)	<b>Amount</b>	<b>%</b>	<b>Amount</b>	<b>%</b>	<b>Amount</b>	<b>%</b>
Sales	\$2,970.0	100.0	\$3,465.0	100.0	\$3,960.0	100.0
Other income, net	23.7	0.8	34.6	1.0	39.6	1.0
Total revenues	<u>\$2,993.7</u>	<u>100.8</u>	<u>\$3,499.6</u>	<u>101.0</u>	<u>\$3,999.6</u>	<u>101.0</u>
Costs and expenses:						
Cost of goods sold	\$1,303.8	43.9	\$1,566.2	45.2	\$1,920.6	48.5
Selling and administrative	1,571.1	52.9	1,593.9	46.0	1,564.2	39.5
Interest	62.4	2.1	65.8	1.9	59.4	1.5

(in thousands)	Year Ended June 30,					
	2009		2008		2007	
	Amount	%	Amount	%	Amount	%
Total costs and expenses	\$2,937.3	98.9	\$3,225.9	93.1	\$3,544.2	89.5
Income before income taxes	\$ 56.4	1.9	\$ 273.7	7.9	\$ 455.4	11.5
Income taxes expense	14.8	0.5	107.4	3.1	182.2	4.6
Net income	<u>\$ 41.6</u>	<u>1.4</u>	<u>\$ 166.3</u>	<u>4.8</u>	<u>\$ 273.2</u>	<u>6.9</u>

**Required:**

1. Suggest why net income declined from \$273,200 to \$41,600 while the cost of goods sold percentage decreased each year and selling and administrative expenses remained nearly constant.
2. Determine what could cause sales to decline while the gross margin percentage increases.

**Problem 12-79A USING COMMON SIZE STATEMENTS****OBJECTIVE** 3 4

Logo, Inc., owns and operates a small chain of sportswear stores located near colleges and universities. Logo has experienced significant growth in recent years. The following data are available for Logo:

Logo, Inc. Comparative Statements of Income			
(In thousands)	Year Ended December 31,		
	2009	2008	2007
Sales	\$51,638	\$41,310	\$34,425
Cost of goods sold	31,050	24,840	20,700
Gross margin	<u>\$20,588</u>	<u>\$16,470</u>	<u>\$13,725</u>
Other income, net	383	426	405
	<u>\$20,971</u>	<u>\$16,896</u>	<u>\$14,130</u>
Costs and expenses:			
Selling and administrative	\$16,570	\$13,465	\$11,350
Interest	1,237	765	554
Total costs and expenses	<u>\$17,807</u>	<u>\$14,230</u>	<u>\$11,904</u>
Income before income taxes	\$ 3,164	\$ 2,666	\$ 2,226
Provision for income taxes	885	746	623
Net income	<u>\$ 2,279</u>	<u>\$ 1,920</u>	<u>\$ 1,603</u>

Logo, Inc. Comparative Balance Sheets (In thousands)			
ASSETS	December 31,		
	2009	2008	2007
Current assets:			
Cash	\$ 360	\$ 293	\$ 236
Accounts receivable	4,658	3,690	3,285
Inventories	6,064	4,478	3,442
Total current assets	<u>\$11,082</u>	<u>\$ 8,461</u>	<u>\$ 6,963</u>
Property, plant, and equipment (net)	4,860	3,600	2,756
Other assets	574	585	562
Total assets	<u>\$16,516</u>	<u>\$12,646</u>	<u>\$10,281</u>

LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Short-term notes payable	\$ 4,230	\$ 1,620	\$ 450
Accounts payable	1,147	1,013	720
Total current liabilities	\$ 5,377	\$ 2,633	\$ 1,170
Long-term debt	3,150	3,150	3,150
Total liabilities	\$ 8,527	\$ 5,783	\$ 4,320
Paid-in capital	\$ 4,725	\$ 4,725	\$ 4,725
Retained earnings	3,264	2,138	1,236
Total stockholders' equity	\$ 7,989	\$ 6,863	\$ 5,961
Total liabilities and stockholders' equity	\$16,516	\$12,646	\$10,281

**Required:**

- Determine how much Logo's sales, net income, and assets have grown during these three years.
- Explain how Logo has financed the increase in assets.
- Determine whether Logo's liquidity is adequate.
- Explain why interest expense is growing.
- If Logo's sales grow by 25 percent in 2010, what would you expect net income to be?
- If Logo's assets must grow by 25 percent to support the 25 percent sales increase and if 50 percent of net income is paid in dividends, how much capital must Logo raise?

**OBJECTIVE** > **3** **4****Problem 12-80A PREPARING COMMON SIZE STATEMENTS**

The financial statements for Jane's Shoes, Inc., appear below and on the next page:

Jane's Shoes, Inc. Income Statement			
(In thousands, except per share data)	Year Ended December 31,		
	2009	2008	2007
Revenues	\$3,930,984	\$3,405,211	\$3,003,610
Costs and expenses:			
Cost of goods sold	\$2,386,993	\$2,089,089	\$1,850,530
Selling and administrative	922,261	761,498	664,061
Interest	25,739	30,665	27,316
Other expenses (income)	1,475	2,141	(43)
Total costs and expenses	\$3,336,468	\$2,883,393	\$2,541,864
Income before income taxes	\$ 594,516	\$ 521,818	\$ 461,746
Income taxes	229,500	192,600	174,700
Net income	\$ 365,016	\$ 329,218	\$ 287,046

Jane's Shoes, Inc. Balance Sheets (In thousands)		
ASSETS	December 31,	
	2009	2008
Current assets:		
Cash and equivalents	\$ 291,284	\$ 260,050
Accounts receivable, less allowance for doubtful accounts of \$19,447 and \$20,046	667,547	596,018
Inventories	592,986	471,202
Deferred income taxes	26,378	27,511
Prepaid expenses	42,452	32,977
Total current assets	\$1,620,647	\$1,387,758

ASSETS	December 31,	
	2009	2008
Property, plant, and equipment	\$ 571,032	\$ 497,795
Less accumulated depreciation	193,037	151,758
Net property, plant, and equipment	\$ 377,995	\$ 346,037
Goodwill	157,894	110,363
Other assets	30,927	28,703
Total assets	<u>\$2,187,463</u>	<u>\$1,872,861</u>
<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>		
Current liabilities:		
Current portion of long-term debt	\$ 52,985	\$ 3,652
Notes payable	108,165	105,696
Accounts payable	135,701	134,729
Accrued liabilities	138,563	134,089
Income taxes payable	17,150	42,422
Total current liabilities	\$ 452,564	\$ 420,588
Long-term debt	15,033	77,022
Noncurrent deferred income taxes	29,965	27,074
Other noncurrent liabilities	43,575	23,728
Commitments and contingencies	—	—
Redeemable preferred stock	300	300
Total liabilities	<u>\$ 541,437</u>	<u>\$ 548,712</u>
Shareholders' equity:		
Common stock at stated value:		
Class A convertible—26,691 and 26,919 shares outstanding	\$ 159	\$ 161
Class B—49,161 and 48,591 shares outstanding	2,720	2,716
Capital in excess of stated value	108,451	93,799
Treasury stock (common at cost)	(7,790)	(6,860)
Retained earnings	1,542,486	1,234,333
Total shareholders' equity	<u>\$1,646,026</u>	<u>\$1,324,149</u>
Total liabilities and shareholders' equity	<u>\$2,187,463</u>	<u>\$1,872,861</u>

**Required:**

1. Prepare common income statements to be used for horizontal analysis for Jane's Shoes for 2007 to 2009.
2. Indicate why Jane's net income increased between 2007 and 2009.
3. Prepare common size balance sheets to be used for vertical analysis for 2009 and 2008.
4. Indicate whether the proportion of dollars invested in the various categories of assets has changed significantly between 2008 and 2009.
5. Indicate whether the proportion of capital raised from the various liability categories and common shareholders' equity has changed significantly between 2008 and 2009.
6. Describe Jane's performance and financial position.

**Problem 12-81A PREPARATION OF RATIOS****OBJECTIVE** 5

Use the Logo, Inc., financial statements in **Problem 12-79A** to respond to the following requirements.

**Required:**

1. Compute asset efficiency ratios for Logo for 2009 and 2008. Indicate whether efficiency has changed.
2. Determine whether Logo's profitability changed for the two-year period 2008–2009.
3. Compute the debt-management ratios for 2008 and 2009. Discuss whether creditors are as secure in 2009 as they were in 2008.

**OBJECTIVE** > **5** **Problem 12-82A COMPARING FINANCIAL RATIOS**

Presented below are selected ratios for four firms: Firm A is a heavy equipment manufacturer, Firm B is a newspaper publisher, Firm C is a food manufacturer, and Firm D is a grocery chain.

	Firm A	Firm B	Firm C	Firm D
<b>Short-term liquidity</b>				
Current ratio	1.3	1.7	1.0	1.6
<b>Debt-management ratio</b>				
Long-term debt-to-equity	1.81	.45	.30	.09
<b>Asset efficiency ratios</b>				
Accounts receivable turnover	4.66	8.28	11.92	116.15
Inventory turnover	6.26	40.26	7.29	8.43
<b>Profitability ratios</b>				
Operating income	12.6%	25.4%	21.2%	3.8%
Net income	5.9	10.9	10.8	1.9
Return on assets	4.7	10.6	16.8	10.3
Return on equity	36.0	22.6	38.0	21.2

**Required:**

- Which firm has the weakest current ratio?
- Explain why the turnover ratios vary so much among the four firms.
- Explain why the return on equity ratio is larger than the return on asset ratio for all four firms.
- Discuss whether the large differences in the return on equity ratios can exist over long periods of time.

**OBJECTIVE** > **5** **Problem 12-83A PREPARATION OF RATIOS**

Use Jane's Shoes' financial statements in **Problem 12-80A** and the following data to respond to the requirements below.

	2009	2008	2007
Average number of common shares outstanding	77,063	76,602	76,067
Accounts receivable	\$ 667,547	\$ 596,018	\$ 521,588
Inventories	592,986	471,202	586,594
Total assets	2,187,463	1,872,861	1,708,430
Shareholders' equity	1,646,026	1,324,149	1,032,789
Stock repurchases	930,111	581,134	288,320
Cash flows from operating activities	190,000	150,000	137,000
Common dividends paid	57,797	45,195	39,555
Dividends per common share	0.75	0.59	0.52
Market price per share:			
High	90.25	77.45	54.50
Low	55.00	35.12	26.00
Close	86.33	71.65	43.22
	<b>Year Ended December 31,</b>		
<b>Industry Averages</b>	<b>2009</b>	<b>2008</b>	
Return on equity	25.98%	23.04%	
Profit margin	0.05	0.04	
Asset turnover	2.24	2.56	
Leverage	2.32	2.25	

**Required:**

- Prepare all the financial ratios for Jane's Shoes for 2009 and 2008.
- Explain whether Jane's Shoes' short-term liquidity is adequate.

- Discuss whether Jane's Shoes uses their assets efficiently.
- Determine whether Jane's Shoes is profitable.
- Discuss whether long-term creditors should regard Jane's Shoes as a high-risk or a low-risk firm.
- Perform Dupont analysis for 2008 and 2009.

### Problem 12-84A ACCOUNTING ALTERNATIVES AND FINANCIAL ANALYSIS

**OBJECTIVE** > 6

Shady Deal Automobile Sales Company has asked your bank for a \$100,000 loan to expand its sales facility. Shady Deal provides you with the following data:

	2009	2008	2007
Sales revenue	\$6,100,000	\$5,800,000	\$5,400,000
Net income	119,000	112,000	106,000
Ending inventory (FIFO)*	665,000	600,000	500,000
Purchases	5,370,000	5,105,000	4,860,000
Depreciable assets	1,240,000	1,150,000	1,090,000

\*The 2006 ending inventory was \$470,000 (FIFO).

Your inspection of the financial statements of other automobiles sales firms indicates that most of these firms adopted the LIFO method in the late 1970s. You further note that Shady Deal has used 5 percent of depreciable asset cost when computing depreciation expense and that other automobile dealers use 10 percent. Assume that Shady Deal's effective tax rate is 25 percent of income before tax. Also assume the following:

	2009	2008	2007
Ending inventory (LIFO)*	\$508,000	\$495,000	\$480,000

\*The 2006 ending inventory was \$470,000 (LIFO).

#### Required:

- Compute cost of goods sold for 2007–2009, using both the FIFO and the LIFO methods.
- Compute depreciation expense for Shady Deal for 2007–2009, using both 5 percent and 10 percent of the cost of depreciable assets.
- Recompute Shady Deal's net income for 2007–2009, using LIFO and 10 percent depreciation. (Don't forget the tax impact of the increases in cost of goods sold and depreciation expense.)
- Explain whether Shady Deal appears to have materially changed its financial statements by the selection of FIFO (rather than LIFO) and 5 percent (rather than 10 percent) depreciation.

## Problem Set B

### Problem 12-75B USING COMMON SIZE DATA FOR CREDIT ANALYSIS

**OBJECTIVE** > 3 4

You are the credit manager for Super Supply, Inc. One of your sales staff has made a \$60,000 credit sale to Tim's Technology, a manufacturer of small computers. Your responsibility is to decide whether to approve the sale. You have the following data for the computer industry and Tim's Technology:

For the Years 2005–2009	Industry	Tim's Technology
Average annual sales growth	12.6%	16.8%
Average annual operating income growth	11.2%	10.2%
Average annual net income growth	15.3%	10.6%
Average annual asset growth	9.9%	13.9%
Average debt to equity ratio	0.36	0.29
Average current ratio	4.12	3.88
Average inventory turnover ratio	2.61	2.19
Average accounts receivable turnover ratio	3.89	4.11

For Tim's Technology, you have the following data for the year ended December 31, 2009:

Sales revenue	\$4,120,000
Net income	367,000
Total assets	3,752,000
Current ratio	1.79
Debt-to-equity ratio	0.42
Inventory turnover ratio	1.83
Accounts receivable turnover ratio	3.71

The salesperson believes that Tim's Technology would order about \$240,000 per year of materials that would provide a gross margin of \$40,000 to Super Supply if reasonable credit terms could be arranged.

**Required:**

State whether or not you would grant authorization for Tim's Technology to purchase on credit and support your decision.

**OBJECTIVE** > **3** **4**

**Problem 12-76B USING COMMON SIZE DATA FOR INVESTMENT ANALYSIS**

Assume that you are a trust officer for the Bank of New York. You are attempting to select a pharmaceutical manufacturer's stock for a client's portfolio. You have secured the following data:

	Five-Year Averages				
	Industry Average	Firm A	Firm B	Firm C	Firm D
Sales growth	9.3%	8.8%	10.2%	10.0%	7.9%
Net income growth	16.0	15.3	18.9	17.4	15.6
Asset growth	7.0	6.6	8.3	8.9	6.3

	Current Year				
	Return on equity	19.5%	18.4%	22.7%	20.8%
Return on assets	11.7	10.4	13.7	12.8	11.1
Dividend payout	31.0	30.0	39.0	37.0	29.0

**Required:**

Comment on the relative performance of these firms.

**OBJECTIVE** > **3** **4**

**Problem 12-77B USING COMMON SIZE INCOME STATEMENT DATA**

The 2009, 2008, and 2007 income statements for Electronics Unlimited appear below.

Electronics Unlimited Income Statement			
	Year Ended December 31,		
	2009	2008	2007
<b>Revenues</b>			
Theme parks and resorts	\$2,723.8	\$3,299.9	\$3,502.7
Filmed entertainment	2,601.4	3,127.3	3,682.4
Consumer products	752.3	1,121.6	1,493.5
	<u>\$6,077.5</u>	<u>\$7,548.8</u>	<u>\$8,678.6</u>
<b>Costs and expenses</b>			
Theme parks and resorts	\$2,263.9	\$2,723.4	\$2,703.7
Filmed entertainment	2,300.2	2,566.3	3,104.9
Consumer products	503.7	804.5	1,120.6
	<u>\$5,067.8</u>	<u>\$6,094.2</u>	<u>\$6,929.2</u>

	Year Ended December 31,		
	2009	2008	2007
<b>Operating income</b>			
Theme parks and resorts	\$ 459.9	\$ 576.5	\$ 799.0
Filmed entertainment	301.2	561.0	577.5
Consumer products	248.6	317.1	372.9
	<u>\$1,009.7</u>	<u>\$1,454.6</u>	<u>\$1,749.4</u>
<b>Corporate activities</b>			
General and administrative expenses	\$ 161.2	\$ 150.2	\$ 165.3
Interest expense	103.7	130.8	158.9
Investment and interest income	(121.1)	(127.4)	(193.6)
	<u>\$ 143.8</u>	<u>\$ 153.6</u>	<u>\$ 130.6</u>
Income (loss) on investment in Asian theme park	\$ 62.1	\$ 13.6	\$ (520.8)
Income before income taxes	\$ 928.0	\$1,314.6	\$1,098.0
Income taxes	376.2	492.3	410.4
Net income	<u>\$ 551.8</u>	<u>\$ 822.3</u>	<u>\$ 687.6</u>

**Required:**

1. Calculate how much each of the revenues and expenses changed from 2007 through 2009.
2. Discuss the primary causes of Electronics Unlimited's increase in net income in 2008 and the decrease in 2009.

**Problem 12-78B USING COMMON SIZE STATEMENTS****OBJECTIVE** 3 4

The following income statement and vertical analysis data are available for Willis Audio Products:

Willis Audio Products Comparative Statements of Income						
(in thousands)	Year Ended June 30,					
	2009		2008		2007	
	Amount	%	Amount	%	Amount	%
Sales	\$4,122.0	100.0	\$3,566.0	100.0	\$2,965.0	100.0
Other income, net	39.7	1.0	36.7	1.0	21.3	0.7
Total revenues	<u>\$4,161.7</u>	<u>101.0</u>	<u>\$3,602.7</u>	<u>101.0</u>	<u>\$2,986.3</u>	<u>100.7</u>
Costs and expenses:						
Cost of goods sold	\$1,893.6	45.9	\$1,610.3	45.2	\$1,310.8	44.2
Selling and administrative	1,610.3	39.1	1,603.6	45.0	1,505.3	50.8
Interest	61.4	1.5	69.7	2.0	63.2	2.1
Total costs and expenses	<u>\$3,565.3</u>	<u>86.5</u>	<u>\$3,283.6</u>	<u>92.2</u>	<u>\$2,879.3</u>	<u>97.1</u>
Income before income taxes	\$ 596.4	14.5	\$ 319.1	8.9	\$ 107.0	3.6
Income taxes expense	181.5	4.4	109.6	3.1	14.5	.5
Net income	<u>\$ 414.9</u>	<u>10.1</u>	<u>\$ 209.5</u>	<u>5.9</u>	<u>\$ 92.5</u>	<u>3.1</u>

**Required:**

1. Suggest why net income increased from \$92,500 to \$414,900 while the cost of goods sold percentage increased each year and selling and administrative expenses remained nearly constant.
2. Explain what could cause sales to increase while the gross margin percentage decreases.

**OBJECTIVE** > **3** **4****Problem 12-79B USING COMMON SIZE STATEMENTS**

Greg's Graphics Company owns and operates a small chain of sportswear stores located near colleges and universities. Greg's Graphics has experienced significant growth in recent years. The following data are available for Greg's Graphics:

<b>Greg's Graphics Company</b>			
<b>Comparative Statements of Income</b>			
(In thousands)	Year Ended December 31,		
	2009	2008	2007
Sales	\$54,922	\$42,893	\$35,526
Cost of goods sold	<u>32,936</u>	<u>25,682</u>	<u>21,721</u>
Gross margin	\$21,986	\$17,211	\$13,805
Other income, net	<u>397</u>	<u>439</u>	<u>421</u>
	<u>\$22,383</u>	<u>\$17,650</u>	<u>\$14,226</u>
Costs and expenses:			
Selling and administrative	\$17,857	\$14,665	\$12,754
Interest	<u>1,356</u>	<u>863</u>	<u>622</u>
	<u>\$19,213</u>	<u>\$15,528</u>	<u>\$13,376</u>
Income before income taxes	\$ 3,170	\$ 2,122	\$ 850
Provision for income taxes	<u>885</u>	<u>746</u>	<u>623</u>
Net income	<u>\$ 2,285</u>	<u>\$ 1,376</u>	<u>\$ 227</u>

<b>Greg's Graphics Company</b>			
<b>Comparative Balance Sheets</b>			
(In thousands)			
ASSETS	December 31,		
	2009	2008	2007
Current assets:			
Cash	\$ 372	\$ 301	\$ 245
Accounts receivable	4,798	3,546	3,369
Inventories	<u>5,673</u>	<u>4,521</u>	<u>3,389</u>
Total current assets	<u>\$10,843</u>	<u>\$ 8,368</u>	<u>\$ 7,003</u>
Property, plant, and equipment (net)	4,912	3,541	2,937
Other assets	<u>592</u>	<u>592</u>	<u>552</u>
Total assets	<u>\$16,347</u>	<u>\$12,501</u>	<u>\$10,492</u>
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Short-term notes payable	\$ 4,314	\$ 1,731	\$ 463
Accounts payable	<u>1,256</u>	<u>987</u>	<u>783</u>
Total current liabilities	<u>\$ 5,570</u>	<u>\$ 2,718</u>	<u>\$ 1,246</u>
Long-term debt	<u>3,241</u>	<u>3,234</u>	<u>3,266</u>
Total liabilities	<u>\$ 8,811</u>	<u>\$ 5,952</u>	<u>\$ 4,512</u>
Paid-in capital	\$ 4,367	\$ 4,598	\$ 4,725
Retained earnings	<u>3,169</u>	<u>1,951</u>	<u>1,255</u>
Total stockholders' equity	<u>\$ 7,536</u>	<u>\$ 6,549</u>	<u>\$ 5,980</u>
Total liabilities and stockholders' equity	<u>\$16,347</u>	<u>\$12,501</u>	<u>\$10,492</u>

**Required:**

1. Calculate how much Greg's Graphics' sales, net income, and assets have grown during these three years.
2. Explain how Greg's Graphics has financed the increase in assets.
3. Discuss whether Greg's Graphics' liquidity is adequate.
4. Explain why interest expense is growing.
5. If Greg's Graphics' sales grow by 25 percent in 2010, what would you expect net income to be?
6. If Greg's Graphics' assets must grow by 25 percent to support the 25 percent sales increase and if 50 percent of net income is paid in dividends, how much capital must Greg's Graphics raise?

**Problem 12-80B PREPARING COMMON SIZE STATEMENTS****OBJECTIVE** 3 4

The financial statements for Matt's Hats, Inc., appear below and on the next page.

<b>Matt's Hats, Inc. Income Statement</b>			
<b>Year Ended December 31,</b>			
<b>(In thousands, except per share data)</b>	<b>2009</b>	<b>2008</b>	<b>2007</b>
Revenues	\$4,102,721	\$3,652,412	\$3,178,569
Costs and expenses:			
Cost of goods sold	\$2,256,236	\$2,234,985	\$1,952,123
Selling and administrative	927,412	653,986	598,236
Interest	23,974	32,596	31,853
Other expenses (income)	1,925	2,254	(102)
Total costs and expenses	<u>\$3,209,547</u>	<u>\$2,923,821</u>	<u>\$2,582,110</u>
Income before income taxes	\$ 893,174	\$ 728,591	\$ 596,459
Income taxes	247,692	183,456	163,524
Net income	<u>\$ 645,482</u>	<u>\$ 545,135</u>	<u>\$ 432,935</u>

<b>Matt's Hats, Inc. Balance Sheets (In thousands)</b>		
<b>December 31,</b>		
<b>ASSETS</b>	<b>2009</b>	<b>2008</b>
Current assets:		
Cash and equivalents	\$ 301,695	\$ 269,648
Accounts receivable, less allowance for doubtful accounts of \$20,568 and \$18,322	670,469	604,236
Inventories	601,396	469,582
Deferred income taxes	23,415	24,397
Prepaid expenses	43,624	36,478
Total current assets	<u>\$1,640,599</u>	<u>\$1,404,341</u>
Property, plant, and equipment	\$ 583,152	\$ 501,239
Less accumulated depreciation	206,452	148,231
Net property, plant, and equipment	\$ 376,700	\$ 353,008
Goodwill	162,325	127,695
Other assets	29,158	23,598
Total assets	<u>\$2,208,782</u>	<u>\$1,908,642</u>

### LIABILITIES AND STOCKHOLDERS' EQUITY

Current liabilities:		
Current portion of long-term debt	\$ 63,169	\$ 5,665
Notes payable	112,596	110,423
Accounts payable	128,696	139,364
Accrued liabilities	143,874	133,569
Income taxes payable	23,541	38,972
Total current liabilities	\$ 471,876	\$ 427,993
Long-term debt	16,254	83,456
Noncurrent deferred income taxes	33,489	31,238
Other noncurrent liabilities	46,685	27,434
Commitments and contingencies	—	—
Redeemable preferred stock	200	200
Total liabilities	\$ 568,504	\$ 570,321
Shareholders' equity:		
Common stock at stated value:		
Class A convertible—27,723 and 25,832 shares outstanding	\$ 164	\$ 175
Class B—49,756 and 47,652 shares outstanding	3,152	3,120
Capital in excess of stated value	110,596	96,546
Treasury stock (common at cost)	(8,741)	(7,859)
Retained earnings	1,535,107	1,246,339
Total stockholders' equity	\$1,640,278	\$1,338,321
Total liabilities and stockholders' equity	\$2,208,782	\$1,908,642

**Required:**

1. Prepare common income statements to be used for horizontal analysis for Matt's Hats for 2007 to 2009.
2. Indicate why Matt's net income increased between 2007 and 2009.
3. Prepare common size balance sheets to be used for vertical analysis for 2009 and 2008.
4. Determine whether the proportion of dollars invested in the various categories of assets has changed significantly between 2008 and 2009.
5. Determine whether the proportion of capital raised from the various liability categories and common shareholders' equity has changed significantly between 2008 and 2009.
6. Indicate how you would describe Matt's performance and financial position?

**OBJECTIVE** 5 **Problem 12-81B PREPARATION OF RATIOS**

Use the Greg's Graphics financial statements in **Problem 12-79B** to respond to the following requirements.

**Required:**

1. Compute asset efficiency ratios for Greg's Graphics for 2009 and 2008 and determine whether their asset efficiency has changed.
2. Determine whether Greg's Graphics' profitability has changed during the two-year period 2008–2009.
3. Compute the debt-management ratios for 2008 and 2009. Discuss whether creditors are as secure in 2009 as they were in 2008.

**Problem 12-82B** COMPARING FINANCIAL RATIOS

OBJECTIVE &gt; 5

Presented below are selected ratios for four firms: Firm A is a distiller, Firm B is a jewelry retailer, Firm C is an airline, and Firm D is a hotel chain.

	Firm A	Firm B	Firm C	Firm D
<b>Short-term liquidity</b>				
Current ratio	1.5	3.5	0.9	1.4
<b>Debt-management ratio</b>				
Long-term debt to equity	0.24	0.20	562.11	209.48
<b>Asset efficiency ratios</b>				
Accounts receivable turnover	7.66	17.07	19.72	11.09
Inventory turnover	2.30	0.95	31.43	7.24
<b>Profitability ratios</b>				
Operating income	17.7%	15.5%	4.2%	9.2%
Net income	13.1	9.6	2.2	5.4
Return on assets	11.9	8.6	1.8	7.9
Return on equity	23.7	14.9	49.2	34.5

**Required:**

1. Explain why the long-term debt-to-equity ratio is so much higher for the airline and hotel chain than it is for the distiller and jewelry retailer.
2. Explain why the turnover ratios vary so much among the four firms.
3. Explain why the return on equity for the airline and hotel chain is higher than for the distiller and jewelry retailer when their operating income and net income percentages are considerably smaller.

**Problem 12-83B** PREPARATION OF RATIOS

OBJECTIVE &gt; 5

Use Matt's Hats' financial statements in **Problem 12-80B** and the following data to respond to the requirements below.

	2009	2008	2007
Average number of common shares outstanding	78,273	77,325	77,021
Accounts receivable	\$ 672,139	\$ 598,243	\$ 545,556
Inventories	596,468	469,327	592,524
Total assets	2,190,254	1,925,632	1,699,432
Shareholders' equity	1,852,695	1,410,723	1,075,952
Stock repurchases	990,521	623,259	310,132
Cash flows from operating activities	495,000	380,000	265,000
Common dividends paid	61,836	49,488	37,740
Dividends per common share	0.79	0.64	0.49
Market price per share:			
High	92.17	79.13	56.22
Low	56.59	37.23	27.10
Close	88.47	73.83	44.26

**Year Ended December 31,**

Industry Averages	2009	2008
Return on equity	32.71%	27.86%
Profit margin	0.06	0.05
Asset turnover	2.31	2.51
Leverage	2.36	2.22

**Required:**

1. Prepare all the financial ratios for Matt's Hats for 2009 and 2008.
2. Indicate whether Matt's Hats' short-term liquidity is adequate.
3. Discuss whether Matt's Hats' uses their assets efficiently.
4. Determine whether Matt's Hats is profitable.
5. Discuss whether long-term creditors should regard Matt's Hats as a high-risk or a low-risk firm.
6. Perform Dupont analysis for 2009 and 2008.

**OBJECTIVE** > **6****Problem 12-84B ACCOUNTING ALTERNATIVES AND FINANCIAL ANALYSIS**

Cheap Auto, Inc., has asked your bank for a \$100,000 loan to expand its sales facility. Cheap Auto provides you with the following data:

	2009	2008	2007
Sales revenue	\$6,900,000	\$6,400,000	\$6,100,000
Net income	120,000	113,000	109,000
Ending inventory (FIFO)*	675,000	620,000	510,000
Purchases	5,410,000	5,200,000	4,990,000
Depreciable assets	1,320,000	1,230,000	1,120,000

\*The 2006 ending inventory was \$420,000 (FIFO).

Your inspection of the financial statements of other auto sales firms indicates that most of these firms adopted the LIFO method in the late 1970s. You further note that Cheap Auto has used 10 percent of depreciable asset cost when computing depreciation expense and that other automobile dealers use 20 percent. Assume that Cheap Auto's effective tax rate is 30 percent of income before tax. Also assume the following:

	2009	2008	2007
Ending inventory (LIFO)*	\$518,000	\$512,000	\$500,000

\*The 2006 ending inventory was \$420,000 (LIFO).

**Required:**

1. Compute cost of goods sold for 2007–2009, using both the FIFO and the LIFO methods.
2. Compute depreciation expense for Cheap Auto for 2007–2009, using both 10 percent and 20 percent of the cost of depreciable assets.
3. Recompute Cheap Auto's net income for 2007–2009, using LIFO and 20 percent depreciation. (Don't forget the tax impact of the increases in cost of goods sold and depreciation expense.)
4. Does Cheap Auto appear to have materially changed its financial statements by the selection of FIFO (rather than LIFO) and 10 percent (rather than 20 percent) depreciation?

**Cases****Case 12-85 ETHICS AND EQUITY**

Anne Yates is employed as a financial analyst at a large brokerage house. Her job is to follow companies in the computer hardware sector and issue reports that will be used by her firm's brokers in making recommendations to the brokerage house's clients. Her reports are summarized by her ratings of the company—strong buy, buy, hold, sell, or strong sell. She is in frequent contact with the top management of the companies she follows.

After a thorough investigation, she believes she should downgrade Dreamware from a "strong buy" to a "hold." However, when she informs Dreamware's CFO, the CFO threatens to call her boss. Later that week, her boss calls her to request that she reconsider her downgrade and states that her cooperation will be "greatly appreciated."

**Required:**

How should Anne respond to her boss? Are there any other steps she should consider taking?

**Case 12-86 ASSESSING THE EFFECTS OF THE "CLEAN AIR" LEGISLATION**

In late 1990, Congress passed and the President signed into law legislation that required significant reductions over a several-year period in the quantity of sulfur dioxide that electric utilities will be allowed to discharge into the air. Electric utilities that generate their electricity by burning inexpensive, but relatively high-sulfur, coal were most affected by this legislation. Some utilities complied with this legislation by changing to coal with a lower sulfur content. Other utilities complied with this legislation by installing devices on power plant smokestacks that would remove sulfur dioxide before it is discharged into the air.

**Required:**

1. In what places on the financial statements of coal-dependent electric utilities do you expect to observe the effects of this legislation?
2. In what places on the financial statements of companies that mine coal do you expect to observe the effects of this legislation?

**Case 12-87 CHANGES IN THE PRICE OF FUEL FOR AIRCRAFT**

The cost of fuel is reported to be about 20 percent of the total operating cost for a major airline. Events in the Middle East caused jet fuel costs to nearly double from 2006 to 2009.

**Required:**

1. If you were the CEO of a major airline, how would you suggest that the airline respond to the fuel price increase?
2. How would you expect the financial statements of major airlines to be affected by the fuel price increase and the actions that the airlines would take in response?

**Case 12-88 ANALYZING GROWTH**

Comparative financial statements for Initech Corporation follow:

Initech Corporation Consolidated Statements of Income			
Three Years Ended December 31,			
(In millions except per share amounts)	2009	2008	2007
Net revenues	\$8,782	\$5,844	\$4,779
Cost of goods sold	\$3,252	\$2,557	\$2,316
Research and development	970	780	618
Marketing, general and administrative	1,168	1,017	765
Operating costs and expenses	<u>\$5,390</u>	<u>\$4,354</u>	<u>\$3,699</u>
Operating income	\$3,392	\$1,490	\$1,080
Interest expense	(50)	(54)	(82)
Interest income and other, net	188	133	197
Income before taxes	<u>\$3,530</u>	<u>\$1,569</u>	<u>\$1,195</u>
Provision for taxes	1,235	502	376
Net income	<u><u>\$2,295</u></u>	<u><u>\$1,067</u></u>	<u><u>\$ 819</u></u>

<b>Initech Corporation Consolidated Balance Sheets</b>		
<b>(In millions except per share amounts)</b>	<b>December 31,</b>	
<b>ASSETS</b>	<b>2009</b>	<b>2008</b>
Current assets:		
Cash and cash equivalents	\$ 1,659	\$1,843
Short-term investments	1,477	993
Accounts and notes receivable, net of allowance for doubtful accounts of \$22 (\$26 in 2008)	1,448	1,069
Inventories	838	535
Deferred tax assets	310	205
Other current assets	70	46
Total current assets	<u>5,802</u>	<u>4,691</u>
Property, plant, and equipment:		
Land and buildings	1,848	1,463
Machinery and equipment	4,148	2,874
Construction in progress	317	311
	<u>6,313</u>	<u>4,648</u>
Less accumulated depreciation	2,317	1,832
Property, plant, and equipment, net	<u>3,996</u>	<u>2,816</u>
Long-term investments	1,416	496
Other assets	130	86
Total assets	<u>\$11,344</u>	<u>\$8,089</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Short-term debt	\$ 399	\$ 202
Long-term debt redeemable within one year	98	110
Accounts payable	427	281
Deferred income on shipments to distributors	200	149
Accrued compensation and benefits	544	435
Other accrued liabilities	374	306
Income taxes payable	391	359
Total current liabilities	<u>\$ 2,433</u>	<u>\$1,842</u>
Long-term debt	426	249
Deferred tax liabilities	297	180
Other long-term liabilities	688	373
Total liabilities	<u>\$ 3,844</u>	<u>\$2,644</u>
Stockholders' equity:		
Preferred stock, \$0.001 par value, 50 shares authorized; none issued	—	—
Common stock, \$0.001 par value, 1,400 shares authorized; 1,000 issued and outstanding in 2009 and 2008	1	1
Capital in excess of par value	2,193	1,775
Retained earnings	5,306	3,669
Total stockholders' equity	<u>7,500</u>	<u>5,445</u>
Total liabilities and stockholders' equity	<u>\$11,344</u>	<u>\$8,089</u>

**Required:**

1. Prepare common size income statements to be used for both vertical and horizontal analysis for 2007–2009.
2. Using the common size income statements for both vertical and horizontal analysis prepared in part (1), indicate why Initech's profits increased more rapidly than sales for 2008 and 2009.
3. Prepare common size balance sheets for vertical analysis for 2008 and 2009.
4. Did the proportion of assets invested in the various classes of assets change significantly from 2008 to 2009?
5. How has Initech financed its growth in assets?
6. Did the income statement change as much between 2008 and 2009 as the balance sheet?

**Case 12-89 IDENTIFYING THE CAUSES OF PROFITABILITY CHANGES**

The consolidated financial statements for Carmody Shipping Corporation and Subsidiaries appear below and on the following pages.

<b>Carmody Shipping Corporation and Subsidiaries</b>			
<b>Consolidated Statements of Operations</b>			
<b>In thousands, except per share amounts</b>	<b>Years Ended May 31,</b>		
	<b>2009</b>	<b>2008</b>	<b>2007</b>
Revenues	\$7,808,043	\$7,550,060	\$7,688,296
Operating expenses:			
Salaries and employee benefits	\$3,807,493	\$3,637,080	\$3,438,391
Rentals and landing fees	658,138	672,341	650,001
Depreciation and amortization	579,896	577,157	562,207
Fuel	495,384	508,386	663,327
Maintenance and repairs	404,639	404,311	449,394
Restructuring charges	(12,500)	254,000	121,000
Other	1,497,820	1,473,818	1,551,850
	<u>\$7,430,870</u>	<u>\$7,527,093</u>	<u>\$7,436,170</u>
Operating income	<u>\$ 377,173</u>	<u>\$ 22,967</u>	<u>\$ 252,126</u>
Other income (expenses):			
Interest, net	\$ (160,923)	\$ (164,315)	\$ (181,880)
Gain on disposition of aircraft and related equipment	4,633	2,832	11,375
Other, net	(17,307)	(8,312)	(8,679)
Payroll tax loss	—	—	(32,000)
Other income (expenses), net	<u>\$ (173,597)</u>	<u>\$ (169,795)</u>	<u>\$ (211,184)</u>
Income (loss) before income taxes and extraordinary loss	<u>\$ (203,576)</u>	<u>\$ (146,828)</u>	<u>\$ 40,942</u>
Provision (credit) for income taxes	93,767	(33,046)	35,044
Income (loss) before Extraordinary loss	<u>\$ 109,809</u>	<u>\$ (113,782)</u>	<u>\$ 5,898</u>
Extraordinary loss, net of tax benefit of \$34,287	(55,943)	—	—
Net income (loss)	<u><u>\$ 53,866</u></u>	<u><u>\$ (113,782)</u></u>	<u><u>\$ 5,898</u></u>

**Carmody Shipping Corporation and Subsidiaries**  
**Consolidated Balance Sheets**  
(In thousands)

ASSETS	May 31,	
	2009	2008
Current assets:		
Cash and cash equivalents	\$ 155,456	\$ 78,177
Receivable, less allowance for doubtful accounts of \$31,308 and \$32,074	922,727	899,773
Spare parts, supplies and fuel	164,087	158,062
Prepaid expenses and other	63,573	69,994
Deferred income taxes	133,875	—
Total current assets	<u>\$1,439,718</u>	<u>\$1,206,006</u>
Property and equipment, at cost		
Flight equipment	\$2,843,253	\$2,540,350
Package handling and ground support equipment	1,413,793	1,352,659
Computer and electronic equipment	947,913	851,686
Other	1,501,250	1,433,212
	<u>\$6,706,209</u>	<u>\$6,177,907</u>
Less accumulated depreciation and amortization	3,229,941	2,766,610
Net property and equipment	<u>\$3,476,268</u>	<u>\$3,411,297</u>
Other assets:		
Goodwill	\$ 432,215	\$ 487,780
Equipment deposits and other assets	444,863	358,103
Total other assets	<u>\$ 877,078</u>	<u>\$ 845,883</u>
Total assets	<u>\$5,793,064</u>	<u>\$5,463,186</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Current portion of long-term debt	\$ 133,797	\$ 155,257
Accounts payable	554,111	430,130
Accrued expenses	761,357	799,468
Total current liabilities	<u>\$1,449,265</u>	<u>\$1,384,855</u>
Long-term debt, less current portion	1,882,279	1,797,844
Deferred income taxes	72,479	123,715
Other liabilities	717,660	577,050
Total liabilities	<u>\$4,121,683</u>	<u>\$3,883,464</u>
Common stockholders' equity:		
Common stock, \$0.10 par value, 100,000 shares authorized, 54,743 and 54,100 shares issued	\$ 5,474	\$ 5,410
Additional paid-in capital	699,385	672,727
Retained earnings	969,515	906,555
	<u>\$1,674,374</u>	<u>\$1,584,692</u>
Less treasury stock and deferred compensation related to stock plans	\$ 2,993	\$ 4,970
Total common stockholders' equity	<u>1,671,381</u>	<u>1,579,722</u>
Total liabilities and stockholders' equity	<u>\$5,793,064</u>	<u>\$5,463,186</u>

**Required:**

1. Evaluate Carmody Shipping's performance in 2009.
2. What were the primary factors responsible for Carmody Shipping's loss in 2008 and return to profitability in 2009?
3. How did Carmody Shipping finance the \$329,878,000 increase in assets in 2009?

# 13

## Managerial Accounting Concepts and Decision- Making Support

After studying Chapter 13,  
you should be able to:

- ▶ **1** Explain the meaning of managerial accounting and contrast it to financial accounting.
- ▶ **2** Identify and explain the current focus of managerial accounting and the role of managerial accountants in an organization.
- ▶ **3** Explain the meaning of cost and how costs are assigned to products and services.
- ▶ **4** Define the various costs of manufacturing products and providing services as well as selling and administration.
- ▶ **5** Prepare income statements for manufacturing and service organizations.
- ▶ **6** Explain the importance of ethical behavior for managers and managerial accountants.





# **E**xperience Managerial Decisions with **BuyCostumes.com**

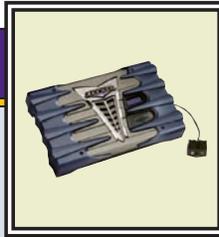
The greatest benefit of managerial accounting is also its biggest challenge—to provide managers with information that improves decisions and creates organizational value. This information helps inform managers about the impact of various strategic and operational decisions on key nonfinancial performance measures and their eventual impact on the organization's financial performance. The information is challenging to prepare and analyze because it requires an understanding of all value chain components that affect the organization, including research and development, production, marketing, distribution, and customer service.

Since its inception in 1999, **BuyCostumes.com** has blended the right managerial accounting information and an innovative business model to provide costumes to customers in over 50 countries. Using the Internet and marketing creativity, BuyCostumes.com serves a market of 150 million U.S. consumers that spend \$3.6 million on costumes each year! According to CEO Jalem Getz, BuyCostumes.com measures key performance indicators to guide its decision making. For example, managerial accountants analyze measures of customer satisfaction, average time between order placement and costume arrival for each shipping method, and the profitability of individual customer types. As customer trends change,

competitors emerge, and technological advances occur, BuyCostumes.com's managerial accounting information adapts to provide crucial insight into the company's performance and how its strategy should evolve to remain the world's largest Internet costume retailer!

We teamed up with Kicker, a real company, and interviewed its top management extensively for stories about the firm and its use of accounting information. You will see boxes called "Here's The Real Kicker," detailing how the company has used managerial accounting information in its operations. In addition, certain exercises or problems are based on actual Kicker experience. Without further ado, let's get better acquainted with Kicker.

## Here's The



## Real Kicker

A division of Stillwater Designs and Audio, Inc., Kicker makes car stereo systems. Its signature logo "Livin' Loud," gives you a hint as to the capabilities of the systems. As the company website says, "Livin' Loud has always been the KICKER way—staying one step ahead of the pack—driven to create components that consistently raise the world's expectations for car stereo performance."

Twenty-five years ago, car stereos were underpowered tinny affairs. They could power a radio or an eight-track tape deck. But the in-home listening experience coveted by audio buffs eluded the automobile market. In 1980, Stillwater Designs virtually invented the high-performance car audio enclosure market when company founder and president Steve Irby developed the Original KICKER®. It was the first full-range speaker enclosure designed specifically for automotive use.

Stillwater Designs began in 1973 as a two-person operation, custom designing and building professional sound and musical instrument speaker systems for churches, auditoriums, and entertainers. Building upon the success of the Original Kicker, the company concentrated on the car audio market, applying research and design skills to the development of a complete line of high-performance components for car audio. Once a company with two employees in a single-car garage, it is now a corporation with more than 200 employees in facilities totaling more than 500,000 square feet. World headquarters are in Stillwater, Oklahoma.

The Kicker brand has a variety of high-performance car stereo products, including subwoofers, midrange and mid-bass drivers, tweeters, crossovers, matched component

systems, speakers, and power amplifiers. Kicker is proud to have won the prestigious Audio-Video International Auto Sound Grand Prix Award, sponsored annually by *AudioVideo*

*International Magazine*. Winners are selected by retailers based on fidelity of sound reproduction, design engineering, reliability, craftsmanship and product integrity, and cost/performance ratio. In 2003, seven Kicker products earned Grand Prix awards. Awards emphasizing the performance of the company include the Governor's Award for Excellence in Exporting (2000), and the 1996 Oklahoma City International Trade Association designation as its International Business of the Year.

While Stillwater Designs originally handled research and design, manufacturing, and sales, it now concentrates primarily on R&D and sales. The bulk of manufacturing has been outsourced (performed by outside firms on a contract basis), although the company still builds some products, and plans to build even more as it moves into its new facility for factory-installed audio systems. Engineering and audio research is Kicker president and chief executive officer Steve Irby's first love, and he still heads its design team. The day-to-day involvement of top management, along with an energetic workforce of talented individuals in all areas of the company's operations and an innate ability to create truly musical components, has been the reason for the company's remarkable success.



### OBJECTIVE > 1

Explain the meaning of managerial accounting and contrast it to financial accounting.

## The Meaning and Purpose of Managerial Accounting

What is managerial accounting? **Managerial accounting** is the provision of accounting information for a company's various *internal* users. Internal users of managerial accounting information include managers of all levels, executives (e.g., chief executive officer, chief financial officer, chief risk officer, etc.), members of the company's board of directors, employees (e.g., production floor worker, delivery truck driver, etc.), union members, and members of the company's audit committee.

The purpose of managerial accounting is to generate information that helps managers and other internal users take actions that create value for the organization. To accomplish its purpose, managerial accounting has three broad objectives:

1. To provide information for planning the organization's actions.
2. To provide information for controlling the organization's actions.
3. To provide information for making effective decisions.

Using recent examples from many companies in both the for-profit and not-for-profit sectors, this textbook explains how all manufacturing (e.g., aircraft producer—**Boeing Corporation**), merchandising (e.g., clothing retailer—**Guess**), and service (e.g., healthcare provider—**The Cleveland Clinic**) organizations use managerial accounting information and concepts. For instance, hospital administrators, presidents of corporations, dentists, educational administrators, and city managers all can improve their managerial skills by being well-grounded in the basic concepts and use of managerial accounting information for planning, controlling, and decision making.

It should be noted that many companies (over 2,500 large multinationals in total) increasingly are deciding to release on their websites large quantities of managerial accounting information, typically given only to internal users, to the public through optional reports known as corporate sustainability reports (e.g., **Starbucks**, **McDonald's**), social responsibility reports (e.g., **Tomkins plc**, **Chiquita**), or citizenship reports (e.g., **General Electric**). The release of these reports—typically referred to as CSRs—often occurs because firms want to manage their reputation by preparing and releasing such information themselves, rather than having Internet bloggers, newspapers, and 24-hour cable news networks publish their own estimates of such information. Some leading companies (e.g., **PepsiCo**, **Novo Nordisk**) have even moved so far as to combine their CSR into their annual report, thereby resulting in a single, integrated report containing both traditional financial accounting information as well as managerial accounting information. Therefore, the demand for managerial accounting information continues to grow.

### Information Needs of Managers and Other Users

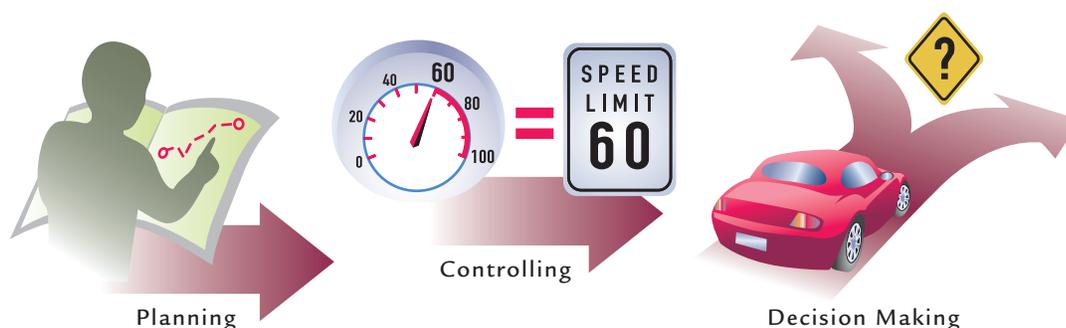
Managerial accounting information is needed by a number of individuals. In particular, managers and empowered workers need comprehensive, up-to-date information for (1) planning, (2) controlling, and (3) decision making. Exhibit 13-1 shows the relationship among these activities.

The detailed formulation of action to achieve a particular end is the management activity called planning. **Planning** requires setting objectives and identifying methods to achieve those objectives. For example, a firm may set the objective of increasing its short-term and long-term profitability by improving the overall quality of its products. **DaimlerChrysler** drastically improved the quality and profitability of its Chrysler automobile division during the beginning of the 21st century to the point where its quality surpassed that of **Mercedes-Benz** (also owned by DaimlerChrysler).<sup>1</sup> By improving product quality, firms like DaimlerChrysler should be able to reduce scrap and rework, decrease the number of customer complaints and warranty work, reduce the resources currently assigned to inspection, and so on, thus increasing profitability. To realize these benefits, management must develop some specific methods that, when implemented, will lead to the achievement of the desired objective. A plant manager, for example, may start a supplier evaluation program to identify and select suppliers who are willing and able to supply defect-free parts. Empowered workers may be able to identify production causes of defects and create new methods for producing a product that will reduce scrap and rework and the need for inspection. The new methods should be clearly specified and detailed.

Planning is only half the battle. Once a plan is created, it must be implemented and monitored by managers and workers to ensure that the plan is being carried out

#### Exhibit 13-1

#### Uses of Managerial Accounting Information



<sup>1</sup>Sarah A. Webster and Joe Guy Collier, "Fixing a Car Company: Zetsche on Mercedes: 'A Lot of Work Is Ahead,'" *Detroit Free Press*. Taken from <http://forums.mbworld.org/forums/showthread.php?t=121650> on April 8, 2008.

as intended. The managerial activity of monitoring a plan's implementation and taking corrective action as needed is referred to as **controlling**. Control is usually achieved by comparing actual performance with expected performance. This information can be used to evaluate or correct the steps being taken to implement a plan. Based on the feedback, a manager (or worker) may decide to let the plan continue as is, take corrective action of some type to put the actions back in harmony with the original plan, or do some midstream replanning.

The managerial accounting information used for planning and control purposes can be either financial or nonfinancial in nature. For example, **Duffy Tool and Stamping** saved \$14,300 per year by redesigning a press operation.<sup>2</sup> In one department, completed parts (made by a press) came down a chute and fell into a parts tub. When the tub became full, press operators had to stop operation while the stock operator removed the full tub and replaced it with an empty one. Workers redesigned the operation so that each press had a chute with two branches—each leading to a different tub. Now when one tub is full, completed parts are routed into the other tub. The \$14,300 savings are a financial measure of the success of the redesign. The redesign also eliminated machine downtime and increased the number of units produced per hour (operational feedback), both of which are examples of nonfinancial information. Both types of measures convey important information. Often financial and nonfinancial feedback is given to managers in the form of performance reports that compare the actual data with planned data or other benchmarks.

The process of choosing among competing alternatives is **decision making**. Decision making is intertwined with planning and control in that a manager cannot successfully plan or control the organization's actions without making decisions regarding competing alternatives. For instance, **BMW** plans to offer a car that runs on gasoline and hydrogen. Decisions can be improved if information about the alternatives (e.g., pertaining to gasoline vs. hydrogen vs. hybrid combinations of these two automobile fuel options) is gathered and made available to managers. One of the major roles of the managerial accounting information system is to supply information that facilitates decision making. For example, Kicker's vice president of sales and marketing was wondering whether or not to hold tent sales in certain cities. He had information on sales as well as the expense of putting on the tent sale. This revenue and cost information, along with the manager's knowledge of competitive conditions and customers' needs, will improve his ability to select appropriate cities for the tent sales.

## Managerial Accounting and Financial Accounting

A brief examination of the basic differences between managerial accounting and financial accounting is helpful for understanding the emerging trends and important managerial accounting concepts discussed in the remainder of the chapter. The two basic kinds of accounting information systems are managerial accounting and financial accounting. **Financial accounting** is primarily concerned with producing financial information and reports (financial statements) for *external* users, such as investors, creditors (banks), government agencies, customers, suppliers, and other outside stakeholders (environmental groups, human rights groups). It must conform to certain rules and conventions that are defined by various agencies, such as the Securities Exchange Commission (SEC), the Financial Accounting Standards Board (FASB), and the International Accounting Standards Board (IASB). These rules pertain to the issues such as the recognition of revenues; timing of expenses; and recording of assets, liabilities, and stockholders' equity. Financial accounting information has a historical orientation and is used for such things as investment decisions, monitoring activities, and regulatory measures.

The *managerial accounting* system produces information for all *internal* users. Specifically, managerial accounting identifies, collects, measures, classifies, and reports financial and nonfinancial information that is useful to internal users in planning,

<sup>2</sup>George F. Hanks, "Excellence Teams in Action," *Management Accounting* (February 1995): 35.

controlling, and decision making. While investors look at a firm's overall profitability, managers need to know the profitability of individual products as well. The managerial accounting system should be designed to provide both total profits and profits for individual products and, thus, has a broad audience. Flexibility is crucial—the managerial accounting system should be able to supply forward-looking information for different purposes, as explained throughout this textbook. Unlike financial accounting, managerial accounting is *not* subject to the requirements of generally accepted accounting principles. When comparing managerial accounting to financial accounting, several differences can be identified. Some of the more important differences follow and are summarized in Exhibit 13-2.

- *Targeted users.* Managerial accounting focuses on providing information for internal users, while financial accounting focuses on providing information for external users.
- *Restrictions on inputs and processes.* Management accounting is not subject to the requirements of generally accepted accounting principles. The SEC and the FASB set the accounting procedures that must be followed for financial reporting. The inputs and processes of financial accounting are well defined and, in fact, restricted. Only certain kinds of economic events qualify as inputs, and processes must follow generally accepted methods. Unlike financial accounting, management accounting has no official body that prescribes the format, content, and rules for selecting inputs and processes and preparing financial reports. Managers are free to choose whatever information they want—provided it can be justified on a cost-benefit basis.
- *Type of information.* The restrictions imposed by financial accounting tend to produce objective and verifiable financial information. For management accounting, information may be financial or nonfinancial and may be much more subjective in nature.
- *Time orientation.* Financial accounting has a historical orientation. It records and reports events that have already happened. Although management accounting also records and reports events that have already occurred, it strongly emphasizes providing information about future events. Management, for example, may want to know what it will cost to produce a product next year. Knowing this information helps in planning material purchases and making pricing decisions, among other things. This future orientation is needed to support the managerial functions of planning and decision making.
- *Breadth.* Managerial accounting is much broader than financial accounting. It includes aspects of economics, industrial engineering, management science, and psychology, as well as numerous other areas.

## Emerging Trends in Managerial Accounting and the Role of Managerial Accountants in an Organization

The business environment in which companies operate has changed dramatically over the past several decades. For instance, advances in technology, the Internet, the opening of markets around the world, increased competitive pressures, and increased complexity of strategy (e.g., alliances between McDonald's and **The Walt Disney**

### OBJECTIVE 2

Identify and explain the current focus of managerial accounting and the role of managerial accountants in an organization.

#### Exhibit 13-2

### Comparison of Managerial and Financial Accounting

Managerial Accounting	Financial Accounting
1. Internally focused.	1. Externally focused.
2. No mandatory rules.	2. Must follow externally imposed rules.
3. Financial and nonfinancial information; subjective information possible.	3. Objective financial information.
4. Emphasis on the future.	4. Historical orientation.
5. Internal evaluation and decisions based on very detailed information	5. Information about the firm as a whole.
6. Broad, multidisciplinary.	6. More self-contained

**Company** for promotional tie-ins) and operations all have combined to produce a global business environment. Effective managerial accounting systems also have changed in order to provide information that helps improve companies' planning, control, and decision-making activities. Several important uses of managerial accounting resulting from these advances include new methods of estimating product and service profitability, understanding customer orientation, evaluating the business from a cross-functional perspective, and providing information useful in improving total quality.

## New Methods of Estimating the Profitability of Products and Services

Companies need focused, accurate information on the cost of the products and services they offer. Years ago, a company might produce a few products that were roughly similar to each other. Only the cost of materials and labor differed from one product to another. Figuring out the cost of each unit was relatively easy. Now, however, with rapid increases in technology and automation, it is more difficult to generate the costing information needed by management to make a wide variety of decisions. As Peter Drucker, internationally respected management guru, points out:

*Traditional cost accounting in manufacturing does not record the cost of nonproducing such as the cost of faulty quality, or of a machine being out of order, or of needed parts not being on hand. Yet these unrecorded and uncontrolled costs in some plants run as high as the costs that traditional accounting does record. By contrast, a new method of cost accounting developed in the last ten years—called “activity-based” accounting—records all costs. And it relates them, as traditional accounting cannot, to value-added [costs].<sup>3</sup>*

Activity-based costing (ABC) is a more detailed approach to determining the cost of goods and services. ABC improves costing accuracy by emphasizing the cost of the many activities or tasks that must be performed to produce a product or offer a service. **United Parcel Service Inc. (UPS)** used ABC to discover and manage the cost of the activities involved with shipping packages by truck, as opposed to by plane, in order to beat **FedEx** at its overnight delivery business in quick mid-distance (up to 500 miles) overnight deliveries.<sup>4</sup>

## Customer Orientation

Customer value is a key focus because firms can establish a competitive advantage by creating better customer value for the same or lower cost than competitors or creating equivalent value for lower cost than that of competitors. Customer value is the difference between what a customer receives and what the customer gives up when buying a product or service. Customers receive basic and special product features, service, quality, instructions for use, reputation, brand name, and other important factors. On the other hand, customers give up the cost of purchasing the product, the time and effort spent acquiring and learning to use the product, and the costs of using, maintaining, and disposing of it.

**Strategic Positioning** Effective cost information can help the company identify strategies that increase customer value. Generally, firms choose one of two general strategies: (1) cost leadership and/or (2) superior products through differentiation (e.g., highest performance quality, most desired product features, best

<sup>3</sup>Peter F. Drucker, “We Need to Measure, Not Count,” *The Wall Street Journal* (13 April 13, 1993): A14.

<sup>4</sup>Charles Haddad and Jack Ewing, “Ground Wars: UPS’s Rapid Ascent Leaves FedEx Scrambling,” *Business Week* (May 21, 2001): 64–68.

customer service, etc.). The objective of the cost leadership strategy is to provide the same or better value to customers at a *lower* cost than competitors. A differentiation strategy, on the other hand, strives to increase customer value by providing something to customers not provided by competitors. For example, Best Buy's Geek Squad of computer technicians creates a competitive advantage for **Best Buy** by providing 24-hour in-home technical assistance for its customers. Accurate cost information is important to see whether or not the additional service provided by the Geek Squad adds more to revenue than it does to cost.

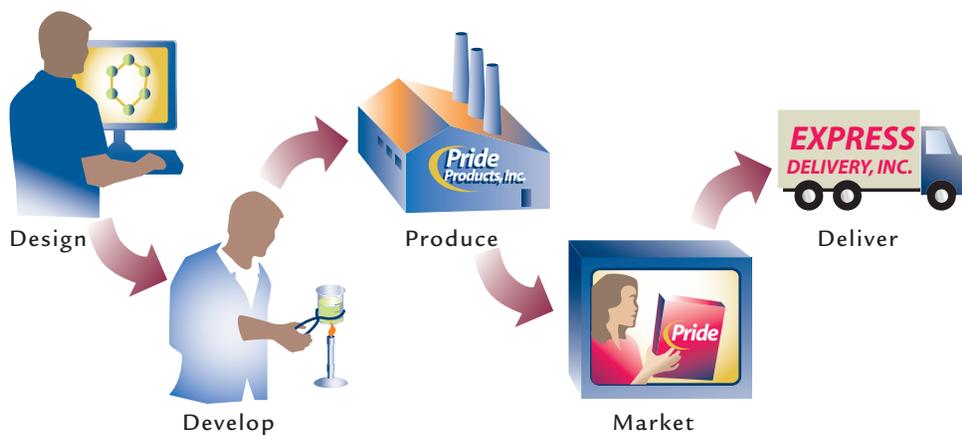
**The Value Chain** Successful pursuit of cost leadership and/or differentiation strategies requires an understanding of a firm's value chain. The **value chain** is the set of activities required to design, develop, produce, market, and deliver products and services, as well as provide support services to customers. Exhibit 13-3 illustrates the value chain. A managerial accounting system should track information about a wide variety of activities that span the value chain. For example, prior to issuing final approval for its most recent version of the iPhone, **Apple** spent considerable effort researching the cost of developing and manufacturing the iPhone, as well as the amount of money potential customers would be willing to spend to purchase it. Also, customer value can be increased by improving the speed of delivery and response. **FedEx** exploited this part of the value chain and successfully developed a service that was not being offered by the U.S. Postal Service. Today, many customers believe that delivery delayed is delivery denied, which indicates that a good managerial accounting system ought to develop and measure indicators of customer satisfaction.

## Cross-Functional Perspective

In managing the value chain, a managerial accountant must understand and measure many functions of the business. Contemporary approaches to costing may include initial design and engineering costs, as well as manufacturing costs, and the costs of distribution, sales, and service. An individual well-schooled in the various definitions of cost, who understands the shifting definitions of cost from the short run to the long run, can be invaluable in determining what information is relevant in decision making. For example, strategic decisions may require a cost definition that assigns the costs of all value-chain activities. In a long-run decision environment, the banking industry (e.g., **Bank One**) spends an estimated \$500 million per year across all functional areas to perform customer profitability analyses that identify their most, and least, profitable customers.<sup>5</sup> However, a short-run decision to determine the

Exhibit 13-3

### The Value Chain



<sup>5</sup>R. Brooks, "Unequal Treatment: Alienating Customers Isn't Always a Bad Idea, Many Firms Discover," *The Wall Street Journal* (January 7, 1999): A1.

profitability of a special order (e.g., an offer made to **Bridgestone Firestone North American Tire** at year-end to use idle machinery to produce 1,000 extra tires for a local tire distributor) may require only the incremental costs of the special order in a single functional area.

## Total Quality Management

**Continuous improvement** is the continual search for ways to increase the overall efficiency and productivity of activities by reducing waste, increasing quality, and reducing costs. Managerial accounting information about the costs of products, customers, processes, and other objects of management interest can be the basis for identifying problems and alternative solutions.

Continuous improvement is fundamental for establishing excellence. Providing products with little waste that perform according to specifications are the twin objectives of world-class firms. A philosophy of **total quality management**, in which manufacturers strive to create an environment that will enable workers to manufacture perfect (zero-defect) products, has replaced the “acceptable quality” attitudes of the past. This emphasis on quality has also created a demand for a managerial accounting system that provides financial and nonfinancial information about quality. For example, in response to increasing customer complaints regarding its laptop computer repair process, **Toshiba** formed an alliance with **UPS** in which UPS picks up the broken laptop, Toshiba fixes it, and UPS returns the repaired laptop to the customer. In order for this alliance to work effectively, both Toshiba and UPS require relevant managerial accounting information regarding the cost of existing poor quality and efforts to improve future quality.<sup>6</sup>

Many companies, such as DaimlerChrysler, used techniques like Six Sigma and Design for Six Sigma (DFSS), together with various types of cost information, to achieve improved quality performance. Specifically, Chrysler’s goal is “to meet customer requirements and improve vehicle and system reliability while reducing development costs and cultivating innovation.”<sup>7</sup> On a related note, many companies attempt to increase organizational value by eliminating wasteful activities that exist throughout the value chain. In eliminating such waste, companies usually find that their accounting must also change. This change in accounting, referred to as **lean accounting**, organizes costs according to the value chain and collects both financial and nonfinancial information. The objective is to provide information to managers that supports their waste reduction efforts and to provide financial statements that better reflect overall performance, using both financial and nonfinancial information.

Finally, one of the more recent charges of managerial accountants is to help carry out the company’s **enterprise risk management (ERM)** approach. ERM is a formal way for managerial accountants to identify and respond to the most important threats and business opportunities facing the organization. ERM is becoming increasingly important for long-term success. For example, it is well recognized that **Wal-Mart**’s expert crisis management processes and teams repeatedly responded to the aftermath of Hurricane Katrina throughout Louisiana and Mississippi better and faster than did either local or federal government agencies (e.g., FEMA)!<sup>8</sup> The results of many public accounting firm surveys, as well as the Institute of Management Accountants, highlight the growing importance that organizations place on conducting effective risk management practices.<sup>9</sup>

<sup>6</sup> T. Friedman, “The World Is Flat: A Brief History of the Twenty-First Century,” Farrar, Straus and Giroux: New York, New York, 2005.

<sup>7</sup> Kevin Kelly, “Chrysler Continues Quality Push,” WardsAuto.Com. Taken from <http://wardsauto.com/microsites/news-article.asp> on September 30, 2005.

<sup>8</sup> A. Zimmerman and V. Bauerlein, “At Wal-Mart, Emergency Plan Has Big Payoff,” *The Wall Street Journal* (September 12, 2005): B1.

<sup>9</sup> *Enterprise Risk Management: Tools and Techniques for Effective Implementation*, Institute of Management Accountants, Montvale, New Jersey, 2007: 1–31.

## The Role of the Managerial Accountant—Preparing and Communicating Information

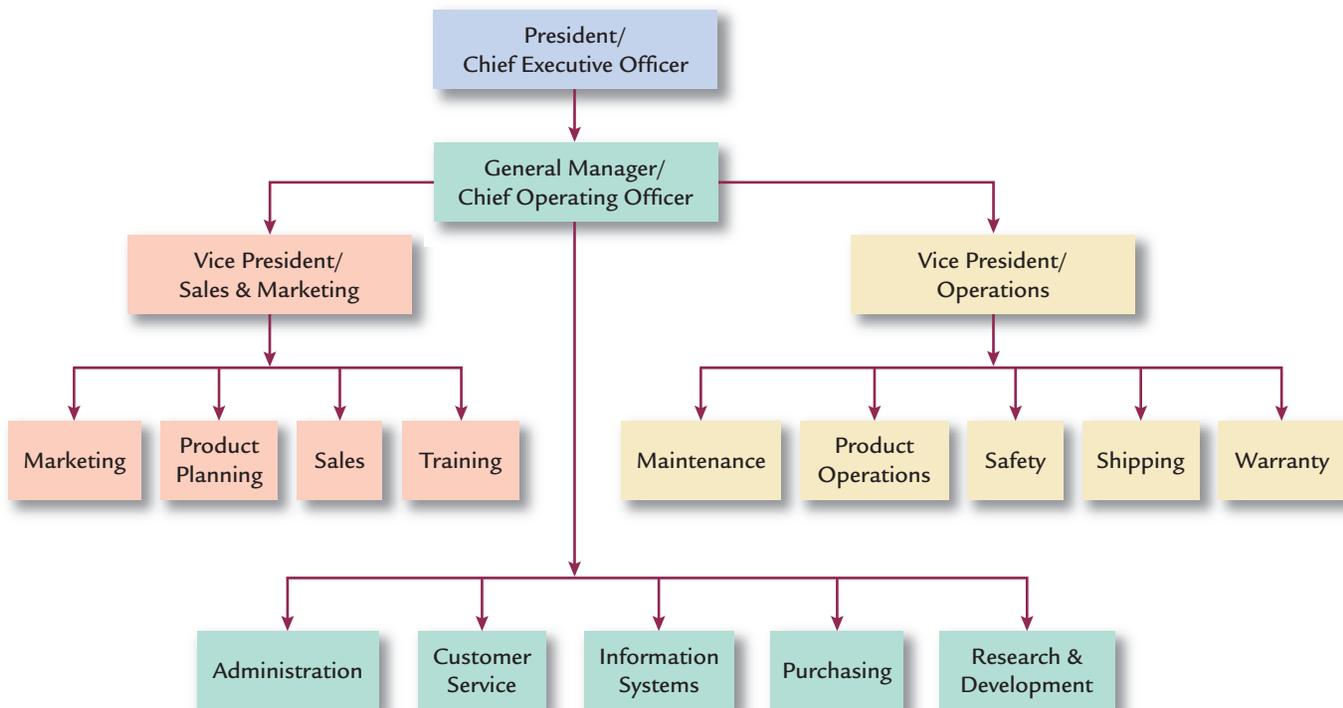
Managerial accountants must support management in all phases of business decision making. They must be intelligent, well prepared, up-to-date with new developments, and familiar with the customs and practices of all countries in which their firms operate. They are expected to be knowledgeable about the legal environment of business and, in particular, about the Sarbanes-Oxley Act of 2002.

Kicker's organization chart is shown in Exhibit 13-4. The **controller**, the chief accounting officer, for Kicker is located in the Administration Department. She supervises all accounting functions and reports directly to the general manager and chief operating officer (COO). Because of the critical role that managerial accounting plays in the operation of an organization, the controller is often viewed as a member of the top management team and is encouraged to participate in planning, controlling, and decision-making activities. As the chief accounting officer, the controller has responsibility for both internal and external accounting requirements. In larger firms, this charge may include direct responsibility for internal auditing, cost accounting, financial accounting (including SEC reports and financial statements), systems accounting (including analysis, design, and internal controls), and taxes. In larger companies, the controller is separate from the treasury department. The **treasurer** is responsible for the finance function. Specifically, the treasurer raises capital and manages cash and investments. The treasurer may also be in charge of credit, collection, and insurance.

Finally, successful managerial accountants at all levels of the organization must communicate with other personnel—both accounting and nonaccounting—within the organization. Knowing how to “crunch the numbers” is necessary but not sufficient for managerial accounting information to be used successfully. Chief financial officers (CFOs) increasingly expect managerial accountants to be able to help senior executives better understand managerial accounting information in order to analyze

Exhibit 13-4

Kicker, Inc., Organizational Chart



complex business decisions.<sup>10</sup> This communications-based challenge for managerial accountants is growing in importance and offers exciting opportunities for well-versed managerial accountants to demonstrate their ability to add value to the organization.

## Sarbanes-Oxley Act of 2002

In June 2002, Congress passed the **Sarbanes-Oxley Act (SOX)**. This legislation was passed in response to the collapse of **Enron** and the revelations of securities fraud and accounting misconduct associated with companies such as **WorldCom**, **Adelphia**, and **HealthSouth**. SOX established stronger government control and regulation of public companies in the United States. SOX applies to **publicly traded companies**, which issue stock traded on U.S. stock exchanges. Major sections of SOX include establishment of the Public Company Accounting Oversight Board (PCAOB), enhanced auditor independence, tightened regulation of corporate governance, control over management, and assessment of the firm's internal controls. SOX also led to increased attention to corporate ethics, discussed later in this chapter. Managerial accountants, through the offices of internal auditing or the chief financial officer, are the people in the organization who are expected to help their organizations comply with SOX.

### OBJECTIVE > 3

Explain the meaning of cost and how costs are assigned to products and services.

## The Meaning and Uses of Cost

An important task of managerial accounting is to determine the cost of products, services, customers, and other items of interest to managers. Therefore, we need to understand the meaning of cost and the ways in which costs can be used to make decisions, both for small entrepreneurial businesses and large international businesses. For example, consider a small gourmet restaurant and its owner Courtney, who also is the head chef. In addition to understanding the complexities of gourmet food preparation, Courtney needs to understand the breakdown of the restaurant's costs into various categories in order to make effective operating decisions. Cost categories of particular interest include direct costs (food and beverages) and indirect costs (laundry of linens). On a larger scale, local banks operating in college communities often look at the cost of providing basic checking account services to students. These accounts typically lose money—that is, the accounts cost more to service than they yield in fees and interest revenue. However, the bank finds that students already banking with them are more likely to take out student loans through the bank, and these loans are very profitable. As a result, the bank may actually decide to expand its offerings to students when the related loan business is considered. Now, let's define “cost” and more fully describe its managerial importance.

### Cost

**Cost** is the amount of cash or cash equivalent sacrificed for goods and/or services that are expected to bring a current or future benefit to the organization. If a furniture manufacturer buys lumber for \$10,000, then the cost of that lumber is \$10,000 cash. Sometimes, one asset is traded for another asset. Then the cost of the new asset is measured by the value of the asset given up (the cash equivalent). If the same manufacturer trades office equipment valued at \$8,000 for a forklift, then the cost of the forklift is the \$8,000 value of the office equipment traded for it. Cost is a dollar measure of the resources used to achieve a given benefit. Managers strive to minimize the cost of achieving benefits. Reducing the cost required to achieve a given benefit means that a firm is becoming more efficient.

Costs are incurred to produce future benefits. In a profit-making firm, those benefits usually mean revenues. As costs are used up in the production of revenues, they are said to expire. Expired costs are called **expenses**. On the income statement, expenses are deducted from revenues to determine income (also called *profit*). For a

<sup>10</sup>C. Rutledge and R. Williams, “A Seat at the Table,” *Outlook Journal* (June 2004). Taken from [http://www.accenture.com/xd/xd.asp?it=enweb&xd=ideas%5Coutlook%5C2\\_2004%5Cm](http://www.accenture.com/xd/xd.asp?it=enweb&xd=ideas%5Coutlook%5C2_2004%5Cm) on October 6, 2005.

company to remain in business, revenues must be larger than expenses. In addition, the income earned must be large enough to satisfy the owners of the firm.

We can look more closely at the relationship between cost and revenue by focusing on the units sold. The revenue per unit is called **price**. In our everyday conversation, we have a tendency to use cost and price as synonyms, because the price of an item (e.g., a CD) is the cost to us. However, accounting courses take the viewpoint of the owner of the company. In that case, cost and price are *not* the same. Instead, for the company, revenue and price are the same. Price must be greater than cost in order for the firm to earn income. Hence, managers need to know cost and trends in cost. For example, the price a consumer pays for a fleece jacket from **The North Face** might be \$200, while the total cost that the company incurs to design, manufacture, deliver, and service that jacket is much lower than the \$200 price it charges consumers.

## Accumulating and Assigning Costs

**Accumulating costs** is the way costs are measured and recorded. The accounting system typically does this job very well. When a telephone bill comes into the company, the bookkeeper records an addition to the expense account, Telephone Expense, and an addition to the liability account, Accounts Payable. In this way, the cost is *accumulated*. It would be easy to tell, at the end of the year, the total spending on telephone expense. However, that information usually is not enough. The company also wants to know why the money was spent. In other words, it wants to know how costs were assigned to cost objects.

**Assigning costs** is the way that a cost is linked to some cost object. A cost object is something for which a company wants to know the cost. For example, of the total telephone expense, how much was for the sales department and how much was for manufacturing? *Assigning costs* tells the company why the money was spent. In this case, cost assignment tells the company whether the money spent on telephone expense was to support the manufacturing or the selling of the product. As we will discuss in later chapters, cost assignment typically is more difficult than cost accumulation.

### Here's The



Kicker collects and analyzes many types of costs. In the manufacturing area, the company keeps track of direct materials, direct labor, and overhead. These costs, of course, make up the cost of goods sold that goes on Kicker's monthly income statement. Nonmanufacturing costs include the costs of marketing and administration. However, this information is decomposed into a series of accounts that helps Kicker's management in budgeting and decision making.

The marketing function, for example, is broken down into three areas: selling, customer service, and marketing. Selling works directly with dealers and outside sales reps. Customer service handles calls from dealers, and decides whether or not a problem is covered under warranty. Marketing is responsible for advertising, tent shows, and promotions. One of the largest is Kicker's annual Big Air Bash, an extravaganza of music, food, cars, and extreme sports demonstrations. Held in conjunction with the SEMA (Specialty Equipment Market Association) show, the Big Air Bash is held outside the Hard Rock Hotel and Casino in Las Vegas. The expenses associated with the show include the modification of show cars in Kicker's in-house garage. Kicker mechanics recently customized a new Dodge Neon. The trunk and back seat area were virtually gutted to make room for 12 speakers and heavy-duty amps. With a souped-up engine, new fiberglass

### Real Kicker

exterior, and trick paint, the car was ready for show. Other "veteran" show cars and pickup trucks were refreshed with additional trick paint, larger tires, and Kicker's newest amps and speakers. You can feel the music from outside the vehicle.

Tent shows are smaller affairs held several times a year in the central and south-central United States. Kicker brings its semitrailer full of products and sound equipment, as well as a couple of show trucks. Then, a large tent is set up to sell Kicker merchandise, explain products, and sell at greatly reduced prices the previous year's models. Fun and relaxed, the tent shows appeal to Kicker's customer base and provide a chance to look at the new models. The cost of each tent show is carefully tracked and compared with that show's revenue. Sites that don't provide sales revenue greater than cost are not booked for the following year.

Like many companies today, Kicker tracks costs carefully to use in decision making. The general cost categories in this chapter help the company to organize cost information and relate it to decision making.



## Cost Objects

Managerial accounting systems are structured to measure and assign costs to entities, called *cost objects*. A **cost object** is any item such as a product, customer, department, project, geographic region, plant, and so on, for which costs are measured and assigned. For example, if **Fifth Third Bank** wants to determine the cost of a platinum credit card, then the cost object is the platinum credit card. All costs related to the platinum card are added in, such as the cost of mailings to potential customers, the cost of telephone lines dedicated to the card, the portion of the computer department that processes platinum card transactions and bills, and so on. In a more personal example, suppose that you are considering taking a course during the summer session. Taking the course is the cost object, and the cost would include tuition, books, fees, transportation, and (possibly) housing. Notice that you could also include the foregone earnings from a summer job (assuming that you cannot work while taking summer classes), which would be an opportunity cost. (The concept of opportunity cost will be discussed more fully later in this chapter, as well as in Chapter 23.)

We will discuss various methods of assigning costs to cost objects in the succeeding chapters.

## Assigning Costs to Cost Objects

Costs can be assigned to cost objects in a number of ways. Relatively speaking, some methods are more accurate, while others are simpler. The choice of a method depends on a number of factors, such as the need for accuracy. The notion of accuracy is a relative concept and has to do with the reasonableness and logic of the cost assignment methods used. The objective is to measure and assign costs as well as possible, given management objectives. For example, suppose you and three of your friends go out to dinner at a local pizza parlor. When the bill comes, it totals \$36. How much is your share? One easy way to find your share it is to divide the bill evenly among you and your friends. In that case, you would each owe \$9 ( $\$36/4$ ). But suppose that one of you had a small salad and drink (totaling \$5), while another had a specialty pizza, appetizer, and beer (totaling \$15). Clearly, it is possible to identify what each person had and assign cost that way. The second method is more accurate, but also more work. Which method you choose will depend on how important it is to you to assign the specific meal costs to each individual. It is the same way in accounting. There are a number of ways to assign costs to cost objects. Some methods are quick and easy, but may be relatively inaccurate. Other methods are much more accurate, but also much more work (in business, more work equals more expense).

**Tracing Direct Costs** **Direct costs** are those costs that can be easily and accurately traced to a cost object. When we say that a cost is easy to trace, we often mean that the relationship between the cost and the object can be physically observed and is easy to track. The more costs that can be traced to the object, the more accurate are the cost assignments. For example, suppose that Chef Courtney, from our earlier discussion, wants to know the cost of emphasizing fresh, in-season fruits and vegetables

in her entrees. The cost of the fruits and vegetables would be relatively easy to determine and, thus, would be direct costs with respect to the meals prepared and sold. Some costs, however, are hard to trace. **Indirect costs** are costs that cannot be easily and accurately traced to a cost object. For example, Courtney incurs additional costs in scouting the outlying farms and farmers markets (as opposed to simply ordering fruits and vegetables from a distributor). She must use her own time and automobile to make the trips. Farmers markets may not deliver, so Courtney must arrange for a coworker with a van to pick up the produce. By definition, fruits and vegetables that are currently in season will be out of season (i.e., unavailable) in a few weeks. This seasonality means that Courtney

### CONCEPT Q&A

Make a list of the costs that you are incurring for your classes this term. Which costs are direct costs for your college course(s)? Which costs are indirect? Now, from your list of total costs, which ones are direct costs of this course? Which are indirect?

*Answers will vary.*

**Possible Answer:**

must spend much more time revising menus and developing new recipes that can be adapted to restaurant conditions. These costs are difficult to assign to the meals prepared and sold. Therefore, they are indirect costs. Exhibit 13-5 shows direct and indirect costs being assigned to cost objects.

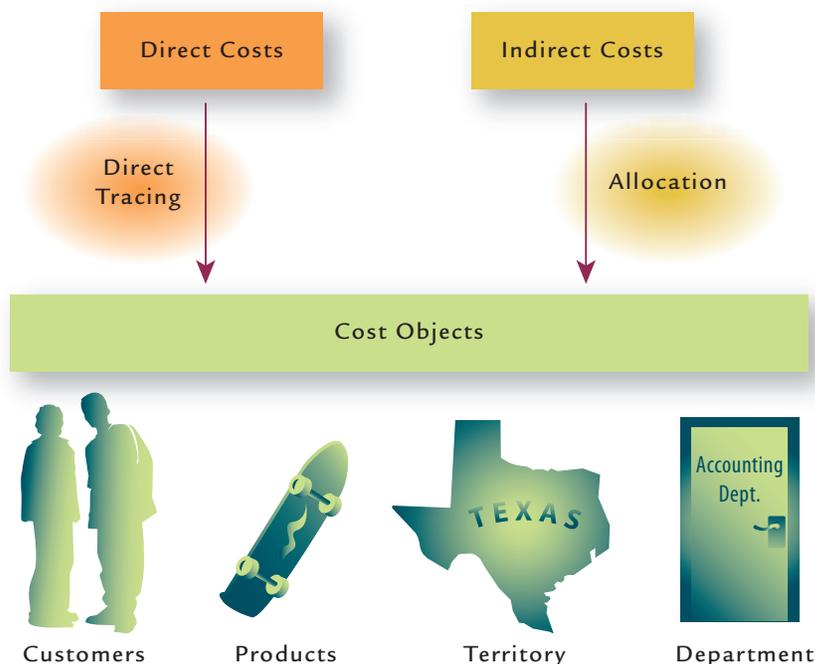
**Assigning Indirect Costs** Even though indirect costs cannot be traced to cost objects, it is still important to assign them. This assignment usually is accomplished using allocation. **Allocation** means that an indirect cost is assigned to a cost object using a reasonable and convenient method. Since no clearly observable causal relationship exists, allocating indirect costs is based on convenience or some assumed causal linkage. For example, consider the cost of heating and lighting a plant in which five products are manufactured. How can we assign the utility cost to these five products? It is difficult to see any causal relationship between utility costs and each unit of product manufactured. Therefore, a convenient way to allocate this cost is to assign it in proportion to the direct labor hours used by each product. This method is relatively easy and accomplishes the purpose of ensuring that all costs are assigned to units produced. Allocating indirect costs is important for a variety of reasons. For example, allocating indirect costs to products is needed to determine the value of inventory and of cost of goods sold. Perhaps more importantly, as companies become more complex in the number and types of products and services they offer to customers, the need to understand, allocate, and effectively control indirect costs becomes increasingly important. In addition, indirect costs represent an increasingly large percentage of total costs for many companies.

Direct and indirect costs occur in service businesses as well. For example, a bank's cost of printing and mailing monthly statements to checking account holders is a direct cost of the product—checking accounts. However, the cost of office furniture in the bank is an indirect cost for the checking accounts.

**Other Categories of Cost** In addition to being categorized as either direct or indirect, costs often also are analyzed with respect to their behavior patterns, or the way in which a cost changes when the level of the output changes. A **variable cost**

Exhibit 13-5

### Object Costing



is one that increases in total as output increases, and decreases in total as output decreases. For example, the denim used in making jeans is a variable cost. As the company makes more jeans, it needs more denim. A **fixed cost** is a cost that does not increase in total as output increases, and does not decrease in total as output decreases. For example, the cost of property taxes on the factory building stays the same no matter how many pairs of jeans the company makes. How can that be, since property taxes can and do change? While the cost changes, it is not because output changes. Rather, it changes because the city or county government decides to raise taxes. Variable and fixed costs are covered more extensively in Chapter 14.

An **opportunity cost** is the benefit given up or sacrificed when one alternative is chosen over another. For example, an opportunity cost of your being in accounting class may be the wages you would have earned during that time if you were working rather than going to school. Opportunity cost differs from accounting costs in that the opportunity cost is never included in the accounting records because it is the cost of something that did not occur. Opportunity costs are important to decision making, as we will see more clearly in Chapter 23.

We will discuss various methods of assigning costs to cost objects in the succeeding chapters.

#### OBJECTIVE 4

Define the various costs of manufacturing products and providing services as well as selling and administration.

## Product and Service Costs

Output represents one of the most important cost objects. There are two types of output: products and services. **Products** are goods produced by converting raw materials through the use of labor and indirect manufacturing resources, such as the manufacturing plant, land, and machinery. Televisions, hamburgers, automobiles, computers, clothes, and furniture are examples of products. **Services** are tasks or activities performed for a customer or an activity performed by a customer using an organization's products or facilities. Insurance coverage, medical care, dental care, funeral care, and accounting are examples of service activities performed for customers. Car rental, video rental, and skiing are examples of services where the customer uses an organization's products or facilities.

Organizations that produce products are called **manufacturing organizations**. Organizations that provide services are called **service organizations**. Managers of both types of organizations need to know how much individual products or services cost. Accurate cost information is vital for profitability analysis and strategic decisions concerning product design, pricing, and product mix. Incidentally, retail organizations, such as **J. Crew**, buy finished products from other organizations, such as manufacturers, and then sell them to customers. The accounting for inventory and cost of goods sold for retail organizations, often referred to as merchandisers, is much simpler than for manufacturing organizations and is usually covered extensively in introductory financial accounting courses. Therefore, the focus here is on manufacturing and service organizations.

Services differ from products in many ways. First, a service is intangible. The buyers of services cannot see, feel, hear, or taste a service before it is bought. Second, services are perishable; they cannot be stored for future use by a consumer but must be consumed when performed. Inventory valuation, so important for products, is not an issue for services. In other words, because service organizations do not produce and sell products as part of their regular operations, they have no inventory asset on the balance sheet. Third, providers of services and buyers of services must usually be in direct contact for an exchange to take place. For example, an eye examination requires both the patient and the optometrist to be present. However, producers of products need not have direct contact with the buyers of their goods. Thus, buyers of automobiles never need to have contact with the engineers and assembly line workers that produced their automobiles. The overall way in which a company costs services in terms of classifying related costs as either direct or indirect is very similar to the way in which it costs products. The main difference in costing is that products are inventoried, whereas services are not.

**ETHICS** Tracking costs can also act as an early warning system for unauthorized activity and possible ethical problems. For example, **Metropolitan Life Insurance Company** was dismayed to learn that some of its agents were selling policies as retirement plans. This practice is illegal, and it cost the company more than \$20 million in fines as well as \$50 million in refunds to policyholders. More accurate and comprehensive data tracking regarding sales, individual agents, types of policies, and policyholders could have alerted Metropolitan Life to a potential problem. Thus, we can see that tracking costs can serve many different and important purposes. ♦

## Determining Product Cost

Managerial accountants must decide what types of managerial accounting information to provide to managers, how to measure such information, and when and to whom to communicate the information. For example, when making most strategic and operating decisions, managers typically rely on managerial accounting information that is prepared in whatever manner the managerial accountant believes provides the best analysis for the decision at hand. Therefore, the majority of the managerial accounting issues explained in this book do not reference a formal set of external rules, but instead consider the context of the given decision (e.g., relevant vs. irrelevant cost information for make-or-buy decisions, full cost vs. functional cost information for pricing decisions, etc.).

However, there is one major exception. Managerial accountants must follow specific external reporting rules (i.e., generally accepted accounting principles) when their companies provide outside parties with cost information about the amount of ending inventory on the balance sheet and the cost of goods sold on the income statement. In order to calculate these two amounts, managerial accountants must subdivide costs into functional categories: production and period (i.e., nonproduction). The following section describes the process for categorizing costs as either product or period in nature.

**Product (manufacturing) costs** are those costs, both direct and indirect, of producing a product in a manufacturing firm or of acquiring a product in a merchandising firm and preparing it for sale. Therefore, only costs in the *production* section of the value chain are included in product costs. A key feature of product costs is that they are inventoried. Product costs initially are added to an inventory account and remain in inventory until they are sold, at which time they are transferred to cost of goods sold (COGS). Product costs can be further classified as direct materials, direct labor, and manufacturing overhead, which are the three cost elements that can be assigned to products for external financial reporting (e.g., inventories or COGS). Exhibit 13-6 shows how direct materials, direct labor, and overhead become product costs.

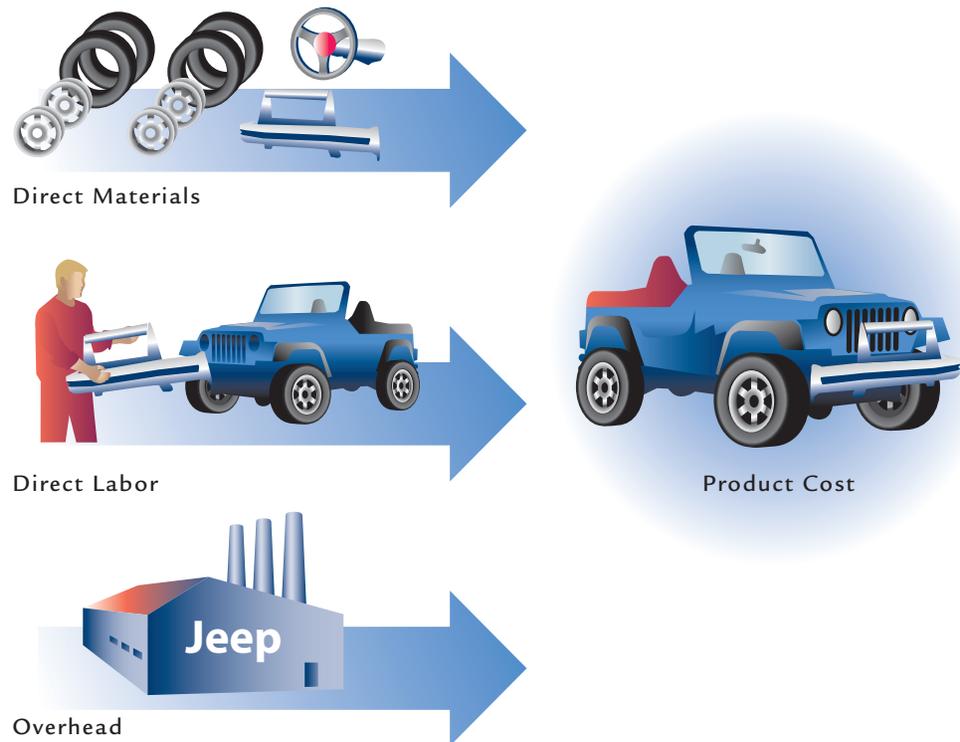
**Direct Materials** **Direct materials** are those materials that are a part of the final product and can be directly traced to the goods being produced. The cost of these materials can be directly charged to products because physical observation can be used to measure the quantity used by each product. Materials that become part of a product usually are classified as direct materials. For example, tires on a new **Porsche** automobile, wood in an **Ethan Allen** dining room table, alcohol in an **Estee Lauder** cologne, and denim in a pair of **American Eagle** jeans are all part of direct materials for manufacturers of these products.

A closely related term is raw materials. Often, the inventory of materials is called the *raw materials account*. Materials in the raw materials account do not become *direct materials* until they are withdrawn from inventory for use in production. The raw materials inventory account can include indirect materials as well as direct materials. Indirect materials are used in the production process but the amount used by each unit cannot be easily determined and, as a result, these costs are treated as indirect costs (as discussed later).

**Direct Labor** **Direct labor** is the labor that can be directly traced to the goods being produced. Physical observation can be used to measure the amount of labor used to produce a product. Those employees who convert direct materials into a

## Exhibit 13-6

## Product Costs Include Direct Materials, Direct Labor, and Overhead



product are classified as direct labor. For example, workers on an assembly line at **Dell** are classified as direct labor.

Just as there were indirect materials in a company, there may also be indirect labor. This labor is not direct labor since these workers do not actually make the product. However, their contribution is necessary to production. An example of indirect labor in a production setting is the maintenance crew who performs regularly scheduled preventative maintenance every other Wednesday morning in **Georgia Pacific's** plywood manufacturing plants. Indirect labor is included in overhead and, therefore, is an indirect cost rather than a direct cost.

**Manufacturing Overhead** All product costs other than direct materials and direct labor are put into a category called **manufacturing overhead**. In a manufacturing firm, manufacturing overhead also is known as *factory burden* or *indirect* manufacturing costs. Costs are included as manufacturing overhead if they cannot be traced to the cost object of interest (e.g., unit of product). The manufacturing overhead cost category contains a wide variety of items. Examples of manufacturing overhead costs include depreciation on plant buildings and equipment, janitorial and maintenance labor, plant supervision, materials handling, power for plant utilities, and plant property taxes. The important thing to remember is that all costs in the factory are classified as direct materials, direct labor, or manufacturing overhead. No product cost can be omitted from classification, no matter how far removed you might think it is from the actual production of a product. Earlier we mentioned that indirect materials and indirect labor are included in overhead. In manufacturing, the glue used in furniture or toys is an example, as is the cost of oil to grease cookie sheets for producing cookies.

## CONCEPT Q&amp;A

Look up and focus on any object in the room. What do you think the direct materials might include? What kind of direct labor might have worked on that item? Finally, what types of overhead costs might have been incurred by the company that produced it?

Answers will vary.

Possible Answer:

**Total Product Cost** The total product cost equals the sum of direct materials, direct labor, and manufacturing overhead. The unit product cost equals total product cost divided by the number of units produced. **Cornerstone 13-1** shows how to calculate total product cost and per-unit product cost.

### HOW TO Calculate Product Cost in Total and Per Unit

**Information:**

BlueDenim Company makes blue jeans. Last week, direct materials (denim, thread, zippers, and rivets) costing \$48,000 were put into production. Direct labor of \$30,000 (50 workers  $\times$  40 hours  $\times$  \$15 per hour) was incurred. Manufacturing overhead equaled \$72,000. By the end of the week, the company had manufactured 30,000 pairs of jeans.

**Required:**

Calculate the total product cost for last week. Calculate the cost of one pair of jeans that was produced last week.

**Solution:**

Direct materials	\$ 48,000
Direct labor	30,000
Manufacturing overhead	<u>72,000</u>
Total product cost	<u><u>\$150,000</u></u>

Per-unit product cost =  $\$150,000 / 30,000 = \$5$

Therefore, one pair of jeans costs \$5 to produce.



### CORNERSTONE 13-1



Product costs include direct materials, direct labor, and manufacturing overhead. Once the product is finished, no more costs attach to it. That is, any costs associated with storing, selling, and delivering the product are not product costs, but instead are period costs.

**Prime and Conversion Costs** Product costs of direct materials, direct labor, and manufacturing overhead are sometimes grouped into prime cost and conversion cost. **Prime cost** is the sum of direct materials cost and direct labor cost. **Conversion cost** is the sum of direct labor cost and manufacturing overhead cost. For a manufacturing firm, conversion cost can be interpreted as the cost of converting raw materials into a final product. **Cornerstone 13-2** shows how to calculate prime cost and conversion cost for a manufactured product.

### HOW TO Calculate Prime Cost and Conversion Cost in Total and Per Unit

**Information:**

BlueDenim Company makes blue jeans. Last week, direct materials (denim, thread, zippers, and rivets) costing \$48,000 were put into production. Direct labor of \$30,000 (50 workers  $\times$  40 hours  $\times$  \$15 per hour) was incurred. Manufacturing overhead equaled \$72,000. By the end of the week, the company had manufactured 30,000 pairs of jeans.



### CORNERSTONE 13-2



**CORNERSTONE**  
**13-2**  
*(continued)*

**Required:**

Calculate the total prime cost for last week. Calculate the per-unit prime cost. Calculate the total conversion cost for last week. Calculate the per-unit conversion cost.

**Solution:**

Direct materials	\$48,000
Direct labor	<u>30,000</u>
Total prime cost	<u><u>\$78,000</u></u>

Per-unit prime cost =  $\$78,000/30,000 = \$2.60$

Direct labor	\$ 30,000
Manufacturing overhead	<u>72,000</u>
Total conversion cost	<u><u>\$102,000</u></u>

Per-unit conversion cost =  $\$102,000/30,000 = \$3.40$

Note: Remember that prime cost and conversion cost do NOT equal total product cost. This is because direct labor is part of BOTH prime cost and conversion cost.

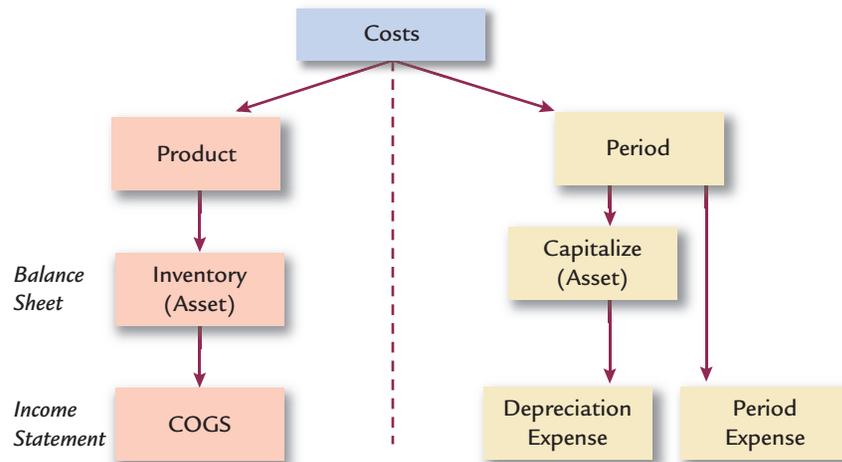
## Determining Period Costs

The costs of production are assets that are carried in inventories until the goods are sold. There are other costs of running a company, referred to as period costs, that are not carried in inventory. Thus, **period costs** are all costs that are not product costs (i.e., all areas of the value chain except for production). The cost of office supplies, research and development activities, the CEO's salary, and advertising are examples of period costs. For instance, **Victoria's Secret** spent approximately \$2.7 million to run a 30-second advertisement during Super Bowl XLII! With the exception of the final episode of **M\*A\*S\*H**, the Giant's underdog victory over the previously unbeaten Patriots was watched by more viewers (97.5 million) than any television show in history.<sup>11</sup> Despite these record ratings, however, some people considered this \$2.7 million period expense to be excessive. Managerial accountants help executives at companies like Victoria's Secret determine whether or not such costly advertising campaigns generate enough additional sales revenue over the long run to make them profitable.

Period costs cannot be assigned to products or appear as part of the reported values of inventories on the balance sheet. Instead, period costs typically are expensed in the period in which they are incurred. However, if a period cost is expected to provide an economic benefit (i.e., revenues) beyond the next year, then it is recorded as an asset (i.e., capitalized) and allocated to expense through depreciation throughout its useful life. The cost associated with the purchase of a delivery truck is an example of a period cost that would be capitalized when incurred and then recognized as an expense over the useful life of the truck. Exhibit 13-7 depicts the distinction between product and period costs and how each type of cost eventually becomes an expense on the income statement. As shown in the exhibit, product costs, which are capitalized as an inventory asset, are expensed on the income statement as cost of goods sold to match against the revenues generated from the sale of the inventory. However, capitalized period costs are depreciated to expense on the income statement over the asset's useful life to match against the revenues generated by the asset over its useful life.

<sup>11</sup>Michael Hiestand, "Game Attracts Biggest Audience," *USA Today* (February 5, 2008): C1.

### The Impact of Product vs. Period Costs on the Financial Statements



In a manufacturing organization, the level of period costs can be significant (often greater than 25 percent of sales revenue), and controlling them may bring greater cost savings than the same effort exercised in controlling production costs. For example, in 2007, Nike's period expenses were 35 percent of its revenue (\$5,669,000,000/\$16,325,900,000)! For service organizations, the relative importance of selling and administrative costs depends on the nature of the service produced. Physicians and dentists, for example, do relatively little marketing and thus have very low selling costs. On the other hand, a grocery chain may incur substantial marketing costs. Period costs often are divided into selling costs and administrative costs.

**Selling Costs** Those costs necessary to market, distribute, and service a product or service are **selling costs**. They are often referred to as *order-getting* and *order-filling* costs. Examples of selling costs include salaries and commissions of sales personnel, advertising, warehousing, shipping, and customer service. The first two items are examples of order-getting costs; the last three are order-filling costs.

**Administrative Costs** All costs associated with research, development, and general administration of the organization that cannot reasonably be assigned to either selling or production are **administrative costs**. General administration has the responsibility of ensuring that the various activities of the organization are properly integrated so that the overall mission of the firm is realized. The president of the firm, for example, is concerned with the efficiency of selling, production, and research and development activities. Proper integration of these activities is essential to maximizing the overall profits of a firm. Examples of general administrative costs are executive salaries, legal fees, printing the annual report, and general accounting. Research and development costs are the costs associated with designing and developing new products and must be expensed in the period incurred.

As with product costs, it is often helpful to distinguish between direct period costs and indirect period costs. Service companies also make this important distinction. For example, a surgical center would show that surgical gauze and anesthesia are direct costs used for an operation because it could be determined how much gauze or anesthesia was used for each procedure or patient. Other examples of direct costs in service industries include the chef in a restaurant, a surgical nurse attending an open heart operation, and a pilot for **Southwest Airlines**.

Alternately, although shampoo and hair spray are used in a beauty shop, the exact amount used in each individual's hair cut is not easily determinable. As a result, the costs associated with shampoo and hair spray would be considered indirect, or overhead, costs and allocated, rather than traced, to individual hair cuts. Examples of

indirect labor costs in a service setting include the surgical assistants in a hospital who clean up the operating room after surgery, dispose of certain used materials, and sterilize the reusable instruments. Indirect labor is included in overhead. The rental of a Santa suit for the annual company Christmas party would be an example of an indirect cost that would be expensed in the period incurred. Although these costs do not affect the calculation of inventories or COGS (i.e., because they are service companies), their correct classification nonetheless affects numerous decisions and planning and control activities for managers, as we will discuss in detail in future chapters.

## OBJECTIVE 5

Prepare income statements for manufacturing and service organizations.

## Preparing Income Statements

The earlier definitions of product, selling, and administrative costs provide a good conceptual overview of these important costs. However, the actual calculation of these costs in practice is a bit more complicated. Let's take a closer look at just how costs are calculated for purposes of preparing the external financial statements, focusing first on manufacturing firms.

### Cost of Goods Manufactured

The **cost of goods manufactured** represents the total product cost of goods *completed* during the current period and transferred to finished goods inventory. The only costs assigned to goods completed are the manufacturing costs of direct materials, direct labor, and manufacturing overhead. So, why don't we just add together the current period's costs of direct materials, direct labor, and manufacturing overhead to arrive at cost of goods sold? The reason is inventories of materials and work in process. For instance, some of the materials purchased in the current period likely were used in production (i.e., transferred from materials inventory to work-in-process inventory during the period). However, other materials likely were not used in production and, thus, remain in materials inventory at period end. Also, some of the units that were worked on (and thus allocated labor and manufacturing overhead costs) in the current period likely were completed during the period (i.e., transferred from work-in-process inventory to finished goods inventory during the period). However, other units worked on during the period likely were not completed during the period and, thus, remain in work-in-process inventory at period end. In calculating cost of goods sold, we need to distinguish between the total manufacturing cost for the current period and the manufacturing costs associated with the units that were completed during the current period (i.e., cost of goods manufactured).

Let's take a look at direct materials. Suppose a company had no materials on hand at the beginning of the month, then bought \$15,000 of direct materials during the month and used all of them in production. The entire \$15,000 would be properly called *direct materials*. Usually, though, the company has some materials on hand at the beginning of the month. These materials are the beginning inventory of materials. Let's say that this beginning inventory of materials cost \$2,500. Then during the month, the company would have a total of \$17,500 of materials that could be used in production (\$2,500 from beginning inventory and \$15,000 purchased during the month). Typically, the company would not use the entire amount of materials on hand in production. Perhaps they use only \$12,000 of materials. Then, the cost of direct materials used in production this month is \$12,000 and the remaining \$5,500 of materials is the ending inventory of materials. This reasoning can be easily expressed in a formula.

$$\begin{array}{r} \text{Beginning} \\ \text{Inventory} \\ \text{of Materials} \end{array} + \text{Purchases} - \begin{array}{r} \text{Direct Materials} \\ \text{Used in Production} \end{array} = \begin{array}{r} \text{Ending Inventory} \\ \text{of Materials} \end{array}$$

While this computation is logical and simple, it does not express the result for which we usually are looking. We are usually trying to figure out the amount of direct

materials used in production—not the amount of ending inventory. **Cornerstone 13-3** shows how to compute the amount of direct materials used in production.

### HOW TO Calculate the Direct Materials Used in Production

**Information:**

BlueDenim Company makes blue jeans. On May 1, BlueDenim had \$68,000 of materials in inventory. During the month of May, the company purchased \$210,000 of materials. On May 31, materials inventory equaled \$22,000.

**Required:**

Calculate the direct materials used in production for the month of May.

**Solution:**

Materials inventory, May 1	\$ 68,000
Purchases	210,000
Materials inventory, May 31	(22,000)
Direct materials used in production	<u>\$256,000</u>



### CORNERSTONE 13-3



Once the direct materials are calculated, the direct labor and manufacturing overhead *for the time period* can be added to get the total manufacturing cost for the period. Now we need to consider the second type of inventory—work in process. **Work in process**, often abbreviated as **WIP**, is the cost of the partially completed goods that are still on the factory floor at the end of a time period. These are units that have been started, but are not finished. They have value, but not as much as they will when they are completed. Just as there are beginning and ending inventories of materials, there are beginning and ending inventories of WIP. We must adjust the total manufacturing cost for the time period for the inventories of WIP. When that is done, we will have the total cost of the goods that were completed and transferred from work-in-process inventory to finished goods inventory during the time period. **Cornerstone 13-4** shows how to calculate the cost of goods manufactured for a particular time period.

### HOW TO Calculate Cost of Goods Manufactured

**Information:**

Recall that BlueDenim Company makes blue jeans. During the month of May, the company purchased \$210,000 of materials. On May 31, materials inventory equaled \$22,000. During the month of May, BlueDenim Company incurred direct labor cost of \$135,000 and manufacturing overhead of \$150,000. Inventory information is as follows:

	May 1	May 31
Materials	\$68,000	\$22,000
Work in process	50,000	16,000

**Required:**

Calculate the cost of goods manufactured for the month of May. Calculate the cost of one pair of jeans assuming that 115,000 pairs of jeans were completed during May.



### CORNERSTONE 13-4



**CORNERSTONE**  
**13-4**  
*(continued)*

**Solution:**

Direct materials*	\$256,000
Direct labor	135,000
Manufacturing overhead	150,000
Total manufacturing cost for May	<u>\$541,000</u>
WIP, May 1	50,000
WIP, May 31	<u>(16,000)</u>
Cost of goods manufactured	<u><u>\$575,000</u></u>

\*Direct materials = \$68,000 + \$210,000 – \$22,000 = \$256,000.

This amount was calculated in Cornerstone 13-3.

Per-unit cost of goods manufactured = \$575,000/115,000 units = \$5

## Cost of Goods Sold

To meet external reporting requirements, costs must be classified into three categories: production, selling, and administration. Remember that product costs are initially put into inventory. They become expenses only when the products are sold, which matches the expenses of manufacturing the product to the sales revenue generated by the product at the time it is sold. Therefore, the expense of manufacturing is not the cost of goods manufactured; instead it is the cost of the goods that are sold. **Cost of goods sold** represents the cost of goods that were sold during the period and, therefore, transferred from finished goods inventory on the balance sheet to cost of goods sold on the income statement (i.e., as an inventory expense). **Cornerstone 13-5** shows how to calculate the cost of goods sold.



**CORNERSTONE**  
**13-5**



## HOW TO Calculate Cost of Goods Sold

**Information:**

Recall that BlueDenim Company makes blue jeans. During the month of May, 115,000 pairs of jeans were completed at a cost of goods manufactured of \$575,000. Suppose that on May 1, BlueDenim had 10,000 units in finished goods inventory costing \$50,000 and on May 31, the company had 26,000 units in finished goods inventory costing \$130,000.

**Required:**

Prepare a cost of goods sold statement for the month of May. Calculate the number of pairs of jeans that were sold during May.

**Solution:**

<b>BlueDenim Company</b>	
<b>Cost of Goods Sold Statement</b>	
<b>For the Month of May</b>	
Cost of goods manufactured	\$ 575,000
Finished goods inventory, May 1	50,000
Finished goods inventory, May 31	<u>(130,000)</u>
Cost of goods sold	<u><u>\$ 495,000</u></u>

Number of units sold:	
Finished goods inventory, May 1	10,000
Units finished during May	115,000
Finished goods inventory, May 31	<u>(26,000)</u>
Units sold during May	<u><u>99,000</u></u>

**CORNERSTONE**  
**13-5**  
*(continued)*

The ending inventories of materials, WIP, and finished goods are important because they are assets and appear on the balance sheet (as current assets). The cost of goods sold is an expense that appears on the income statement. Selling and administrative costs are period costs and also appear on the income statement as an expense. Collectively, Cornerstones 13-3, 13-4, and 13-5 depict the flow of costs through the three inventories (materials, work in process, and finished goods) and finally into cost of goods sold.

### Income Statement: Manufacturing Firm

The income statement for a manufacturing firm is displayed in **Cornerstone 13-6**. This income statement follows the traditional format taught in an introductory financial accounting course. Notice that the income statement covers a certain period of time (i.e., the month of May in Cornerstone 13-6). However, the time period may vary. The key point is that all sales revenue and expenses attached to that period of time appear on the income statement.

### HOW TO Prepare an Income Statement for a Manufacturing Firm

**Information:**

Recall that BlueDenim Company sold 99,000 pairs of jeans during the month of May at a total cost of \$495,000. Each pair sold at a price of \$8. BlueDenim also incurred two types of selling costs: commissions equal to 10 percent of the sales price, and other selling expense of \$120,000. Administrative expense totaled \$85,000.

**Required:**

Prepare an income statement for BlueDenim for the month of May.

**Solution:**

<b>BlueDenim Company</b>		
<b>Income Statement</b>		
<b>For the Month of May</b>		
Sales revenue (99,000 × \$8)		\$792,000
Cost of goods sold		<u>495,000</u>
Gross margin		\$297,000
Less:		
Selling expense		
Commissions (0.10 × \$792,000)	\$ 79,200	
Fixed selling expense	<u>120,000</u>	199,200
Administrative expense		<u>85,000</u>
Operating income		<u><u>\$ 12,800</u></u>



**CORNERSTONE**  
**13-6**



Look at the income statement in Cornerstone 13-6. First, the heading tells us what type of statement it is, for what firm, and for what period of time. Then, the income statement itself always begins with “sales revenue” (or “sales” or “revenue”). The sales revenue is the price multiplied by the units sold. After the sales revenue is determined, the firm must calculate expenses for the period.

Notice that the expenses are separated into three categories: production (cost of goods sold), selling, and administrative. The first type of expense is the cost of producing the units sold, or the cost of goods sold. This amount was computed and explained in Cornerstone 13-5. Remember that the cost of goods sold is the cost of producing the units that were sold during the time period. It includes direct materials, direct labor, and manufacturing overhead. It does *not* include any selling or administrative expense. In the case of a retail (i.e., a merchandising) firm, the cost of goods sold represents the total cost of the goods sold when they were purchased from an outside supplier. Therefore, the cost of goods sold for a retailer equals the purchase costs adjusted for the beginning and ending balances in its single inventory account. A merchandising firm, such as **Old Navy** or J. Crew, has only one inventory account because it does not transform the purchased good into a different form by adding materials, labor, and overhead, as does a manufacturing firm.

**Gross margin** is the difference between sales revenue and cost of goods sold. It shows how much the firm is making over and above the cost of the units sold. Gross margin does *not* equal operating income or profit. Selling and administrative expenses have not yet been subtracted. However, gross margin does provide useful information. If gross margin is positive, the firm at least charges prices that cover the product cost. In addition, the firm can calculate its gross margin percentage (gross margin/sales revenue), as shown in **Cornerstone 13-7**, and compare it with the average gross margin percentage for the industry to see if its experience is in the ballpark with other firms in the industry. Gross margin percentage varies significantly by industry. For instance, **Kroger’s** gross margin percentage as determined from the income statement in its 2006 annual report was 24.2 percent ( $\$15,996,000,000/\$66,111,000,000$ ). However, **Merck’s** gross margin percentage as determined from the income statement in its 2006 annual report was 73.5 percent ( $\$16,634,900,000/\$22,636,000,000$ )! One reason for Merck’s extremely high gross margin percent is that a large percentage of its costs are related to marketing (e.g., advertising) and research and development (\$8.2 million and \$4.8 million, respectively) and, as such, are expensed as period costs in the period incurred. Thus, Merck’s cost of goods sold was relatively small.

Finally, selling expense and administrative expense for the period are subtracted from gross margin to arrive at operating income. Operating income is the key figure from the income statement; it is profit, and shows how much the owners are actually earning from the company. Again, calculating the percentage of operating income (i.e., operating income/sales revenue) and comparing it to the average for the industry gives the owners valuable information about relative profitability.

The income statement can be analyzed further by calculating the percentage of sales revenue represented by each line of the statement, as was done in Cornerstone 13-7. How can management use this information? The first thing that jumps out is that operating income is less than 2 percent of sales revenue. That’s a very small percentage. Unless this is common for the blue jeans manufacturing business, BlueDenim’s management should work hard to increase the percentage. Selling expense is a whopping 25.2 percent of sales! Do commissions really need to be that high? Or is the price too low (compared to competitors’ prices)? Can cost of goods sold be reduced? Is 62.5 percent reasonable? These are questions that are suggested by Cornerstone 13-7, but not answered. Answering the questions is the job of management.

## ANALYTICAL Q&A

Your friend, Ted, mentioned that **Macy’s** department store marks up sweaters by 100 percent. “Wow,” said Ted, “So a sweater that costs them \$25 is sold for \$50—they’re making \$25 in profit (operating income)!” Is Ted correct? Refer to the income statement from Cornerstone 13-7. What line would include the \$50 price of the sweater? What line would include the \$25 original cost (to the store) of the sweater? What line would include the \$25 that is over and above the cost?

*No, the \$25 markup is not operating income. The \$50 price is included in revenue; the \$25 original cost is included in cost of goods sold; and the \$25 over and above the cost to the store is gross margin.*

**Answer:**

## HOW TO Calculate the Percentage of Sales Revenue for Each Line on the Income Statement

### Information:

Recall that BlueDenim Company's income statement for the month of May was shown in Cornerstone 13-6.

### Required:

Calculate the percentage of sales revenue represented by each line of the income statement.

### Solution:

BlueDenim Company Income Statement For the Month of May			Percent*
Sales revenue (99,000 × \$8)	\$792,000		100.0
Cost of goods sold	495,000		62.5
Gross margin	<u>\$297,000</u>		<u>37.5</u>
Less:			
Selling expense			
Commissions (0.10 × \$792,000)	\$ 79,200		
Fixed selling expense	<u>120,000</u>	199,200	25.2
Administrative expense		<u>85,000</u>	<u>10.7</u>
Operating income		<u>\$ 12,800</u>	<u>1.6</u>

\*Steps in calculating the percentages:

1. Sales revenue percent =  $\$792,000/\$792,000 = 1.00$  or 100% (sales revenue is always 100% of itself)
2. Cost of goods sold percent =  $\$495,000/\$792,000 = 0.625$  or 62.5%
3. Gross margin percent =  $\$297,000/\$792,000 = 0.375$  or 37.5%
4. Selling expense percent =  $\$199,200/\$792,000 = 0.252$  or 25.2% (this has been rounded)
5. Administrative expense percent =  $\$85,000/\$792,000 = 0.107$  or 10.7% (this has been rounded)
6. Operating income expense percent =  $\$12,800/\$792,000 = 0.016$  or 1.6% (this has been rounded)



## CORNERSTONE 13-7



## Income Statement: Service Firm

In a service organization, there is no product to purchase (e.g., a merchandiser like American Eagle Outfitters) or to manufacture (e.g., **Toshiba**) and, therefore, there are no beginning or ending inventories. As a result, there is no cost of goods sold or gross margin on the income statement. Instead, the cost of providing services appears along with the other operating expenses of the company. For example, Southwest Airlines' 2007 income statement begins with total operating revenues of \$9,861,000,000 and subtracts total operating expenses of \$9,070,000,000 to arrive at an operating income of \$791,000,000. An income statement for a service firm is shown in **Cornerstone 13-8**.

## Managerial Accounting and Ethical Conduct

### Ethical Behavior

**Ethical behavior** involves choosing actions that are “right,” “proper,” and “just.” Traditionally, actions regarding the economic performance of the firm have been the overriding concern of managerial accounting. Yet managers and managerial accountants should not become so focused on profits that they develop a belief that the only goal of a business is maximizing its net worth. The objective of profit maximization

### OBJECTIVE > 6

Explain the importance of ethical behavior for managers and managerial accountants.



## CORNERSTONE 13-8



### HOW TO Prepare an Income Statement for a Service Organization

#### Information:

Komala Information Systems designs and installs human resources software for small companies. Last month, Komala had software licensing costs of \$5,000, service technicians costs of \$35,000, and research and development costs of \$55,000. Selling expenses were \$5,000, and administrative expenses equaled \$7,000. Sales totaled \$130,000.

#### Required:

Prepare an income statement for Komala Information Systems for the past month.

#### Solution:

Komala Information Systems		
Income Statement		
For the Past Month		
Sales revenues		\$130,000
Less operating expenses:		
Software licensing	\$ 5,000	
Service technicians	35,000	
Research and development	55,000	
Selling expenses	5,000	
Administrative expenses	7,000	107,000
Operating income		\$ 23,000

should be constrained by the requirement that profits be achieved through legal and ethical means. While this belief has always been an implicit assumption of managerial accounting, the assumption should be made explicit. To help achieve this objective, many of the problems in this text require explicit consideration of ethical issues.

Many of the recent accounting scandals, such as those involving Adelphia, WorldCom, HealthSouth, **Parmalat**, and **McKesson**, provide evidence of the pressures faced by top managers and accountants to produce large net income numbers. Unfortunately, such individuals often give into these pressures when faced with questionable revenue- and cost-related judgments. For example, the scandal at WorldCom was committed because the CEO, Bernie Ebbers, coerced several of the top accountants at WorldCom to wrongfully record journal entries in the company's books that capitalized millions of dollars in costs as assets (i.e., on the balance sheet) rather than as expenses (i.e., on the income statement) that would have dramatically lowered current period net income. In 2005, WorldCom was forced to pay hundreds of millions of dollars to the U.S. government and to shareholders for its illegal and unethical actions. In addition, several of the top executives were sentenced to extensive prison time for their actions. The recent subprime mortgage crisis also highlights the importance of ethical considerations as some banks tried to increase their profits either by lending individuals more money than they could reasonably afford or using terms that were intentionally less clear, or transparent, than many outsiders thought they should be.<sup>12</sup>

<sup>12</sup> Jane Sasseen, "FBI Widens Net Around Subprime Industry: With 14 Companies Under Investigation, the Bureau's Scope is the Entire Securitization Process," *Business Week Online* (January 30, 2008). Taken from [http://www.businessweek.com/bwdaily/dnflash/content/jan2008/db20080129\\_728982.htm?chan=search](http://www.businessweek.com/bwdaily/dnflash/content/jan2008/db20080129_728982.htm?chan=search) on February 12, 2008.

## Company Codes of Ethical Conduct

To promote ethical behavior by managers and employees, organizations commonly establish standards of conduct referred to as Company Codes of Conduct. For example, Boeing's Code of Conduct<sup>13</sup> states that it will “conduct its business fairly, impartially, in an ethical and proper manner, and in full compliance with all applicable laws and regulations.” All employees must sign the code of conduct, and the company “requires that they understand the code, and ask questions, seek guidance, report suspected violations, and express concerns regarding compliance with this policy and the related procedures.”

As with the legal and medical professions, the accounting profession relies on certification to help promote ethical behavior, as well as to provide evidence that the certificate holder has achieved a minimum level of professional competence. The accounting profession offers three major forms of certification to managerial accountants: a Certificate in Management Accounting, a Certificate in Public Accounting, and a Certificate in Internal Auditing. In each case, an applicant must meet specific educational and experience requirements and pass a qualifying examination to become certified. These certifying organizations have responded to recent ethics scandals with their own policies. For example, in 2005, the Institute of Management Accountants, which sponsors the Certificate in Management Accounting, revised its Standards of Ethical Conduct for Management Accountants to reflect the impact of the Sarbanes-Oxley Act of 2002. Now called the Statement of Ethical Professional Practice, the revised code considers global issues and incorporates the principles of the code of the International Federation of Accountants, which is the global association of professional accounting groups.

Perhaps the biggest challenge with ethical dilemmas is that when they arise, employees frequently do not realize either (1) that such a dilemma has arisen or (2) the “correct” action that should be taken to rectify the dilemma.

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## Summary of Learning Objectives

- LO1. Explain the meaning of managerial accounting and contrast it to financial accounting.**
- Managerial accounting information helps managers achieve their objectives of planning, controlling, and decision making. Planning is the detailed formulation of action to achieve a particular end. Controlling is the monitoring of a plan's implementation. Decision making is choosing among competing alternatives.
  - Managerial accounting information is intended for internal users and generally is not subject to generally accepted accounting principles (GAAP), whereas financial accounting information is directed toward external users and is subject to GAAP.
- LO2. Identify and explain the current focus of managerial accounting and the role of managerial accountants in an organization.**
- The nature of managerial accounting information depends on the strategic position of the firm—cost leadership strategy, product differentiation strategy, and lean accounting.
  - Information about value chain activities and customer satisfaction is collected, including activity-based management information.
  - Managerial accountants are responsible for identifying, collecting, measuring, analyzing, preparing, and interpreting information.
  - Managerial accountants also must communicate—both orally and in writing—information to individuals inside and outside of the organization, including non-accountants.

<sup>13</sup>Taken from the Boeing website, <http://www.boeing.com/companyoffices/aboutus/ethics/> (accessed May 12, 2004).

**LO3. Explain the meaning of cost and how costs are assigned to products and services.**

- Cost is the cash or cash-equivalent value sacrificed for goods and services that are expected to bring a current or future benefit to the organization.
- Managers use cost information to determine the cost of objects, such as products, plants, geographic regions, and customers.
- Direct costs are traced to cost objects based on cause-and-effect relationships.
- Indirect (i.e., overhead) costs are allocated to cost objects based on assumed relationships and convenience.

**LO4. Define the various costs of manufacturing products and providing services as well as selling and administration.**

- Products are goods that either are purchased or produced by converting raw materials through the use of labor and indirect manufacturing resources, such as plants, land, and machinery. Services are tasks performed for a customer or activities performed by a customer using an organization's products or facilities.
- Product costs are those costs, both direct and indirect, of acquiring a product in a merchandising business and preparing it for sale or of producing a product in a manufacturing business. Product costs are classified as inventory on the balance sheet and then expensed as cost of goods sold on the income statement when the inventory is sold.
- Selling costs are the costs of marketing and distributing goods and services, and administrative costs are the costs of organizing and running a company as well as selling and administration.
- Both selling and administrative costs are period costs as well as selling and administration.

**LO5. Prepare income statements for manufacturing and service organizations.**

- The cost of goods manufactured (COGM) represents the total product cost of goods *completed* during the period and transferred to finished goods inventory. The cost of goods sold (COGS) represents the cost of goods that were sold during the period and, therefore, transferred from finished goods inventory to cost of goods sold. For a retailer, there is no COGM and COGS equals the beginning inventory plus net purchases minus ending inventory.
- For manufacturing and merchandising firms, cost of goods sold is subtracted from sales revenue to arrive at gross margin. In addition, for manufacturing firms, cost of goods manufactured must first be calculated before calculating cost of goods sold.
- Service firms do not calculate gross margin because they do not purchase or produce inventory for sale and, as a result, do not have a cost of goods sold (i.e., inventory expense).
- All firms next subtract selling and administrative expenses to arrive at net income.

**LO6. Explain the importance of ethical behavior for managers and managerial accountants.**

- A strong ethical sense is needed to resist pressures to change economic information that may present an untrue picture of firm performance.
- Many firms have a written code of ethics (e.g., IMA) or code of conduct.
- Proper employee training, controls, regulation (e.g., Sarbanes-Oxley Act), and incentive systems can curb ethical problems.

## Summary of Important Equations

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1. Total Product Cost = Direct Materials + Direct Labor + Manufacturing Overhead
2. Unit Product Cost =  $\frac{\text{Total Product Cost}}{\text{Number of Units}}$
3. Prime Cost = Direct Materials + Direct Labor
4. Conversion Cost = Direct Labor + Manufacturing Overhead

5. Direct Materials Used in Production = Beginning Inventory of Materials + Purchases – Ending Inventory of Materials
6. Cost of Goods Manufactured = Direct Materials Used in Production + Direct Labor Used in Production + Manufacturing Overhead Costs Used in Production + Beginning WIP Inventory – Ending WIP Inventory
7. Cost of Goods Sold = Beginning Finished Goods Inventory + Cost of Goods Manufactured – Ending Finished Goods Inventory

**CORNERSTONE 13-1** How to calculate product cost in total and per unit, page 719

**CORNERSTONE 13-2** How to calculate prime cost and conversion cost in total and per unit, page 719

**CORNERSTONE 13-3** How to calculate the direct materials used in production, page 723

**CORNERSTONE 13-4** How to calculate cost of goods manufactured, page 723

**CORNERSTONE 13-5** How to calculate cost of goods sold, page 724

**CORNERSTONE 13-6** How to prepare an income statement for a manufacturing firm, page 725

**CORNERSTONE 13-7** How to calculate the percentage of sales revenue for each line on the income statement, page 727

**CORNERSTONE 13-8** How to prepare an income statement for a service organization, page 728



## CORNERSTONES FOR CHAPTER 13

## Key Terms

Accumulating costs, 713	Indirect costs, 714
Administrative costs, 721	Lean accounting, 710
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## Review Problem

### Product Costs, Cost of Goods Manufactured Statement, and the Income Statement

Brody Company makes industrial cleaning solvents. Various chemicals, detergent, and water are mixed together and then bottled in 10-gallon drums. Brody provided the following information for last year:

Raw materials purchases	\$250,000
Direct labor	140,000
Depreciation on factory equipment	45,000
Depreciation on factory building	30,000
Depreciation on headquarters building	50,000
Factory insurance	15,000
Property taxes:	
Factory	20,000
Headquarters	18,000
Utilities for factory	34,000
Utilities for sales office	1,800
Administrative salaries	150,000
Indirect labor salaries	156,000
Sales office salaries	90,000
Beginning balance, Raw Materials	124,000
Beginning balance, WIP	124,000
Beginning balance, Finished Goods	84,000
Ending balance, Raw Materials	102,000
Ending balance, WIP	130,000
Ending balance, Finished Goods	82,000

Last year, Brody completed 100,000 units. Sales revenue equaled \$1,200,000, and Brody paid a sales commission of 5 percent of sales.

#### Required:

1. Calculate the direct materials used in production for last year.
2. Calculate total prime cost.
3. Calculate total conversion cost.
4. Prepare a cost of goods manufactured statement for last year. Calculate the unit product cost.
5. Prepare a cost of goods sold statement for last year.
6. Prepare an income statement for last year. Show the percentage of sales that each line item represents.

#### Solution:

1. Direct materials =  $\$124,000 + \$250,000 - \$102,000 = \$272,000$
2. Prime cost =  $\$272,000 + \$140,000 = \$412,000$
3. First, calculate total manufacturing overhead cost:

Depreciation on factory equipment	\$ 45,000
Depreciation on factory building	30,000
Factory insurance	15,000
Factory property taxes	20,000
Factory utilities	34,000
Indirect labor salaries	156,000
Total manufacturing overhead	<u>\$300,000</u>

$$\text{Conversion cost} = \$140,000 + \$300,000 = \$440,000$$

4.	Direct materials	\$ 272,000
	Direct labor	140,000
	Manufacturing overhead	<u>300,000</u>
	Total manufacturing cost	\$ 712,000
	+ Beginning WIP	124,000
	– Ending WIP	<u>(130,000)</u>
	Cost of goods manufactured	<u>\$ 706,000</u>

$$\text{Unit product cost} = \frac{\$706,000}{100,000 \text{ units}} = \$7.06$$

5.	Cost of goods manufactured	\$706,000
	+ Beginning inventory, Finished goods	84,000
	– Ending inventory, Finished goods	<u>(82,000)</u>
	Cost of goods sold	<u>\$708,000</u>

6. First, compute selling expense and administrative expense:

Utilities, sales office	\$ 1,800
Sales office salaries	90,000
Sales commissions (\$1,200,000 × 0.05)	<u>60,000</u>
Selling expense	<u>\$151,800</u>
Depreciation on headquarters building	\$ 50,000
Property taxes, headquarters	18,000
Administrative salaries	<u>150,000</u>
Administrative expense	<u>\$218,000</u>

**Brody Company  
Income Statement  
For Last Year**

		Percent
Sales	\$1,200,000	100.00
Cost of goods sold	<u>708,000</u>	<u>59.00</u>
Gross margin	\$ 492,000	41.00
Less:		
Selling expense	(151,800)	(12.65)
Administrative expense	<u>(218,000)</u>	<u>(18.17)</u>
Operating income	<u>\$ 122,200</u>	<u>10.18</u>

## Discussion Questions

1. What is managerial accounting?
2. What are the three broad objectives of managerial accounting?
3. Who are the users of managerial accounting information?
4. Should a managerial accounting system provide both financial and nonfinancial information? Explain.
5. What is meant by controlling?
6. How do managerial accounting and financial accounting differ?
7. Explain the meaning of customer value. How is focusing on customer value changing managerial accounting?
8. Explain why today's managerial accountant must have a cross-functional perspective.
9. What is the value chain? Why is it important?
10. Explain the challenges faced by managerial accountants in effectively communicating managerial accounting information to various interested users.
11. What is a cost object? Give some examples.
12. What is the difference between accumulating cost and assigning cost?
13. What is a direct cost? An indirect cost? Can the same cost be direct for one purpose and indirect for another? Give an example.

14. Define *prime cost* and *conversion cost*. Why can't prime cost be added to conversion cost to get total product cost?
15. Explain the difference between cost and expense.
16. How does a period cost differ from a product cost?
17. Define manufacturing *overhead*.
18. Explain the difference between direct materials purchases in a month and direct materials used for the month.
19. Why do firms like to calculate a percentage column on the income statement (in which each line item is expressed as a percentage of sales)?
20. What is the difference between the income statement for a manufacturing firm and the income statement for a service firm?
21. Define *selling cost*. Give five examples of selling cost.
22. What is the difference between cost of goods manufactured and cost of goods sold?
23. What is ethical behavior? Is it possible to teach ethical behavior in a managerial accounting course?

## Multiple-Choice Exercises

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**13-1** The provision of accounting information for internal users is known as:

- a. managerial accounting.
- b. accounting.
- c. financial accounting.
- d. enterprise risk management.
- e. accounting for planning and control.

**13-2** The process of choosing among competing alternatives is called:

- a. controlling.
- b. decision making.
- c. planning.
- d. performance evaluation.
- e. none of the above.

**13-3** Which of the following is a characteristic of managerial accounting?

- a. There is an internal focus.
- b. Subjective information may be used.
- c. There is an emphasis on the future.
- d. It is broad-based and multidisciplinary.
- e. All of the above.

**13-4** In terms of strategic positioning, which two general strategies may be chosen by a company?

- a. Activity-based costing and value chain emphasis
- b. Revenue production and cost enhancement
- c. Cost leadership and product differentiation
- d. Increasing customer value and decreasing supplier orientation
- e. Product differentiation and cost enhancement

**13-5** Accumulating costs means that:

- a. costs must be summed and entered on the income statement.
- b. each cost must be linked to some cost object.
- c. costs must be measured and tracked.
- d. costs must be allocated to units of production.
- e. costs have expired and must be transferred from the balance sheet to the income statement.

**13-6 Product (or manufacturing) costs consist of:**

- direct materials, direct labor, and selling costs.
- direct materials, direct labor, overhead, and operating expense.
- prime costs and conversion costs.
- prime costs and overhead.
- selling and administrative costs.

**13-7 Wachman Company produces a product with the following per-unit costs:**

Direct materials	\$15
Direct labor	6
Manufacturing overhead	10

Last year, Wachman produced and sold 1,000 units at a price of \$75 each. Total selling and administrative expense was \$30,000.

**Conversion cost per unit was:**

- \$15.
- \$21.
- \$31.
- \$16.
- none of the above.

**13-8 Refer to the Wachman Company information in Multiple-Choice Exercise 13-7. Total gross margin for last year was:**

- \$75,000.
- \$44,000.
- \$61,000.
- \$9,000.
- \$31,000.

**13-9 The accountant in a factory that produces biscuits for fast-food restaurants wants to assign costs to boxes of biscuits. Which of the following costs can be traced directly to boxes of biscuits?**

- The cost of flour and baking soda
- The wages of the mixing labor
- The cost of the boxes
- The cost of packing labor
- All of the above

**13-10 Which of the following is an indirect cost?**

- The cost of denim in a jeans factory
- The cost of mixing labor in a factory that makes over-the-counter pain relievers
- The cost of restriping the parking lot at a perfume factory
- The cost of bottles in a shampoo factory
- All of the above

**13-11 Bobby Dee's is an owner-operated company that details (thoroughly cleans—inside and out) automobiles. Bobby Dee's is which of the following?**

- Retailer
- Wholesaler
- Manufacturing firm
- Service firm
- None of the above

**13-12** Kellogg's makes a variety of breakfast cereals. Kellogg's is which of the following?

- Retailer
- Wholesaler
- Manufacturing firm
- Service firm
- None of the above

**13-13** Target is which of the following?

- Retailer
- Wholesaler
- Manufacturing firm
- Service firm
- None of the above

**13-14** Stone Inc. is a company that purchases goods (e.g., chess sets, pottery) from overseas and resells them to gift shops in the United States. Stone Inc. is which of the following?

- Retailer
- Wholesaler
- Manufacturing firm
- Service firm
- None of the above

**13-15** JackMan Company produces diecast metal bulldozers for toy shops. JackMan estimated the following average costs per bulldozer:

Direct materials	\$8.65
Direct labor	1.10
Manufacturing overhead	0.95

**Prime cost per unit is:**

- \$8.65.
- \$1.10.
- \$0.95.
- \$2.05.
- \$9.75.

**13-16** Which of the following is a period expense?

- Factory insurance
- CEO salary
- Direct labor
- Factory maintenance
- All of the above

**13-17** Last year, Barnard Company incurred the following costs:

Direct materials	\$ 50,000
Direct labor	20,000
Manufacturing overhead	130,000
Selling expense	40,000
Administrative expense	36,000

Barnard produced and sold 10,000 units at a price of \$31 each.

**Prime cost per unit is:**

- a. \$7.00.
- b. \$20.00.
- c. \$15.00.
- d. \$5.00.
- e. \$27.60.

**13-18** Refer to the Barnard Company information in Multiple-Choice Exercise 13-17. Conversion cost per unit is:

- a. \$7.00.
- b. \$20.00.
- c. \$15.00.
- d. \$5.00.
- e. \$27.60.

**13-19** Refer to the Barnard Company information in Multiple-Choice Exercise 13-17. The cost of goods sold per unit is:

- a. \$7.00.
- b. \$20.00.
- c. \$15.00.
- d. \$5.00.
- e. \$27.60.

**13-20** Refer to the Barnard Company information in Multiple-Choice Exercise 13-17. The gross margin per unit is:

- a. \$24.00.
- b. \$11.00.
- c. \$16.00.
- d. \$26.00.
- e. \$3.40.

**13-21** Refer to the Barnard Company information in Multiple-Choice Exercise 13-17. The total period expense is:

- a. \$276,000.
- b. \$200,000.
- c. \$76,000.
- d. \$40,000.
- e. \$36,000.

**13-22** Refer to the Barnard Company information in Multiple-Choice Exercise 13-17. Operating income is:

- a. \$34,000.
- b. \$110,000.
- c. \$234,000.
- d. \$270,000.
- e. \$74,000.

## Cornerstone Exercises

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**Cornerstone Exercise 13-23** TOTAL PRODUCT COST AND PER-UNIT PRODUCT COST

Slapshot Company makes ice hockey sticks. Last week, direct materials (wood, paint, Kevlar, and resin) costing \$24,000 were put into production. Direct labor of \$40,000

**OBJECTIVE** > **4****CORNERSTONE 13-1**

(20 workers  $\times$  100 hours  $\times$  \$20 per hour) was incurred. Manufacturing overhead equaled \$56,000. By the end of the week, the company had manufactured 4,000 hockey sticks.

**Required:**

Calculate the total product cost for last week. Also, calculate the per-unit cost of one hockey stick that was produced last week.

**OBJECTIVE** > **4**

**CORNERSTONE 13-2**

**Cornerstone Exercise 13-24 PRIME COST AND CONVERSION COST**

Slapshot Company makes ice hockey sticks. Last week, direct materials (wood, paint, Kevlar, and resin) costing \$24,000 were put into production. Direct labor of \$40,000 (20 workers  $\times$  100 hours  $\times$  \$20 per hour) was incurred. Manufacturing overhead equaled \$56,000. By the end of the week, the company had manufactured 4,000 hockey sticks.

**Required:**

Calculate the total prime cost for last week. Calculate the per-unit prime cost. Also, calculate the total conversion cost for last week. Calculate the per-unit conversion cost.

**OBJECTIVE** > **4**

**CORNERSTONE 13-3**

**Cornerstone Exercise 13-25 DIRECT MATERIALS USED IN PRODUCTION**

Slapshot Company makes ice hockey sticks. On June 1, Slapshot had \$42,000 of materials in inventory. During the month of June, the company purchased \$180,000 of materials. On June 30, materials inventory equaled \$51,000.

**Required:**

Calculate the direct materials used in production for the month of June.

**OBJECTIVE** > **5**

**CORNERSTONE 13-4**

**Cornerstone Exercise 13-26 COST OF GOODS MANUFACTURED**

Slapshot Company makes ice hockey sticks. During the month of June, the company purchased \$180,000 of materials. Also, during the month of June, Slapshot Company incurred direct labor cost of \$165,000 and manufacturing overhead of \$215,000. Inventory information is as follows:

	June 1	June 30
Materials	\$42,000	\$51,000
Work in process	60,000	71,000

**Required:**

Calculate the cost of goods manufactured for the month of June. Calculate the cost of one hockey stick assuming that 18,000 sticks were completed during June.

**OBJECTIVE** > **5**

**CORNERSTONE 13-5**

**Cornerstone Exercise 13-27 COST OF GOODS SOLD**

Slapshot Company makes ice hockey sticks. During the month of June, 18,000 sticks were completed at a cost of goods manufactured of \$540,000. Suppose that on June 1, Slapshot had 5,000 units in finished goods inventory costing \$160,000 and on June 30, the company had 7,000 units in finished goods inventory costing \$215,000.

**Required:**

Prepare a cost of goods sold statement for the month of June. Calculate the number of sticks that were sold during June.

**OBJECTIVE** > **6**

**CORNERSTONE 13-6**

**Cornerstone Exercise 13-28 MANUFACTURING FIRM INCOME STATEMENT**

Slapshot Company makes ice hockey sticks and sold 16,000 sticks during the month of June at a total cost of \$485,000. Each stick sold at a price of \$90. Slapshot also incurred two types of selling costs: commissions equal to 15 percent of the sales price, and other selling expense of \$200,000. Administrative expense totaled \$115,000.

**Required:**

Prepare an income statement for Slapshot for the month of June.

**Cornerstone Exercise 13-29 INCOME STATEMENT PERCENTAGES****OBJECTIVE** > **7****CORNERSTONE 13-7**

Slapshot Company makes ice hockey sticks and sold 16,000 sticks during the month of June at a total cost of \$485,000. Each stick sold at a price of \$90. Slapshot also incurred two types of selling costs: commissions equal to 15 percent of the sales price, and other selling expense of \$200,000. Administrative expense totaled \$115,000.

**Required:**

Prepare an income statement for Slapshot for the month of June and calculate the percentage of sales revenue represented by each line of the income statement. Round answers to one decimal place.

**Cornerstone Exercise 13-30 SERVICE ORGANIZATION INCOME STATEMENT****OBJECTIVE** > **8****CORNERSTONE 13-8**

Allstar Exposure designs and sells advertising services to small, relatively unknown companies. Last month, Allstar had sales commissions costs of \$50,000, technology costs of \$75,000, and research and development costs of \$200,000. Selling expenses were \$10,000, and administrative expenses equaled \$35,000. Sales totaled \$410,000.

**Required:**

Prepare an income statement for Allstar for the past month.

## Exercises

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**Exercise 13-31 CUSTOMER VALUE, STRATEGIC POSITIONING****OBJECTIVE** > **2**

Adriana Alvarado has decided to purchase a personal computer. She has narrowed the choices to two: Drantex and Confiar. Both brands have the same processing speed, 6.4 gigabytes of hard-disk capacity, two USB ports, a DVD drive, and each comes with the same basic software support package. Both come from mail-order companies with good reputations. The selling price for each is identical. After some review, Adriana discovers that the cost of operating and maintaining Drantex over a three-year period is estimated to be \$300. For Confiar, the operating and maintenance cost is \$600. The sales agent for Drantex emphasized the lower operating and maintenance costs. The agent for Confiar, however, emphasized the service reputation of the product and the faster delivery time (Confiar can be purchased and delivered one week sooner than Drantex). Based on all the information, Adriana has decided to buy Confiar.

**Required:**

1. What is the total product purchased by Adriana?
2. How does the strategic positioning differ for the two companies?
3. When asked why she decided to buy Confiar, Adriana responded, "I think that Confiar offers more value than Drantex." What are the possible sources of this greater value? What implications does this have for the managerial accounting information system?
4. Suppose that Adriana's decision was prompted mostly by the desire to receive the computer quickly. Informed that it was losing sales because of the longer time to produce and deliver its products, the management of the company producing Drantex decided to improve delivery performance by improving its internal processes. These improvements decreased the number of defective units and the time required to produce its product. Consequently, delivery time and costs both decreased, and the company was able to lower its prices on Drantex. Explain how these actions translate into strengthening the competitive position of the Drantex PC relative to the Confiar PC. Also discuss the implications for the managerial accounting information system.

**OBJECTIVE** > **3** **Exercise 13-32 COST ASSIGNMENT**

The sales staff of Central Media (a locally owned radio and cable television station) consists of two salespeople, Derek and Lawanna. During March, the following salaries and commissions were paid:

	Derek	Lawanna
Salary	\$25,000	\$30,000
Commissions	6,000	1,500

Derek spends 100 percent of his time selling advertising. Lawanna spends two-thirds of her time selling advertising and the remaining one-third on administrative work. Commissions are paid only on sales.

**Required:**

1. Accumulate these costs by account by filling in the following table:

Cost	Salaries	Commissions
Derek		
Lawanna		
Total		

2. Assign the costs of salaries and commissions to selling expense and administrative expense by filling in the following table:

Cost	Selling Costs	Administrative Costs
Derek's salary		
Lawanna's salary		
Derek's commissions		
Lawanna's commissions		
Total		

**OBJECTIVE** > **3** **Exercise 13-33 PRODUCTS VERSUS SERVICES, COST ASSIGNMENT**

Holmes Company produces wooden playhouses. When a customer orders a playhouse, it is delivered in pieces with detailed instructions on how to put it together. Some customers prefer that Holmes puts the playhouse together, and they purchase the playhouse plus the installation package. Holmes then pulls two workers off the production line and sends them to construct the playhouse on site.

**Required:**

1. What two products does Holmes sell? Classify each one as a product or a service.
2. Do you think Holmes assigns costs individually to each product or service? Why or why not?
3. Describe the opportunity cost of the installation process.

**OBJECTIVE** > **3** **Exercise 13-34 ASSIGNING COSTS TO A COST OBJECT, DIRECT AND INDIRECT COSTS**

Hummer Company uses manufacturing cells to produce its products (a *cell* is a manufacturing unit dedicated to the production of subassemblies or products). One manufacturing cell produces small motors for lawn mowers. Suppose that the motor manufacturing cell is the cost object. Assume that all or a portion of the following costs must be assigned to the cell.

- a. Salary of cell supervisor
- b. Power to heat and cool the plant in which the cell is located
- c. Materials used to produce the motors
- d. Maintenance for the cell's equipment (provided by the maintenance department)
- e. Labor used to produce motors
- f. Cafeteria that services the plant's employees
- g. Depreciation on the plant
- h. Depreciation on equipment used to produce the motors

- i. Ordering costs for materials used in production
- j. Engineering support (provided by the engineering department)
- k. Cost of maintaining the plant and grounds
- l. Cost of the plant's personnel office
- m. Property tax on the plant and land

**Required:**

Classify each of the costs as a direct cost or an indirect cost to the motor manufacturing cell.

**Exercise 13-35 TOTAL AND UNIT PRODUCT COST****OBJECTIVE** > 4

Martinez Manufacturing Inc. showed the following costs for last month:

Direct materials	\$7,000
Direct labor	3,000
Manufacturing overhead	2,000
Selling expense	8,000

Last month, 6,000 units were produced and sold.

**Required:**

1. Classify each of the costs as a product cost or period cost.
2. What is the total product cost for last month?
3. What is the unit product cost for last month?

**Exercise 13-36 COST CLASSIFICATION****OBJECTIVE** > 4

Loring Company incurred the following costs last year:

Direct materials	\$216,000
Factory rent	24,000
Direct labor	120,000
Factory utilities	6,300
Supervision in the factory	50,000
Indirect labor in the factory	30,000
Depreciation on factory equipment	9,000
Sales commissions	27,000
Sales salaries	65,000
Advertising	37,000
Depreciation on the headquarters building	10,000
Salary of the corporate receptionist	30,000
Other administrative costs	175,000
Salary of the factory receptionist	28,000

**Required:**

1. Classify each of the costs using the table format given below. Be sure to total the amounts in each column. The row for "Direct materials" is filled in as an example.

Costs	Product Cost			Period Cost	
	Direct Materials	Direct Labor	Manufacturing Overhead	Selling Expense	Administrative Expense
Direct materials	\$216,000				

2. What was the total product cost for last year?
3. What was the total period cost for last year?
4. If 30,000 units were produced last year, what was the unit product cost?

**OBJECTIVE** > **4** **Exercise 13-37 CLASSIFYING COST OF PRODUCTION**

A factory manufactures jelly. The jars of jelly are packed six to a box, and the boxes are sold to grocery stores. The following types of cost were incurred:

- Jars
- Sugar
- Fruit
- Pectin (thickener used in jams and jellies)
- Boxes
- Depreciation on the factory building
- Cooking equipment operators' wages
- Filling equipment operators' wages
- Packers' wages
- Janitors' wages
- Receptionist's wages
- Telephone
- Utilities
- Rental of Santa Claus suit (for the annual Christmas party for factory children)
- Supervisory labor salaries
- Insurance on factory building
- Depreciation on factory equipment
- Oil to lubricate filling equipment

**Required:**

Classify each of the costs as direct materials, direct labor, or overhead by using the following table. The row for "Jars" is filled in as an example.

Costs	Direct Materials	Direct Labor	Manufacturing Overhead
Jars	X		

**OBJECTIVE** > **4** **Exercise 13-38 PRODUCT COST IN TOTAL AND PER UNIT**

Grin Company manufactures digital cameras. In January, Grin produced 6,400 cameras with the following costs:

Direct materials	\$400,000
Direct labor	80,000
Manufacturing overhead	320,000

There were no beginning or ending inventories of WIP.

**Required:**

1. What was the total product cost in January?
2. What was the product cost per unit in January?

**OBJECTIVE** > **4** **Exercise 13-39 PRIME COST AND CONVERSION COST**

Refer to the Grin Company manufacturing information in **Exercise 13-38**.

**Required:**

1. What was the total prime cost in January?
2. What was the prime cost per unit in January?
3. What was the total conversion cost in January?
4. What was the conversion cost per unit in January?

**OBJECTIVE** > **5** **Exercise 13-40 DIRECT MATERIALS USED**

Hannah Banana Bakers makes chocolate chip cookies for café restaurants. In June, Hannah Banana purchased \$15,500 of materials. On June 1, the materials inventory was \$3,700. On June 30, \$1,600 of materials remained in materials inventory.

**Required:**

What is the cost of the direct materials that were used in production during June?

**Exercise 13-41 COST OF GOODS SOLD****OBJECTIVE** > **5**

Allyson Ashley makes jet skis. During the year, Allyson manufactured 54,000 jet skis. Finished goods inventory had the following units:

January 1	2,100
December 31	2,750

**Required:**

1. How many jet skis did Allyson sell during the year?
2. If each jet ski had a product cost of \$1,125, what was the cost of goods sold last year?

**Exercise 13-42 DIRECT MATERIALS USED, COST OF GOODS MANUFACTURED****OBJECTIVE** > **5**

In March, Chilton Company purchased materials costing \$14,000 and incurred direct labor cost of \$20,000. Overhead totaled \$36,000 for the month. Information on inventories was as follows:



	March 1	March 31
Materials	\$8,600	\$2,300
Work in process	1,700	9,000
Finished goods	7,000	6,500

**Required:**

1. What was the cost of direct materials for March?
2. What was the total manufacturing cost in March?
3. What was the cost of goods manufactured for March?

**Exercise 13-43 COST OF GOODS SOLD****OBJECTIVE** > **5**

Refer to the Chilton Company information in **Exercise 13-42**.

**Required:**

What was the cost of goods sold for March?

**Exercise 13-44 COST OF GOODS SOLD, SALES REVENUE, INCOME STATEMENT****OBJECTIVE** > **5**

Jasper Company provided the following information for last year:

Sales in units	300,000
Selling price	\$9
Direct materials	\$150,000
Direct labor	\$325,000
Manufacturing overhead	\$215,000
Selling expense	\$437,000
Administrative expense	\$854,000

Last year, beginning and ending inventories of work in process and finished goods equaled zero.

**Required:**

Calculate the cost of goods sold for last year.

**Exercise 13-45 INCOME STATEMENT****OBJECTIVE** > **5**

Refer to the Jasper Company information provided in **Exercise 13-44**.

**Required:**

1. Calculate the sales revenue for last year.
2. Prepare an income statement for Jasper Company for last year.

**OBJECTIVE** > **5****Exercise 13-46 INCOME STATEMENT**

Refer to the Jasper Company information provided in **Exercise 13-44**.

**Required:**

Prepare an income statement for Jasper Company for last year. Calculate the percentage of sales for each line item on the income statement. Round percentages to the nearest tenth of a percent.

**OBJECTIVE** > **6****Exercise 13-47 ETHICAL BEHAVIOR**

**Manager:** If I can reduce my costs by \$40,000 during this last quarter, my division will show a profit that is 10 percent above the planned level, and I will receive a \$10,000 bonus. However, given the projections for the fourth quarter, it does not look promising. I really need that \$10,000. I know of one way that I can qualify. All I have to do is lay off my three most expensive salespeople. After all, most of the orders are in for the fourth quarter, and I can always hire new sales personnel at the beginning of the next year.

**Required:**

What is the right choice for the manager to make? Why did the ethical dilemma arise? Is there any way to redesign the accounting reporting system to discourage the type of behavior that the manager is contemplating?

**OBJECTIVE** > **6****Exercise 13-48 ETHICAL ISSUES**

The Bedron Company is a closely held investment service group that has been quite successful over the past five years, consistently providing most members of the top management group with 50 percent bonuses. In addition, both the chief financial officer and the chief executive officer have received 100 percent bonuses. Bedron expects this trend to continue.

Recently, Bedron's top management group, which holds 35 percent of the outstanding shares of common stock, has learned that a major corporation is interested in acquiring Bedron. The other corporation's initial offer is attractive and is several dollars per share higher than Bedron's current share price. One member of management told a group of employees under him about the potential offer. He suggested that they might want to purchase more Bedron stock at the current price in anticipation of the takeover offer.

**Required:**

Do you think that the employees should take the action suggested by their boss? Suppose the action is prohibited by Bedron's code of ethics. Now suppose that it is not prohibited by Bedron's code of ethics. Is the action acceptable in that case?

**OBJECTIVE** > **6****Exercise 13-49 COMPANY CODES OF CONDUCT**

Using the Internet, locate the code of conduct for three different companies.

**Required:**

Briefly describe each code of conduct. How are they similar? How are they different?

## Problems

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**OBJECTIVE** > **4** **5****Problem 13-50 MANUFACTURING, COST CLASSIFICATION, INCOME STATEMENT SERVICE FIRM PRODUCT COSTS AND SELLING AND ADMINISTRATIVE COSTS, INCOME STATEMENT**

Pop's Drive-Thru Burger Heaven produces and sells quarter-pound hamburgers. Each burger is wrapped and put in a "burger bag," which also includes a serving of fries and a

soft drink. The price for the burger bag is \$3.50. During December, 10,000 burger bags were sold. The restaurant employs college students part-time to cook and fill orders. There is one supervisor (the owner, John Peterson). Pop's maintains a pool of part-time employees so that the number of employees scheduled can be adjusted to the changes in demand. Demand varies on a weekly as well as a monthly basis.

A janitor is hired to clean the building early each morning. Cleaning supplies are used by the janitor, as well as the staff, to wipe counters, wash cooking equipment, and so on. The building is leased from a local real estate company; it has no seating capacity. All orders are filled on a drive-thru basis.

The supervisor schedules work, opens the building, counts the cash, advertises, and is responsible for hiring and firing. The following costs were incurred during December:

Hamburger meat	\$4,500
Buns, lettuce, pickles, and onions	800
Frozen potato strips	1,250
Wrappers, bags, and condiment packages	600
Other ingredients	660
Part-time employees' wages	7,250
John Peterson's salary	3,000
Utilities	1,500
Rent	1,800
Depreciation, cooking equipment and fixtures	600
Advertising	500
Janitor's wages	520
Janitorial supplies	150
Accounting fees	1,500
Taxes	4,250

Pop's accountant, Elena DeMarco, does the bookkeeping, handles payroll, and files all necessary taxes. She noted that there were no beginning or ending inventories of materials. To simplify accounting for costs, Elena assumed that all part-time employees are production employees and that John Peterson's salary is selling and administrative expense. She further assumed that all rent and depreciation expense on the building and fixtures are part of product cost. Finally, she decided to put all taxes into one category, taxes, and to treat them as administrative expense.

#### Required:

1. Classify each of the costs for Pop's December operations using the table format given below. Be sure to total the amounts in each column. The row for "Hamburger meat" is filled in as an example.

Cost	Direct Materials	Direct Labor	Manufacturing Overhead	Selling and Administrative
Hamburger meat	\$4,500			
Total				

2. Prepare an income statement for the month of December.
3. Elena made some simplifying assumptions. Were those reasonable? Suppose a good case could be made that the portion of the employees' time spent selling the burger bags was really a part of sales. In that case, would it be better to divide their time between production and selling? Should John Peterson's time be divided between marketing and administrative duties? What difference (if any) would that make on the income statement?

#### Problem 13-51 COST ASSIGNMENT, DIRECT COSTS

#### OBJECTIVE 3

Harry Whipple, owner of an inkjet printer, has agreed to allow Mary and Natalie, two friends who are pursuing master's degrees, to print several papers for their graduate courses. However, he has imposed two conditions. First, they must supply their own

paper. Second, they must pay Harry a fair amount for the usage of the ink cartridge. Harry's printer takes two types of cartridges, a black one and a color one that contains the inks necessary to print in color. Black replacement cartridges cost \$25.50 each and print approximately 850 pages. The color cartridge replacement cost \$31 and prints approximately 310 color pages. One ream of paper costs \$2.50 and contains 500 sheets. Mary's printing requirements are for 500 pages, while Natalie's are for 1,000 pages.

**Required:**

1. Assuming that both women write papers using text only (i.e., black ink), what is the total amount owed to Harry by Mary? By Natalie?
2. What is the total cost of printing (ink and paper) for Mary? For Natalie?
3. Now suppose that Natalie illustrates her writing with many large colorful pie charts and pictures and that about 20 percent of her total printing is primarily color. Mary uses no color illustrations. What is the total amount owed to Harry by Natalie? What is the total cost of printing (ink and paper) for Natalie?

**OBJECTIVE** > **5** **Problem 13-52 COST OF DIRECT MATERIALS, COST OF GOODS MANUFACTURED, COST OF GOODS SOLD**

Bisby Company manufactures fishing rods. At the beginning of July, the following information was supplied by its accountant:

Raw materials inventory	\$40,000
Work-in-process inventory	21,000
Finished goods inventory	23,200

During July, the direct labor cost was \$43,500, raw materials' purchases were \$64,000, and the total overhead cost was \$108,750. The inventories at the end of July were:

Raw materials inventory	\$19,800
Work-in-process inventory	32,500
Finished goods inventory	22,100

**Required:**

1. What is the cost of the direct materials used in production during July?
2. What is the cost of goods manufactured for July?
3. What is the cost of goods sold for July?

**OBJECTIVE** > **5** **Problem 13-53 PREPARATION OF INCOME STATEMENT: MANUFACTURING FIRM**

Laworld Inc. manufactures small camping tents. Last year, 200,000 tents were made and sold for \$60 each. Each tent includes the following costs:

Direct materials	\$18
Direct labor	12
Manufacturing overhead	16

The only selling expenses were a commission of \$2 per unit sold and advertising totaling \$100,000. Administrative expenses, all fixed, equaled \$300,000. There were no beginning or ending finished goods inventories. There were no beginning or ending work-in-process inventories.

**Required:**

1. Calculate the product cost for one tent. Calculate the total product cost for last year.
2. Prepare an income statement for external users. Did you need to prepare a supporting statement of cost of goods manufactured? Explain.
3. Suppose 200,000 tents were produced (and 200,000 sold) but that the company had a beginning finished goods inventory of 10,000 tents produced in the prior year at \$40 per unit. The company follows a first-in, first-out policy for its inventory

(meaning that the units produced first are sold first for purposes of cost flow). What effect does this have on the income statement? Show the new statement.

### Problem 13-54 COST OF GOODS MANUFACTURED, COST OF GOODS SOLD

OBJECTIVE > 5



Hayward Company, a manufacturing firm, has supplied the following information from its accounting records for the month of May:

Direct labor cost	\$10,500
Purchases of raw materials	15,000
Supplies used	675
Factory insurance	350
Commissions paid	2,500
Factory supervision	2,225
Advertising	800
Material handling	3,750
Materials inventory, May 1	3,475
Work-in-process inventory, May 1	12,500
Finished goods inventory, May 1	6,685
Materials inventory, May 31	9,500
Work-in-process inventory, May 31	14,250
Finished goods inventory, May 31	4,250

#### Required:

1. Prepare a statement of cost of goods manufactured.
2. Prepare a statement of cost of goods sold.

### Problem 13-55 COST IDENTIFICATION

OBJECTIVE > 3 4

Following is a list of cost items described in the chapter as well as a list of brief descriptive settings for each item.

#### Cost terms:

- a. Opportunity cost
- b. Period cost
- c. Product cost
- d. Direct labor cost
- e. Selling cost
- f. Conversion cost
- g. Prime cost
- h. Direct materials cost
- i. Manufacturing overhead cost
- j. Administrative cost

#### Settings:

1. Marcus Armstrong, manager of Timmins Optical, estimated that the cost of plastic, wages of the technician producing the lenses, and overhead totaled \$30 per pair of single-vision lenses.
2. Linda was having a hard time deciding whether to return to school. She was concerned about the salary she would have to give up for the next four years.
3. Randy Harris is the finished goods warehouse manager for a medium-sized manufacturing firm. He is paid a salary of \$90,000 per year. As he studied the financial statements prepared by the local certified public accounting firm, he wondered how his salary was treated.
4. Jamie Young is in charge of the legal department at company headquarters. Her salary is \$95,000 per year. She reports to the chief executive officer.
5. All factory costs that are not classified as direct materials or direct labor.

6. The new product required machining, assembly, and painting. The design engineer asked the accounting department to estimate the labor cost of each of the three operations. The engineer supplied the estimated labor hours for each operation.
7. After obtaining the estimate of direct labor cost, the design engineer estimated the cost of the materials that would be used for the new product.
8. The design engineer totaled the costs of materials and direct labor for the new product.
9. The design engineer also estimated the cost of converting the raw materials into its final form.
10. The auditor for a soft drink bottling plant pointed out that the depreciation on the delivery trucks had been incorrectly assigned to product cost (through overhead). Accordingly, the depreciation charge was reallocated on the income statement.

**Required:**

Match the items with the settings. More than one cost classification may be associated with each setting; however, select the setting that seems to fit the item best. When you are done, each cost term will be used just once.

**OBJECTIVE** > **5****Problem 13-56 COST OF GOODS MANUFACTURED, INCOME STATEMENT**

W. W. Phillips Company produced 4,000 leather recliners during the year. These recliners sell for \$400 each. Phillips had 500 recliners in finished goods inventory at the beginning of the year. At the end of the year, there were 700 recliners in finished goods inventory. Phillips' accounting records provide the following information:

Purchases of raw materials	\$320,000
Beginning materials inventory	46,800
Ending materials inventory	66,800
Direct labor	200,000
Indirect labor	40,000
Rent, factory building	42,000
Depreciation, factory equipment	60,000
Utilities, factory	11,900
Salary, sales supervisor	90,000
Commissions, salespersons	180,000
General administration	300,000
Beginning work-in-process inventory	13,040
Ending work-in-process inventory	14,940
Beginning finished goods inventory	80,000
Ending finished goods inventory	114,100

**Required:**

1. Prepare a statement of cost of goods manufactured.
2. Compute the average cost of producing one unit of product in the year.
3. Prepare an income statement for external users.

**OBJECTIVE** > **3****Problem 13-57 COST DEFINITIONS**

Luisa Giovanni is a student at New York University. To help pay her way through college, Luisa started a dog walking service. She has 12 client dogs—6 are walked on the first shift (6:30 A.M. and 5:00 P.M.), and 6 are walked on the second shift (7:30 A.M. and 6:00 P.M.).

Last month, Luisa noted the following:

1. Purchase of three leashes at \$10 each (she carries these with her in case a leash breaks during a walk).
2. Internet service cost of \$40 a month. This enables her to keep in touch with the owners, bill them by email, and so on.
3. Dog treats of \$50 to reward each dog at the end of each walk.

4. A heavy-duty raincoat and hat for \$100.
5. Partway through the month, Luisa's friend, Jason, offered her a chance to play a bit role in a movie that was shooting on location in New York City. The job paid \$100 and would have required Luisa to be on location at 6 A.M. and to remain for 12 hours. Regretfully, Luisa turned it down.
6. The owners pay Luisa \$250 per month per dog for her services.

**Required:**

1. At the end of the month, how would Luisa classify her Internet payment of \$40—as a cost on the balance sheet or as an expense on the income statement?
2. Which of the above is an opportunity cost? Why?
3. What price is charged? What is Luisa's total revenue for a month?

**Problem 13-58 COST IDENTIFICATION AND ANALYSIS, COST ASSIGNMENT, INCOME STATEMENT**OBJECTIVE > 3 4 5

Melissa Vassar has decided to open a printing shop. She has secured two contracts. One is a five-year contract to print a popular regional magazine. This contract calls for 5,000 copies each month. The second contract is a three-year agreement to print tourist brochures for the state. The state tourist office requires 10,000 brochures per month.

Melissa has rented a building for \$1,400 per month. Her printing equipment was purchased for \$40,000 and has a life expectancy of 20,000 hours with no salvage value. Depreciation is assigned to a period based on the hours of usage. Melissa has scheduled the delivery of the products so that two production runs are needed. In the first run, the equipment is prepared for the magazine printing. In the second run, the equipment is reconfigured for brochure printing. It takes twice as long to configure the equipment for the magazine setup as it does for the brochure setup. The total setup costs per month are \$600.

Insurance costs for the building and equipment are \$140 per month. Power to operate the printing equipment is strongly related to machine usage. The printing equipment causes virtually all the power costs. Power costs will run \$350 per month. Printing materials will cost \$0.40 per copy for the magazine and \$0.08 per copy for the brochure. Melissa will hire workers to run the presses as needed (part-time workers are easy to hire). She must pay \$10 per hour. Each worker can produce 20 copies of the magazine per printing hour or 100 copies of the brochure. Distribution costs are \$500 per month. Melissa will receive a salary of \$1,500 per month. She is responsible for personnel, accounting, sales, and production—in effect, she is responsible for administering all aspects of the business.

**Required:**

1. What are the total monthly manufacturing costs?
2. What are the total monthly prime costs? Total monthly prime costs for the regional magazine? For the brochure?
3. What are the total monthly conversion costs? Suppose Melissa wants to determine monthly conversion costs for each product. Assign monthly conversion costs to each product using direct tracing and driver tracing whenever possible. For those costs that cannot be assigned using a tracing approach, you may assign them using direct labor hours.
4. Melissa receives \$1.80 per copy of the magazine and \$0.45 per brochure. Prepare an income statement for the first month of operations.

**Problem 13-59 COST ANALYSIS, INCOME STATEMENT**OBJECTIVE > 3 4

Five to six times a year, Kicker puts on tent sales in various cities throughout Oklahoma and the surrounding states. The tent sales are designed to show Kicker customers new products, engender enthusiasm about those products, and sell soon to be out-of-date products at greatly reduced prices. Each tent sale lasts one day and requires parking lot space to set up the Kicker semitrailer; a couple of show cars; a deejay playing music; and a tent to sell Kicker merchandise, distribute brochures, and so on.



Last year, the Austin tent sale was held in a far corner of the parking lot outside the city exhibition hall where the automotive show was in progress. Because most customers were interested more in the new model cars than in the refurbishment of their current cars, foot traffic was low. In addition, customers did not want to carry speakers and amplifiers all the way back to where they had originally parked. Total direct costs for this tent sale were \$14,300. Direct costs included gasoline and fuel for three pickup trucks and the semitrailer; wages and per diem for the five Kicker personnel who traveled to the show; rent on the parking lot space; depreciation on the semitrailer, pickups, tent, tables (in tent), sound equipment; and the like. Revenue was \$20,000. Cost of goods sold for the speakers was \$7,000.

**Required:**

1. How do you suppose Kicker accounts for the costs of the tent sales? What income statement items are affected by the tent sales?
2. What was the profit (loss) from the Austin tent sale? What do you think Kicker might do to make it more profitable in the future?

## Cases

**OBJECTIVE** > **3** **4** **5**

### Case 13-60 COST CLASSIFICATION, INCOME STATEMENT

Gateway Construction Company is a family-operated business that was founded in 1950 by Samuel Gateway. In the beginning, the company consisted of Gateway and three employees laying gas, water, and sewage pipelines as subcontractors. Currently, the company employs 25 to 30 people; Jack Gateway, Samuel's son, directs it. The main line of business continues to be laying pipeline.

Most of Gateway's work comes from contracts with city and state agencies. All of the company's work is located in Nebraska. The company's sales volume averages \$3 million, and profits vary between 0 and 10 percent of sales.

Sales and profits have been somewhat below average for the past three years due to a recession and intense competition. Because of this competition, Jack Gateway is constantly reviewing the prices that other companies bid for jobs; when a bid is lost, he makes every attempt to analyze the reasons for the differences between his bid and that of his competitors. He uses this information to increase the competitiveness of future bids.

Jack has become convinced that Gateway's current accounting system is deficient. Currently, all expenses are simply deducted from revenues to arrive at operating income. No effort is made to distinguish among the costs of laying pipe, obtaining contracts, and administering the company. Yet all bids are based on the costs of laying pipe.

With these thoughts in mind, Jack began a careful review of the income statement for the previous year (see next page). First, he noted that jobs were priced on the basis of equipment hours, with an average price of \$165 per equipment hour. However, when it came to classifying and assigning costs, he decided that he needed some help. One thing that really puzzled him was how to classify his own salary of \$114,000. About half of his time was spent in bidding and securing contracts, and the other half was spent in general administrative matters.

**Required:**

1. Classify the costs in the income statement as (1) costs of laying pipe (production costs), (2) costs of securing contracts (selling costs), or (3) costs of general administration. For production costs, identify direct materials, direct labor, and overhead costs. The company never has significant work in process (most jobs are started and completed within a day).
2. Assume that a significant driver is equipment hours. Identify the expenses that would likely be traced to jobs using this driver. Explain why you feel these costs are traceable using equipment hours. What is the cost per equipment hour for these traceable costs?

**Gateway Construction**  
**Income Statement**  
**For the Year Ended December 31, 2009**

Sales (18,200 equipment		
hours @ \$165 per hour)		\$3,003,000
Less expenses:		
Utilities	\$ 24,000	
Machine operators	218,000	
Rent, office building	24,000	
CPA fees	20,000	
Other direct labor	265,700	
Administrative salaries	114,000	
Supervisory salaries	70,000	
Pipe	1,401,340	
Tires and fuel	418,600	
Depreciation, equipment	198,000	
Salaries of mechanics	50,000	
Advertising	15,000	
Total expenses		2,818,640
Income before income taxes		\$ 184,360

**Case 13-61 COST INFORMATION AND ETHICAL BEHAVIOR, SERVICE ORGANIZATION**

**OBJECTIVE** 3 4

Jean Erickson, manager and owner of an advertising company in Charlotte, North Carolina, had arranged a meeting with Leroy Gee, the chief accountant of a large, local competitor. The two are lifelong friends. They grew up together in a small town and attended the same university. Leroy was a competent, successful accountant but currently was experiencing some personal financial difficulties. The problems were created by some investments that had turned sour, leaving him with a \$15,000 personal loan to pay off—just at the time that his oldest son was scheduled to enter college.

Jean, on the other hand, was struggling to establish a successful advertising business. She had recently acquired the rights to open a branch office of a large regional advertising firm headquartered in Atlanta, Georgia. During her first two years, she had managed to build a small, profitable practice; however, the chance to gain a significant foothold in the Charlotte advertising community hinged on the success of winning a bid to represent the state of North Carolina in a major campaign to attract new industry and tourism. The meeting she had scheduled with Leroy concerned the bid she planned to submit.

**Jean:** Leroy, I'm at a critical point in my business venture. If I can win the bid for the state's advertising dollars, I'll be set. Winning the bid will bring \$600,000 to \$700,000 of revenues into the firm. On top of that, I estimate that the publicity will bring another \$200,000 to \$300,000 of new business.

**Leroy:** I understand. My boss is anxious to win that business as well. It would mean a huge increase in profits for my firm. It's a competitive business, though. As new as you are, I doubt that you'll have much chance of winning.

**Jean:** You may be wrong. You're forgetting two very important considerations. First, I have the backing of all the resources and talent of a regional firm. Second, I have some political connections. Last year, I was hired to run the publicity side of the governor's campaign. He was impressed with my work and would like me to have this business. I am confident that the proposals I submit will be very competitive. My only concern is to submit a bid that beats your firm. If I come in with a lower bid and good proposals, the governor can see to it that I get the work.

**Leroy:** Sounds promising. If you do win, however, there will be a lot of upset people. After all, they are going to claim that the business should have been given to

local advertisers, not to some out-of-state firm. Given the size of your office, you'll have to get support from Atlanta. You could take a lot of heat.

**Jean:** True. But I am the owner of the branch office. That fact alone should blunt most of the criticism. Who can argue that I'm not a local? Listen, with your help, I think I can win this bid. Furthermore, if I do win it, you can reap some direct benefits. With that kind of business, I can afford to hire an accountant, and I'll make it worthwhile for you to transfer jobs. I can offer you an up-front bonus of \$15,000. On top of that, I'll increase your annual salary by 20 percent. That should solve most of your financial difficulties. After all, we have been friends since day one—and what are friends for?

**Leroy:** Jean, my wife would be ecstatic if I were able to improve our financial position as quickly as this opportunity affords. I certainly hope that you win the bid. What kind of help can I provide?

**Jean:** Simple. To win, all I have to do is beat the bid of your firm. Before I submit my bid, I would like you to review it. With the financial skills you have, it should be easy for you to spot any excessive costs that I may have included. Or perhaps I included the wrong kind of costs. By cutting excessive costs and eliminating costs that may not be directly related to the project, my bid should be competitive enough to meet or beat your firm's bid.

**Required:**

1. What would you do if you were Leroy? Fully explain the reasons for your choice. What do you suppose the code of conduct for Leroy's company would say about this situation?
2. What is the likely outcome if Leroy agrees to review the bid? Is there much risk to him personally if he reviews the bid? Should the degree of risk have any bearing on his decision?

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# 14

## Cost Behavior

After studying Chapter 14, you should be able to:

- **1** Explain the meaning of cost behavior, and define and describe fixed and variable costs.
- **2** Define and describe mixed and step costs.
- **3** Separate mixed costs into their fixed and variable components using the high-low method, the scattergraph method, and the method of least squares.
- **4** (Appendix) Use a personal computer spreadsheet program to perform the method of least squares.





# **E**xperience Managerial Decisions with Zingerman's Deli

Have you ever walked by a bakery counter, or even Mom's kitchen, and been stopped in your tracks by the unmistakable aroma of freshly baked bread or homemade cookies? If so, cost behavior was probably the furthest thing from your mind. However, for the owners of **Zingerman's** deli and bakery, founded in 1982 in Ann Arbor, Michigan, cost behavior is critical in making decisions that improve Zingerman's profitability.

In total, Zingerman's tracks and manages over 3,000 distinct costs! For example, Zingerman's pays close attention to variable costs, such as the all-natural, non-alkalized cocoa powder ingredient used in its signature Hot Cocoa Cake, and the size of its hourly workforce,

which varies by season. Zingerman's also closely manages its numerous fixed costs, such as recipe "research and development" creation and ovens, across different production and sales levels to be sure that it doesn't make decisions that increase costs to a greater extent than revenues. Still other costs are mixed in nature, and the variable and fixed components must be disentangled before Zingerman's owners can budget for future periods, set prices, and plan for growth in the businesses. So, the next time you bite into a warm chocolate chip cookie, think about—if only for a brief moment—all of the cost behaviors that went into producing, packaging, selling, and distributing that tasty bite of joy!



Chapter 13 discussed various types of costs and took a close look at manufacturing and service costs. However, the primary concern of the chapter was organizing costs into production, selling, and administrative costs. Related schedules of the cost of goods manufactured, cost of goods sold, and income statements were built. Now it is time to focus on cost behavior—the way costs change as the related activity changes.

Cost behavior represents the foundation upon which managerial accounting is built, much like the critical role played by the theoretical pyramid in financial accounting. The theoretical pyramid of financial accounting, which contains critical assumptions (e.g., economic entity assumption) and principles (e.g., matching principle), is necessary for helping financial accountants properly record transactions and prepare financial statements for parties external to the organization. In much the same way, managers must properly understand cost behavior in order to make wise decisions. For example, a **Grant Thornton** Survey of 300 U.S. business leaders and senior executives reported that 79 percent of CEOs focus on understanding and managing costs in an attempt to increase company value.<sup>1</sup> This textbook provides numerous examples of how understanding cost behavior improves managerial decision making.

Costs can be variable, fixed, or mixed. Knowing how costs change as output changes is essential to planning, controlling, and decision making. For example, suppose that BlueDenim Company expects demand for its jeans product to increase by 10 percent next year. How will that affect the total costs budgeted for the factory? Clearly, BlueDenim will need 10 percent more raw materials (denim, thread, zippers, and so on). In addition, it will need more cutting and sewing labor because someone will need to make the additional jeans, so these costs are variable in nature. But the factory building will probably not need to be expanded. Neither will the factory need an additional receptionist or plant manager. So those costs are fixed in nature. As long as BlueDenim's accountant understands the behavior of the fixed and variable costs, it will be possible to develop a fairly accurate budget for the next year.

Budgeting, deciding to keep or drop a product line (e.g., **Converse's** ongoing decision to keep, drop, or alter its Dwyane Wade shoe), and evaluating the performance of a segment (e.g., **Delta Air Lines** decided in late 2005 to discontinue its low-fare Song Airline business segment after only three years of operation) all benefit from knowledge of cost behavior. In fact, failure to know and understand cost behavior can lead to poor—even disastrous—decisions. This chapter discusses cost behavior in depth so that a proper foundation is laid for its use in studying other cost management topics.

## OBJECTIVE > 1

Explain the meaning of cost behavior, and define and describe fixed and variable costs.

## Basics of Cost Behavior

**Cost behavior** is the general term for describing whether a cost changes when the level of output changes. A cost that does not change in total as output changes is a *fixed cost*. A *variable cost*, on the other hand, increases in total with an increase in output and decreases in total with a decrease in output. Let's first review the basics of cost and output measures. Then we will look at fixed and variable costs.

## Measures of Output and the Relevant Range

In order to determine the behavior of a cost, we need to have a good grasp of the cost under consideration and a measure of the output associated with the activity. The terms *fixed cost* and *variable cost* do not exist in a vacuum; they only have meaning when related to some output measure. In other words, a cost is fixed or variable with respect to some output measure or driver. In order to understand the behavior of costs, we must first determine the underlying business activity and ask ourselves “What causes the cost of this particular activity to go up (or down)?” A cost **driver** is a causal factor that measures the output of the activity that leads (or causes) costs to change. Identifying and managing drivers helps managers better predict and control costs.

<sup>1</sup>Grant Thornton LLP Survey of U.S. Business Leaders, 12th Edition, 2006.

Let's look at some examples. Suppose that BlueDenim Company wants to classify its product costs as either variable or fixed with respect to the number of jeans produced. In this case, the number of jeans produced is the driver. Clearly, the use of raw materials (denim, thread, zippers, and buttons) varies with the number of jeans produced. So, we could say that materials costs are variable with respect to the number of units produced. How about electricity to run the sewing machines? That, too, is variable with respect to the number of jeans produced because the more jeans that are produced, the more sewing machine time is needed, and the more electricity it takes. Finally, what about the cost of supervision for the sewing department? Whether the company produces many pairs of jeans or fewer pairs of jeans, the cost of supervision is unchanged. So, we would say that supervision is fixed with respect to the number of jeans produced.

How does the relevant range fit into cost relationships? The **relevant range** is the range of output over which the assumed cost relationship is valid for the normal operations of a firm. The relevant range limits the cost relationship to the range of operations that the firm normally expects to occur. Let's consider BlueDenim's cost relationships more carefully. We said that the salary of the supervisor is strictly fixed. But is that true? If the company produced just a few pairs of jeans a year, it would not even need a supervisor. Surely the owner could handle that task (and probably a good number of other tasks as well). On the other hand, suppose that BlueDenim increased its current production by two or three times, perhaps by adding a second and third shift. One supervisor could not possibly handle all three shifts. So, when we talk about supervision cost, we are implicitly talking about it for the range of production that normally occurs. We now take a closer look at fixed, variable, and mixed costs. In each case, the cost is related to only one driver and is defined within the relevant range.

## Here's The



## Real Kicker

Kicker uses information on cost behavior to guide new programs. For example, the variable cost of manufacturing speakers led Kicker to work with its manufacturers to both increase quality and decrease cost. Fixed costs at the Stillwater location also received attention. Eight years ago Safety Director Terry Williams faced a problem with worker safety. Cost information based on a number of indicators revealed the problem:

- The cost of workmen's compensation insurance was high.
- The workmen's compensation experience rating was high.
- The number of injuries was up.
- The number of injuries requiring time off was up.
- The number of back injuries (the most serious type) was up.
- The average cost per injury was up.

Terry looked for the root cause of the problem and discovered that improper lifting led to the more serious back injuries. He instituted a comprehensive safety program emphasizing 20 minutes of stretching exercises each day (five minutes before work, five minutes after each break, and five minutes after lunch).

Was the program a success? At first, the workers resisted the stretching, so Terry got them weight belts. The workers hated them. They went back to stretching. But this time, any worker who refused to stretch had to wear the weight belt for 30 days. This was a highly visible sign of failure to adhere to the program. In addition, Kicker's president was a big proponent of the safety program. He explained the impact of the increased insurance premiums and lost work time on the Kicker profit-sharing program. The profit-sharing program is an important extra for Kicker employees; each employee makes it his or her job to contribute to the bottom line whenever possible.

Over several months, workers bought into the program. The indicators decreased dramatically. The cost of workmen's compensation insurance decreased by nearly 50 percent, the average cost per injury is less than 5 percent of the presafety program cost, and there is no lost work time.



## Fixed Costs

**Fixed costs** are costs that *in total* are constant within the relevant range as the level of output increases or decreases. For example, **Southwest Airlines** has a fleet of 737s. The cost of these planes represents a fixed cost to the airline because, within the relevant range, the cost does not change as the number of flights or the number

of passengers changes. Similarly, the rental cost of warehouse space by a wholesaler is fixed for the term of the lease. If the wholesaler's sales go up or down, the cost of the leased warehouse stays the same.

To illustrate fixed cost behavior, consider a factory operated by Colley Computers Inc., a company that produces unlabeled personal computers for small computer stores across the Midwest. The assembly department of the factory assembles components into a completed personal computer. Assume that Colley Computers wants to look at the cost relationship between supervision cost and the number of computers processed. The assembly department can process up to 50,000 computers per year. The assemblers (direct labor) are supervised by a production-line manager who is paid \$32,000 per year. The company was established five years ago. Currently, the factory produces 40,000 to 50,000 computers per year. Production has never fallen below 20,000 computers in a year. The cost of supervision for several levels of production is as follows:

Number of Computers Produced	Total Cost of Supervision	Unit Cost
20,000	\$32,000	\$1.60
30,000	32,000	1.07
40,000	32,000	0.80
50,000	32,000	0.64

The cost relationship considered is between supervision cost and the number of computers processed. The number of computers processed is called the *output measure*, or *driver*. Since Colley Computers has been processing between 20,000 and 50,000 computers per year, the relevant range is 20,000 to 50,000. Notice that the *total* cost of supervision remains constant within this range as more computers are processed. Colley Computers pays \$32,000 for supervision regardless of whether it processes 20,000, 40,000, or 50,000 computers.

Pay particular attention to the words *in total* in the definition of fixed costs. While the total cost of supervision remains unchanged as more computers are processed, the unit cost does change as the level of output changes. As the example in the table shows, within the relevant range, the unit cost of supervision decreases from \$1.60 to \$0.64. Because of the behavior of per-unit fixed costs, it is easy to get the impression that the fixed costs themselves are affected by changes in the level of output. But that is not true. Instead, higher output means that the fixed costs can be spread over more units and are thus smaller per unit. Unit fixed costs can often be misleading and may lead to poor decisions. It is often safer to work with total fixed costs.

Let's take a look at the graph of fixed costs given in Exhibit 14-1. We see that for the relevant range, fixed cost behavior is described by a horizontal line. Notice that at 40,000 computers processed, supervision cost is \$32,000; at 50,000 computers processed, supervision is also \$32,000. This line visually demonstrates that cost remains unchanged as the level of the activity driver varies. For the relevant range, total fixed costs are simply an amount. For Colley Computers, supervision cost amounted to \$32,000 for any level of output between 20,000 and 50,000 computers processed. Thus, supervision is a fixed cost and can be expressed as:

$$\text{Supervision cost} = \$32,000$$

Strictly speaking, this equation assumes that the fixed costs are \$32,000 for all levels (as if the line extends to the vertical axis as indicated by the dashed portion in Exhibit 14-1). Although this assumption is not true, it is harmless if the operating decisions are confined to the relevant range.

Can fixed costs change? Of course, but this possibility does not make them variable. They are fixed at a new higher

## ANALYTICAL Q&A

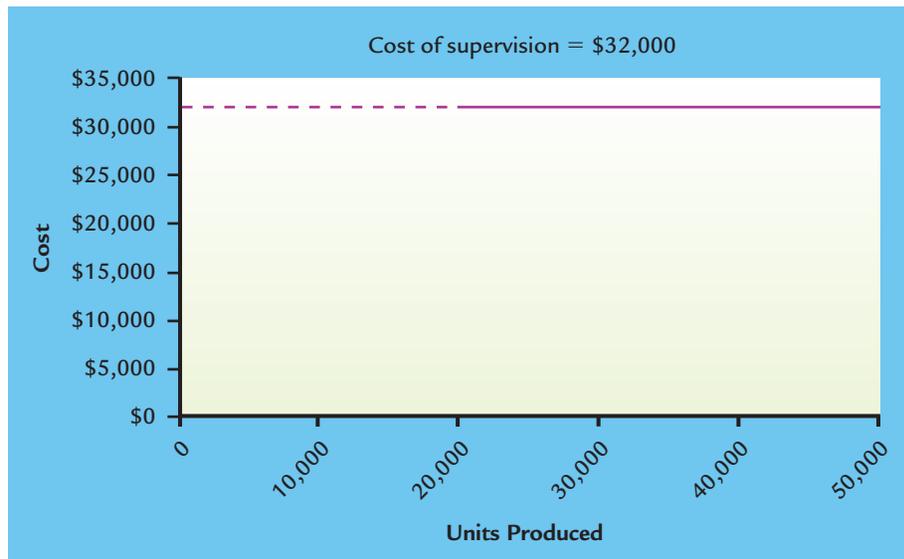
In Exhibit 14-1, the fixed cost of supervision is drawn at \$32,000. If the supervisor's salary is raised to \$34,000 per year, can you draw in the new fixed cost line on Exhibit 14-1?

The new line is above and parallel to the original one. The new line intersects the vertical axis at \$34,000.

Answer:

## Exhibit 14-1

## Colley Computers Fixed Cost of Supervision



(or lower) rate. Going back to Colley Computers, suppose that the company gives a raise to the assembly department supervisor. Instead of being paid \$32,000 per year, the salary is \$34,000 per year. The cost of supervision within the relevant range is \$34,000 per year. However, supervision cost is still *fixed* with respect to the number of computers produced.

By their nature, fixed costs are difficult to change quickly—that is why they are considered fixed. Two types of fixed costs are commonly recognized: discretionary fixed costs and committed fixed costs. **Discretionary fixed costs** are fixed costs that can be changed or avoided relatively easily at management discretion. For example, advertising is a discretionary fixed cost. Advertising cost depends on the decision by management to purchase print, radio, video, or online advertising. This cost might depend on the size of the ad, the number of times it runs, or the number of “hits,” but it does *not* depend on the number of units produced and sold. Management can easily decide to increase or decrease dollars spent on advertising.

Two days prior to the beginning of the 2006–07 season, the **National Football League (NFL)** was forced to make a decision involving discretionary costs. Specifically, the league realized that **Wilson Sporting Goods** had already manufactured 500,000 footballs (of the 900,000 total footballs that would be needed for the entire season) with the signature of the outgoing NFL Commissioner—Paul Tagliabue—instead of the incoming Commissioner—Roger Goodell. The decision facing the NFL was whether to play the entire season or approximately only half of the season with the incoming Commissioner’s signature on the balls. If the 500,000 existing balls were given away to high schools (as the NFL eventually decided to do), then the \$250,000 additional cost to produce another 500,000 balls with the new signature represents a discretionary cost to the league because it could be changed (i.e., avoided) relatively easily.<sup>2</sup> The \$250,000 is a discretionary cost that is entirely fixed as the NFL will need to purchase the additional footballs regardless of the number of games played (the driver for football cost).

**Committed fixed costs**, on the other hand, are fixed costs that cannot be easily changed. Often, committed fixed costs are those that involve a long-term contract (e.g., leasing of machinery or warehouse space) or the purchase of property, plant, and equipment. For example, a construction company may lease heavy-duty earth-moving equipment for a period of three years. The lease cost is a committed fixed cost.

<sup>2</sup>T. Lowry, “Two-Minute Warning,” *Business Week* (September 4, 2006): 12.

## CONCEPT Q&A

Consider the cost of a wedding reception. What costs are fixed? What costs are variable? What output measure did you use in classifying the costs as fixed or variable?

*Possible Answer: Often, the number of guests is the output measure for a wedding reception. The cost of food and drinks varies with the number of guests. The relevant range for a wedding might be the approximate size—perhaps small (less than 100 guests), medium (100–200 guests), and large (200+ guests). Within a relevant range, fixed costs might include rental of the facility, flowers, and the cake.*

Possible Answer:

## Variable Costs

**Variable costs** are defined as costs that in total vary in direct proportion to changes in output within the relevant range. The costs of producing and assembling the propeller on each boat manufactured by **Boston Whaler** represent variable costs for a manufacturer. In a dentist's office, certain supplies, such as the disposable bib used on each patient, floss, and x-ray film, vary with the number of patients seen. **Binney & Smith**, the maker of Crayola crayons, finds that the cost of wax and pigments varies with the number of crayons produced.

To illustrate, let's expand the Colley Computers example to include the cost of the DVD-ROM drive that is inserted in each computer. Here the cost is the cost of direct materials—the DVD-ROM drive—and the output measure is the number of computers processed. Each computer requires one DVD-ROM drive costing \$40. The cost of DVD-ROM drives for various levels of production is as follows:

Colley Computers Inc.  
Cost of DVD-ROM Drives

Number of Computers Produced	Total Cost of DVD-ROM Drives (\$)	Unit Cost (\$)
20,000	800,000	40
30,000	1,200,000	40
40,000	1,600,000	40
50,000	2,000,000	40

As more computers are produced, the total cost of DVD-ROM drives increases in direct proportion. For example, as production doubles from 20,000 to 40,000 units, the *total* cost of DVD-ROM drives doubles from \$800,000 to \$1,600,000. Notice also that the unit cost of direct materials is constant.

Variable costs can also be represented by a linear equation. Here, total variable costs depend on the level of output. This relationship can be described by the following equation:

$$\text{Total Variable Costs} = \text{Variable Rate} \times \text{Amount of Output}$$

The relationship that describes the cost of disk drives is:

$$\text{Total Variable Cost} = \$40 \times \text{Number of Computers}$$

Exhibit 14-2 shows graphically that variable cost behavior is represented by a straight line extending out from the origin. Notice that at zero units processed, total variable cost is zero. However, as units produced increase, the total variable cost also increases. It can be seen that total cost increases in direct proportion to increases in the number of computers processed; the rate of increase is measured by the slope of the line. At 50,000 computers processed, the total cost of DVD-ROM drives is \$2,000,000 (or  $\$40 \times 50,000$  computers processed); at 30,000 computers processed, the total cost would be \$1,200,000. Exhibit 14-2 illustrates variable cost behavior for the DVD-ROM drives.

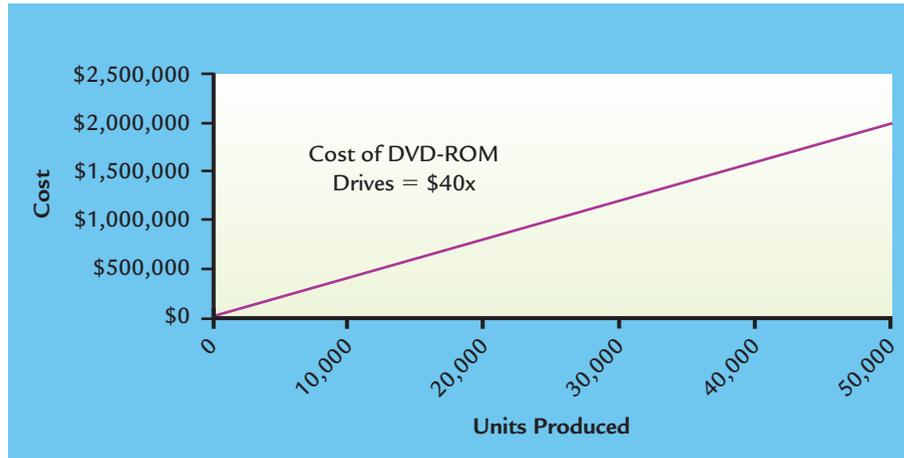
## The Reasonableness of Straight-Line Cost Relationships

The graphs of fixed and variable costs that were just reviewed show cost relationships that are straight lines. Is this reasonable; are real-world cost relationships linear?

In the Colley Computers example, the DVD-ROM drives cost \$40 each—no matter how many were purchased. However, if only a few drives were bought, surely the per-unit cost would be higher—perhaps more than double. So, there are economies

Exhibit 14-2

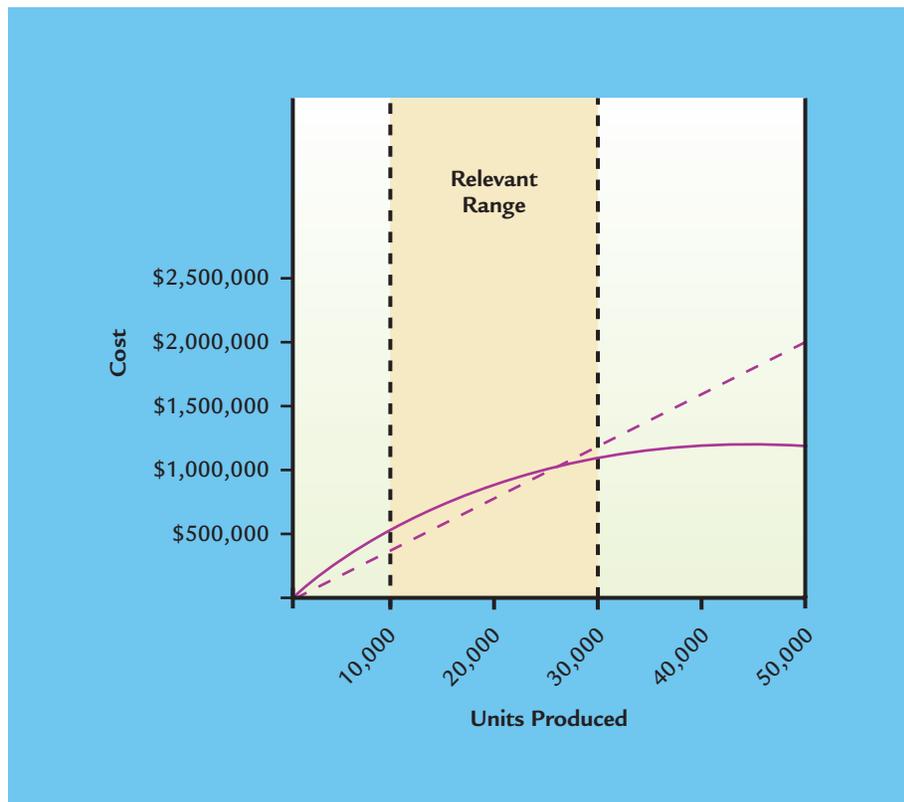
## Colley Computers Variable Cost of DVD-ROM Drives



of scale in producing larger quantities of output. For example, at extremely low levels of output workers often use more materials per unit or require more time per unit than they do at higher levels of output. Then, as the level of output increases, economies of scale arise as workers experience a learning curve and figure out how to use materials and time more efficiently such that the variable cost per unit decreases as more and more output is produced. Therefore, when economies of scale are present, the true total cost function is increasing at a decreasing rate, as shown in Exhibit 14-3. Some managers refer to this type of cost behavior as **semi-variable**.

Exhibit 14-3

## Nonlinearity of Variable Costs



When unit costs change in this way, how do we choose the correct variable rate? Fortunately, the relevant range can help us out. Recall that *relevant range* is defined as the range of activity for which the assumed cost relationships are valid. Exhibit 14-3 shows us how the relevant range can be used to see how well a straight line approximates variable cost. Note that for units of output before 20,000 on the x-axis, the approximation appears to break down. Therefore, managers must be extremely careful in applying cost behavior assumptions to decision making whenever the output level falls outside of the company's relevant range of operations.

## OBJECTIVE 2

Define and describe mixed and step costs.

## Mixed Costs and Step Costs

While strictly fixed and variable costs are easy to handle, many costs do not fall into those categories. Often, costs are a combination of fixed and variable costs (mixed costs) or have an increased fixed component at specified intervals (step costs).

### Mixed Costs

**Mixed costs** are costs that have both a fixed and a variable component. For example, sales representatives are often paid a salary plus a commission on sales. Suppose that Colley Computers has 10 sales representatives, each earning a salary of \$30,000 per year plus a commission of \$25 per computer sold. The activity is selling, and the output measure is units sold. If 50,000 computers are sold, then the total cost associated with the sales representatives is \$1,550,000—the sum of the fixed salary cost of \$300,000 ( $10 \times \$30,000$ ) and the variable cost of \$1,250,000 ( $\$25 \times 50,000$ ).

The formula for a mixed cost is as follows:

$$\text{Total Cost} = \text{Total Fixed Cost} + \text{Total Variable Cost}$$

For Colley Computers, the cost of the sales representatives is represented by the following equation:

$$\text{Total Cost} = \$300,000 + (\$25 \times \text{Number of Computers Sold})$$

The following table shows the selling cost for different levels of sales activity:

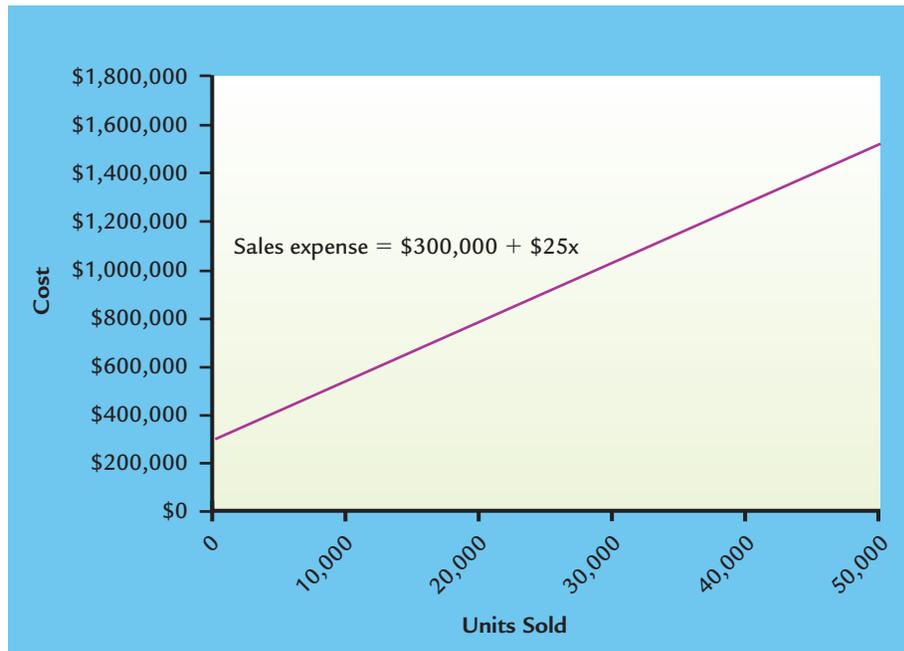
Colley Computers Inc.				
Fixed Cost of Selling (\$)	Variable Cost of Selling (\$)	Total Cost (\$)	Computers Sold	Selling Cost per Unit (\$)
300,000	500,000	800,000	20,000	40.00
300,000	750,000	1,050,000	30,000	35.00
300,000	1,000,000	1,300,000	40,000	32.50
300,000	1,250,000	1,550,000	50,000	31.00

The graph for our mixed cost example is given in Exhibit 14-4 (assuming a relevant range of 0 to 50,000 units). Mixed costs are represented by a line that intercepts the vertical axis (at \$300,000 for this example). The y-intercept corresponds to the fixed cost, and the slope of the line gives the variable cost per unit of activity driver (slope is \$25 for this example).

### Step Cost Behavior

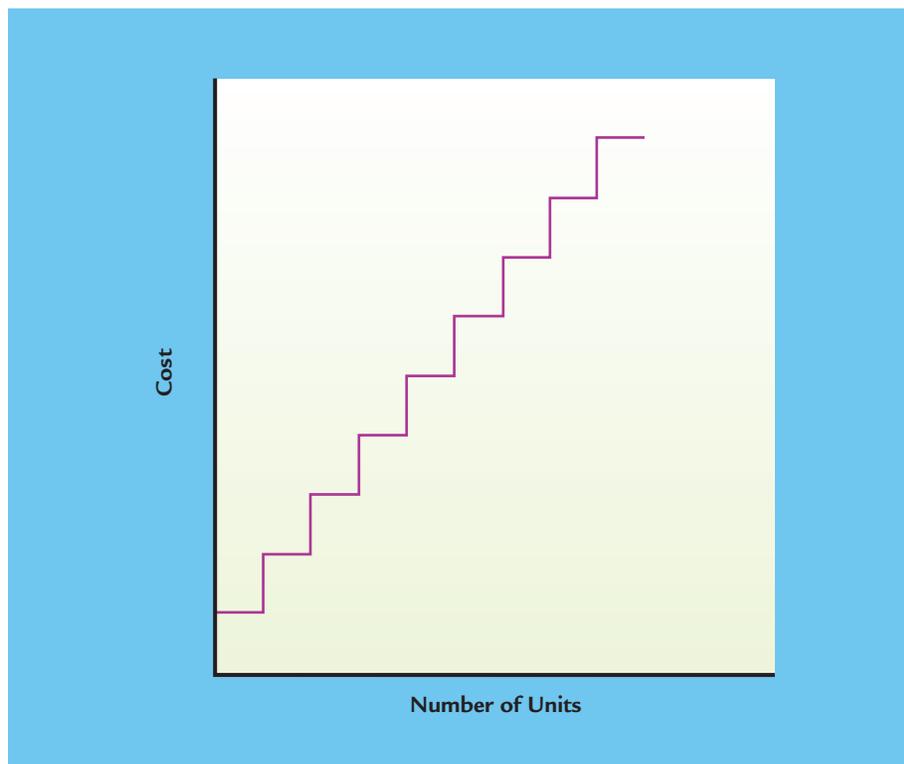
So far in our discussion of cost behavior, we have assumed that the cost function is continuous. In reality, some cost functions may be discontinuous; these costs are known as *step costs* (or semi-fixed). A **step cost** displays a constant level of cost for a range of output and then jumps to a higher level of cost at some point, where it remains for a similar range of output. Items that display a step cost behavior must be purchased in chunks. The width of the step defines the range of output for which a particular amount of the resource applies.

Exhibit 14-4

**Mixed Cost Behavior**

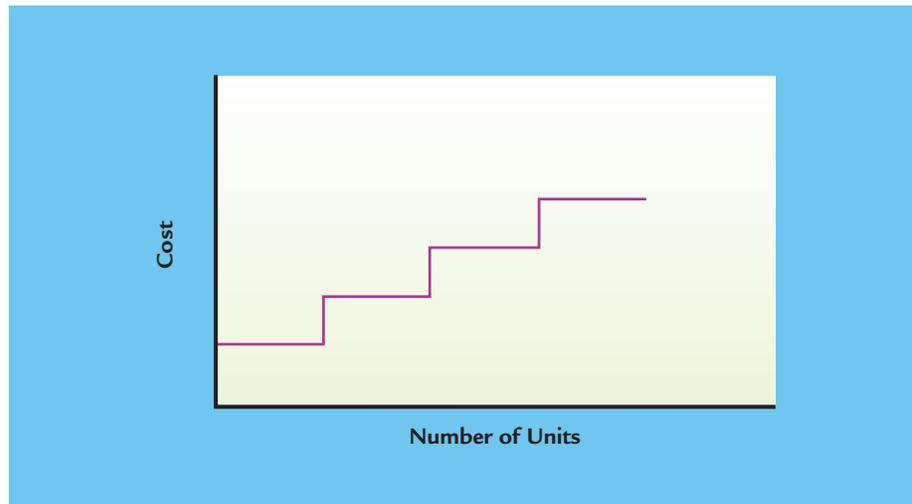
Exhibits 14-5A and B illustrate step costs. Exhibit 14-5A shows a step cost with relatively narrow steps. These narrow steps mean that the cost changes in response to fairly small changes in output. Often, if the steps are very narrow, we can approximate

Exhibit 14-5A

**Step Cost with Narrow Steps**

## Exhibit 14-5B

## Step Cost with Wide Steps



the step cost as a strictly variable cost. For example, Copy-2-Go, a photocopying shop, buys copy paper by the 20-ream box. The shop typically uses three boxes per day. The cost of copy paper is a step cost with very narrow steps. Exhibit 14-5B, however, shows a step cost with relatively wide steps. An example of this type of cost is a factory that leases production machinery. Suppose that each machine can produce 1,000 units per month. If production ranges from 0 to 1,000 units, only one machine is needed. However, if production increases to amounts between 1,001 and 2,000 units, a second machine must be leased. Many so-called fixed costs may be, in reality, step costs.

### Accounting Records and Mixed Costs

Sometimes it is easy to identify the variable and fixed components of a mixed cost, as in the example given earlier for Colley Computers' sales representatives. Many times, however, the only information available is the total cost and a measure of output. For example, the accounting system will usually record both the total cost of maintenance and the number of maintenance hours provided during a given period of time. How much of the total maintenance cost represents a fixed cost and how much represents a variable cost is not revealed by the accounting records. (In fact, the accounting records may not even reveal the breakdown of costs in the sales representative example.) Often, the total cost is simply recorded with no attempt to segregate the fixed and variable costs.

### Need for Cost Separation

Accounting records typically show only the total cost and the associated amount of activity of a mixed cost item. Therefore, it is necessary to separate the total cost into its fixed and variable components. Only through a formal effort to separate costs can all costs be classified into the appropriate cost behavior categories.

If mixed costs are a very small percentage of total costs, formal cost separation may be more trouble than it's worth. In this case, mixed costs could be assigned to either the fixed or variable cost category without much concern for the classification error or its effect on decision making. Alternatively, the total mixed cost could be arbitrarily divided between the two cost categories. However, this option is seldom available. Mixed costs for many firms are large enough to call for separation.

## Methods for Separating Mixed Costs into Fixed and Variable Components

Three methods of separating a mixed cost into its fixed and variable components are commonly used: the high-low method, the scattergraph method, and the method of least squares. Each method requires the simplifying assumption of a linear cost relationship. Therefore, before we examine each of these methods more closely, let's review the expression of cost as an equation for a straight line.

$$\text{Total Cost} = \text{Fixed Cost} + (\text{Variable Rate} \times \text{Output})$$

The **dependent variable** is a variable whose value depends on the value of another variable. In the previous equation, total cost is the dependent variable; it is the cost we are trying to predict. The **independent variable** is a variable that measures output and explains changes in the cost or other dependent variable. A good independent variable is one that causes or is closely associated with the dependent variable. Therefore, many managers refer to an independent variable as a cost driver. The **intercept** corresponds to fixed cost. Graphically, the intercept is the point at which the cost line intercepts the cost (vertical) axis. The **slope** corresponds to the variable rate (the variable cost per unit of output); it is the slope of the cost line. **Cornerstone 14-1** shows how to create and use a cost formula.

### OBJECTIVE > 3

Separate mixed costs into their fixed and variable components using the high-low method, the scattergraph method, and the method of least squares.

### HOW TO Create and Use a Cost Formula

#### Information:

The art and graphics department of State College decided to equip each faculty office with an inkjet color printer (computers were already in place). Sufficient color printers had monthly depreciation of \$250. The department purchased paper in boxes of 10,000 sheets (20 reams of 500 sheets each) for \$35 per box. Ink cartridges cost \$30 and will print, on average, 300 pages.

#### Required:

1. Create a formula for the monthly cost of inkjet printing in the art and graphics department.
2. If the department expects to print 4,400 pages next month, what is the expected fixed cost? Total variable cost? Total printing cost?

#### Solution:

1. The cost formula takes the following form:

$$\text{Total Cost} = \text{Fixed Cost} + (\text{Variable Rate} \times \text{Number of Pages})$$

The monthly fixed cost is \$250 (the cost of printer depreciation), as it does not vary according to the number of pages printed. The variable costs are paper and ink, as both vary with the number of pages printed.

Cost of paper per page is  $\$35/10,000 = \$0.0035$

Cost of ink per page is  $\$30/300 = \$0.10$

Variable rate per page is  $\$0.0035 + \$0.10 = \$0.1035$

The cost formula is:

$$\text{Total Cost of Printing} = \$250 + (\$0.1035 \times \text{Number of Pages})$$

2. Expected fixed cost for next month is \$250.

Expected variable cost for next month is  $\$0.1035 \times 4,400 \text{ pages} = \$455.40$

Expected total printing cost for next month is  $\$250 + \$455.40 = \$705.40$



### CORNERSTONE 14-1



Since the accounting records reveal only total cost and output, those values must be used to estimate the fixed cost and variable rate. Three methods can be used to estimate these two items: the high-low method, the scattergraph method, and the method of least squares (i.e., regression).

The following example with the same data will be used with each method so that comparisons among them can be made. The example focuses on materials handling cost for Anderson Company, a manufacturer of household cleaning products. Materials handling involves moving materials from one area of the factory, say the raw materials storeroom, to another area, such as workstation 6. Large, complex organizations have found that the cost of moving materials can be quite large. Understanding the behavior of this cost is an important part of deciding how to reduce the cost.

Anderson's controller has accumulated data for the materials handling activity. The plant manager believes that the number of material moves is a good activity driver for the activity. Assume that the accounting records of Anderson Company disclose the following material handling costs and number of material moves for the past 10 months:

Month	Material Handling Cost (\$)	Number of Moves
January	2,000	100
February	3,090	125
March	2,780	175
April	1,990	200
May	7,500	500
June	5,300	300
July	3,800	250
August	6,300	400
September	5,600	475
October	6,240	425

## The High-Low Method

From basic geometry, we know that two points are needed to determine a line. Once we know the two points on a line, then its equation can be determined. Recall that the fixed cost is the *intercept* of the total cost line and that the variable rate is the *slope* of the line. Given two points, the slope and the intercept can be determined. The **high-low method** is a method of separating mixed costs into fixed and variable components by using just the high and low data points. Four steps must be taken in the high-low method.

**Step 1:** Find the high point and the low point for a given data set. The *high point* is defined as the point with the *highest activity or output level*. The *low point* is defined as the point with the *lowest activity or output level*. It is important to note that the high and low points are identified by looking at the activity levels and not the costs. In some cases the highest (or lowest) activity level might also be associated with the highest (or lowest) cost, whereas in other cases it is not. Therefore, the managerial accountant must be careful to use the activity level in identifying the high and low data points for the analysis, regardless of whether or not the high (or low) activity level is associated with the high (or low) cost. In the data for maintenance cost, the high output occurred in May, with 500 material moves and total cost of \$7,500. The low output was in January with 100 material moves and total cost of \$2,000.

### ANALYTICAL Q&A

When working high-low problems, it helps to circle the high and low points so that you don't become confused. Right now, go to the data given for materials handling cost and number of moves, and circle the high point and the low point.

The high point is May, with cost of \$7,500 and 500 moves; the low point is January, with cost of \$2,000 and 100 moves.

Answer:

**Step 2:** Using the high and low points, calculate the variable rate. To perform this calculation, we recognize that the variable rate, or slope, is the change in the total cost divided by the change in output.

$$\text{Variable Rate} = \frac{\text{High Point Cost} - \text{Low Point Cost}}{\text{High Point Output} - \text{Low Point Output}}$$

Using the high and low points for our example, the variable rate would be as follows:

$$\text{Variable Rate} = \frac{(\$7,500 - \$2,000)}{(500 - 100)} = \frac{\$5,500}{400} = \$13.75$$

**Step 3:** Calculate the fixed cost using the variable rate (from step 2) and either the high point or low point.

$$\text{Fixed Cost} = \text{Total Cost at High Point} - (\text{Variable Rate} \times \text{Output at High Point})$$

OR

$$\text{Fixed Cost} = \text{Total Cost at Low Point} - (\text{Variable Rate} \times \text{Output at Low Point})$$

Let's use the high point to calculate fixed cost.

$$\text{Fixed Cost} = \$7,500 - (\$13.75 \times 500) = \$625$$

**Step 4:** Form the cost formula for materials handling based on the high-low method.

$$\text{Total Cost} = \$625 + (\$13.75 \times \text{Number of Moves})$$

**Cornerstone 14-2** shows how to use the high-low method to construct a cost formula. Once we have the cost formula, we can use it in budgeting and in performance control. For example, suppose that the number of moves for November is expected to be 350. Budgeted materials handling cost would be \$5,437.50, or  $\$625 + (\$13.75 \times 350)$ . Alternatively, suppose that the controller wondered whether or not October's materials handling cost of \$6,240 was reasonably close to what would have been predicted. Our cost formula would predict October's cost of \$6,469 (rounded). (This amount is found by multiplying \$13.75 times the 425 actual moves and then adding fixed cost of \$625.) The actual cost is just \$229 different from the predicted cost and probably would be judged to be reasonably close to the budgeted cost. **Cornerstone 14-3** shows how to use the high-low method to calculate predicted total variable cost and total cost for budgeted output.

Let's look at one last point. Notice that monthly data were used to find the high and low points and to calculate the fixed cost and variable rate. This means that the cost formula is the fixed cost *for the month*. Suppose, however, that the company wants to use that formula to predict cost for a different period of time, say a year. In that case, the variable cost rate is just multiplied by the budgeted amount of the independent variable for the year. The intercept, or fixed cost, must be adjusted. To convert monthly fixed cost to yearly fixed cost, simply multiply the monthly fixed cost by 12 (because there are 12 months in a year).

If weekly data were used to calculate the fixed and variable costs, one would multiply the weekly fixed cost by 52 to convert it to yearly fixed cost, and so on. **Cornerstone 14-4** shows how to use the high-low method to calculate predicted total variable cost and total cost for budgeted output in which the time period differs from the data period.

The high-low method has several important advantages. One advantage is its objectivity. That is, any two people using the high-low method on a particular data set will arrive at the same answer. Also, the high-low method allows a manager to get a quick fix on a cost relationship by using only two data points. For example, a manager may have only two months of data. Sometimes this will be enough to get a crude approximation of the cost relationship. In addition, the high-low method is simple, inexpensive, and easily communicated to other individuals, even those who are not comfortable with numerical analyses. For these reasons, managerial accountants use the high-low method.

## ANALYTICAL Q&A

Right now, calculate the fixed cost by using the *low* point and the variable rate calculated in step 2. (You will get the same fixed cost, \$625.)

$$\text{Fixed cost} = \$2,000 - \$13.75(100) = \$625$$

Answer:



## CORNERSTONE 14-2



### HOW TO Use the High-Low Method to Calculate Fixed Cost and the Variable Rate and to Construct a Cost Formula

#### Information:

BlueDenim Company makes blue jeans. The company controller wants to calculate the fixed and variable costs associated with electricity used in the factory. Data for the past eight months were collected:

Month	Electricity Cost (\$)	Machine Hours
January	3,255	460
February	3,485	500
March	4,100	600
April	3,300	470
May	3,312	470
June	2,575	350
July	3,910	570
August	4,200	590

#### Required:

Using the high-low method, calculate the fixed cost of electricity, calculate the variable rate per machine hour, and construct the cost formula for total electricity cost.

#### Solution:

**Step 1—Find the high and low points:** The high number of machine hours is in March, and the low number of machine hours is in June. (*Hint:* Did you notice that the high cost of \$4,200 was for August? Yet August is not the high point because its number of machine hours is not the highest activity level. Remember, the high point is associated with the highest activity level; the low point is associated with the lowest activity level.)

**Step 2—Calculate the variable rate:**

$$\begin{aligned} \text{Variable Rate} &= (\text{High Cost} - \text{Low Cost}) / (\text{High Machine Hours} - \text{Low Machine Hours}) \\ &= (\$4,100 - \$2,575) / (600 - 350) = \$1,525 / 250 \\ &= \$6.10 \text{ per Machine Hour} \end{aligned}$$

**Step 3—Calculate the fixed cost:**

$$\text{Fixed Cost} = \text{Total Cost} - (\text{Variable Rate} \times \text{Machine Hours})$$

Let's choose the high point with cost of \$4,100 and machine hours of 600.

$$\text{Fixed Cost} = \$4,100 - (\$6.10 \times 600) = \$4,100 - \$3,660 = \$440$$

(*Hint:* Check your work by computing fixed cost using the low point.)

**Step 4—Construct a cost formula:** If the variable rate is \$6.10 per machine hour and fixed cost is \$440 per month, then the formula for monthly electricity cost is:

$$\text{Total Electricity Cost} = \$440 + (\$6.10 \times \text{Machine Hours})$$

However, the high-low method also has several disadvantages that lead some managers to believe that it is not as good as the other methods at separating mixed costs into fixed and variable components. Why? First, the high and low points often can be what are known as outliers. They may represent atypical cost-activity relationships. For instance, if in the Anderson Company example the high output had been 1,000 moves (rather than 500) due to some extremely unusual business activity

## HOW TO Use the High-Low Method to Calculate Predicted Total Variable Cost and Total Cost for Budgeted Output

### Information:

Recall that BlueDenim Company constructed the following formula for monthly electricity cost. (Refer to Cornerstone 14-2 to see how the fixed cost per month and the variable rate were computed.)

$$\text{Total Electricity Cost} = \$440 + (\$6.10 \times \text{Machine Hours})$$

### Required:

Assume that 550 machine hours are budgeted for the month of September. Use the previous cost formula for the following calculations:

1. Calculate total variable electricity cost for October.
2. Calculate total electricity cost for October.

### Solution:

1. Total Variable Electricity Cost = Variable Rate  $\times$  Machine Hours  
 $= \$6.10 \times 550$   
 $= \$3,355$
2. Total Electricity Cost = Fixed Cost + (Variable Rate  $\times$  Machine Hours)  
 $= \$440 + (\$6.10 \times 550)$   
 $= \$440 + \$3,355$   
 $= \$3,795$



## CORNERSTONE 14-3



during a given month, then this high point likely would have fallen outside of the company's relevant range of operations and, therefore, represented an outlier. In the case of outliers, the cost formula computed using these two points will not represent what usually takes place. The scattergraph method can help a manager avoid this trap by selecting two points that appear to be representative of the general cost-activity pattern. Second, even if the high and low points are not outliers, other pairs of points may be more representative. To stress the likelihood of this possibility, a high-low analysis of 50 weeks of data would ignore 96 percent (i.e., 48 out of the 50 weeks) of the data! Again, the scattergraph method allows the choice of more representative points.

## Scattergraph Method

The **scattergraph method** is a way to see the cost relationship by plotting the data points on a graph. The first step in applying the scattergraph method is to plot the data points so that the relationship between materials handling costs and activity output can be seen. This plot is referred to as a scattergraph and is shown in Exhibit 14-6A. The vertical axis is total cost (materials handling cost), and the horizontal axis is the driver or output measure (number of moves). Looking at Exhibit 14-6A, we see that the relationship between materials handling costs and number of moves is reasonably linear; cost goes up as the number of moves goes up and vice versa.

Now let's examine Exhibit 14-6B to see if the line determined by the high and low points is representative of the overall relationship. Notice that three points lie above the high-low line and five lie below it. This realization does not give us confidence in the high-low results for fixed and variable costs. In particular, we might wonder if the variable cost (slope) is somewhat higher than it should be and the fixed cost is somewhat lower than it should be.

Thus, one purpose of a scattergraph is to see whether or not a straight line reasonably describes the cost relationship. Additionally, inspecting the scattergraph may



## CORNERSTONE 14-4



### HOW TO Use the High-Low Method to Calculate Predicted Total Variable Cost and Total Cost for a Time Period that Differs from the Data Period

#### Information:

Recall that BlueDenim Company constructed the following formula for *monthly* electricity cost. (Refer to Cornerstone 14-2 to see how the fixed cost per month and variable rate were computed.)

$$\text{Total Electricity Cost} = \$440 + (\$6.10 \times \text{Machine Hours})$$

#### Required:

Assume that 6,500 machine hours are budgeted for the coming year. Use the previous cost formula to make the following calculations:

1. Calculate total variable electricity cost for the year.
2. Calculate total fixed electricity cost for the year.
3. Calculate total electricity cost for the coming year.

#### Solution:

$$\begin{aligned} 1. \text{ Total Variable Electricity Cost} &= \text{Variable Rate} \times \text{Machine Hours} \\ &= \$6.10 \times 6,500 \\ &= \$39,650 \end{aligned}$$

2. There's a trick here; the cost formula is for the month, but we are being asked to budget electricity for the year. Thus we will need to multiply the fixed cost for the month by 12 (the number of months in a year).

$$\begin{aligned} \text{Total Fixed Electricity Cost} &= \text{Fixed Cost} \times 12 \text{ Months in a Year} \\ &= \$440 \times 12 \\ &= \$5,280 \end{aligned}$$

$$\begin{aligned} 3. \text{ Total Electricity Cost} &= 12(\$440) + (\$6.10 \times 6,500) \\ &= \$5,280 + \$39,650 \\ &= \$44,930 \end{aligned}$$

reveal one or more points that do not seem to fit the general pattern of behavior. Upon investigation, it may be discovered that these points (the outliers) were due to some irregular occurrences that are not expected to happen again. This knowledge might justify their elimination and perhaps lead to a better estimate of the underlying cost function.

We can use the scattergraph to visually fit a line to the data points on the graph. Of course, the manager or cost analyst will choose the line that appears to fit the points the best, and perhaps that choice will take into account past experience with the behavior of the cost item. Experience may provide a good intuitive sense of how materials handling costs behave; the scattergraph then becomes a useful tool to quantify this intuition. Fitting a line to the points in this way is how the scattergraph method works. Keep in mind that the scattergraph and other statistical aids are tools that can help managers improve their judgment. Using the tools does not restrict the manager from using judgment to alter any of the estimates produced by formal methods.

Examine Exhibit 14-6A carefully. Based only on the information contained in the graph, how would you fit a line to the points in it? Of course, an infinite number of lines might go through the data, but let's choose one that goes through the point for January (100, \$2,000) and intersects the y-axis at \$800. This gives us the straight line shown in Exhibit 14-6C. The fixed cost, of course, is \$800, the intercept. We can use the high-low method to determine the variable rate.

First, remember that our two points are (100, \$2,000) and (0, \$800). Next, use these two points to compute the variable rate (the slope):

$$\text{Variable Rate} = \frac{\text{High Point Cost} - \text{Low Point Cost}}{\text{High Point Number of Moves} - \text{Low Point Number of Moves}}$$

$$\begin{aligned} &= (\$2,000 - \$800)/(100 - 0) \\ &= \$1,200/100 \\ &= \$12 \end{aligned}$$

Exhibit 14-6A

**Anderson Company's Materials Handling Cost  
Scattergraph Showing Data Points**

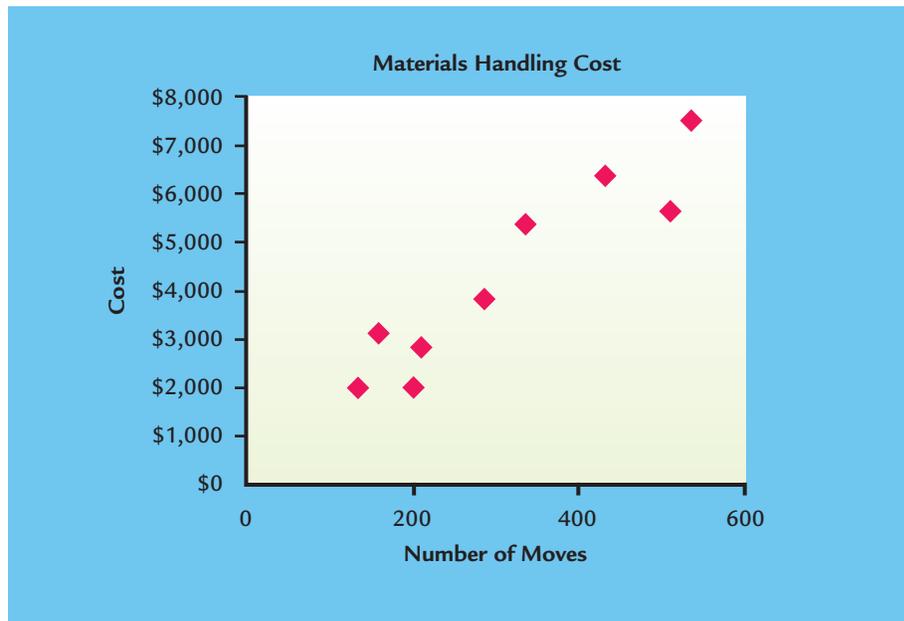
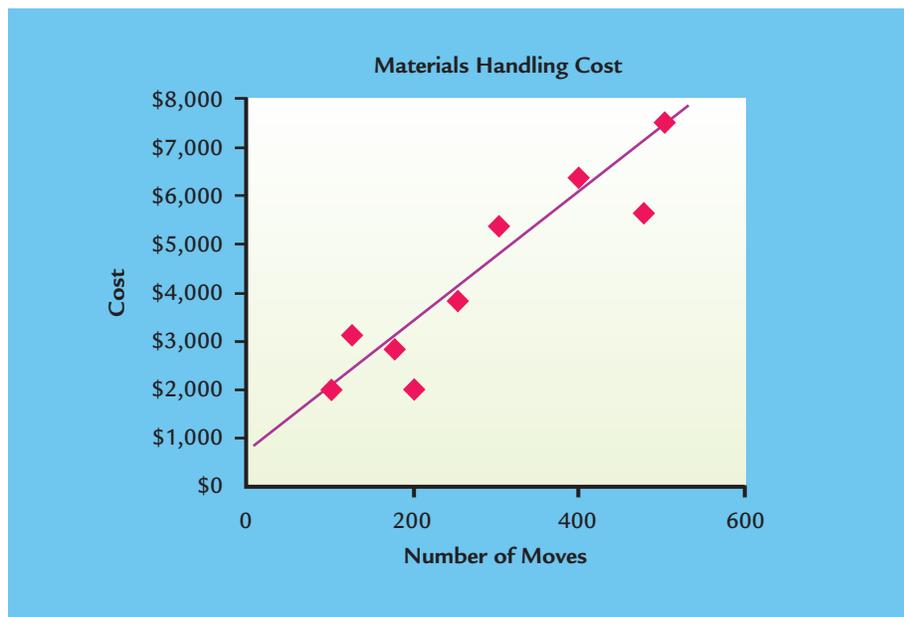


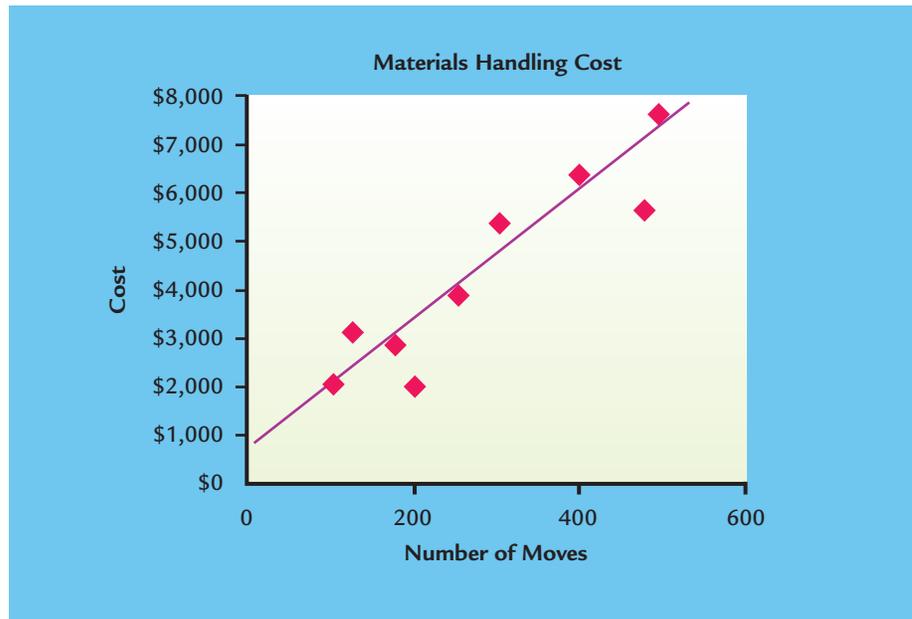
Exhibit 14-6B

**Scattergraph with the High-Low Cost Line**



## Exhibit 14-6C

## Scattergraph with the Cost Line Fitted by Visual Inspection



Thus the variable rate is \$12 per material move.

The fixed cost and variable rate for materials handling cost have now been identified. The cost formula for the materials handling activity can be expressed as:

$$\text{Total Cost} = \$800 + \$12 \times \text{Number of Moves}$$

Using this formula, the total cost of materials handling for between 100 and 500 moves can be predicted and then broken down into fixed and variable components. For example, assume that 350 moves are planned for November. Using the cost formula, the predicted cost is \$5,000 [ $\$800 + (\$12 \times 350)$ ]. Of this total cost, \$800 is fixed, and \$4,200 is variable.

A significant advantage of the scattergraph method is that it allows a cost analyst to inspect the data visually. Exhibits 14-7A, B, and C illustrate cost behavior situations that are not appropriate for the simple application of the high-low method.

## Exhibit 14-7A

## Scattergraphs with Nonlinear Cost

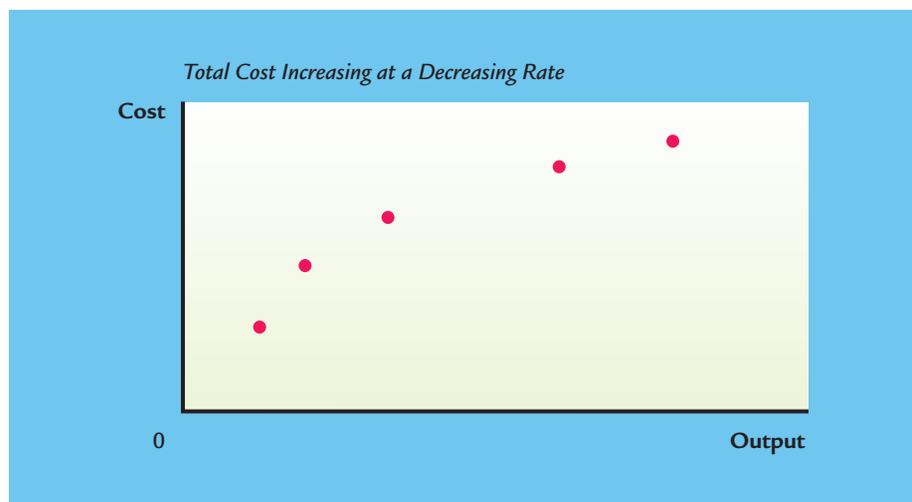


Exhibit 14-7B

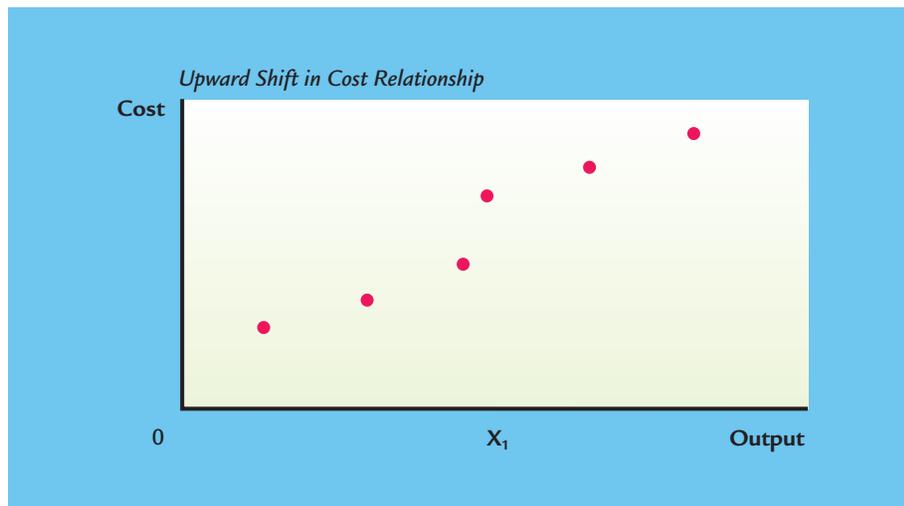


Exhibit 14-7C



Exhibit 14-7A shows a nonlinear relationship between cost and output. An example of this type of relationship is a volume discount given on direct materials or evidence of learning by workers (e.g., as more hours are worked, the total cost increases at a decreasing rate due to the increased efficiency of the workers). Exhibit 14-7B shows an upward shift in cost if more than  $X_1$  units are made—perhaps because an additional supervisor must be hired or a second shift run. Exhibit 14-7C shows outliers that do not represent the overall cost relationship.

The cost formula for materials handling was obtained by fitting a line to two points [(0, \$800) and (100, \$2,000)] in Exhibit 14-6C. Judgment was used to select the line. Whereas one person may decide that the best-fitting line is the one passing through those points, others, using their own judgment, may decide that the best line passes through other pairs of points.

### CONCEPT Q&A

Draw a straight line through the high and low points on each graph in Exhibit 14-7. Can you see that these lines, the high-low lines, could give misleading information on fixed and variable costs?

*Yes, it is quite important to consider the relevant range.*

**Possible Answer:**

The scattergraph method suffers from the lack of any objective criterion for choosing the best-fitting line. The quality of the cost formula depends on the quality of the subjective judgment of the analyst. The high-low method removes the subjectivity in the choice of the line. Regardless of who uses the method, the same line will result.

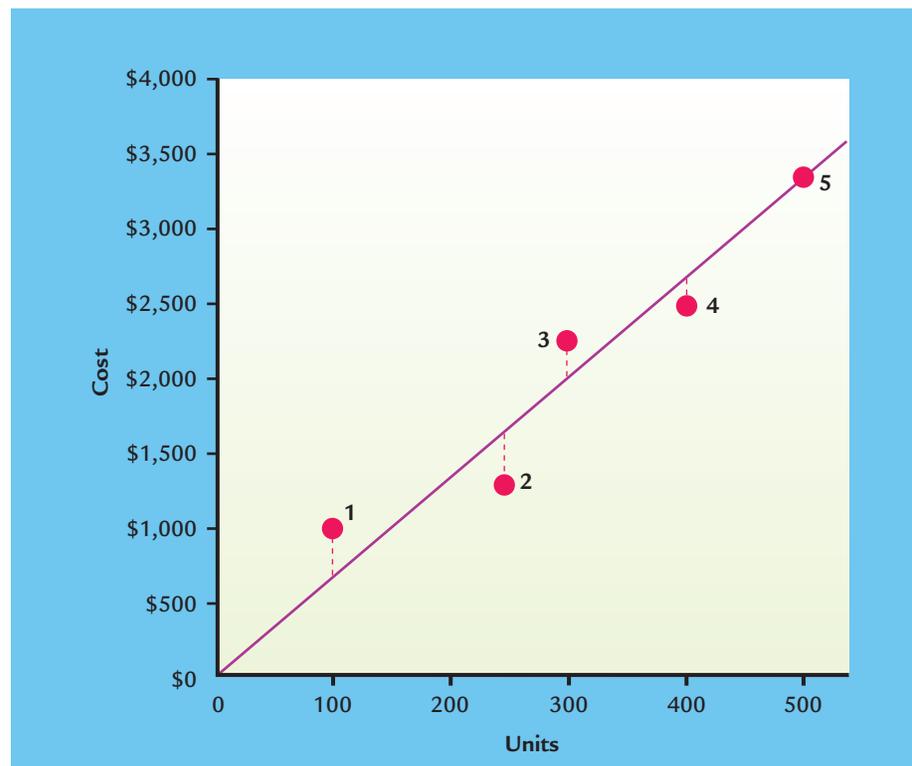
Looking again at Exhibits 14-6B and 14-6C, we can compare the results of the scattergraph method with those of the high-low method. There is a difference between the fixed cost components and the variable rates. The predicted materials handling cost for 350 moves is \$5,000 according to the scattergraph method and \$5,438 according to the high-low method. Which is correct? Since the two methods can produce significantly different cost formulas, the question of which method is the best naturally arises. Ideally, a method that is objective and, at the same time, produces the best-fitting line is needed. Let's take a look at the method of least squares.

### The Method of Least Squares

The **method of least squares (regression)** is a statistical way to find the *best-fitting* line through a set of data points. One advantage of the method of least squares is that for a given set of data, it will always produce the same cost formula. Basically, the best-fitting line is the one in which the data points are closer to the line than to any other line. What do we mean by closest? Let's take a look at Exhibit 14-8. Notice that there are a series of data points and a line—we'll assume that it is the regression line calculated by the method of least squares. The data points do not all lie directly on the line; this is typical. However, the regression line better describes the pattern of the data than other possible lines. This best description results because the squared deviations between the regression line and each data point are, in total, smaller than

Exhibit 14-8

#### Line Deviations



## A Portion of the Summary Output from Excel for Anderson Company

	A	B	C	D	E	F	G	H
1	<b>Coefficients:</b>							
2	<b>Intercept</b>	788.7806						
3	<b>X Variable 1</b>	12.38058						
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								

the sum of the squared deviations of the data points and any other line. The least squares statistical formulas can find the one line with the smallest sum of squared deviations. In other words, this method identifies the regression line that minimizes the cost prediction errors or differences between predicted costs (i.e., on the regression line) and actual costs (i.e., the actual data points). Given that the method of least squares generates the smallest possible cost prediction errors, many managers refer to it as the most accurate method.

Formerly, the method of least squares had to be calculated by hand. It was a complicated and lengthy process. Today, spreadsheet programs for personal computers have regression packages. It is easy to use them to input data and to let the programs calculate the fixed cost and variable rate. Exhibit 14-9 shows a printout from a Microsoft Excel® spreadsheet regression that was run on the data from Anderson Company. Notice that the intercept term is the fixed cost, which is \$789 (rounded). The variable rate is shown as “X Variable 1”; in other words, it is the first independent variable. So, the variable rate is \$12.38 (rounded). We can use the output of regression in budgeting and control the same way that we used the results of the high-low and scattergraph methods.

Suppose that Anderson Company expects the number of moves for November to be 350. Budgeted materials handling cost would be \$5,122, or  $\$789 + (\$12.38 \times 350)$ . Alternatively, suppose the controller wondered whether or not October’s materials handling cost of \$6,240 was reasonably close to what would have been predicted. Our cost formula would predict October cost of \$6,051 (rounded). (This amount is found by multiplying \$12.38 times the 425 actual moves and then adding the fixed cost of \$789.) The actual cost is just \$189 different from the predicted cost and probably would be judged to be reasonably close to the budgeted cost. **Cornerstone 14-5** shows how to use results of regression to construct a cost formula.

## Managerial Judgment

Managerial judgment is critically important in determining cost behavior and is by far the most widely used method in practice. Many managers simply use their experience and past observation of cost relationships to determine fixed and variable costs. This method, however, may take a number of forms. Some managers simply assign some costs to the fixed category and others to the variable category. They ignore the possibility of mixed costs. Thus, a chemical firm may regard materials and utilities as strictly variable, with respect to pounds of chemical produced, and all other costs as



## CORNERSTONE 14-5



### HOW TO Use the Regression Method to Calculate Fixed Cost and the Variable Rate and to Construct a Cost Formula and to Determine Budgeted Cost

#### Information:

BlueDenim Company makes blue jeans. The company controller wanted to calculate the fixed and variable costs associated with electricity used in the factory. Data for the past eight months were collected:

Month	Electricity Cost (\$)	Machine Hours
January	3,255	460
February	3,485	500
March	4,100	600
April	3,300	470
May	3,312	470
June	2,575	350
July	3,910	570
August	4,200	590

Coefficients shown by a regression program are:

Intercept	321
X Variable 1	6.38

#### Required:

Use the results of regression to perform the following.

1. Calculate the fixed cost of electricity and the variable rate per machine hour.
2. Construct the cost formula for total electricity cost.
3. Calculate the budgeted cost for next month, assuming that 550 machine hours are budgeted.

#### Solution:

1. The fixed cost and the variable rate are given directly by regression.

$$\begin{aligned}\text{Fixed cost} &= \$321 \\ \text{Variable rate} &= \$6.38\end{aligned}$$

2. The cost formula is:

$$\text{Total Electricity Cost} = \$321 + (\$6.38 \times \text{Machine Hours})$$

3. Budgeted Electricity Cost =  $\$321 + (\$6.38 \times 550) = \$3,830$

fixed. Even labor, the textbook example of a strictly variable cost, may be fixed for this firm. The appeal of this method is simplicity. Before opting for this method, management would do well to make sure that each cost is predominantly fixed or variable and that the decisions being made are not highly sensitive to errors in classifying costs as fixed or variable.

To illustrate the use of judgment in assessing cost behavior, consider **Elgin Sweeper Company**, a leading manufacturer of motorized street sweepers. Using production volume as the measure of activity output, Elgin revised its chart of accounts to organize costs into fixed and variable components. Elgin's accountants used their knowledge of the company to assign expenses to either a fixed or variable category,

using a decision rule that categorized an expense as fixed if it were fixed 75 percent of the time and as variable if it were variable 75 percent of the time.<sup>3</sup>

Management may instead identify mixed costs and divide these costs into fixed and variable components by deciding what the fixed and variable parts are; that is, they may use experience to say that a certain amount of a cost is fixed and that the rest therefore must be variable. Suppose that a small business had a photocopier with a fixed cost of \$3,000 per year. The variable component could be computed by using one or more cost/volume data points. This approach has the advantage of accounting for mixed costs but is subject to a similar type of error as the strict fixed/variable dichotomy. That is, management may be wrong in its assessment.

Finally, management may use experience and judgment to refine statistical estimation results. Perhaps the experienced manager might “eyeball” the data and throw out several points as being highly unusual or revise the results of estimation to take account of projected changes in cost structure or technology. For example, **Tecnol Medical Products Inc.** radically changed its method of manufacturing medical face masks. Traditionally, face-mask production was labor intensive, requiring hand stitching. Tecnol developed its own highly automated equipment and became the industry’s low cost supplier—besting both **Johnson & Johnson** and **3M**. Tecnol’s rapid expansion into new product lines and European markets means that historical data on costs and revenues are for the most part irrelevant. Tecnol’s management must look forward, not back, to predict the impact of changes on profit.<sup>4</sup> Statistical techniques are highly accurate in depicting the past, but they cannot foresee the future, which of course is what management really wants.

The advantage of using managerial judgment to separate fixed and variable costs is its simplicity. In situations in which the manager has a deep understanding of the firm and its cost patterns, this method can give good results. However, if the manager does not have good judgment, errors will occur. Therefore, it is important to consider the experience of the manager, the potential for error, and the effect that error could have on related decisions.

**ETHICS** There are ethical implications to the use of managerial judgment. Managers use their knowledge of fixed and variable costs to make important decisions, such as whether to switch suppliers, expand or contract production, or lay off workers. These decisions affect the lives of workers, suppliers, and customers. The ethical manager will make sure that he or she has the best information possible when making these decisions. In addition, the manager will not let personal factors affect the use of cost information. For example, suppose that the purchasing department manager has a good friend who wants to supply some materials for production. The price of the materials is slightly lower than that of the current supplier; however, the friend’s company will not ensure 100 percent quality control—and that will lead to additional costs for rework and warranty repair. The ethical manager will include these additional costs along with the purchase price to calculate the full cost of purchasing from the friend’s company. ♦

## CONCEPT Q&A

Suppose that you own a small business with a photocopier that a neighboring business owner asks to use occasionally. What is the average cost of copying one page? What cost items would you include? Now consider Kinko’s: What cost items do you think that it would include?

*electricity and utilities, wages of staff, and so on. of copies, including paper, toner, depreciation on equipment, cost of from time to time. Kinko’s must include all costs in determining the cost copying shop. Alternatively, the neighbor might buy you a ream of paper charge 10¢ to 20¢ per page—a price similar to that of an outside photo- the neighboring business owner used your copier frequently, you might consider it a favor and not charge at all. If it happened several times a month, you might charge the variable cost of paper and toner. Finally, if*

**Possible Answer:**

<sup>3</sup>John P. Callan, Wesley N. Tredup, and Randy S. Wissinger, “Elgin Sweeper Company’s Journey Toward Cost Management,” *Management Accounting* (July 1991): 24–27.

<sup>4</sup>Stephanie Anderson Forest, “Who’s Afraid of J&J and 3M,” *Business Week* (December 5, 1994): 66, 68.

## Summary of Learning Objectives

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- LO1. Explain the meaning of cost behavior, and define and describe fixed and variable costs.**
- Cost behavior is the way a cost changes in relation to changes in activity output.
  - Time horizon is important because costs can change from fixed to variable depending on whether the decision takes place over the short run or the long run.
  - Variable costs change *in total* as the driver, or output measure, changes. Usually, we assume that variable costs increase in direct proportion to increases in activity output.
  - Fixed costs do not change *in total* as activity output changes.
- LO2. Define and describe mixed and step costs.**
- Mixed costs have both a variable and a fixed component.
  - Step costs remain at a constant level of cost for a range of output and then jump to a higher level of cost at some point, where it remains for a similar range of output.
  - Cost objects that display a step cost behavior must be purchased in chunks.
  - The width of the step defines the range of output for which a particular amount of the resource applies.
- LO3. Separate mixed costs into their fixed and variable components using the high-low method, the scattergraph method, and the method of least squares.**
- In the high-low method, only two data points are used—the high point and the low point with respect to activity level. These two points then are used to compute the intercept and the slope of the line on which they lie.
  - The high-low method is objective and easy, but a nonrepresentative high or low point will lead to an incorrectly estimated cost relationship.
  - The scattergraph method involves inspecting a graph showing total mixed cost at various output levels and selecting two points that seem to best represent the relationship between cost and output, and drawing a straight line. The intercept gives an estimate of the fixed cost component and the slope an estimate of the variable cost per unit of activity.
  - The scattergraph method is a good way to identify nonlinearity, the presence of outliers, and the presence of a shift in the cost relationship. Its disadvantage is that it is subjective.
  - The method of least squares uses all of the data points (except outliers) on the scattergraph and produces a line that best fits all of the points.
  - The method of least squares offers ways to assess the reliability of cost equations.
  - Managers use their experience and knowledge of cost and activity-level relationships to identify outliers, understand structural shifts, and adjust parameters due to anticipated changing conditions.

## Summary of Important Equations

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1. Cost formula: Total Cost = Total Fixed Cost + (Variable Rate × Units of Output)
2. Total Variable Cost = Variable Rate × Units of Output

- CORNERSTONE 14-1** How to create and use a cost formula, page 765
- CORNERSTONE 14-2** How to use the high-low method to calculate fixed cost and the variable rate and to construct a cost formula, page 768
- CORNERSTONE 14-3** How to use the high-low method to calculate predicted total variable cost and total cost for budgeted output, page 769
- CORNERSTONE 14-4** How to use the high-low method to calculate predicted total variable cost and total cost for a time period that differs from the data period, page 770
- CORNERSTONE 14-5** How to use the regression method to calculate fixed cost and the variable rate and to construct a cost formula and to determine budgeted cost, page 776



## CORNERSTONES FOR CHAPTER 14

## Key Terms

Committed fixed costs, 759	Method of least squares (regression), 774
Cost behavior, 756	Mixed costs, 762
Dependent variable, 765	Relevant range, 757
Discretionary fixed costs, 759	Scattergraph method, 769
Driver, 756	Semi-variable, 761
Fixed costs, 757	Slope, 765
High-low method, 766	Step cost, 762
Independent variable, 765	Variable costs, 760
Intercept, 765	

## Appendix: Using the Regression Programs

Computing the regression formula manually is tedious, even with only a few data points. As the number of data points increases, manual computation becomes impractical. Fortunately, spreadsheet packages such as Microsoft Excel have regression routines that will perform the computations. All you need to do is input the data. The spreadsheet regression program supplies more than the estimates of the coefficients. It also provides information that can be used to see how reliable the cost equation is—a feature that is not available for the scattergraph and high-low methods.

The first step in using the computer to calculate regression coefficients is to enter the data. Exhibit 14-10 shows the computer screen that you would see if you entered the Anderson Company data on moves into a spreadsheet. It is a good idea to label your variables as is done in the exhibit. That is, the months are labeled, as are column B for moving costs and column C for number of moves. The next step is to run the regression. In Excel, the regression routine is located under the tools menu (located toward the top right of the screen). When you pull down the tools menu, you will see other menu possibilities. Choose add in, and then add the data analysis tools. When the data analysis tools have been added, data analysis will appear at the bottom of the tools menu; click on data analysis and then on regression.

When the regression screen pops up, you can tell the program where the dependent and independent variables are located. Simply place the cursor at the beginning of the independent rectangle and then (again using the cursor) block the values

### OBJECTIVE > 4

Use a personal computer spreadsheet program to perform the method of least squares.

## Exhibit 14-10

## Spreadsheet Data for Anderson Company

Month	Cost	# Moves
January	\$2,000	100
February	3,090	125
March	2,780	175
April	1,990	200
May	7,500	500
June	5,300	300
July	3,800	250
August	6,300	400
September	5,600	475

under the independent variable column—in this case, cells c2 through c10. Then, move the cursor to the beginning of the dependent rectangle, and block the values in cells b2 through b10. Finally, you need to tell the computer where to place the output. Block a nice-size rectangle, say cells a13 through f 20, and click on OK. In less than the blink of an eye, the regression output is complete. The regression output is shown in Exhibit 14-11.

Now, let's take a look at the output in Exhibit 14-11. First, let's locate the fixed cost and variable rate coefficients. At the bottom of the exhibit, the intercept and X Variable 1 are shown, and the next column gives their coefficients. Rounding, the fixed cost is 789 and the variable rate is 12.38. Now we can construct the cost formula for materials handling cost. It is:

$$\text{Materials Handling Cost} = \$789 + (\$12.38 \times \text{Number of Moves})$$

We can use this formula to predict the materials handling cost for future months as we did with the formulas for the high-low and scattergraph methods.

Since the regression cost formula is the best-fitting line, it should produce better predictions of materials handling costs. For 350 moves, the total materials handling cost predicted by the least squares line is \$5,122 [ $\$789 + (\$12.38 \times 350)$ ], with a fixed component of \$789 plus a variable component of \$4,333. Using this prediction as a standard, the scattergraph line most closely approximates the least squares line.

## Exhibit 14-11

## Regression Output for Anderson Company

SUMMARY OUTPUT	
<b>Regression Statistics</b>	
Multiple R	0.92436
R Square	0.854442
Standard Error	810.1969
Observations	9
<b>Coefficients</b>	
Intercept	788.7806
X Variable 1	12.38058

While the computer output in Exhibit 14-11 can give us the fixed and variable cost coefficients, its major usefulness lies in its ability to provide information about reliability of the estimated cost formula. This is a feature not provided by either the scattergraph or high-low methods.

## Goodness of Fit

Regression routines provide information on goodness of fit. Goodness of fit tells us how well the independent variable predicts the dependent variable. This information can be used to assess reliability of the estimated cost formula, a feature not provided by either the scattergraph or high-low methods. The printout in Exhibit 14-11 provides a wealth of statistical information. However, we will look at just one more feature—the coefficient of determination, or  $R^2$ . (The remaining information is discussed in statistics classes and higher-level accounting classes.)

The Anderson Company example suggests that the number of moves can explain changes in materials handling costs. The scattergraph shown in Exhibit 14-6A confirms this belief because it reveals that materials handling costs and activity output (as measured by number of moves) seem to move together. It is quite likely that a significant percentage of the total variability in cost is explained by our output variable. We can determine statistically just how much variability is explained by looking at the coefficient of determination. The percentage of variability in the dependent variable explained by an independent variable (in this case, a measure of activity output) is called the **coefficient of determination ( $R^2$ )**. The higher the percentage of cost variability explained, the better job the independent variable does of explaining the dependent variable. Since  $R^2$  is the percentage of variability explained, it always has a value between 0 and 1.00. In the printout in Exhibit 14-11, the coefficient of determination is labeled R Square ( $R^2$ ). The value given is 0.85 (rounded), which means that 85 percent of the variability in the materials handling cost is explained by the number of moves. How good is this result? There is no cutoff point for a good versus bad coefficient of determination. Clearly, the closer  $R^2$  is to 1.00, the better. Is 85 percent good enough? How about 73 percent? Or even 46 percent? The answer is that it depends. If your cost equation yields a coefficient of determination of 75 percent, you know that your independent variable explains three-fourths of the variability in cost. You also know that some other factor or combination of factors explains the remaining one-fourth. Depending on your tolerance for error, you may want to improve the equation by trying different independent variables (e.g., materials handling hours worked rather than number of moves) or by trying multiple regression. (Multiple regression uses two or more independent variables. This topic is saved for later courses.)

We note from the computer output in Exhibit 14-11 that the  $R^2$  for materials handling cost is 0.85. In other words, material moves explain about 85 percent of the variability in the materials handling cost. This is not bad. However, something else explains the remaining 15 percent. Anderson Company's controller may want to keep this in mind when using the regression results.

## Appendix: Summary of Learning Objectives

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LO4. Use a personal computer spreadsheet program to perform the method of least squares.

## Key Term for Appendix

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Coefficient of determination ( $R^2$ ), 781

## Review Problem

Kim Wilson, controller for Max Enterprises, has decided to estimate the fixed and variable components associated with the company's shipping activity. She has collected the following data for the past six months:

Packages Shipped	Total Shipping Costs (\$)
10	800
20	1,100
15	900
12	900
18	1,050
25	1,250

### Required:

1. Estimate the fixed and variable components for the shipping costs using the high-low method. Using the cost formula, predict the total cost of shipping if 14 packages are shipped.
2. Estimate the fixed and variable components using the method of least squares. Using the cost formula, predict the total cost of shipping if 14 packages are shipped.
3. (Appendix) For the method of least squares, explain what the coefficient of determination tells us.

### Solution:

1. The estimate of fixed and variable costs using the high-low method is as follows:

$$\begin{aligned} \text{Variable Rate} &= (\$1,250 - \$800)/(25 - 10) \\ &= \$450/15 \\ &= \$30 \text{ per Package} \\ \text{Fixed Amount} &= \$1,250 - \$30(25) = \$500 \\ \text{Total Cost} &= \$500 + \$30X \\ &= \$500 + \$30(14) \\ &= \$920 \end{aligned}$$

2. The output of a spreadsheet regression routine is as follows:  
Regression output:

Constant	509.911894273125
Std Err of Y Est	32.1965672507378
R Squared	0.96928536465981
4	
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	29.4052863436125
Std Err of Coef	2.61723229918858
Y = \$509.91 + \$29.41(14) = \$921.65	

3. The coefficient of determination ( $R^2$ ) tells us that about 96.9 percent of total shipping cost is explained by the number of packages shipped.

## Discussion Questions

1. Why is knowledge of cost behavior important for managerial decision making? Give an example to illustrate your answer.
2. What is a driver? Give an example of a cost and its corresponding output measure or driver.

3. Suppose a company finds that shipping cost is \$3,560 each month plus \$6.70 per package shipped. What is the cost formula for monthly shipping cost? Identify the independent variable, the dependent variable, the fixed cost per month, and the variable rate.
4. Some firms assign mixed costs to either the fixed or variable cost categories without using any formal methodology to separate them. Explain how this practice can be defended.
5. Explain the difference between committed and discretionary fixed costs. Give examples of each.
6. Explain why the concept of relevant range is important when dealing with step costs.
7. Why do mixed costs pose a problem when it comes to classifying costs into fixed and variable categories?
8. Describe the cost formula for a strictly fixed cost such as depreciation of \$15,000 per year.
9. Describe the cost formula for a strictly variable cost such as electrical power cost of \$1.15 per machine hour (i.e., every hour the machinery is run, electrical power cost goes up by \$1.15).
10. What is the scattergraph method, and why is it used? Why is a scattergraph a good first step in separating mixed costs into their fixed and variable components?
11. Describe how the scattergraph method breaks out the fixed and variable costs from a mixed cost. Now describe how the high-low method works. How do the two methods differ?
12. What are the advantages of the scattergraph method over the high-low method? The high-low method over the scattergraph method?
13. Describe the method of least squares. Why is this method better than either the high-low method or the scattergraph method?
14. What is meant by the best-fitting line?
15. Explain the meaning of the coefficient of determination.

## Multiple-Choice Exercises

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**14-1** A factor that causes or leads to a change in a cost or activity is a(n):

- a. driver.
- b. intercept.
- c. slope.
- d. variable term.
- e. cost object.

**14-2** Which of the following would probably be a variable cost in a soda bottling plant?

- a. Direct labor
- b. Bottles
- c. Carbonated water
- d. Power to run the bottling machine
- e. All of the above

**14-3** Which of the following would probably be a fixed cost in an automobile insurance company?

- a. Application forms
- b. Time spent by adjusters to evaluate accidents
- c. The salary of customer service representatives
- d. All of the above

**14-4** The following cost formula was developed by using monthly data for a hospital.

$$\text{Total Cost} = \$51,400 + (\$125 \times \text{Number of Patient Days})$$

The term \$51,400:

- is the variable rate.
- is the intercept.
- is the dependent variable.
- is the independent variable.
- cannot be determined from the above formula.

**14-5** The following cost formula was developed using monthly data for a hospital.

$$\text{Total Cost} = \$51,400 + (\$125 \times \text{Number of Patient Days})$$

The term \$125:

- is the variable rate.
- is the intercept.
- is the dependent variable.
- is the independent variable.
- cannot be determined from the above formula.

**14-6** The following cost formula was developed using monthly data for a hospital.

$$\text{Total Cost} = \$51,400 + (\$125 \times \text{Number of Patient Days})$$

The term “Number of patient days”:

- is the variable rate.
- is the intercept.
- is the dependent variable.
- is the independent variable.
- cannot be determined from the above formula.

**14-7** The following cost formula was developed using monthly data for a hospital.

$$\text{Total Cost} = \$51,400 + (\$125 \times \text{Number of Patient Days})$$

The term “Total cost”:

- is the variable rate.
- is the intercept.
- is the dependent variable.
- is the independent variable.
- cannot be determined from the above formula.

**14-8** The following cost formula for total purchasing cost in a factory was developed using monthly data.

$$\text{Purchasing Cost} = \$123,800 + (\$15 \times \text{Number of Purchase Orders})$$

Next month, 2,000 purchase orders are predicted. The total cost predicted for the purchasing department next month:

- a. is \$2,000.
- b. is \$153,800.
- c. is \$30,000.
- d. is \$123,800.
- e. cannot be determined from the above formula.

**14-9** An advantage of the high-low method is that it:

- a. is objective.
- b. is subjective.
- c. is the most accurate method.
- d. removes outliers.
- e. is descriptive of nonlinear data.

**14-10** The following six months of data were collected on maintenance cost and the number of machine hours in a factory:

Month	Maintenance Cost (\$)	Machine Hours
January	16,900	5,600
February	13,900	4,500
March	10,900	3,800
April	11,450	3,700
May	13,050	4,215
June	16,990	4,980

Select the independent and dependent variables.

Independent Variable	Dependent Variable
a. Maintenance cost	Machine hours
b. Machine hours	Maintenance cost
c. Maintenance cost	Month
d. Machine hours	Month
e. Month	Maintenance cost

**14-11** The following six months of data were collected on maintenance cost and the number of machine hours in a factory:

Month	Maintenance Cost (\$)	Machine Hours
January	16,900	5,600
February	13,900	4,500
March	10,900	3,800
April	11,450	3,700
May	13,050	4,215
June	16,990	4,980

Select the correct set of high and low months.

High	Low
a. January	April
b. January	March
c. June	March
d. June	April

**14-12** An advantage of the scattergraph method is that it:

- a. is objective.
- b. is easier to use than the high-low method.
- c. is the most accurate method.
- d. removes outliers.
- e. is descriptive of nonlinear data.

**14-13** The cost formula for monthly supervisory cost in a factory:

$$\text{Total Cost} = \$4,500$$

**This cost:**

- is strictly variable.
- is strictly fixed.
- is a mixed cost.
- is a step cost.
- cannot be determined from this information.

**14-14 (Appendix)** In the method of least squares, the coefficient that tells the percentage of variation in the dependent variable that is explained by the independent variable is:

- the intercept term.
- the x-coefficient.
- the coefficient of correlation.
- the coefficient of determination.
- none of the above.

## Cornerstone Exercises

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**OBJECTIVE** > **3**
**CORNERSTONE 14-1**
**Cornerstone Exercise 14-15 CREATING AND USING A COST FORMULA**

Big Thumbs Company manufactures portable flash drives for computers. Big Thumbs incurs monthly depreciation costs of \$15,000 on its plant equipment and monthly advertising costs of \$3,000 to place advertisements in magazines. Also, each drive requires materials and manufacturing overhead resources. On average, the company uses 10,000 ounces of materials to manufacture 5,000 flash drives per month. Each ounce of material costs \$3.00. In addition, manufacturing overhead resources are driven by machine hours. On average, the company incurs \$22,500 of manufacturing overhead resources to produce 5,000 flash drives per month.

**Required:**

- Create a formula for the monthly cost of flash drives for Big Thumbs.
- If the department expects to manufacture 6,000 flash drives next month, what is the expected fixed cost (assume that 6,000 units is within the company's current relevant range)? Total variable cost? Total manufacturing cost (i.e., both fixed and variable)?

**OBJECTIVE** > **3**
**CORNERSTONE 14-2**
**Cornerstone Exercise 14-16 USING HIGH-LOW TO CALCULATE FIXED COST, CALCULATE THE VARIABLE RATE, AND CONSTRUCT A COST FUNCTION**

Pizza Vesuvio makes specialty pizzas. Vesuvio's controller wants to calculate the fixed and variable costs associated with labor used in the restaurant. Data for the past eight months were collected:

Month	Labor Cost (\$)	Employee Hours
January	7,000	360
February	8,140	550
March	9,010	585
April	9,787	610
May	8,490	480
June	2,450	350
July	9,490	570
August	7,531	310

**Required:**

Using the high-low method, calculate the fixed cost of labor, calculate the variable rate per employee hour, and construct the cost formula for total labor cost.

**Cornerstone Exercise 14-17 USING HIGH-LOW TO CALCULATE PREDICTED TOTAL VARIABLE COST AND TOTAL COST FOR BUDGETED OUTPUT****OBJECTIVE** > **3**  
**CORNERSTONE 14-3**

Refer to the Pizza Vesuvio company information in **Cornerstone Exercise 14-16**. Assume that Pizza Vesuvio used this information to construct the following formula for monthly labor cost.

$$\text{Total Labor Cost} = \$5,200 + (\$7.52 \times \text{Employee Hours})$$

**Required:**

Assume that 675 employee hours are budgeted for the month of September. Use the total labor cost formula for the following calculations:

1. Calculate total variable labor cost for September.
2. Calculate total labor cost for September.

**Cornerstone Exercise 14-18 USING HIGH-LOW TO CALCULATE PREDICTED TOTAL VARIABLE COST AND TOTAL COST FOR A TIME PERIOD THAT DIFFERS FROM THE DATA PERIOD****OBJECTIVE** > **3**  
**CORNERSTONE 14-4**

Refer to the Pizza Vesuvio company information in **Cornerstone Exercise 14-16**. Assume that Pizza Vesuvio used this information to construct the following formula for monthly labor cost.

$$\text{Total Labor Cost} = \$5,200 + (\$7.52 \times \text{Employee Hours})$$

**Required:**

Assume that 4,000 employee hours are budgeted for the coming year. Use the total labor cost formula to make the following calculations:

1. Calculate total variable labor cost for the year.
2. Calculate total fixed labor cost for the year.
3. Calculate total labor cost for the coming year.

**Cornerstone Exercise 14-19 USING REGRESSION TO CALCULATE FIXED COST, CALCULATE THE VARIABLE RATE, CONSTRUCT A COST FORMULA, AND DETERMINE BUDGETED COST****OBJECTIVE** > **3**  
**CORNERSTONE 14-5**

Refer to the Pizza Vesuvio company information in **Cornerstone Exercise 14-16**. Coefficients shown by a regression program for this data are:

Intercept	1,145
X Variable	13.82

**Required:**

Use the results of regression to make the following calculations:

1. Calculate the fixed cost of labor and the variable rate per employee hour.
2. Construct the cost formula for total labor cost.
3. Calculate the budgeted cost for next month, assuming that 675 employee hours are budgeted. Round answers to the nearest dollar.

**Exercises****Exercise 14-20 VARIABLE AND FIXED COSTS****OBJECTIVE** > **1**

What follows are a number of resources that are used by a manufacturer of futons. Assume that the output measure or cost driver is the number of futons produced. All direct labor is paid on an hourly basis, and hours worked can be easily changed by management. All other factory workers are salaried.

- Power to operate a drill (to drill holes in the wooden frames of the futons)
- Cloth to cover the futon mattress
- Salary of the factory receptionist
- Cost of food and decorations for the annual Fourth of July party for all factory employees
- Fuel for a forklift used to move materials in a factory
- Depreciation on the factory
- Depreciation on a forklift used to move partially completed goods
- Wages paid to workers who assemble the futon frame
- Wages paid to workers who maintain the factory equipment
- Cloth rags used to wipe the excess stain off the wooden frames

**Required:**

Classify the resource costs as variable or fixed.

**OBJECTIVE** > **1** **Exercise 14-21 COST BEHAVIOR, CLASSIFICATION**

Smith Concrete Company owns enough ready-mix trucks to deliver up to 100,000 cubic yards of concrete per year (considering each truck's capacity, weather, and distance to each job). Total truck depreciation is \$200,000 per year. Raw materials (cement, gravel, and so on) cost about \$25 per cubic yard of cement.

**Required:**

- Prepare a graph for truck depreciation. Use the vertical axis for cost and the horizontal axis for cubic yards of cement.
- Prepare a graph for raw materials. Use the vertical axis for cost and the horizontal axis for cubic yards of cement.
- Assume that the normal operating range for the company is 90,000 to 96,000 cubic yards per year. Classify truck depreciation and raw materials as variable or fixed costs.

**OBJECTIVE** > **1** **Exercise 14-22 CLASSIFYING COSTS AS FIXED AND VARIABLE IN A SERVICE ORGANIZATION**

Alva Community Hospital has five laboratory technicians who are responsible for doing a series of standard blood tests. Each technician is paid a salary of \$30,000. The lab facility represents a recent addition to the hospital and cost \$300,000. It is expected to last 20 years. Equipment used for the testing cost \$10,000 and has a life expectancy of five years. In addition to the salaries, facility, and equipment, Alva expects to spend \$200,000 for chemicals, forms, power, and other supplies. This \$200,000 is enough for 200,000 blood tests.

**Required:**

Assuming that the driver (measure of output) for each type of cost is the number of blood tests run, classify the costs by completing the following table. Put a check mark in the appropriate box for variable cost, discretionary fixed cost, or committed fixed cost.

Cost Category	Variable Cost	Discretionary Fixed Cost	Committed Fixed Cost
Technician salaries			
Laboratory facility			
Laboratory equipment			
Chemicals and other supplies			

**OBJECTIVE** > **1** **Exercise 14-23 COST BEHAVIOR**

Alisha Incorporated manufactures medical stints for use in heart bypass surgery. Based on past experience, Alisha has found that its total maintenance costs can be represented by the following formula: Maintenance cost = \$310,000 + \$18.50X, where X = Number of heart stints. Last year, Alisha produced 150,000 stints. Actual maintenance costs for the year were as expected. Round all answers to two decimal places.

**Required:**

1. What is the total maintenance cost incurred by Alisha last year?
2. What is the total fixed maintenance cost incurred by Alisha last year?
3. What is the total variable maintenance cost incurred by Alisha last year?
4. What is the maintenance cost per unit produced?
5. What is the fixed maintenance cost per unit?
6. What is the variable maintenance cost per unit?

**Exercise 14-24 COST BEHAVIOR****OBJECTIVE** > **1**

Refer to the Alisha Incorporated information in **Exercise 14-23**. However, now assume that Alisha produced 80,000 thermometers (rather than 150,000). Round all answers to two decimal places.

**Required:**

1. What is the total maintenance cost incurred by Alisha last year?
2. What is the total fixed maintenance cost incurred by Alisha last year?
3. What is the total variable maintenance cost incurred by Alisha last year?
4. What is the maintenance cost per unit produced?
5. What is the fixed maintenance cost per unit?
6. What is the variable maintenance cost per unit?

**Exercise 14-25 STEP COSTS, RELEVANT RANGE****OBJECTIVE** > **2**

Bellati Inc. produces large industrial machinery. Bellati has a machining department and a group of direct laborers called machinists. Each machinist is paid \$50,000 and can machine up to 500 units per year. Bellati also hires supervisors to develop machine specification plans and to oversee production within the machining department. Given the planning and supervisory work, a supervisor can oversee, at most, three machinists. Bellati's accounting and production history shows the following relationships between number of units produced and the costs of materials handling and supervision (measured on an annual basis):

Units Produced	Direct Labor (\$)	Supervision (\$)
0–500	36,000	40,000
501–1,000	72,000	40,000
1,001–1,500	108,000	40,000
1,501–2,000	144,000	80,000
2,001–2,500	180,000	80,000
2,501–3,000	216,000	80,000
3,001–3,500	252,000	120,000
3,501–4,000	288,000	120,000

**Required:**

1. Prepare a graph that illustrates the relationship between direct labor cost and number of units produced in the machining department. (Let cost be the vertical axis and number of units produced the horizontal axis.) Would you classify this cost as a strictly variable cost, a fixed cost, or a step cost?
2. Prepare a graph that illustrates the relationship between the cost of supervision and the number of units produced. (Let cost be the vertical axis and number of units produced the horizontal axis.) Would you classify this cost as a strictly variable cost, a fixed cost, or a step cost?
3. Suppose that the normal range of activity is between 1,400 and 1,500 units and that the exact number of machinists are currently hired to support this level of activity. Further suppose that production for the next year is expected to increase by an additional 500 units. By how much will the cost of direct labor increase? Cost of supervision?

**Exercise 14-26 MIXED COSTS****OBJECTIVE** > **2**

Ben Palman owns an art gallery. He accepts paintings and sculpture on consignment and then receives 20 percent of the price of each piece as his fee. Space is limited, and there

are costs involved, so Ben is careful about accepting artists. When he does accept one, he arranges for an opening show (usually for three hours on a weekend night) and sends out invitations to his customer list. At the opening, he serves wine, soft drinks, and appetizers to create a comfortable environment for prospective customers to view the new works and to chat with the artist. On average, each opening costs \$500. Ben has given as many as 20 opening shows in a year. The total cost of running the gallery, including rent, furniture and fixtures, utilities, and a part-time assistant, amounts to \$80,000 per year.

**Required:**

1. Prepare a graph that illustrates the relationship between the cost of giving opening shows and the number of opening shows given. (Let opening show cost be the vertical axis and number of opening shows given the horizontal axis.) Would you classify this cost as a strictly variable cost, a fixed cost, or a mixed cost?
2. Prepare a graph that illustrates the relationship between the cost of running the gallery and the number of opening shows given. (Let gallery cost be the vertical axis and number of opening shows given the horizontal axis.) Would you classify this cost as a strictly variable cost, a fixed cost, or a mixed cost?
3. Prepare a graph that illustrates the relationship between Ben's total costs (the sum of the costs of giving opening shows and running the gallery) and the number of opening shows given. (Let total cost be the vertical axis and number of opening shows given the horizontal axis.) Would you classify this cost as a strictly variable cost, a fixed cost, or a mixed cost?

**OBJECTIVE** > **3** **Exercise 14-27 MIXED COSTS AND COST FORMULA**

Refer to the Ben Palman art gallery information in **Exercise 14-26**.

**Required:**

1. Assume that the cost driver is number of opening shows. Develop the cost formula for the gallery's costs for a year.
2. Using the formula developed in Requirement 1, what is the total cost for Ben in a year with 12 opening shows? With 14 opening shows?

**OBJECTIVE** > **3** **Exercise 14-28 HIGH-LOW METHOD**

Luisa Crimini has been operating a beauty shop in a college town for the past 10 years. Recently, Luisa rented space next to her shop and opened a tanning salon. She anticipated that the costs for the tanning service would primarily be fixed but found that tanning salon costs increased with the number of appointments. Costs for this service over the past eight months are as follows:

Month	Tanning Appointments	Total Cost (\$)
January	700	1,758
February	2,000	2,140
March	3,100	2,790
April	2,500	2,400
May	1,500	1,800
June	2,300	2,275
July	2,150	2,200
August	3,000	2,640

**Required:**

1. Which month represents the high point? The low point?
2. Using the high-low method, compute the variable rate for tanning. Compute the fixed cost per month.
3. Using your answers to Requirement 2, write the cost formula for tanning services.
4. Calculate the total predicted cost of tanning services for September for 2,500 appointments using the formula found in Requirement 3. Of that total cost, how much is the total fixed cost for September? How much is the total predicted variable cost for September?

**Exercise 14-29 SCATTERGRAPH METHOD****OBJECTIVE** > **3**

Refer to the Luisa Crimini company information in **Exercise 14-28**.

**Required:**

Prepare a scattergraph based on Luisa's data. Use cost for the vertical axis and number of tanning appointments for the horizontal. Based on an examination of the scattergraph, does there appear to be a linear relationship between the cost of tanning services and the number of appointments?

**Exercise 14-30 METHOD OF LEAST SQUARES****OBJECTIVE** > **3**

Refer to the Luisa Crimini company information in **Exercise 14-28**.

**Required:**

1. Compute the cost formula for tanning services using the results from the method of least squares.
2. Using the formula computed in Requirement 1, what is the predicted cost of tanning services for September for 2,500 appointments?

**Exercise 14-31 HIGH-LOW METHOD, COST FORMULAS****OBJECTIVE** > **3**

During the past year, the high and low use of three different resources for Fly High Airlines occurred in July and April. The resources are airplane depreciation, fuel, and airplane maintenance. The number of airplane flight hours is the driver. The total costs of the three resources and the related number of airplane flight hours are as follows:



Resource	Airplane Flight Hours	Total Cost (\$)
Airplane depreciation:		
High	44,000	18,000,000
Low	28,000	18,000,000
Fuel:		
High	44,000	445,896,000
Low	28,000	283,752,000
Airplane maintenance:		
High	44,000	15,792,000
Low	28,000	11,504,000

**Required:**

Use the high-low method to answer the following questions.

1. What is the variable rate for airplane depreciation? The fixed cost?
2. What is the cost formula for airplane depreciation?
3. What is the variable rate for fuel? The fixed cost?
4. What is the cost formula for fuel?
5. What is the variable rate for airplane maintenance? The fixed cost?
6. What is the cost formula for airplane maintenance?
7. Using the three cost formulas that you developed, predict the cost of each resource in a month with 36,000 airplane flight hours.

**Exercise 14-32 CHANGING THE COST FORMULA FOR A MONTH TO THE COST FORMULA FOR A YEAR****OBJECTIVE** > **3**

Refer to the Fly High Airlines company information in **Exercise 14-31**.

**Required:**

1. Develop annual cost formulas for airplane depreciation, fuel, and airplane maintenance.
2. Using the three annual cost formulas that you developed, predict the cost of each resource in a year with 480,000 airline flight hours.

**OBJECTIVE** > **3** **Exercise 14-33 METHOD OF LEAST SQUARES, DEVELOPING AND USING THE COST FORMULA**

The method of least squares was used to develop a cost equation to predict the cost of receiving. Ninety-six data points from monthly data were used for the regression. The following computer output was received:

Intercept	23,100
Slope	316

The driver used was number of parts inspected.

**Required:**

1. What is the cost formula?
2. Using the cost formula from Requirement 1, identify each of the following: independent variable, dependent variable, variable rate, and fixed cost per month.
3. Using the cost formula, predict the cost of parts inspection for a month in which 2,500 parts are inspected.

**OBJECTIVE** > **3** **Exercise 14-34 METHOD OF LEAST SQUARES, BUDGETED TIME PERIOD IS DIFFERENT FROM TIME PERIOD USED TO GENERATE RESULTS**

Refer to the company information in **Exercise 14-33**.

**Required:**

1. What is the cost formula for a year?
2. Using the cost formula from Requirement 1, predict the cost of parts inspection for a year in which 29,000 parts are inspected.

**OBJECTIVE** > **3** **Exercise 14-35 IDENTIFYING THE PARTS OF THE COST FORMULA; CALCULATING MONTHLY, QUARTERLY, AND YEARLY COSTS USING A COST FORMULA BASED ON MONTHLY DATA**

Gordon Company's controller, Eric Junior, estimated the following formula, based on monthly data, for overhead cost:

$$\text{Overhead Cost} = \$109,743 + (\$80.75 \times \text{Direct Labor Hours})$$

**Required:**

1. Link each term in column A to the corresponding term in column B.

Column A	Column B
Overhead cost	Variable rate (slope)
\$109,743	Independent variable
\$80.75	Fixed cost (intercept)
Direct labor hours	Dependent variable

2. If next month's budgeted direct labor hours equal 5,000, what is the budgeted overhead cost?
3. If next quarter's budgeted direct labor hours equal 18,000, what is the budgeted overhead cost?
4. If next year's budgeted machine hours equal 58,000, what is the budgeted overhead cost?

**OBJECTIVE** > **4** **Exercise 14-36 (APPENDIX) METHOD OF LEAST SQUARES USING COMPUTER SPREADSHEET PROGRAM**

The controller for Beckham Company believes that the number of direct labor hours is associated with overhead cost. He collected the following data on the number of direct labor hours and associated factory overhead cost for the months of January through August.

Month	Number of Direct Labor Hours	Overhead Cost (\$)
January	689	5,550
February	700	5,590
March	720	5,650
April	690	5,570
May	680	5,570
June	590	5,410
July	750	5,720
August	675	5,608

**Required:**

- Using a computer spreadsheet program such as Excel, run a regression on these data. Print out your results.
- Using your results from Requirement 1, write the cost formula for overhead cost. (You may round the fixed cost to the nearest dollar and the variable rate to the nearest cent.)
- What is  $R^2$  based on your results? Do you think that the number of direct labor hours is a good predictor of factory overhead cost?
- Assuming that expected September direct labor hours are 700, what is expected factory overhead cost using the cost formula in Requirement 2?

**Exercise 14-37 (APPENDIX) METHOD OF LEAST SQUARES USING  
COMPUTER SPREADSHEET PROGRAM**
**OBJECTIVE** > **4**

Susan Lewis, owner of a florist shop, is interested in predicting the cost of delivering floral arrangements. She collected monthly data on the number of deliveries and the total monthly delivery cost (depreciation on the van, wages of the driver, and fuel) for the past year.

Month	Number of Deliveries	Delivery Cost (\$)
January	100	1,200
February	550	1,800
March	85	1,100
April	115	1,050
May	160	1,190
June	590	1,980
July	500	1,800
August	520	1,700
September	100	1,100
October	200	1,275
November	260	1,400
December	450	2,200

**Required:**

- Using a computer spreadsheet program such as Excel, run a regression on these data. Print out your results.
- Using your results from Requirement 1, write the cost formula for delivery cost. (You may round the fixed cost to the nearest dollar and the variable rate to the nearest cent.)
- What is  $R^2$  based on your results? Do you think that the number of direct labor hours is a good predictor of delivery cost?
- Using the cost formula in Requirement 2, what would predicted delivery cost be for a month with 300 deliveries?

## Problems

### OBJECTIVE > 1 2

#### Problem 14-38 IDENTIFYING FIXED, VARIABLE, MIXED, AND STEP COSTS

Consider each of the following independent situations:

- A computer service agreement in which a company pays \$150 per month and \$15 per hour of technical time.
- Fuel cost of the company's fleet of motor vehicles.
- The cost of beer for a bar.
- The cost of computer of computer printers and copiers in your college.
- Rent for a dental office.
- The salary of a receptionist in a law firm.
- The wages of counter help in a fast-food restaurant.
- The salaries of dental hygienists in a three-dentist office. One hygienist can take care of 120 cleanings per month.
- Electricity cost, which includes a \$15 per month billing charge and an additional amount depending on the number of kilowatt-hours used.

#### Required:

- For each situation, describe the cost as one of the following: fixed cost, variable cost, mixed cost, or step cost. (*Hint:* First, consider what the driver or output measure is. If additional assumptions are necessary to support your cost type decision, be sure to write them down.)

*Example:* Raw materials used in production—Variable cost

- Change your assumption(s) for each situation so that the cost type changes to a different cost type. List the new cost type and the changed assumption(s) that gave rise to it.

*Example:* Raw materials used in production. Changed assumption—the materials are difficult to obtain, and a year's worth must be contracted for in advance. Now, this is a fixed cost. (This is the case with diamond sales by DeBeers Inc. to its sightholders. See the following website for information: <http://www.keyguide.net/sightholders/>.)

### OBJECTIVE > 3

#### Problem 14-39 IDENTIFYING USE OF THE HIGH-LOW, SCATTERGRAPH, AND LEAST SQUARES METHODS

Consider each of the following independent situations:

- Shaniqua Boyer just started her new job as controller for St. Matthias General Hospital. She wants to get a feel for the cost behavior of various departments of the hospital. Shaniqua first looks at the radiology department. She has annual data on total cost and the number of procedures that have been run for the past 15 years. However, she knows that the department upgraded its equipment substantially two years ago and is doing a wider variety of tests. So, Shaniqua decides to use data for just the past two years.
- Francis Hidalgo is a summer intern in the accounting department of a manufacturing firm. His boss assigned him a special project to determine the cost of manufacturing a special order. Francis needs information on variable and fixed overhead, so he gathers monthly data on overhead cost and machine hours for the past 60 months and enters them into his personal computer. A few keystrokes later, he has information on fixed and variable overhead costs.
- Ron Wickstead sighed and studied his computer printout again. The results made no sense to him. He seemed to recall that sometimes it helped to visualize the cost relationships. He reached for some graph paper and a pencil.
- Lois March had hoped that she could find information on the actual cost of promoting new products. Unfortunately, she had spent the weekend going through the files and was only able to find data on the total cost of the sales department by month for the past three years. She was also able to figure out the number of new product

launches by month for the same time period. Now, she had just 15 minutes before a staff meeting in which she needed to give the vice president of sales an expected cost of the average new product launch. A light bulb went off in her head, and she reached for paper, pencil, and a calculator.

**Required:**

Determine which of the following cost separation methods is being used: the high-low method, the scattergraph method, or the method of least squares.

**Problem 14-40 IDENTIFYING VARIABLE COSTS, COMMITTED FIXED COSTS, AND DISCRETIONARY FIXED COSTS**

**OBJECTIVE** > 1

**Required:**

Classify each of the following costs for a jeans manufacturing company as a variable cost, committed fixed cost, or discretionary fixed cost.

- The cost of buttons.
- The cost to lease warehouse space for completed jeans. The lease contract runs for two years at \$5,000 per year.
- The salary of a summer intern.
- The cost of landscaping and mowing the grass. The contract with a local mowing company runs from month to month.
- Advertising in a national magazine for teenage girls.
- Electricity to run the sewing machines.
- Oil and spare needles for the sewing machines.
- Quality training for employees—typically given for four hours at a time, every six months.
- Food and beverages for the company Fourth of July picnic.
- Natural gas to heat the factory during the winter.

**Problem 14-41 SCATTERGRAPH, HIGH-LOW METHOD, AND PREDICTING COST FOR A DIFFERENT TIME PERIOD FROM THE ONE USED TO DEVELOP A COST FORMULA**

**OBJECTIVE** > 3



Farnsworth Company has gathered data on its overhead activities and associated costs for the past 10 months. Tracy Heppler, a member of the controller's department, has convinced management that overhead costs can be better estimated and controlled if the fixed and variable components of each overhead activity are known. One such activity is receiving raw materials (unloading incoming goods, counting goods, and inspecting goods), which she believes is driven by the number of receiving orders. Ten months of data have been gathered for the receiving activity and are as follows:

Month	Receiving Orders	Receiving Cost (\$)
1	1,000	18,000
2	700	15,000
3	1,500	28,000
4	1,200	17,000
5	1,300	25,000
6	1,100	21,000
7	1,600	29,000
8	1,400	24,000
9	1,700	27,000
10	900	16,000

**Required:**

- Prepare a scattergraph based on the 10 months of data. Does the relationship appear to be linear?
- Using the high-low method, prepare a cost formula for the receiving activity. Using this formula, what is the predicted cost of receiving for a month in which 1,450 receiving orders are processed?

(Continued)

- Prepare a cost formula for the receiving activity for a quarter. Based on this formula, what is the predicted cost of receiving for a quarter in which 4,650 receiving orders are anticipated? Prepare a cost formula for the receiving activity for a year. Based on this formula, what is the predicted cost of receiving for a year in which 18,000 receiving orders are anticipated?

**OBJECTIVE** > **3****Problem 14-42 METHOD OF LEAST SQUARES, PREDICTING COST FOR DIFFERENT TIME PERIODS FROM THE ONE USED TO DEVELOP A COST FORMULA**

Refer to the Farnsworth Company information in **Problem 14-41**. However, now assume that Tracy has used the method of least squares on the receiving data and has gotten the following results:

Intercept	3,212
Slope	15.15

**Required:**

- Using the results from the method of least squares, prepare a cost formula for the receiving activity.
- Using the formula from Requirement 1, what is the predicted cost of receiving for a month in which 1,450 receiving orders are processed? (Round your answer to the nearest dollar.)
- Prepare a cost formula for the receiving activity for a quarter. Based on this formula, what is the predicted cost of receiving for a quarter in which 4,650 receiving orders are anticipated? Prepare a cost formula for the receiving activity for a year. Based on this formula, what is the predicted cost of receiving for a year in which 18,000 receiving orders are anticipated?

**OBJECTIVE** > **1** **2** **3****Problem 14-43 COST BEHAVIOR, HIGH-LOW METHOD, PRICING DECISION**

Fonseca, Ruiz, and Dunn is a large, local accounting firm located in a southwestern city. Carlos Ruiz, one of the firm's founders, appreciates the success his firm has enjoyed and wants to give something back to his community. He believes that an inexpensive accounting services clinic could provide basic accounting services for small businesses located in the barrio. He wants to price the services at cost.

Since the clinic is brand new, it has no experience to go on. Carlos decided to operate the clinic for two months before determining how much to charge per hour on an ongoing basis. As a temporary measure, the clinic adopted an hourly charge of \$25, half the amount charged by Fonseca, Ruiz, and Dunn for professional services.

The accounting services clinic opened on January 1. During January, the clinic had 120 hours of professional service. During February, the activity was 150 hours. Costs for these two levels of activity usage are as follows:

	120 Professional Hours (\$)	150 Professional Hours (\$)
Salaries:		
Senior accountant	2,500	2,500
Office assistant	1,200	1,200
Internet and software subscriptions	700	850
Consulting by senior partner	1,200	1,500
Depreciation (equipment)	2,400	2,400
Supplies	905	1,100
Administration	500	500
Rent (offices)	2,000	2,000
Utilities	332	365

**Required:**

- Classify each cost as fixed, variable, or mixed, using hours of professional service as the activity driver.

- Use the high-low method to separate the mixed costs into their fixed and variable components.
- Luz Mondragon, the chief paraprofessional of the clinic, has estimated that the clinic will average 140 professional hours per month. If the clinic is to be operated as a nonprofit organization, how much will it need to charge per professional hour? How much of this charge is variable? How much is fixed?
- Suppose the accounting center averages 170 professional hours per month. How much would need to be charged per hour for the center to cover its costs? Explain why the per-hour charge decreased as the activity output increased.

### Problem 14-44 FLEXIBLE AND COMMITTED RESOURCES, CAPACITY USAGE FOR A SERVICE

OBJECTIVE > 1 2 3

Jana Morgan is about to sign up for cellular telephone service. She is primarily interested in the safety aspect of the phone; that is, she wants to have one available for emergencies. She does not want to use it as her primary phone. Jana has narrowed her options down to two plans:

	Plan 1	Plan 2
Monthly fee	\$20	\$ 30
Free local minutes	60	120
Additional charges per minute:		
Airtime	\$ 0.40	\$ 0.30
Long distance	0.15	—
Regional roaming	0.60	—
National roaming	0.60	0.60

Both plans are subject to a \$25 activation fee and a \$120 cancellation fee if the service is cancelled before one year. Jana's brother will give her a cell phone that he no longer needs. It is not the latest version (and is not Internet capable) but will work well with both plans.

#### Required:

- Classify the charges associated with the cellular phone service as (a) committed resources or (b) flexible resources.
- Assume that Jana will use, on average, 45 minutes per month in local calling. For each plan, split her minute allotment into used and unused capacity. Which plan will be most cost effective? Why?
- Assume that Jana loves her cell phone and ends up talking frequently with friends while traveling within her region. On average, she uses 60 local minutes a month and 30 regional minutes. For each plan, split her minute allotment into used and unused capacity. Which plan will be most cost effective? Why?
- Analyze your own cellular phone plan by comparing it with other possible options.

### Problem 14-45 VARIABLE AND FIXED COSTS, COST FORMULA, HIGH-LOW METHOD

OBJECTIVE > 1 3

Li Ming Yuan and Tiffany Shaden are the department heads for the accounting department and human resources department, respectively, at a large textile firm in the southern United States. They have just returned from an executive meeting at which the necessity of cutting costs and gaining efficiency has been stressed. After talking with Tiffany and some of her staff members, as well as his own staff members, Li Ming discovered that there were a number of costs associated with the claims processing activity. These costs included the salaries of the two paralegals who worked full-time on claims processing; the salary of the accountant who cut the checks; the cost of claims forms, checks, envelopes, and postage; and depreciation on the office equipment dedicated to the processing. Some of the paralegals' time is spent in the routine processing of uncontested claims, but much time is spent on the claims that have incomplete documentation or are contested. The accountant's time appears to vary with the number of claims processed.

Li Ming was able to separate the costs of processing claims from the costs of running the departments of accounting and human resources. He gathered the data on claims

processing cost and the number of claims processed per month for the past six months. These data are as follows:

Month	Claims Processing Cost (\$)	Number of Claims Processed
February	34,907	5,700
March	31,260	4,900
April	37,950	6,100
May	38,250	6,500
June	44,895	7,930
July	44,055	7,514

**Required:**

1. Classify the claims processing costs that Li Ming identified as variable and fixed.
2. What is the independent variable? The dependent variable?
3. Use the high-low method to find the fixed cost per month and the variable rate. What is the cost formula?
4. Suppose that an outside company bids on the claims processing business. The bid price is \$4.60 per claim. If Tiffany expects 75,600 claims next year, should she out-source the claims processing or continue to do it in house?

**OBJECTIVE** > **1** **2**



**Problem 14-46 COST SEPARATION**

About eight years ago, Kicker faced the problem of rapidly increasing costs associated with workplace accidents. The costs included the following:

State unemployment insurance premiums	\$100,000
Average cost per injury	\$1,500
Number of injuries per year	15
Number of serious injuries	4
Number of workdays lost	30

A safety program was implemented with the following features: hiring a safety director, new employee orientation, stretching required four times a day, and systematic monitoring of adherence to the program by directors and supervisors. A year later, the indicators were as follows:

State unemployment insurance premiums	\$50,000
Average cost per injury	\$50
Number of injuries per year	10
Number of serious injuries	0
Number of workdays lost	0
Safety director's starting salary	\$60,000

**Required:**

1. Discuss the safety-related costs listed. Are they variable or fixed with respect to speakers sold? With respect to other independent variables (describe)?
2. Did the safety program pay for itself? Discuss your reasoning.

**OBJECTIVE** > **4**



**Problem 14-47 (APPENDIX) METHOD OF LEAST SQUARES**

Refer to the Farnsworth Company information in **Problem 14-41** for the first 10 months of data on receiving orders and receiving cost. Now suppose that Tracy has gathered two more months of data:

Month	Receiving Orders	Receiving Cost
11	1,200	\$28,000
12	950	\$17,500

For the following requirements, round the intercept terms to the nearest dollar and round the variable rates to the nearest cent.

**Required:**

1. Run two regressions using a computer spreadsheet program such as Excel. First, use the method of least squares on the first 10 months of data. Then, use the method of least squares on all 12 months of data. Write down the results for the intercept, slope, and  $R^2$  for each regression. Compare the results.
2. Prepare a scattergraph using all 12 months of data. Do any points appear to be outliers? Suppose Tracy has learned that the factory suffered severe storm damage during month 11 that required extensive repairs to the receiving area—including major repairs on a forklift. These expenses, included in month 11 receiving costs, are not expected to recur. What step might Tracy, using her judgment, take to amend the results from the method of least squares?
3. Rerun the method of least squares, using all the data except for month 11. (You should now have 11 months of data.) Prepare a cost formula for receiving based on these results, and calculate the predicted receiving cost for a month with 1,450 receiving orders. Discuss the results from this regression versus those from the regression for 12 months of data.

**Problem 14-48 (APPENDIX) SCATTERGRAPH, HIGH-LOW METHOD, METHOD OF LEAST SQUARES, USE OF JUDGMENT**
**OBJECTIVE** > **3** **4**

The management of Wheeler Company has decided to develop cost formulas for its major overhead activities. Wheeler uses a highly automated manufacturing process, and power costs are a significant manufacturing cost. Cost analysts have decided that power costs are mixed; thus, they must be broken into their fixed and variable elements so that the cost behavior of the power usage activity can be properly described. Machine hours have been selected as the activity driver for power costs. The following data for the past eight quarters have been collected:

Quarter	Machine Hours	Power Cost (\$)
1	20,000	26,000
2	25,000	38,000
3	30,000	42,500
4	22,000	37,000
5	21,000	34,000
6	18,000	29,000
7	24,000	36,000
8	28,000	40,000

For the following requirements, round the fixed cost to the nearest dollar and round the variable rates to the nearest cent.

**Required:**

1. Prepare a scattergraph by plotting power costs against machine hours. Does the scattergraph show a linear relationship between machine hours and power cost?
2. Using the high and low points, compute a power cost formula.
3. Use the method of least squares to compute a power cost formula. Evaluate the coefficient of determination.
4. Rerun the regression, and drop the point (20,000, \$26,000) as an outlier. Compare the results from this regression to those for the regression in Requirement 3. Which is better?

**Problem 14-49 (APPENDIX) SEPARATING FIXED AND VARIABLE COSTS, SERVICE SETTING**
**OBJECTIVE** > **3** **4**

Louise McDermott, controller for the Galvin plant of Veromar Inc., wanted to determine the cost behavior of moving materials throughout the plant. She accumulated the following data on the number of moves (from 100 to 800 in increments of 100) and the total cost of moving materials at those levels of moves:

Number of Moves	Total Cost (\$)
100	3,000
200	4,650
300	3,400
400	8,500
500	10,000
600	12,600
700	13,600
800	14,560

**Required:**

1. Prepare a scattergraph based on these data. Use cost for the vertical axis and number of moves for the horizontal. Based on an examination of the scattergraph, does there appear to be a linear relationship between the total cost of moving materials and the number of moves?
2. Compute the cost formula for moving materials by using the high-low method. Calculate the predicted cost for a month with 550 moves by using the high-low formula.
3. Compute the cost formula for moving materials using the method of least squares. Using the regression cost formula, what is the predicted cost for a month with 550 moves? What does the coefficient of determination tell you about the cost formula computed by regression?
4. Evaluate the cost formula using the least squares coefficients. Could it be improved? Try dropping the third data point (300, \$3,400), and rerun the regression.

**Cases****OBJECTIVE** > 1 2 3 4**Case 14-50 COST FORMULAS, SINGLE AND MULTIPLE COST DRIVERS**

For the past five years, Garner Company has had a policy of producing to meet customer demand. As a result, finished goods inventory is minimal, and for the most part, units produced equal units sold.

Recently, Garner's industry entered a recession, and the company is producing well below capacity (and expects to continue doing so for the coming year). The president is willing to accept orders that at least cover their variable costs so that the company can keep its employees and avoid layoffs. Also, any orders above variable costs will increase overall profitability of the company. Toward that end, the president of Garner Company implemented a policy that any special orders will be accepted if they cover the costs that the orders cause.

To help implement the policy, Garner's controller developed the following cost formulas:

$$\begin{aligned}
 \text{Direct material usage} &= \$94X, & R^2 &= 0.90 \\
 \text{Direct labor usage} &= \$16X, & R^2 &= 0.92 \\
 \text{Overhead} &= \$350,000 + \$80X, & R^2 &= 0.56 \\
 \text{Selling costs} &= \$50,000 + \$7X, & R^2 &= 0.86
 \end{aligned}$$

where X = direct labor hours

**Required:**

1. Compute the total unit variable cost. Suppose that Garner has an opportunity to accept an order for 20,000 units at \$212 per unit. Each unit uses one direct labor hour for production. Should Garner accept the order? (The order would not displace any of Garner's regular orders.)
2. (Appendix) Explain the significance of the coefficient of determination measures for the cost formulas. Did these measures have a bearing on your answer in Requirement 1? Should they have a bearing? Why?

3. (Appendix) Suppose that a multiple regression equation is developed for overhead costs:  $Y = \$100,000 + \$85X_1 + \$5,000X_2 + \$300X_3$ , where  $X_1$  = Direct labor hours,  $X_2$  = Number of setups, and  $X_3$  = Engineering hours. The coefficient of determination for the equation is 0.89. Assume that the order of 20,000 units requires 12 setups and 600 engineering hours. Given this new information, should the company accept the special order referred to in Requirement 1? Is there any other information about cost behavior that you would like to have? Explain.

### Case 14-51 SUSPICIOUS ACQUISITION OF DATA, ETHICAL ISSUES

### OBJECTIVE 1

Bill Lewis, manager of the Thomas Electronics Division, called a meeting with his controller, Brindon Peterson, and his marketing manager, Patty Fritz. The following is a transcript of the conversation that took place during the meeting:

**Bill:** Brindon, the variable costing system that you developed has proved to be a big plus for our division. Our success in winning bids has increased, and as a result our revenues have increased by 25 percent. However, if we intend to meet this year's profit targets, we are going to need something extra—am I not right, Patty?

**Patty:** Absolutely. While we have been able to win more bids, we still are losing too many, particularly to our major competitor, Kilborn Electronics. If we knew more about their bidding strategy, we could be more successful at competing with them.

**Brindon:** Would knowing their variable costs help?

**Patty:** Certainly. It would give me their minimum price. With that knowledge, I'm sure that we could find a way to beat them on several jobs, particularly on those jobs where we are at least as efficient. It would also help us to identify where we are not cost competitive. With this information, we might be able to find ways to increase our efficiency.

**Brindon:** Well, I have good news. I've been talking with Carl Penobscot, Kilborn's assistant controller. Carl doesn't feel appreciated by Kilborn and wants to make a change. He could easily fit into our team here. Plus, Carl has been preparing for a job switch by quietly copying Kilborn's accounting files and records. He's already given me some data that reveal bids that Kilborn made on several jobs. If we can come to a satisfactory agreement with Carl, he'll bring the rest of the information with him. We'll easily be able to figure out Kilborn's prospective bids and find ways to beat them. Besides, I could use another accountant on my staff. Bill, would you authorize my immediate hiring of Carl with a favorable compensation package?

**Bill:** I know that you need more staff, Brindon, but is this the right thing to do? It sounds like Carl is stealing those files, and surely Kilborn considers this information confidential. I have real ethical and legal concerns about this. Why don't we meet with Laurie, our attorney, and determine any legal problems?

#### Required:

1. Is Carl's behavior ethical? What would Kilborn think?
2. Is Bill correct in supposing that there are ethical and/or legal problems involved with the hiring of Carl? (Reread the section on corporate codes of conduct in Chapter 13 and read the Institute of Management Accountants "Statement of Ethical Professional Practice" found at [https://www.imanet.org/about\\_ethics\\_statement.asp](https://www.imanet.org/about_ethics_statement.asp).) What would you do if you were Bill? Explain.

# 15

## Cost-Volume-Profit Analysis: A Managerial Planning Tool

After studying Chapter 15, you should be able to:

- **1** Determine the break-even point in number of units and in total sales dollars.
- **2** Determine the number of units that must be sold, and the amount of revenue required, to earn a targeted profit.
- **3** Prepare a profit-volume graph and a cost-volume-profit graph, and explain the meaning of each.
- **4** Apply cost-volume-profit analysis in a multiple-product setting.
- **5** Explain the impact of risk, uncertainty, and changing variables on cost-volume-profit analysis.





# **E**xperience Managerial Decisions with **Boyer Resorts**

**Boyer USA Resorts** owns and operates ski resorts in British Columbia, Washington, Montana, and Michigan, including two of the premier properties east of the Rocky Mountains, Boyer Highlands and Boyer Mountain. These two resort properties are located in Michigan's northern Lower Peninsula near the picturesque village of Petoskey. Boyer earns a significant portion of its revenue from winter skiing. However, winter ski volume is heavily dependent on natural snowfall, which varies significantly from year to year. The business risk associated with such large snowfall variation is likely to continue into the foreseeable future as dramatic climactic changes, such as global warming, continue to occur. As a result, Boyer uses creative thinking along with various cost-volume-profit (CVP) analyses to develop activities that generate additional profit. Consider ski lifts at Boyer Highlands. These are important sources of revenue for the company. What other revenue-generating activities can you think of that Boyer might develop that revolve around such ski lifts? What additional variable and fixed costs might be involved with your activities, and what are the profit implications?

Boyer develops a variety of lift ticket packages to accommodate as many snow skiers and snow boarders as possible. For example, lift tickets are interchangeable

between multiple Boyer properties and can be used during night skiing in certain areas. Like many ski resorts, Boyer markets spring, summer, and fall activities as well. For instance, many resorts promote mountain biking and hiking where participants purchase lift tickets for enclosed lifts, called gondolas, that carry them and their gear to the top of the mountain to begin their descent. Other ski resorts, such as Aspen, build elaborate children's playgrounds and bungee trampolines at the top of the lifts to generate additional summer business in ski areas that might otherwise be dormant during the off season. Still other resorts build elaborate mountaintop restaurants and entertainment areas that can be reached only via ski lifts or gondolas, thereby increasing revenues and profits. Using CVP equations and contribution margin formulas, as well as cost-volume-profit and profit-volume graphs, Boyer spends considerable effort analyzing the revenue, cost, volume, and profit implications of these varied activities. With careful CVP analysis and sound judgment, Boyer attempts to make the best decisions possible to continue its profitability and reputation for fun.



**OBJECTIVE** > 1

Determine the break-even point in number of units and in total sales dollars.

## Break-Even Point in Units and in Sales Dollars

Cost-volume-profit (CVP) analysis estimates how changes in costs (both variable and fixed), sales volume, and price affect a company's profit. CVP is a powerful tool for planning and decision making. In fact, CVP is one of the most versatile and widely applicable tools used by managerial accountants to help managers make better decisions.

You might have read of companies using CVP analysis to reach important benchmarks, such as their break-even point. The **break-even point** is the point where total revenue equals total cost (i.e., the point of zero profit). New start-up companies typically experience losses (negative operating income) initially and view their first break-even period as a significant milestone. For example, online retail pioneer **Amazon.com** was founded in 1994 but did not break even for the first time until the fourth quarter of 2001! Also, managers become very interested in CVP analysis during times of economic trouble. For example, to the dismay of many of its shareholders, **Sirius Satellite Radio** signed shock-jock Howard Stern to a five-year, \$500 million employment contract for joining the young company. As a result of Stern's monstrous contract cost, some analysts estimated that Sirius would need an additional 2.4 million subscribers (i.e., customers) to reach break even. Therefore, CVP analysis helps managers pinpoint problems and find solutions.

CVP analysis can address many other issues as well, such as the number of units that must be sold to break even, the impact of a given reduction in fixed costs on the break-even point, and the impact of an increase in price on profit. Additionally, CVP analysis allows managers to do sensitivity analysis by examining the impact of various price or cost levels on profit.

Since CVP analysis shows how revenues, expenses, and profits behave as volume changes, it is natural to begin by finding the firm's break-even point in units sold.

### Here's The



### Real Kicker

Kicker separates cost into fixed and variable components by using judgment. Because the bulk of manufacturing is outsourced, the cost of a set of speakers starts with the purchase price from the manufacturer. This cost is strictly variable in nature. Additional variable costs include duty (ranging from 9 to 30 percent—electronics are at the high end) and freight, as all units are shipped to Stillwater, Oklahoma, for distribution to customers. In-house labor may be needed at Kicker's Stillwater facilities, and that cost has both fixed (salaried workers) and variable (temporary workers) components.

The entire salaried staff in Stillwater, research and development, depreciation on property, plant and equipment, utilities, and so on, are all fixed.

These fixed and variable costs are used in cost-volume-profit analysis (performed monthly) and in management decision making. For example, the monthly cost-volume-profit figures can be used to monitor the effect of changing volume on profit and spotlight increases in fixed and variable costs. If costs are going up, management finds out about the problem early and can make adjustments.



## Using Operating Income in Cost-Volume-Profit Analysis

Remember from Chapter 13 that operating income is total revenue minus total expense. For the income statement, expenses were classified according to function, that is, the manufacturing (or service provision) function, the selling function, and the administrative function. For CVP analysis, however, it is much more useful to organize costs into fixed and variable components. The focus is on the firm as a whole. Therefore, the costs refer to all costs of the company—production, selling, and administration. So variable costs are all costs that increase as more units are sold, including direct materials, direct labor, variable overhead, and variable selling and

administrative costs. Similarly, fixed costs include fixed overhead and fixed selling and administrative expenses. The income statement format that is based on the separation of costs into fixed and variable components is called the **contribution margin income statement**. Exhibit 15-1 shows the format for the contribution margin income statement.

## Exhibit 15-1

**The Contribution Margin Income Statement**

Sales	\$ XXX
Less: Total variable expense	<u>(XXX)</u>
Total contribution margin	\$ XXX
Less: Total fixed expense	<u>(XXX)</u>
Operating income	<u>\$ XXX</u>

The contribution margin income statement in Exhibit 15-1 contains a new term, *contribution margin*. **Contribution margin** is the difference between sales and variable expense. It is the amount of sales revenue left over after all the variable expenses are covered that can be used to contribute to fixed expense and operating income. The contribution margin can be calculated in total (as it was in Exhibit 15-1) or per unit.

Let's use Whittier Company, a manufacturer of mulching lawn mowers, for an example. Whittier's controller has budgeted the following production costs for the coming year:

Direct materials per mower	\$ 180
Direct labor per mower	100
Variable factory overhead per mower	25
Total fixed factory overhead	15,000

Whittier also has \$30,000 in fixed selling and administrative expense, as well as a \$20 sales commission on each mower sold. In the coming year, Whittier Company plans to produce and sell 1,000 mowers at a price of \$400 each.

The total variable cost per mower includes direct materials, direct labor, variable overhead per unit, and the sales commission. Thus, variable cost per unit is \$325 (\$180 + \$100 + \$25 + \$20). The total fixed expense includes fixed factory overhead and fixed selling and administrative expense; the total fixed expense is \$45,000 (\$15,000 + \$30,000). Notice that both the variable cost per mower and the total fixed expense include all types of cost—both product and selling cost across the value chain.

The contribution margin income statement for Whittier Company for the coming year is shown in **Cornerstone 15-1**.

Notice that the contribution margin income statement in Cornerstone 15-1 shows a total contribution margin of \$75,000. The per-unit contribution margin is \$75 (\$400 – \$325). That is, every mower sold contributes \$75 toward fixed expense and operating income.

What does Whittier's contribution margin income statement show? First, of course, we notice that Whittier will more than break even at sales of 1,000 mowers. In fact, it expects an operating income of \$30,000. Clearly, Whittier would just break even if total contribution margin equaled the total fixed cost. Let's see how to calculate the break-even point.

## Break-Even Point in Units

If the contribution margin income statement is recast as an equation, it becomes more useful for solving CVP problems. The operating income equation is:

$$\text{Operating Income} = \text{Sales} - \text{Total Variable Expenses} - \text{Total Fixed Expenses}$$



$$\text{Operating Income} = (\text{Price} \times \text{Number of Units Sold}) - (\text{Variable Cost per Unit} \times \text{Number of Units Sold}) - \text{Total Fixed Cost}$$

At the break-even point, of course, operating income equals \$0. Let's see how we can use the operating income equation to find the break-even point in units for Whittier Company. Recall that Whittier Company sells mowers at \$400 each, and variable cost per mower is \$325. Total fixed cost equals \$45,000.

$$\begin{aligned} (\$400 \times \text{Break-Even Units}) - (\$325 \times \text{Break-Even Units}) - \$45,000 &= \$0 \\ (\$75 \times \text{Break-Even Units}) - \$45,000 &= \$0 \\ \text{Break-Even Units} &= \frac{\$45,000}{\$75} \\ \text{Break-Even Units} &= 600 \end{aligned}$$

It is easy to see that a contribution margin income statement for Whittier Company, with sales of 600 mowers, does result in zero operating income.

Sales (\$400 × 600 mowers)	\$240,000
Total variable expense (\$325 × 600)	<u>195,000</u>
Total contribution margin	\$ 45,000
Total fixed expense	<u>45,000</u>
Operating income	<u><u>\$ 0</u></u>

When Whittier breaks even, total contribution margin equals total fixed cost. Exhibit 15-2 illustrates this important observation.

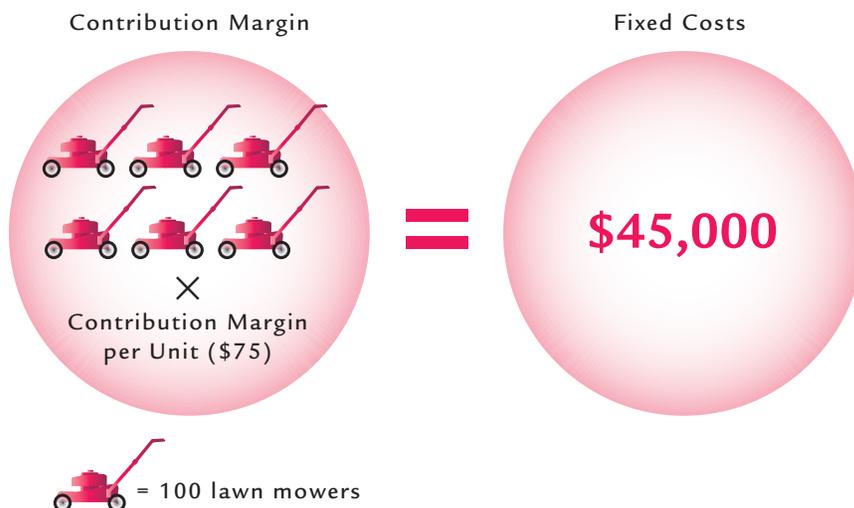
The operating income equation can be rearranged as follows to show the number of units at break even:

$$\text{Break-Even Units} = \frac{\text{Total Fixed Cost}}{\text{Price} - \text{Variable Cost per Unit}}$$

In other words, the break-even units are equal to the fixed cost divided by the contribution margin per unit. So, if a company sells enough units for the contribution margin to just cover fixed costs, it will earn zero operating income. In other words, it will break even. It is quicker to solve break-even problems using this break-even version of the operating income equation than it is using the original operating income equation.

### Exhibit 15-2

#### Contribution Margin and Fixed Cost at Break Even for Whittier Company





## CORNERSTONE 15-2



### HOW TO Solve for the Break-Even Point in Units

#### Information:

Whittier Company plans to sell 1,000 mowers at \$400 each in the coming year. Product costs include:

Direct materials per mower	\$ 180
Direct labor per mower	100
Variable factory overhead per mower	25
Total fixed factory overhead	15,000

Variable selling expense is a commission of \$20 per mower; fixed selling and administrative expense totals \$30,000.

#### Required:

1. Calculate the total variable cost per unit.
2. Calculate the total fixed expense for the year.
3. Calculate the number of mowers that Whittier Company must sell to break even.
4. Check your answer by preparing a contribution margin income statement based on the break-even point.

#### Solution:

1. Variable Cost per Unit = Direct Materials + Direct Labor + Variable Factory Overhead + Variable Selling Expense  
 $= \$180 + \$100 + \$25 + \$20 = \$325$
2. Total Fixed Expense = Fixed Factory Overhead + Fixed Selling and Administrative Expense  
 $= \$15,000 + \$30,000 = \$45,000$
3. Break-Even Number of Mowers =  $\frac{\text{Total Fixed Expense}}{\text{Price} - \text{Variable Cost}}$   
 $= \frac{\$45,000}{(\$400 - \$325)} = 600$
4. Contribution margin income statement based on 600 mowers.

Sales (\$400 × 600 mowers)	\$240,000
Total variable expense (\$325 × 600)	<u>195,000</u>
Total contribution margin	\$ 45,000
Total fixed expense	<u>45,000</u>
Operating income	<u><u>\$ 0</u></u>

Indeed, selling 600 units does yield a zero profit.

**Cornerstone 15-2** shows how to use the break-even units equation to solve for the break-even point for Whittier Company.

### Break-Even Point in Sales Dollars

In some cases when using CVP analysis, managers may prefer to use sales revenue as the measure of sales activity instead of units sold. A units sold measure can be converted to a sales revenue measure by multiplying the unit selling price by the units sold. For example, the break-even point for Whittier Company is 600 mulching

mowers. Since the selling price for each lawn mower is \$400, the break-even volume in sales revenue is \$240,000 ( $\$400 \times 600$ ).

Any answer expressed in units sold can be easily converted to one expressed in sales revenues, but the answer can be computed more directly by developing a separate formula for the sales revenue case. In this case, the important variable is sales dollars, so both the revenue and the variable costs must be expressed in dollars instead of units. Since sales revenue is always expressed in dollars, measuring that variable is no problem. Let's look more closely at variable costs and see how they can be expressed in terms of sales dollars.

To calculate the break-even point in sales dollars, total variable costs are defined as a percentage of sales rather than as an amount per unit sold. For example, suppose that a company sells a product for \$10 per unit and incurs a variable cost of \$6 per unit. Of course, the remainder is contribution margin of \$4 ( $\$10 - \$6$ ). If 10 units are sold, total variable costs are \$60 ( $\$6 \times 10$  units). Alternatively, since each unit sold earns \$10 of revenue and has \$6 of variable cost, one could say that 60 percent of each dollar of revenue earned is attributable to variable cost ( $\$6/\$10$ ). Thus, sales revenues of \$100 would result in total variable costs of \$60 ( $0.60 \times \$100$ ).

This 60 percent is the variable cost ratio. The **variable cost ratio** is the proportion of each sales dollar that must be used to cover variable costs. The variable cost ratio can be computed using either total data or unit data. The percentage of sales dollars remaining after variable costs are covered is the contribution margin ratio. The **contribution margin ratio** is the proportion of each sales dollar available to cover fixed costs and provide for profit. In this example, if the variable cost ratio is 60 percent of sales, then the contribution margin ratio must be the remaining 40 percent of sales. It makes sense that the complement of the variable cost ratio is the contribution margin ratio. After all, total variable costs and total contribution margin sum to sales revenue.

Just as the variable cost ratio can be computed using total or unit figures, the contribution margin ratio, 40 percent in our example, can also be computed in these two ways. That is, one can divide the total contribution margin by total sales ( $\$40/\$100$ ), or one can use the unit contribution margin divided by price ( $\$4/\$10$ ). Naturally, if the variable cost ratio is known, it can be subtracted from 1 to yield the contribution margin ratio ( $1 - 0.60 = 0.40$ ). **Cornerstone 15-3** shows how the income statement can be expanded to yield the variable cost ratio and the contribution margin ratio.

Notice in Cornerstone 15-3, Requirement 3, that sales revenue, variable costs, and contribution margin have been expressed as a percent of sales. The variable cost ratio is 0.8125 ( $\$325,000/\$400,000$ ); the contribution margin ratio is 0.1875 (computed either as  $1 - 0.8125$ , or  $\$75,000/\$400,000$ ).

How do fixed costs relate to the variable cost ratio and contribution margin ratio? Since the total contribution margin is the revenue remaining after total variable costs are covered, it must be the revenue available to cover fixed costs and contribute to profit. How does the relationship of fixed cost to contribution margin affect operating income? There are three possibilities: Fixed cost can equal contribution margin; fixed cost can be less than contribution margin; or fixed cost can be greater than contribution margin. If fixed cost equals contribution margin, then operating income is \$0 (the company is at break even). If fixed cost is less than contribution margin, the company earns a positive operating income. Finally, if fixed cost is greater than contribution margin, then the company faces an operating loss.

Now, let's turn to the equation for calculating the break-even point in sales dollars. One way of calculating break-even sales revenue is to multiply the break-even units by the price. However, often the company is a multiple-product firm, and it can be difficult to figure the break-even point for each product sold. The operating income equation can be used to solve for break-even sales for Whittier as follows:

$$\text{Operating Income} = \text{Sales} - \text{Total Variable Expenses} - \text{Total Fixed Expenses}$$

## CONCEPT Q&A

1. If the contribution margin ratio is 30 percent, what is the variable cost ratio?
2. If the variable cost ratio is 77 percent, what is the contribution margin ratio?
3. Explain why the contribution margin ratio and the variable cost ratio always total 100 percent.

*total contribution margin sum to sales revenue.*

3. The contribution margin ratio and the variable cost ratio always equal 100 percent of sales revenue. By definition, total variable cost and

2. Contribution margin ratio =  $1.00 - 0.77 = 0.23$ , or 23 percent.

1. Variable cost ratio =  $1.00 - 0.30 = 0.70$ , or 70 percent.

Possible Answer:

$\$0 = \text{Break-Even Sales}$

$$- (0.8125 \times \text{Break-Even Sales}) - \$45,000$$

$$\$0 = \text{Break-Even Sales} (1.00 - 0.8125) - \$45,000$$

$$\text{Break-Even Sales} = \frac{\$45,000}{(1.00 - 0.8125)}$$

$$\text{Break-Even Sales} = \$240,000$$

So, Whittier Company has sales of \$240,000 at the break-even point.

Just as it was quicker to use an equation to calculate the break-even units directly, it is helpful to have an equation to figure the break-even sales dollars. This equation is:

$$\text{Break-Even Sales} = \frac{\text{Total Fixed Expenses}}{\text{Contribution Margin Ratio}}$$

**Cornerstone 15-4** shows how to obtain the break-even point in sales dollars for Whittier Company.



### CORNERSTONE 15-3



## HOW TO Calculate the Variable Cost Ratio and the Contribution Margin Ratio

### Information:

Whittier Company plans to sell 1,000 mowers at \$400 each in the coming year. Variable cost per unit is \$325. Total fixed cost is \$45,000.

### Required:

1. Calculate the variable cost ratio.
2. Calculate the contribution margin ratio using unit figures.
3. Prepare a contribution margin income statement based on the budgeted figures for next year. In a column next to the income statement, show the percentages based on sales for sales, total variable costs, and total contribution margin.

### Solution:

$$1. \text{ Variable Cost Ratio} = \frac{\text{Variable Cost per Unit}}{\text{Price}} = \frac{\$325}{\$400} = 0.8125, \text{ or } 81.25\%$$

$$2. \text{ Contribution Margin per Unit} = \text{Price} - \text{Variable Cost per Unit} = \$400 - \$325 = \$75$$

$$\text{Contribution Margin Ratio} = \frac{\text{Contribution Margin per Unit}}{\text{Price}} = \frac{\$75}{\$400} = 0.1875, \text{ or } 18.75\%$$

3. Contribution margin income statement based on budgeted figures:

		Percent of Sales
Sales ( $\$400 \times 1,000$ mowers)	\$400,000	100.00
Total variable expense ( $0.8125 \times \$400,000$ )	325,000	81.25
Total contribution margin	\$ 75,000	18.75
Total fixed expense	45,000	
Operating income	<u>\$ 30,000</u>	

## HOW TO Solve for the Break-Even Point in Sales Dollars

### Information:

Whittier Company plans to sell 1,000 mowers at \$400 each in the coming year. Total variable expense per unit is \$325. Total fixed expense is \$45,000.

### Required:

1. Calculate the contribution margin ratio.
2. Calculate the sales revenue that Whittier Company must make to break even by using the break-even point in sales equation.
3. Check your answer by preparing a contribution margin income statement based on the break-even point in sales dollars.

### Solution:

1. Contribution Margin per Unit = Price – Variable Expense per Unit  
= \$400 – \$325 = \$75

$$\begin{aligned} \text{Contribution Margin Ratio} &= \frac{\text{Contribution Margin per Unit}}{\text{Price}} \\ &= \frac{\$75}{\$400} = 0.1875, \text{ or } 18.75\% \end{aligned}$$

[Hint: The contribution margin ratio comes out cleanly to four decimal places. Don't round it, and your break-even point in sales dollars will yield an operating income of \$0 (rather than being a few dollars off due to rounding).]

Notice that the variable cost ratio equals 0.8125, or the difference between 1.0000 and the contribution margin ratio.

2. Calculate the break-even point in sales dollars:

$$\begin{aligned} \text{Break-Even Sales Dollars} &= \frac{\text{Total Fixed Expense}}{\text{Contribution Margin Ratio}} \\ &= \frac{\$45,000}{0.1875} = \$240,000 \end{aligned}$$

3. Contribution margin income statement based on sales of \$240,000:

Sales	\$240,000
Total variable expense (0.8125 × \$240,000)	<u>195,000</u>
Total contribution margin	\$ 45,000
Total fixed expense	<u>45,000</u>
Operating income	<u><u>\$ 0</u></u>

Indeed, sales equal to \$240,000 does yield a zero profit.



## CORNERSTONE 15-4



## Units and Sales Dollars Needed to Achieve a Target Income

While the break-even point is useful information and an important benchmark for relatively young companies, most companies would like to earn operating income greater than \$0. CVP analysis gives us a way to determine how many units must be sold, or how much sales revenue must be generated, to earn a particular target income. Let's look first at the number of units that must be sold to earn a targeted operating income.

### Units to Be Sold to Achieve a Target Income

Remember that at the break-even point, operating income is \$0. How can the equations used in our earlier break-even analyses be adjusted to find the number of units

### OBJECTIVE 2

Determine the number of units that must be sold, and the amount of revenue required, to earn a targeted profit.

that must be sold to earn a target income? The answer is that we add the target income amount to the fixed costs. Let's try it two different ways—with the operating income equation and with the basic break-even equation.

Remember that the equation for the operating income is:

$$\text{Operating Income} = (\text{Price} \times \text{Units Sold}) - (\text{Unit Variable Cost} \times \text{Units Sold}) - \text{Fixed Cost}$$

To solve for positive operating income, replace the operating income term with the target income. Recall that Whittier Company sells mowers at \$400 each, incurs variable cost per unit of \$325, and has total fixed expense of \$45,000. Suppose that Whittier wants to make a target operating income of \$37,500. The number of units that must be sold to achieve that target income is calculated as follows:

$$\begin{aligned} \$37,500 &= (\$400 \times \text{Number of Units}) - (\$325 \times \text{Number of Units}) - \$45,000 \\ \text{Number of Units} &= \frac{(\$37,500 + \$45,000)}{(\$400 - \$325)} = 1,100 \end{aligned}$$

Does the sale of 1,100 units really result in operating income of \$37,500? The contribution margin income statement provides a good check.

Sales (\$400 × 1,100)	\$440,000
Total variable expense (\$325 × 1,100)	357,500
Total contribution margin	\$ 82,500
Total fixed expense	45,000
Operating income	<u>\$ 37,500</u>

Indeed, selling 1,100 units does yield operating income of \$37,500.

The operating income equation can be used to find the number of units to sell to earn a targeted income. However, it is quicker to adjust the break-even units equation by adding target income to the fixed cost. This adjustment results in the following equation:

$$\text{Number of Units to Earn Target Income} = \frac{\text{Fixed Cost} + \text{Target Income}}{\text{Price} - \text{Variable Cost per Unit}}$$

This equation was used when calculating the 1,100 units needed to earn operating income of \$37,500. **Cornerstone 15-5** shows how Whittier Company can use this approach.

Another way to check the number of units to be sold to yield a target operating income is to use the break-even point. As shown in Cornerstone 15-5, Whittier must sell 1,100 lawn mowers, or 500 more than the break-even volume of 600 units, to earn a profit of \$37,500. The contribution margin per lawn mower is \$75. Multiplying \$75 by the 500 lawn mowers above break even produces the operating income of \$37,500 (\$75 × 500). This outcome demonstrates that contribution margin per unit for each unit above break even is equivalent to operating income per unit. Since the break-even point had already been computed, the number of lawn mowers to be sold to yield a \$37,500 operating income could have been calculated by dividing the unit contribution margin into the target income and adding the resulting amount to the break-even volume.

In general, assuming that fixed costs remain the same, the impact on a firm's income resulting from a change in the number of units sold can be assessed by multiplying the unit contribution margin by the change in units sold. For example, if 1,400 lawn mowers instead of 1,100 are sold, how much more operating income will be earned? The change in units sold is an increase of 300 lawn mowers, and the unit contribution margin is \$75. Thus, operating income will increase by \$22,500 (\$75 × 300) over the \$37,500 initially calculated, and total operating income will be \$60,000.

## HOW TO Solve for the Number of Units to Be Sold to Earn a Target Operating Income

### Information:

Whittier Company sells mulching mowers at \$400 each. Variable cost per unit is \$325, and total fixed costs are \$45,000.

### Required:

1. Calculate the number of units that Whittier Company must sell to earn operating income of \$37,500.
2. Check your answer by preparing a contribution margin income statement based on the number of units calculated.

### Solution:

$$\begin{aligned} 1. \text{ Number of Units} &= \frac{(\text{Target Income} + \text{Total Fixed Expense})}{(\text{Price} - \text{Variable Cost per Unit})} \\ &= \frac{(\$45,000 + \$37,500)}{(\$400 - \$325)} = 1,100 \end{aligned}$$

2. Contribution margin income statement based on sales of 1,100 units:

Sales (\$400 × 1,100)	\$440,000
Total variable expense (\$325 × 1,100)	<u>357,500</u>
Total contribution margin	\$ 82,500
Total fixed expense	<u>45,000</u>
Operating income	<u>\$ 37,500</u>

Indeed, selling 1,100 units does yield operating income of \$37,500.



## CORNERSTONE 15-5



## Sales Revenue to Achieve a Target Income

Consider the following question: How much sales revenue must Whittier generate to earn an operating income of \$37,500? This question is similar to the one we asked earlier in terms of units but phrases the question directly in terms of sales revenue. To answer the question, add the targeted operating income of \$37,500 to the \$45,000 of fixed cost and divide by the contribution margin ratio. Then, the equation is the following:

$$\text{Sales Dollars to Earn Target Income} = \frac{\text{Fixed Cost} + \text{Target income}}{\text{Contribution Margin Ratio}}$$

**Cornerstone 15-6** shows how to calculate the sales revenue needed to earn a target operating income of \$37,500.

Whittier must earn revenues equal to \$440,000 to achieve a profit target of \$37,500. Since break-even sales equals \$240,000, additional sales of \$200,000 (\$440,000 – \$240,000) must be earned above break even. Notice that multiplying the contribution margin ratio by revenues above break even yields the profit of \$37,500 (0.1875 × \$200,000). Above break even, the contribution margin ratio is a profit ratio; therefore, it represents the proportion of each sales dollar attributable to profit. For Whittier Company, every sales dollar earned above break even increases profits by \$0.1875.

In general, assuming that fixed costs remain unchanged, the contribution margin ratio can be used to find the profit impact of a change in sales revenue. To obtain the total

## CONCEPT Q&A

Lorna makes and sells decorative candles through gift shops. She knows she must sell 200 candles a month to break even. Every candle has a contribution margin of \$1.50. So far this month, Lorna has sold 320 candles. How much has Lorna earned so far this month in operating income? If she sells 10 more candles, by how much will income increase?

*320 candles sold – 200 candles at break even = 120 candles above break even, 120 × \$1.50 = \$180 Lorna has earned operating income of \$180 so far during the month. An additional 10 candles contribute \$15 to operating income (\$1.50 × 10).*

**Possible Answer:**



## CORNERSTONE 15-6



### HOW TO Solve for the Sales Needed to Earn a Target Operating Income

#### Information:

Whittier Company sells mulching mowers at \$400 each. Variable cost per unit is \$325, and total fixed costs are \$45,000.

#### Required:

1. Calculate the contribution margin ratio.
2. Calculate the sales that Whittier Company must make to earn an operating income of \$37,500.
3. Check your answer by preparing a contribution margin income statement based on the sales dollars calculated.

#### Solution:

$$1. \text{ Contribution Margin Ratio} = \frac{(\$400 - \$325)}{\$400} = 0.1875$$

$$2. \text{ Sales Dollars} = \frac{(\text{Target Income} + \text{Total Fixed Expense})}{\text{Contribution Margin Ratio}}$$

$$= \frac{(\$45,000 + \$37,500)}{0.1875} = \$440,000$$

3. Contribution margin income statement based on sales revenue of \$440,000:

Sales	\$440,000
Total variable expense (0.8125 × \$440,000)	<u>357,500</u>
Total contribution margin	\$ 82,500
Total fixed expense	<u>45,000</u>
Operating income	<u><u>\$ 37,500</u></u>

Indeed, sales revenue of \$440,000 does yield operating income of \$37,500.

change in profits from a change in revenues, multiply the contribution margin ratio times the change in sales. For example, if sales revenues are \$400,000 instead of \$440,000, how will the expected profits be affected? A decrease in sales revenues of \$40,000 will cause a decrease in profits of \$7,500 ( $0.1875 \times \$40,000$ ).

### OBJECTIVE > 3

Prepare a profit-volume graph and a cost-volume-profit graph, and explain the meaning of each.

## Graphs of Cost-Volume-Profit Relationships

It may be helpful in understanding CVP relationships to see them portrayed visually. A graphical representation can help managers see the difference between variable cost and revenue. It may also help them understand quickly what impact an increase or decrease in sales will have on the break-even point. Two basic graphs are the profit-volume graph and the cost-volume-profit graph.

### The Profit-Volume Graph

A **profit-volume graph** visually portrays the relationship between profits (operating income) and units sold. The profit-volume graph is the graph of the operating income equation [Operating Income = (Price × Units) – (Unit Variable Cost × Units) – Total Fixed Cost]. In this graph, operating income is the dependent variable, and units is the independent variable. Usually, values of the independent variable are

measured along the horizontal axis, and values of the dependent variable are measured along the vertical axis.

To make this discussion more concrete, a simple set of data will be used. Assume that Tyson Company produces a single product with the following cost and price data:

Total fixed costs	\$100
Variable costs per unit	5
Selling price per unit	10

Using these data, operating income can be expressed as:

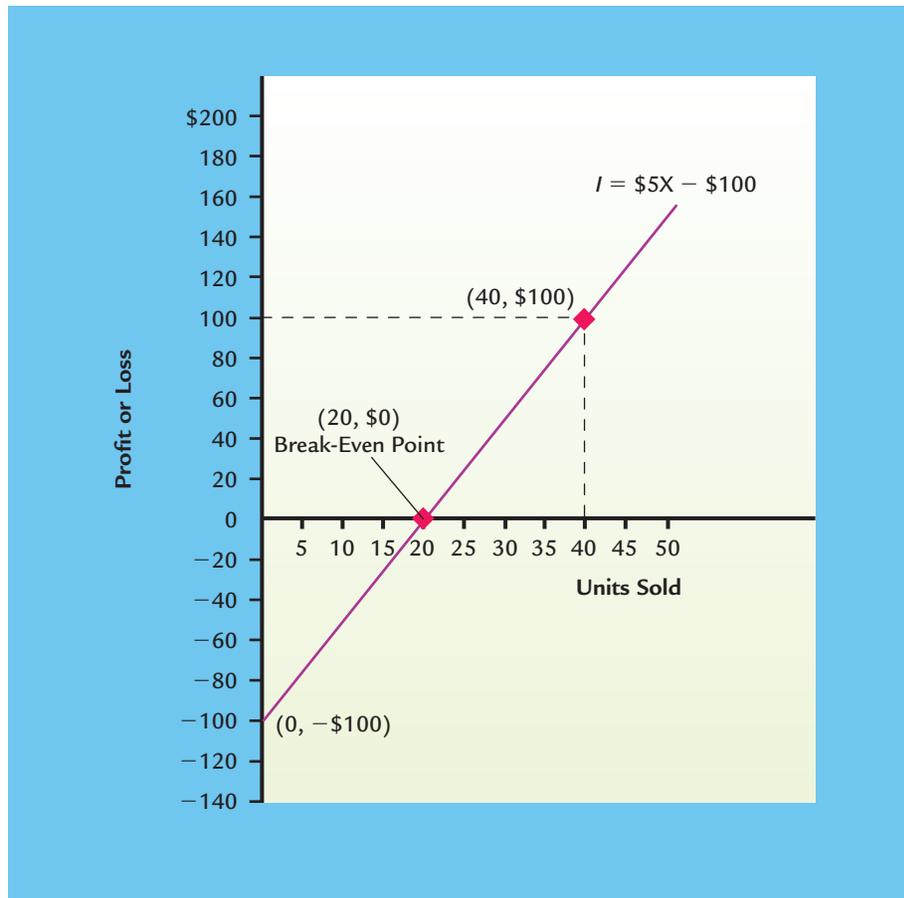
$$\begin{aligned}\text{Operating Income} &= (\$10 \times \text{Units}) - (\$5 \times \text{Units}) - \$100 \\ &= (\$5 \times \text{Units}) - \$100\end{aligned}$$

This relationship can be graphed by plotting units along the horizontal axis and operating income (or loss) along the vertical axis. Two points are needed to graph a linear equation. While any two points will do, the two points often chosen are those that correspond to zero units sold and zero profits. When units sold are 0, Tyson experiences an operating loss of \$100 (or an operating income of  $-\$100$ ). The point corresponding to zero sales volume, therefore, is  $(0, -\$100)$ . When no sales take place, the company suffers a loss equal to its total fixed costs. When operating income is \$0, the units sold are equal to 20. The point corresponding to zero profits (break even) is  $(20, \$0)$ . These two points, plotted in Exhibit 15-3, define the profit graph.

The graph in Exhibit 15-3 can be used to assess Tyson's profit (or loss) at any level of sales activity. For example, the profit associated with the sale of 40 units can

Exhibit 15-3

### Profit-Volume Graph



be read from the graph by (1) drawing a vertical line from the horizontal axis to the profit line and (2) drawing a horizontal line from the profit line to the vertical axis. As illustrated in Exhibit 15-3, the profit associated with sales of 40 units is \$100. The profit-volume graph, while easy to interpret, fails to reveal how costs change as sales volume changes. An alternative approach to graphing can provide this detail.

## The Cost-Volume-Profit Graph

The **cost-volume-profit graph** depicts the relationships among cost, volume, and profits (operating income) by plotting the total revenue line and the total cost line on a graph. To obtain the more detailed relationships, it is necessary to graph two separate lines: the total revenue line and the total cost line. These two lines are represented by the following two equations:

$$\text{Revenue} = \text{Price} \times \text{Units}$$

$$\text{Total Cost} = (\text{Unit Variable Cost} \times \text{Units}) + \text{Fixed Cost}$$

Using the Tyson Company example, the revenue and cost equations are:

$$\text{Revenue} = \$10 \times \text{Units}$$

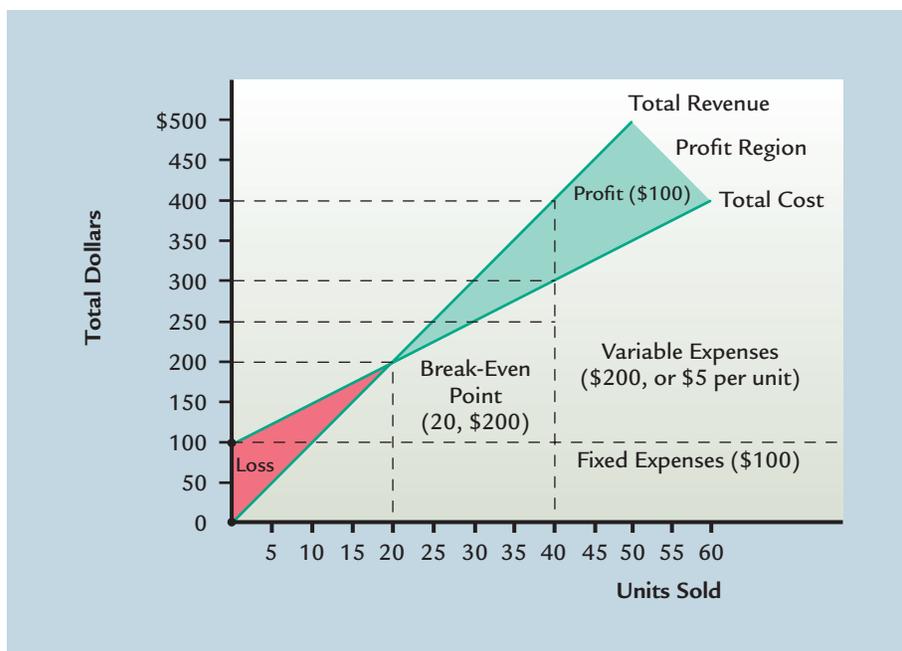
$$\text{Total Cost} = (\$5 \times \text{Units}) + \$100$$

To portray both equations in the same graph, the vertical axis is measured in dollars, and the horizontal axis is measured in units sold.

Again, two points are needed to graph each equation. For the revenue equation, setting number of units equal to 0 results in revenue of \$0; setting number of units equal to 20 results in revenue of \$200. Therefore, the two points for the revenue equation are (0, \$0) and (20, \$200). For the cost equation, units sold of 0 and units sold of 20 produce the points (0, \$100) and (20, \$200). The graph of each equation appears in Exhibit 15-4.

Exhibit 15-4

Cost-Volume-Profit Graph



Notice that the total revenue line begins at the origin and rises with a slope equal to the selling price per unit (a slope of 10). The total cost line intercepts the vertical axis at a point equal to total fixed costs and rises with a slope equal to the variable cost per unit (a slope of 5). When the total revenue line lies below the total cost line, a loss region is defined. Similarly, when the total revenue line lies above the total cost line, a profit region is defined. The point where the total revenue line and the total cost line intersect is the break-even point. To break even, Tyson Company must sell 20 units and, thus, receive \$200 in total revenues.

Now, let's compare the information available from the CVP graph with that available from the profit-volume graph. To do so, consider the sale of 40 units. Recall that the profit-volume graph revealed that 40 units produced profits of \$100. Examine Exhibit 15-4 again. The CVP graph also shows profits of \$100, but it reveals more as well. The CVP graph discloses that total revenues of \$400 and total costs of \$300 are associated with the sale of 40 units. Furthermore, the total costs can be broken down into fixed costs of \$100 and variable costs of \$200. The CVP graph provides revenue and cost information not provided by the profit-volume graph. Unlike the profit-volume graph, some computation is needed to determine the profit associated with a given sales volume. Nonetheless, because of the greater information content, managers are likely to find the CVP graph a more useful tool.

## Assumptions of Cost-Volume-Profit Analysis

The profit-volume and cost-volume-profit graphs rely on important assumptions. Some of these assumptions are as follows:

- There are identifiable linear revenue and linear cost functions that remain constant over the relevant range.
- Selling prices and costs are known with certainty.
- Units produced are sold—there are no finished goods inventories.
- Sales mix is known with certainty for multiple-product break-even settings (explained later in this chapter).

**Linear Cost and Revenue Functions** CVP assumes that cost and revenue functions are linear; that is, they are straight lines. But, as was discussed in Chapter 14 on cost behavior, these functions are often not linear. They may be curved or step functions. Fortunately, it is not necessary to consider all possible ranges of production and sales for a firm. Remember that CVP analysis is a short-run decision-making tool. (We know that it is short run in orientation because some costs are fixed.) It is only necessary for us to determine the current operating range, or relevant range, for which the linear cost and revenue relationships are valid. Once a relevant range has been identified, then the cost and price relationships are assumed to be known and constant.

**Prices and Costs Known with Certainty** In actuality, firms seldom know prices, variable costs, and fixed costs with certainty. A change in one variable usually affects the value of others. Often, there is a probability distribution to consider. Furthermore, there are formal ways of explicitly building uncertainty into the CVP model. These issues are explored in the section on incorporating risk and uncertainty into CVP analysis.

**Production Equal to Sales** CVP assumes that all units produced are actually sold. There is no change in inventory over the period. The idea that inventory has no impact on break-even analysis makes sense. Break-even analysis is a short-run decision-making technique, so we are looking to cover all costs of a particular period of time. Inventory embodies costs of a previous period and is not considered in CVP analyses.

**Constant Sales Mix** In single-product analysis, the sales mix is obviously constant—the one product accounts for 100 percent of sales. Multiple-product break-even analysis requires a constant sales mix. However, it is virtually impossible

to predict with certainty the sales mix. Typically, this constraint is handled in practice through sensitivity analysis. By using the capabilities of spreadsheet analysis, the sensitivity of variables to a variety of sales mixes can be readily assessed.

## OBJECTIVE > 4

Apply cost-volume-profit analysis in a multiple-product setting.

## Multiple-Product Analysis

Cost-volume-profit analysis is fairly simple in the single-product setting. However, most firms produce and sell a number of products or services. Even though CVP analysis becomes more complex with multiple products, the operation is reasonably straightforward. Let's see how we can adapt the formulas used in a single-product setting to a multiple-product setting by expanding the Whittier Company example.

Whittier Company has decided to offer two models of lawn mowers: a mulching mower that sells for \$400 and a riding mower that sells for \$800. The marketing department is convinced that 1,200 mulching mowers and 800 riding mowers can be sold during the coming year. The controller has prepared the following projected income statement based on the sales forecast:

	Mulching Mower	Riding Mower	Total
Sales	\$480,000	\$640,000	\$1,120,000
Less: Variable expenses	<u>390,000</u>	<u>480,000</u>	<u>870,000</u>
Contribution margin	\$ 90,000	\$160,000	\$ 250,000
Less: Direct fixed expenses	<u>30,000</u>	<u>40,000</u>	<u>70,000</u>
Product margin	<u>\$ 60,000</u>	<u>\$120,000</u>	\$ 180,000
Less: Common fixed expenses			<u>26,250</u>
Operating income			<u>\$ 153,750</u>

Note that the controller has separated *direct fixed expenses* from *common fixed expenses*. The **direct fixed expenses** are those fixed costs that can be traced to each segment and would be avoided if the segment did not exist. The **common fixed expenses** are the fixed costs that are not traceable to the segments and would remain even if one of the segments was eliminated.

## Break-Even Point in Units

The owner of Whittier is somewhat apprehensive about adding a new product line and wants to know how many of each model must be sold to break even. If you were given the responsibility of answering this question, how would you respond? One possible response is to use the equation developed earlier in which fixed costs were divided by the contribution margin. This equation presents a problem, however; it was developed for single-product analysis. For two products, there are two prices and two variable costs per unit. The variable cost per unit is derived from the income statement. For the mulching mower, total variable costs are \$390,000 based on sales of 1,200 units, yielding a per-unit variable cost of \$325 ( $\$390,000/1,200$ ). For the riding mower, total variable costs are \$480,000 based on sales of 800 units, yielding a per-unit variable cost of \$600 ( $\$480,000/800$ ). Then, the mulching mower has a contribution margin per unit of \$75 ( $\$400 - \$325$ ); the riding mower has a contribution margin per unit of \$200 ( $\$800 - \$600$ ).

One possible solution is to apply the analysis separately to each product line. It is possible to obtain individual break-even points when income is defined as product margin. Break even for the mulching mower is as follows:

## CONCEPT Q&A

Suppose that the revenue line in Exhibit 15-4 had a steeper slope due to a higher price. What would that imply for the break-even point? For the amount of operating income (profit) for units sold above break even? Now suppose that the revenue line remains unchanged, but that variable cost per unit increases. How would this increase affect the total cost line? What would this increase imply for the break-even point? For the amount of operating income (profit) for units sold above break even?

Possible Answer:  
A steeper revenue line would intersect the total cost line sooner. Thus, the break-even point would be lower. (Hint: Draw a steeper total revenue line on Exhibit 15-4 to check this reasoning. Remember, revenue still starts at the origin; zero units sold means zero total revenue.) Increased variable cost per unit means a steeper slope for the total cost line. Thus, the break-even point would be higher, and the operating income above break even would be lower.

$$\begin{aligned} \text{Mulching Mower Break-Even Units} &= \frac{\text{Fixed Cost}}{(\text{Price} - \text{Unit Variable Cost})} \\ &= \frac{\$30,000}{\$75} \\ &= 400 \text{ Units} \end{aligned}$$

Break even for the riding mower can be computed as well:

$$\begin{aligned} \text{Riding Mower Break-Even Units} &= \frac{\text{Fixed Cost}}{(\text{Price} - \text{Unit Variable Cost})} \\ &= \frac{\$40,000}{\$200} \\ &= 200 \text{ Units} \end{aligned}$$

Thus, 400 mulching mowers and 200 riding mowers must be sold to achieve a break-even product margin. But a break-even product margin covers only direct fixed costs; the common fixed costs remain to be covered. Selling these numbers of lawn mowers would result in a loss equal to the common fixed costs. This level of sales is not the break-even point for the firm as a whole; somehow the common fixed costs must be factored into the analysis.

Allocating the common fixed costs to each product line before computing a break-even point may resolve this difficulty. The problem with this approach is that allocation of the common fixed costs is arbitrary. Thus, no meaningful break-even volume is readily apparent.

Another possible solution is to convert the multiple-product problem into a single-product problem. If this can be done, then all of the single-product CVP methodology can be applied directly. The key to this conversion is to identify the expected sales mix, in units, of the products being marketed. **Sales mix** is the relative combination of products being sold by a firm.

**Determining the Sales Mix** The sales mix is measured in units sold. For example, if Whittier plans on selling 1,200 mulching mowers and 800 riding mowers, then the sales mix in units is 1,200:800. Usually, the sales mix is reduced to the smallest possible whole numbers. Thus, the relative mix, 1,200:800, can be reduced to 12:8, and further reduced to 3:2. That is, Whittier expects that for every three mulching mowers sold, two riding mowers will be sold.

An endless number of different sales mixes can be used to define the break-even volume in a multiple-product setting. For example, a sales mix of 2:1 will define a break-even point of 550 mulching mowers and 275 riding mowers. The total contribution margin produced by this mix is \$96,250 [(\$75 × 550) + (\$200 × 275)]. Similarly, if 350 mulching mowers and 350 riding mowers are sold (corresponding to a 1:1 sales mix), then the total contribution margin is also \$96,250 [(\$75 × 350) + (\$200 × 350)]. Since total fixed costs are \$96,250, both sales mixes define break-even points. Fortunately, every sales mix need not be considered. Can Whittier really expect a sales mix of 2:1 or 1:1? For every two mulching mowers sold, does Whittier expect to sell a riding mower? Or, for every mulching mower, can Whittier really sell one riding mower?

According to Whittier's marketing study, a sales mix of 3:2 can be expected. This is the ratio that should be used; all others can be ignored. The sales mix that is expected to prevail should be used for CVP analysis.

**Sales Mix and Cost-Volume-Profit Analysis** Defining a particular sales mix allows the conversion of a multiple-product problem into a single-product CVP format. Since Whittier expects to sell three mulching mowers for every two riding mowers, it can define the single product it sells as a package containing three mulching mowers and two riding mowers. By defining the product as a package, the multiple-product problem is converted into a single-product one. To use the approach of break-even point in units, the package selling price and the variable cost per package must

be known. To compute these package values, the sales mix, individual product prices, and individual variable costs are needed. **Cornerstone 15-7** shows how the overall break-even point for each product can be determined.



## CORNERSTONE 15-7



### HOW TO Calculate the Break-Even Units for a Multiple-Product Firm

#### Information:

Recall that Whittier Company sells two products: mulching mowers priced at \$400 and riding mowers priced at \$800. The variable costs per unit are \$325 per mulching mower and \$600 per riding mower. Total fixed expense is \$96,250. Whittier's expected sales mix is three mulching mowers to two riding mowers.

#### Required:

1. Form a package of mulching and riding mowers based on the sales mix, and calculate the package contribution margin.
2. Calculate the break-even point in units for mulching mowers and for riding mowers.
3. Check your answers by preparing a contribution margin income statement.

#### Solution:

1. Each package consists of three mulching mowers and two riding mowers:

Product	Price	Unit Variable Cost	Unit Contribution Margin	Sales Mix	Package Contribution Margin
Mulching	\$400	\$325	\$ 75	3	\$225
Riding	800	600	200	2	400
Package total					<u>\$625</u>

The three mulching mowers in the package yield \$225 ( $3 \times \$75$ ) in contribution margin. The two riding mowers in the package yield \$400 ( $2 \times \$200$ ) in contribution margin. Thus, a package of five mowers (three mulching and two riding) has a total contribution margin of \$625.

$$\begin{aligned}
 2. \text{ Break-Even Packages} &= \frac{\text{Fixed Cost}}{\text{Package Contribution Margin}} \\
 &= \frac{\$96,250}{\$625} \\
 &= 154 \text{ Packages}
 \end{aligned}$$

Mulching Mower Break-Even Units =  $154 \times 3 = 462$

Riding Mower Break-Even Units =  $154 \times 2 = 308$

3. Income statement—break-even solution:

	Mulching Mower	Riding Mower	Total
Sales	\$184,800	\$246,400	\$431,200
Less: Variable expenses	<u>150,150</u>	<u>184,800</u>	<u>334,950</u>
Contribution margin	<u>\$ 34,650</u>	<u>\$ 61,600</u>	<u>\$ 96,250</u>
Less: Total fixed expenses			<u>96,250</u>
Operating income			<u>\$ 0</u>

The complexity of the approach of break-even point in units increases dramatically as the number of products increases. Imagine performing this analysis for a firm with several hundred products. This observation seems more overwhelming than it actually is. Computers can easily handle a problem with so much data. Furthermore, many firms simplify the problem by analyzing product groups rather than individual products. Another way to handle the increased complexity is to switch from the units sold to the sales revenue approach. This approach can accomplish a multiple-product CVP analysis using only the summary data found in an organization's income statement. The computational requirements are much simpler.

## Break-Even Point in Sales Dollars

To illustrate the break-even point in sales dollars, the same examples will be used. However, the only information needed is the projected income statement for Whittier Company as a whole.

Sales	\$1,120,000
Less: Variable costs	<u>870,000</u>
Contribution margin	\$ 250,000
Less: Fixed costs	<u>96,250</u>
Operating income	<u><u>\$ 153,750</u></u>

Notice that this income statement corresponds to the total column of the more detailed income statement examined previously. The projected income statement rests on the assumption that 1,200 mulching mowers and 800 riding mowers will be sold (a 3:2 sales mix). The break-even point in sales revenue also rests on the expected sales mix. (As with the units sold approach, different sales mixes will produce different results.)

With the income statement, the usual CVP questions can be addressed. For example, how much sales revenue must be earned to break even? **Cornerstone 15-8** shows how to calculate the break-even point in sales dollars for a multiple-product firm.

The break-even point in sales dollars implicitly uses the assumed sales mix but avoids the requirement of building a package contribution margin. No knowledge of individual product data is needed. The computational effort is similar to that used in the single-product setting. Moreover, the answer is still expressed in sales revenue. Unlike the break-even point in units, the answer to CVP questions using sales dollars is still expressed in a single summary measure. The sales revenue approach, however, does sacrifice information concerning individual product performance.

## CONCEPT Q&A

Suppose a men's clothing store sells two brands of suits: designer suits with a contribution margin of \$600 each and regular suits with a contribution margin of \$500 each. At break even, the store must sell a total of 100 suits a month. Last month, the store sold 100 suits in total but incurred an operating loss. There was no change in fixed cost, variable cost, or price. What happened?

Probably, the sales mix shifted toward the relatively lower contribution margin suits. For example, suppose that the break-even point for regular suits was 80, and the break-even point for designer suits was 20. If the mix shifted to 90 regular and 10 designer, it is easy to see that less total contribution margin (and, hence, operating income) would be realized.

Possible Answer:

## Cost-Volume-Profit Analysis and Risk and Uncertainty

Because firms operate in a dynamic world, they must be aware of changes in prices, variable costs, and fixed costs. They must also account for the effect of risk and uncertainty. The break-even point can be affected by changes in price, unit contribution margin, and fixed cost. Managers can use CVP analysis to handle risk and uncertainty.

For example, France-based **Airbus** reported in 2006 its first ever loss, which resulted from a decreased sales volume and major costly production delays involving a redesign of its "extra wide-body" passenger jet to compete with **Boeing's** 787 Dreamliner. In response to this loss, Airbus used CVP analysis to estimate how a

## OBJECTIVE 5

Explain the impact of risk, uncertainty, and changing variables on cost-volume-profit analysis.



## CORNERSTONE 15-8



### HOW TO Calculate the Break-Even Sales Dollars for a Multiple-Product Firm

#### Information:

Recall that Whittier Company sells two products that are expected to produce total revenue next year of \$1,120,000 and total variable costs of \$870,000. Total fixed costs are expected to equal \$96,250.

#### Required:

1. Calculate the break-even point in sales dollars for Whittier Company.
2. Check your answer by preparing a contribution margin income statement.

#### Solution:

$$1. \text{ The Contribution Margin Ratio} = \frac{\$250,000}{\$1,120,000}$$

$$= 0.22$$

$$\text{Break-Even Sales} = \frac{\text{Fixed Cost}}{\text{Contribution Margin Ratio}}$$

$$= \frac{\$96,250}{0.22}$$

$$= \$437,500$$

[Note: Total break-even sales differ slightly between Cornerstones 15-7 and 15-8 (\$431,200 vs. \$437,500) due to the rounding of the contribution margin ratio to only two decimal places (0.22).]

2. Income statement—break-even solution:

Sales	\$437,500
Less: Variable costs (0.78 × \$437,500)	341,250
Contribution margin	\$ 96,250
Less: Fixed costs	96,250
Operating income	<u>\$ 0</u>

\$2.6 billion reduction in its annual variable and fixed costs, as well as various reductions in its \$144 million unit jet price, would affect its annual profit.<sup>1</sup>

For a given sales mix, CVP analysis can be used as if the firm were selling a single product. However, when the prices of individual products change, the sales mix can be affected because consumers may buy relatively more or less of the product. Keep in mind that a new sales mix will affect the units of each product that need to be sold in order to achieve a desired profit target. If the sales mix for the coming period is uncertain, it may be necessary to look at several different mixes. In this way, a manager gains insight into the possible outcomes facing the firm.

Suppose that Whittier Company recently conducted a market study of the mulching lawn mower that revealed three different alternatives:

1. *Alternative 1:* If advertising expenditures increase by \$8,000, then sales will increase from 1,600 units to 1,725 units.
2. *Alternative 2:* A price decrease from \$400 to \$375 per lawn mower will increase sales from 1,600 units to 1,900 units.
3. *Alternative 3:* Decreasing price to \$375 and increasing advertising expenditures by \$8,000 will increase sales from 1,600 units to 2,600 units.

<sup>1</sup>"Planemaker Airbus to report its first annual loss," *USA Today* (January 18, 2007): 3B.

Should Whittier maintain its current price and advertising policies, or should it select one of the three alternatives described by the marketing study?

The first alternative, increasing advertising costs by \$8,000 with a resulting sales increase of 125 units, is summarized in Exhibit 15-5. This alternative can be analyzed by using the contribution margin per unit of \$75. Since units sold increase by 125, the increase in total contribution margin is \$9,375 ( $\$75 \times 125$  units). However, since fixed costs increase by \$8,000, profits only increase by \$1,375 ( $\$9,375 - \$8,000$ ). Notice that we need to look only at the incremental increase in total contribution margin and fixed expenses to compute the increase in total operating income.

For the second alternative, the price is dropped to \$375 (from \$400), and the units sold increase to 1,900 (from 1,600). The effects of this alternative are summarized in Exhibit 15-6. Here, fixed expenses do not change, so only the change in total contribution margin is relevant. For the current price of \$400, the contribution margin per unit is \$75 ( $\$400 - \$325$ ), and the total contribution margin is \$120,000 ( $\$75 \times 1,600$ ). For the new price, the contribution margin drops to \$50 per unit ( $\$375 - \$325$ ). If 1,900 units are sold at the new price, then the new total contribution margin is \$95,000 ( $\$50 \times 1,900$ ). Dropping the price results in a profit decline of \$25,000 ( $\$120,000 - \$95,000$ ).

Exhibit 15-5

### Summary of the Effects of Alternative 1

	Before the Increased Advertising	With the Increased Advertising
Units sold	1,600	1,725
Unit contribution margin	$\times \$75$	$\times \$75$
Total contribution margin	<u>\$120,000</u>	<u>\$129,375</u>
Less: Fixed expenses	45,000	53,000
Operating income	<u>\$ 75,000</u>	<u>\$ 76,375</u>
<b>Difference in Profit</b>		
Change in sales volume		125
Unit contribution margin		$\times \$75$
Change in contribution margin		<u>\$ 9,375</u>
Less: Change in fixed expenses		8,000
Increase in operating income		<u>\$ 1,375</u>

Exhibit 15-6

### Summary of the Effects of Alternative 2

	Before the Proposed Price Decrease	With the Proposed Price Decrease
Units sold	1,600	1,900
Unit contribution margin	$\times \$75$	$\times \$50$
Total contribution margin	<u>\$120,000</u>	<u>\$95,000</u>
Less: Fixed expenses	45,000	45,000
Operating income	<u>\$ 75,000</u>	<u>\$50,000</u>
<b>Difference in Profit</b>		
Change in contribution margin ( $\$95,000 - \$120,000$ )		<u>\$(25,000)</u>
Less: Change in fixed expenses		—
Decrease in operating income		<u>\$(25,000)</u>

## Exhibit 15-7

## Summary of the Effects of Alternative 3

	Before the Proposed Price and Advertising Changes	With the Proposed Price Decrease and Advertising Increase
Units sold	1,600	2,600
Unit contribution margin	× \$75	× \$50
Total contribution margin	<u>\$120,000</u>	<u>\$130,000</u>
Less: Fixed expenses	45,000	53,000
Profit	<u>\$ 75,000</u>	<u>\$ 77,000</u>
		<b>Difference in Profit</b>
Change in contribution margin (\$130,000 – \$120,000)		\$10,000
Less: Change in fixed expenses (\$53,000 – \$45,000)		<u>8,000</u>
Increase in profit		<u>\$ 2,000</u>

The third alternative calls for a decrease in the unit selling price and an increase in advertising costs. Like the first alternative, the profit impact can be assessed by looking at the incremental effects on contribution margin and fixed expenses. The incremental profit change can be found by (1) computing the incremental change in total contribution margin, (2) computing the incremental change in fixed expenses, and (3) adding the two results. As shown in Exhibit 15-7, the current total contribution margin (for 1,600 units sold) is \$120,000. Since the new unit contribution margin is \$50, the new total contribution margin is \$130,000 ( $\$50 \times 2,600$  units). Thus, the incremental increase in total contribution margin is \$10,000 ( $\$130,000 - \$120,000$ ). However, to achieve this incremental increase in contribution margin, an incremental increase of \$8,000 in fixed costs is needed. The net effect is an incremental increase in operating income of \$2,000.

Of the three alternatives identified by the marketing study, the third alternative promises the most benefit. It increases total operating income by \$2,000. The first alternative increases operating income by only \$1,375, and the second *decreases* operating income by \$25,000.

These examples are all based on a units sold approach. However, we could just as easily have applied a sales revenue approach. The answers would be the same.

## Introducing Risk and Uncertainty

An important assumption of CVP analysis is that prices and costs are known with certainty. This assumption is seldom accurate. Risk and uncertainty are a part of business decision making and must be dealt with somehow. Formally, risk differs from uncertainty in that under risk, the probability distributions of the variables are known; under uncertainty, they are not known. For purposes of CVP analysis, however, the terms will be used interchangeably.

How do managers deal with risk and uncertainty? There are a variety of methods. First, of course, is that management must realize the uncertain nature of future prices, costs, and quantities. Next, managers move from consideration of a break-even point to what might be called a “break-even band.” In other words, given the uncertain nature of the data, perhaps a firm might break even when 1,800 to 2,000 units are sold instead of at the point estimate of 1,900 units. Further, managers may engage in sensitivity or what-if analysis. In this instance, a computer spreadsheet is helpful, as managers set up the break-even (or targeted profit) relationships and then check to see the impact that varying costs and prices have on quantity sold. Two concepts useful to management are margin of safety and operating leverage. Both of these concepts may be considered measures of risk. Each requires knowledge of fixed and variable costs.

**Margin of Safety** The **margin of safety** is the units sold or the revenue earned above the break-even volume. For example, if the break-even volume for a company is 200 units and the company is currently selling 500 units, then the margin of safety is 300 units (500 – 200). The margin of safety can be expressed in sales revenue as well. If the break-even volume is \$200,000 and current revenues are \$500,000, then the margin of safety is \$300,000 (\$500,000 – \$200,000). In addition, margin of safety sales revenue can be expressed as a percentage of total sales dollars, which some managers refer to as the margin of safety ratio. In this example, the margin of safety ratio would be 60 percent (\$300,000/\$500,000). Exhibit 15-8 shows the calculation of the margin of safety and the margin of safety ratio. **Cornerstone 15-9** shows the expected margin of safety for Whittier Company.

The margin of safety can be viewed as a crude measure of risk. There are always events, unknown when plans are made, that can lower sales below the original expected level. In the event that sales take a downward turn, the risk of suffering losses is less if a firm's expected margin of safety is large than if the margin of safety is small. Managers who face a low margin of safety may wish to consider actions to increase sales or decrease costs. These steps will increase the margin of safety and lower the risk of incurring losses.

**Operating Leverage** In physics, a lever is a simple machine used to multiply force. Basically, the lever multiplies the effort applied to create more work. The larger the load moved by a given amount of effort, the greater is the mechanical advantage. In financial terms, operating leverage is concerned with the relative mix of fixed costs and variable costs in an organization. It is sometimes possible to trade off fixed costs for variable costs. As variable costs decrease, the unit contribution margin increases, making the contribution of each unit sold that much greater. In such a case, fluctuations in sales have an increased effect on profitability. Thus, firms that have realized lower variable costs by increasing the proportion of fixed costs will benefit with greater increases in profits as sales increase than will firms with a lower proportion of fixed costs. Fixed costs are being used as leverage to increase profits. Unfortunately, it is also true that firms with a higher operating leverage will experience greater reductions in profits as sales decrease. **Operating leverage** is the use of fixed costs to extract higher percentage changes in profits as sales activity changes.

### CONCEPT Q&A

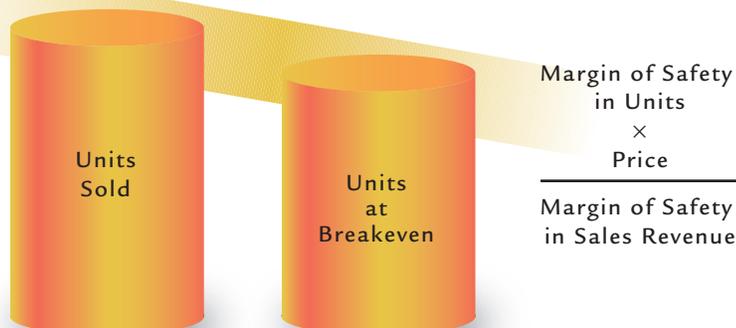
Two companies have identical sales revenue of \$15 million. Is it true that both have the same operating income and the same margin of safety? Is it possible that one company has a higher margin of safety?

*It is not necessarily true that the two companies make the same operating income. If one company has lower variable costs per unit and/or a lower total fixed cost, then its operating income would be higher. The differences in variable cost per unit and total fixed cost would lead to different break-even revenues. Of course, the company with the lower break-even sales would have a higher margin of safety.*

**Possible Answer:**

### Exhibit 15-8

#### The Margin of Safety





### CORNERSTONE 15-9



## HOW TO Compute the Margin of Safety

### Information:

Recall that Whittier Company plans to sell 1,000 mowers at \$400 each in the coming year. Whittier has variable costs of \$325 and fixed costs of \$45,000. Break-even units were previously calculated as 600.

### Required:

1. Calculate the margin of safety for Whittier Company in terms of the number of units.
2. Calculate the margin of safety for Whittier Company in terms of sales revenue.

### Solution:

1. Margin of safety in units =  $1,000 - 600 = 400$
2. Margin of safety in sales revenue =  $\$400(1,000) - \$400(600) = \$160,000$

The **degree of operating leverage (DOL)** can be measured for a given level of sales by taking the ratio of contribution margin to operating income, as follows:

$$\text{Degree of Operating Leverage} = \frac{\text{Total Contribution Margin}}{\text{Operating Income}}$$

If fixed costs are used to lower variable costs such that contribution margin increases and operating income decreases, then the degree of operating leverage increases—signaling an increase in risk. **Cornerstone 15-10** shows how to compute the degree of operating leverage for Whittier Company.

The greater the degree of operating leverage, the more that changes in sales will affect operating income. Because of this phenomenon, the mix of costs that an organization chooses can have a considerable influence on its operating risk and profit level. A company's mix of fixed costs relative to variable costs is referred to as its **cost structure**. Often, a company changes its cost structure by taking on more of one type of cost in exchange for reducing its amount of the other type of cost. For example, as U.S. companies try to compete more effectively with foreign competitors' significantly lower hourly labor costs (i.e., a variable cost), many are altering their cost



### CORNERSTONE 15-10



## HOW TO Compute the Degree of Operating Leverage

### Information:

Recall that Whittier Company plans to sell 1,000 mowers at \$400 each in the coming year. Whittier has variable costs of \$325 and fixed costs of \$45,000. Operating income at that level of sales was previously computed as \$30,000.

### Required:

Calculate the degree of operating leverage for Whittier Company.

### Solution:

$$\begin{aligned} \text{Degree of Operating Leverage} &= \frac{\text{Total Contribution Margin}}{\text{Operating Income}} \\ &= \frac{(\$400 - \$325)(1,000 \text{ units})}{\$30,000} \\ &= 2.5 \end{aligned}$$

structures by taking on more plant machine automation (i.e., a fixed cost) in exchange for using less labor.

To illustrate the impact of these concepts on management decision making, consider a firm that is planning to add a new product line. In adding the line, the firm can choose to rely heavily on automation or on labor. If the firm chooses to emphasize automation rather than labor, fixed costs will be higher, and unit variable costs will be lower. Relevant data for a sales level of 10,000 units follow:

	<b>Automated System</b>	<b>Manual System</b>
Sales	\$1,000,000	\$1,000,000
Less: Variable costs	<u>500,000</u>	<u>800,000</u>
Contribution margin	\$ 500,000	\$ 200,000
Less: Fixed costs	<u>375,000</u>	<u>100,000</u>
Operating income	<u>\$ 125,000</u>	<u>\$ 100,000</u>
Unit selling price	\$ 100	\$ 100
Unit variable cost	50	80
Unit contribution margin	50	20

The degree of operating leverage for the automated system is 4.0 ( $\$500,000/\$125,000$ ). The degree of operating leverage for the manual system is 2.0 ( $\$200,000/\$100,000$ ). What happens to profit in each system if sales increase by 40 percent? We can generate the following income statements to see the following:

	<b>Automated System</b>	<b>Manual System</b>
Sales	\$1,400,000	\$1,400,000
Less: Variable costs	<u>700,000</u>	<u>1,120,000</u>
Contribution margin	\$ 700,000	\$ 280,000
Less: Fixed costs	<u>375,000</u>	<u>100,000</u>
Operating income	<u>\$ 325,000</u>	<u>\$ 180,000</u>

Profits for the automated system would increase by \$200,000 ( $\$325,000 - \$125,000$ ) for a 160 percent increase. In the manual system, profits increase by only \$80,000 ( $\$180,000 - \$100,000$ ) for an 80 percent increase. The automated system has a greater percentage increase because it has a higher degree of operating leverage.

The degree of operating leverage can be used directly to calculate the change in operating income that would result from a given percentage change in sales.

$$\text{Percentage Change in Operating Income} = \text{DOL} \times \text{Percent Change in Sales}$$

Since sales are predicted to increase by 40 percent, and the DOL for the automated system is 4.0, operating income increases by 160 percent. Since operating income based on the original sales level is \$125,000, the operating income based on the increased sales level would be \$325,000 [ $\$125,000 + (\$125,000 \times 1.6)$ ]. Similarly, for the manual system, increased sales of 40 percent and DOL of 2.0 imply increased operating income of 80 percent. Therefore, operating income based on the increased sales level would be \$180,000 [ $\$100,000 + (\$100,000 \times 0.8)$ ]. **Cornerstone 15-11** illustrates the impact of increased sales on operating income using the degree of operating leverage.

In choosing between the two systems, the effect of operating leverage is a valuable piece of information. Higher operating leverage multiplies the impact of increased sales on income. However, the effect is a two-edged sword. As sales decrease, the automated system will also show much higher percentage decreases. Moreover, the increased operating leverage is available under the automated system because of the presence of increased fixed costs. The break-even point for the automated system is 7,500 units ( $\$375,000/\$50$ ), whereas the break-even point for the manual system is 5,000 units ( $\$100,000/\$20$ ). Thus, the automated system has greater operating



## CORNERSTONE 15-11



### HOW TO Compute the Impact of Increased Sales on Operating Income Using the Degree of Operating Leverage

#### Information:

Recall that Whittier Company had expected to sell 1,000 mowers and earn operating income equal to \$30,000 next year. Whittier's degree of operating leverage is equal to 2.5. The company plans to increase sales by 20 percent next year.

#### Required:

1. Calculate the percent change in operating income expected by Whittier Company for next year using the degree of operating leverage.
2. Calculate the operating income expected by Whittier Company next year using the percent change in operating income calculated in Requirement 1.

#### Solution:

1. Percent Change in Operating Income =  $\text{DOL} \times \% \text{ Change in Sales}$   
 $= 2.5 \times 20\% = 50\%$
2. Expected Operating Income =  $\$30,000 + (0.5 \times \$30,000) = \$45,000$

risk. The increased risk, of course, provides a potentially higher profit level as long as units sold exceed 9,167. Why 9,167? Because that is the quantity for which the operating income for the automated system equals the operating income for the manual system. The quantity at which two systems produce the same operating income is referred to as the **indifference point**. This number of units is computed by setting the operating income equations of the two systems equal and solving for number of units:

$$\begin{aligned} \$50 (\text{Units}) - \$375,000 &= \$20 (\text{Units}) - \$100,000 \\ \text{Units} &= 9,167 \end{aligned}$$

In choosing between the automated and manual systems, the manager must consider the likelihood that sales will exceed 9,167 units. If after careful study there is a strong belief that sales will easily exceed this level, then the choice is obviously the automated system. On the other hand, if sales are unlikely to exceed 9,167 units, then the manual system is preferable. Exhibit 15-9 summarizes the relative differences between the manual and automated systems in terms of some of the CVP concepts.

### Sensitivity Analysis and Cost-Volume-Profit

The widespread use of personal computers and spreadsheets has placed sensitivity analysis within reach of most managers. An important tool, **sensitivity analysis** is a “what-if”

#### Exhibit 15-9

#### Differences between a Manual and an Automated System

	Manual System	Automated System
Price	Same	Same
Variable cost	Relatively higher	Relatively lower
Fixed cost	Relatively lower	Relatively higher
Contribution margin	Relatively lower	Relatively higher
Break-even point	Relatively lower	Relatively higher
Margin of safety	Relatively higher	Relatively lower
Degree of operating leverage	Relatively lower	Relatively higher
Down-side risk	Relatively lower	Relatively higher
Up-side potential	Relatively lower	Relatively higher

technique that examines the impact of changes in underlying assumptions on an answer. It is relatively simple to input data on prices, variable costs, fixed costs, and sales mix and to set up formulas to calculate break-even points and expected profits. Then, the data can be varied as desired to see how changes impact the expected profit.

In the example on operating leverage, a company analyzed the impact on profit of using an automated versus a manual system. The computations were essentially done by hand, and too much variation is cumbersome. Using the power of a computer, it would be an easy matter to change the sales price in \$1 increments between \$75 and \$125, with related assumptions about quantity sold. At the same time, variable and fixed costs could be adjusted. For example, suppose that the automated system has fixed costs of \$375,000 but that those costs could easily double in the first year and come back down in the second and third years as bugs are worked out of the system and workers learn to use it. Again, the spreadsheet can effortlessly handle the many computations.

A spreadsheet, while wonderful for cranking out numerical answers, cannot do the most difficult job in CVP analysis. That job is determining the data to be entered in the first place. The managerial accountant must be aware of the cost and price distributions of the firm as well as of the impact of changing economic conditions on these variables. The fact that variables are seldom known with certainty is no excuse for ignoring the impact of uncertainty on CVP analysis. Fortunately, sensitivity analysis can also give managers a feel for the degree to which a poorly forecast variable will affect an answer. That is also an advantage.

**ETHICS** It is important to note that the CVP results are only one input into business decisions. There are many other factors that may bear on decisions to choose one type of process over another, for example, or whether or not to delete certain costs. Businesses and nonprofit entities often face trade-offs involving safety. Ethical concerns also have an important place in CVP analysis. One possibility is that cost of potential problems can be estimated and included in the CVP results. Often, however, the costs and probabilities are not known with sufficient certainty. In that case, these factors are included in the ultimate decision-making process. Chapter 23, on short-run decision making, covers this topic in more detail. ♦

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## Summary of Learning Objectives

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- LO1. Determine the break-even point in number of units and in total sales dollars.**
- At break even, total costs (variable and fixed) equal total sales revenue.
  - Break-even units equal total fixed costs divided by the contribution margin (price minus variable cost per unit).
  - Break-even revenue equals total fixed costs divided by the contribution margin ratio.
- LO2. Determine the number of units that must be sold, and the amount of revenue required, to earn a targeted profit.**
- To earn a target (desired) profit, total costs (variable and fixed) plus the amount of target profit must equal total sales revenue.
  - Units to earn target profit equal total fixed costs plus target profit divided by the contribution margin.
  - Sales revenue to earn target profit equals total fixed costs plus target profit divided by the contribution margin ratio.
- LO3. Prepare a profit-volume graph and a cost-volume-profit graph, and explain the meaning of each.**
- CVP assumes linear revenue and cost functions, no finished goods ending inventories, constant sales mix, and that selling prices and fixed and variable costs are known with certainty.

- Profit-volume graphs plot the relationship between profit (operating income) and units sold. Break-even units are shown where the profit line crosses the horizontal axis.
- CVP graphs plot a line for total costs and a line for total sales revenue. The intersection of these two lines is the break-even point in units.

**LO4. Apply cost-volume-profit analysis in a multiple-product setting.**

- Multiple-product analysis requires the expected sales mix.
- Break-even units for each product will change as the sales mix changes.
- Increased sales of high contribution margin products decrease the break-even point.
- Increased sales of low contribution margin products increase the break-even point.

**LO5. Explain the impact of risk, uncertainty, and changing variables on cost-volume-profit analysis.**

- Uncertainty regarding costs, prices, and sales mix affect the break-even point.
- Sensitivity analysis allows managers to vary costs, prices, and sales mix to show various possible break-even points.
- Margin of safety shows how far the company's actual sales and/or units are above or below the break-even point.
- Operating leverage is the use of fixed costs to increase the percentage changes in profits as sales activity changes.

## Summary of Important Equations

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1. Sales Revenue = Price  $\times$  Units Sold
2. Operating Income = (Price  $\times$  Units Sold) – (Unit Variable Cost  $\times$  Units Sold) – Fixed Cost
3. Break-Even Point in Units =  $\frac{\text{Fixed Cost}}{(\text{Price} - \text{Unit Variable Cost})}$
4. Contribution Margin Ratio =  $\frac{\text{Total Contribution Margin}}{\text{Sales}}$   
or  
 $= \frac{(\text{Price} - \text{Unit Variable Cost})}{\text{Price}}$
5. Variable Cost Ratio =  $\frac{\text{Total Variable Cost}}{\text{Sales}}$   
or  
 $= \frac{\text{Unit Variable Cost}}{\text{Price}}$
6. Break-Even Point in Sales Dollars =  $\frac{\text{Fixed Cost}}{\text{Contribution Margin Ratio}}$   
or  
 $= \frac{\text{Fixed Cost}}{(1 - \text{Variable Cost Ratio})}$
7. Margin of Safety = Sales – Break-Even Sales
8. Degree of Operating Leverage =  $\frac{\text{Total Contribution Margin}}{\text{Operating Income}}$
9. Percentage Change in Profits = Degree of Operating Leverage  $\times$  Percent Change in Sales

- CORNERSTONE 15-1** How to prepare a contribution margin income statement, page 806
- CORNERSTONE 15-2** How to solve for the break-even point in units, page 808
- CORNERSTONE 15-3** How to calculate the variable cost ratio and the contribution margin ratio, page 810
- CORNERSTONE 15-4** How to solve for the break-even point in sales dollars, page 811
- CORNERSTONE 15-5** How to solve for the number of units to be sold to earn a target operating income, page 813
- CORNERSTONE 15-6** How to solve for the sales needed to earn a target operating income, page 814
- CORNERSTONE 15-7** How to calculate the break-even units for a multiple-product firm, page 820
- CORNERSTONE 15-8** How to calculate the break-even sales dollars for a multiple-product firm, page 822
- CORNERSTONE 15-9** How to compute the margin of safety, page 826
- CORNERSTONE 15-10** How to compute the degree of operating leverage, page 826
- CORNERSTONE 15-11** How to compute the impact of increased sales on operating income using the degree of operating leverage, page 828



## CORNERSTONES FOR CHAPTER 15

## Key Terms

Break-even point, 804	Direct fixed expenses, 818
Common fixed expenses, 818	Indifference point, 828
Contribution margin, 805	Margin of safety, 825
Contribution margin income statement, 805	Operating leverage, 825
Contribution margin ratio, 809	Profit-volume graph, 814
Cost-volume-profit graph, 816	Sales mix, 819
Cost structure, 826	Sensitivity analysis, 828
Degree of operating leverage (DOL), 826	Variable cost ratio, 809

## Review Problems

### I. Single Product Cost-Volume-Profit Analysis

Cutlass Company's projected profit for the coming year is as follows:

	Total	Per Unit
Sales	\$200,000	\$20
Less: Variable expenses	<u>120,000</u>	<u>12</u>
Contribution margin	\$ 80,000	<u>\$ 8</u>
Less: Fixed expenses	<u>64,000</u>	
Operating income	<u><u>\$ 16,000</u></u>	

**Required:**

1. Compute the variable cost ratio. Compute the contribution margin ratio.
2. Compute the break-even point in units.
3. Compute the break-even point in sales dollars.
4. How many units must be sold to earn a profit of \$30,000?
5. Compute the contribution margin ratio. Using that ratio, compute the additional profit that Cutlass would earn if sales were \$25,000 more than expected.
6. For the projected level of sales, compute the margin of safety in units and in sales dollars.
7. Calculate the degree of operating leverage. Now suppose that Cutlass revises the forecast to show a 30% increase in sales over the original forecast. What is the percent change in operating income expected for the revised forecast? What is the total operating income expected by Cutlass after revising the sales forecast?

**Solution:**

$$\begin{aligned}
 1. \text{ Variable Cost Ratio} &= \frac{\text{Total Variable Cost}}{\text{Sales}} \\
 &= \frac{\$120,000}{\$200,000} \\
 &= 0.60, \text{ or } 60\%
 \end{aligned}$$

$$\begin{aligned}
 \text{Contribution Margin Ratio} &= \frac{\text{Contribution Margin}}{\text{Sales}} \\
 &= \frac{\$80,000}{\$200,000} \\
 &= 0.40, \text{ or } 40\%
 \end{aligned}$$

2. The break-even point is computed as follows:

$$\begin{aligned}
 \text{Units} &= \frac{\text{Fixed Cost}}{(\text{Price} - \text{Unit Variable Cost})} \\
 &= \frac{\$64,000}{(\$20 - \$12)} \\
 &= \frac{\$64,000}{\$8} = 8,000 \text{ Units}
 \end{aligned}$$

3. The break-even point in sales dollars is computed as follows:

$$\begin{aligned}
 \text{Break-Even Sales Dollars} &= \frac{\text{Fixed Cost}}{\text{Contribution Margin Ratio}} \\
 &= \frac{\$64,000}{0.40} \\
 &= \$160,000
 \end{aligned}$$

4. The number of units that must be sold to earn a profit of \$30,000 is calculated as follows:

$$\begin{aligned}
 \text{Units} &= \frac{(\$64,000 + \$30,000)}{\$8} \\
 &= \frac{\$94,000}{\$8} \\
 &= 11,750 \text{ Units}
 \end{aligned}$$

5. The additional contribution margin on additional sales of \$25,000 would be  $0.40 \times \$25,000 = \$10,000$ .

6. Margin of Safety in Units = Projected Units – Break-Even Units  
 $= 10,000 - 8,000 = 2,000 \text{ Units}$

Margin of safety in sales dollars = \$200,000 – \$160,000, or \$40,000 in sales revenues

$$7. \text{ Degree of Operating Leverage} = \frac{\text{Contribution Margin}}{\text{Operating Income}}$$

$$= \frac{\$80,000}{\$16,000} = 5.0$$

$$\text{Percent Change in Operating Income} = \text{Degree of Operating Leverage} \times \% \text{ Change in Sales}$$

$$= 5.0 \times 30\%$$

$$= 150\%$$

$$\text{Expected Operating Income} = \$16,000 + (1.5 \times \$16,000)$$

$$= \$40,000$$

## II. Multiple-Product Cost-Volume-Profit Analysis

Alpha Company produces and sells two products: Alpha-Basic and Alpha-Deluxe. In the coming year, Alpha expects to sell 3,000 units of Alpha-Basic and 1,500 units of Alpha-Deluxe. Information on the two products is as follows:

	Alpha-Basic	Alpha-Deluxe
Price	\$120	\$200
Variable cost per unit	40	80

Total fixed costs are \$140,000.

### Required:

1. What is the sales mix of Alpha-Basic to Alpha-Deluxe?
2. Compute the break-even quantity of each product.

### Solution:

1. The sales mix of Alpha-Basic to Alpha-Deluxe is 3,000:1,500 or 2:1.
2. Each package consists of two Alpha-Basic and one Alpha-Deluxe:

Product	Price	Unit Variable Cost	Unit Contribution Margin	Sales Mix	Package Unit Contribution Margin
Alpha-Basic	\$120	\$40	\$ 80	2	\$160
Alpha-Deluxe	200	80	120	1	120
Package total					<u>\$280</u>

$$\text{Break-Even Packages} = \frac{\text{Total Fixed Cost}}{\text{Package Contribution Margin}}$$

$$= \frac{\$140,000}{\$280}$$

$$= 500 \text{ Packages}$$

$$\text{Alpha-Basic Break-Even Units} = 500 \times 2 = 1,000$$

$$\text{Alpha-Deluxe Break-Even Units} = 500 \times 1 = 500$$

## Discussion Questions

1. Explain how CVP analysis can be used for managerial planning.
2. Describe the difference between the units sold approach to CVP analysis and the sales revenue approach.
3. Define the term *break-even point*.
4. Explain why contribution margin per unit becomes profit per unit above the break-even point.
5. What is the variable cost ratio? The contribution margin ratio? How are the two ratios related?

6. Suppose a firm with a contribution margin ratio of 0.3 increased its advertising expenses by \$10,000 and found that sales increased by \$30,000. Was it a good decision to increase advertising expenses? Suppose that the contribution margin ratio is now 0.4. Would it be a good decision to increase advertising expenses?
7. Define the term *sales mix*, and give an example to support your definition.
8. Explain how CVP analysis developed for single products can be used in a multiple-product setting.
9. Since break-even analysis focuses on making zero profit, it is of no value in determining the units a firm must sell to earn a targeted profit. Do you agree or disagree with this statement? Why?
10. How does targeted profit enter into the break-even units equation?
11. Explain how a change in sales mix can change a company's break-even point.
12. Define the term *margin of safety*. Explain how it can be used as a crude measure of operating risk.
13. Explain what is meant by the term *operating leverage*. What impact does increased leverage have on risk?
14. How can sensitivity analysis be used in conjunction with CVP analysis?
15. Why is a declining margin of safety over a period of time an issue of concern to managers?

## Multiple-Choice Exercises

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### 15-1 If the variable cost per unit goes up,

Contribution Margin	Break-Even Point
a. increases	increases.
b. increases	decreases.
c. decreases	decreases.
d. decreases	increases.
e. decreases	remains unchanged.

### 15-2 The amount of revenue required to earn a targeted profit is equal to:

- a. fixed cost divided by contribution margin.
- b. fixed cost divided by contribution margin ratio.
- c. fixed cost plus targeted profit divided by contribution margin ratio.
- d. targeted profit divided by contribution margin ratio.
- e. targeted profit divided by variable cost ratio.

### 15-3 Break-even revenue for the multiple-product firm can:

- a. be calculated by dividing total fixed cost by the overall contribution margin ratio.
- b. be calculated by dividing segment fixed cost by the overall contribution margin ratio.
- c. be calculated by dividing total fixed cost by the package contribution margin.
- d. be calculated by multiplying total fixed cost by the contribution margin ratio.
- e. not be calculated; break-even revenue can only be computed for a single-product firm.

### 15-4 In the cost-volume-profit graph,

- a. the break-even point is found where the total revenue curve crosses the x-axis.
- b. the area of profit is to the left of the break-even point.
- c. the area of loss cannot be determined.
- d. both the total revenue curve and the total cost curve appear.
- e. neither the total revenue curve nor the total cost curve appear.

### 15-5 An important assumption of cost-volume-profit analysis is that:

- a. both costs and revenues are linear functions.
- b. all cost and revenue relationships are analyzed within the relevant range.

- c. there is no change in inventories.
- d. sales mix remains constant.
- e. all of the above are assumptions of cost-volume-profit analysis.

**15-6 The use of fixed costs to extract higher percentage changes in profits as sales activity changes involves:**

- a. margin of safety.
- b. operating leverage.
- c. degree of operating leverage.
- d. sensitivity analysis.
- e. variable cost reduction.

**15-7 If the margin of safety is 0, then:**

- a. the company is operating at a loss.
- b. the company is precisely breaking even.
- c. the company is earning a small profit.
- d. the margin of safety cannot be less than or equal to 0; it must be positive.
- e. none of the above is true.

**15-8 The contribution margin is the:**

- a. amount by which sales exceed fixed costs.
- b. difference between sales and total expenses.
- c. difference between sales and operating income.
- d. difference between sales and total variable expense.
- e. difference between variable expense and fixed expense.

*Use the following information for 15-9 and 15-10.*

Corleone Company produces a single product with a price of \$15, variable costs per unit of \$12, and fixed costs of \$9,000.

**15-9 Corleone's break-even point in units:**

- a. is 600.
- b. is 750.
- c. is 9,000.
- d. is 3,000.
- e. cannot be determined from the information given.

**15-10 The variable cost ratio and the contribution margin ratio for Corleone are:**

- | Variable Cost Ratio   | Contribution Margin Ratio |
|---|---------------------------|
| a. 80%  | 80%.                      |
| b. 20%  | 80%.                      |
| c. 20%  | 20%.                      |
| d. 80%  | 20%.                      |
| e. The contribution margin ratio cannot be determined from the information given. |                           |

**15-11 If a company's fixed costs rise by \$10,000, which of the following will be true?**

- a. The break-even point will decrease.
- b. The variable cost ratio will increase.
- c. The break-even point will be unchanged.
- d. The variable cost ratio will decrease.
- e. The contribution margin ratio will be unchanged.

**15-12** Solemon Company has fixed costs of \$15,000, variable cost per unit of \$5, and a price of \$8. If Solemon wants to earn a targeted profit of \$3,600, how many units must be sold?

- 6,200
- 5,000
- 1,200
- 3,720
- 1,875

## Cornerstone Exercises

**OBJECTIVE** > **1**  
**CORNERSTONE 15-1**

**Cornerstone Exercise 15-13 VARIABLE COST, FIXED COST, CONTRIBUTION MARGIN INCOME STATEMENT**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Product costs include:

Direct materials per helmet	\$	30
Direct labor per helmet		5
Variable overhead per helmet		12
Total fixed factory overhead		14,000

Variable selling expense is a commission of \$2 per helmet; fixed selling and administrative expense totals \$15,400.

**Required:**

- Calculate the total variable cost per unit.
- Calculate the total fixed expense for the year.
- Prepare a contribution margin income statement for Head-First Company for the coming year.

**OBJECTIVE** > **1**  
**CORNERSTONE 15-2**

**Cornerstone Exercise 15-14 BREAK-EVEN POINT IN UNITS**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Unit variable cost is \$49 (includes direct materials, direct labor, variable overhead, and variable selling expense). Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense).

**Required:**

- Calculate the break-even number of helmets.
- Check your answer by preparing a contribution margin income statement based on the break-even units.

**OBJECTIVE** > **1**  
**CORNERSTONE 15-3**

**Cornerstone Exercise 15-15 VARIABLE COST RATIO, CONTRIBUTION MARGIN RATIO**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Unit variable cost is \$49 (includes direct materials, direct labor, variable overhead, and variable selling expense). Fixed factory overhead is \$14,000 and fixed selling and administrative expense is \$15,400.

**Required:**

- Calculate the variable cost ratio.
- Calculate the contribution margin cost ratio.
- Prepare a contribution margin income statement based on the budgeted figures for next year. In a column next to the income statement, show the percentages based on sales for sales, total variable costs, and total contribution margin.

**Cornerstone Exercise 15-16 BREAK-EVEN POINT IN SALES DOLLARS****OBJECTIVE** > 1**CORNERSTONE 15-4**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Variable cost is 70 percent of the sales price; contribution margin is 30 percent of sales price. Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense).

**Required:**

1. Calculate the sales revenue that Head-First must make to break even by using the break-even point in sales equation.
2. Check your answer by preparing a contribution margin income statement based on the break-even point in sales dollars.

**Cornerstone Exercise 15-17 UNITS TO EARN TARGET INCOME****OBJECTIVE** > 2**CORNERSTONE 15-5**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Unit variable cost is \$49 (includes direct materials, direct labor, variable overhead, and variable selling expense). Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense).

**Required:**

1. Calculate the number of helmets Head-First must sell to earn operating income of \$81,900.
2. Check your answer by preparing a contribution margin income statement based on the number of units calculated.

**Cornerstone Exercise 15-18 SALES NEEDED TO EARN TARGET INCOME****OBJECTIVE** > 2**CORNERSTONE 15-6**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Variable cost is 70 percent of the sales price; contribution margin is 30 percent of sales price. Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense).

**Required:**

1. Calculate the sales revenue that Head-First must make to earn operating income of \$81,900.
2. Check your answer by preparing a contribution margin income statement based on the sales dollars calculated in Requirement 1.

**Cornerstone Exercise 15-19 BREAK-EVEN POINT IN UNITS FOR A MULTIPLE-PRODUCT FIRM****OBJECTIVE** > 4**CORNERSTONE 15-7**

Suppose that Head-First Company now sells both bicycle helmets and motorcycle helmets. The bicycle helmets are priced at \$70 and have variable costs of \$49 each. The motorcycle helmets are priced at \$220 and have variable costs of \$143 each. Total fixed costs for Head-First as a whole equals \$54,600 (includes all fixed factory overhead and fixed selling and administrative expense). Next year, Head-First expects to sell 5,000 bicycle helmets and 1,000 motorcycle helmets.

**Required:**

1. Form a package of bicycle and motorcycle helmets based on the sales mix expected for the coming year.
2. Calculate the break-even point in units for bicycle helmets and for motorcycle helmets.
3. Check your answer by preparing a contribution margin income statement.

**Cornerstone Exercise 15-20 BREAK-EVEN SALES DOLLARS FOR A MULTIPLE-PRODUCT FIRM****OBJECTIVE** > 4**CORNERSTONE 15-8**

Head-First Company now sells both bicycle helmets and motorcycle helmets. Next year, Head-First expects to produce total revenue of \$570,000 and total variable costs of \$388,000. Total fixed costs are expected to be \$54,600.

**Required:**

1. Calculate the break-even point in sales dollars for Head-First. (Round the contribution margin ratio to four significant digits.)
2. Check your answer by preparing a contribution margin income statement.

**OBJECTIVE** > **5****CORNERSTONE 15-9****Cornerstone Exercise 15-21 MARGIN OF SAFETY**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Unit variable cost is \$49 (includes direct materials, direct labor, variable overhead, and variable selling expense). Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense). Break-even units equal 1,400.

**Required:**

1. Calculate the margin of safety in terms of the number of units.
2. Calculate the margin of safety in terms of sales revenue.

**OBJECTIVE** > **5****CORNERSTONE 15-10****Cornerstone Exercise 15-22 DEGREE OF OPERATING LEVERAGE**

Head-First Company plans to sell 5,000 bicycle helmets at \$70 each in the coming year. Unit variable cost is \$49 (includes direct materials, direct labor, variable overhead, and variable selling expense). Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense). Operating income at 5,000 units sold is \$75,600.

**Required:**

Calculate the degree of operating leverage. (Round your answer to the nearest tenth.)

**OBJECTIVE** > **5****CORNERSTONE 15-11****Cornerstone Exercise 15-23 IMPACT OF INCREASED SALES ON OPERATING INCOME USING THE DEGREE OF OPERATING LEVERAGE**

Head-First Company had planned to sell 5,000 bicycle helmets at \$70 each in the coming year. Unit variable cost is \$49 (includes direct materials, direct labor, variable overhead, and variable selling expense). Total fixed cost equals \$29,400 (includes fixed factory overhead and fixed selling and administrative expense). Operating income at 5,000 units sold is \$75,600. The degree of operating leverage is 1.4. Now Head-First expects to increase sales by 15 percent next year.

**Required:**

1. Calculate the percent change in operating income expected.
2. Calculate the operating income expected next year using the percent change in operating income calculated in Requirement 1.

## Exercises

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**OBJECTIVE** > **1****Exercise 15-24 BASIC BREAK-EVEN CALCULATIONS**

Suppose that Adams Company sells a product for \$16. Unit costs are as follows:

Direct materials	\$3.90
Direct labor	1.40
Variable overhead	2.10
Variable selling and administrative expense	1.60

Total fixed overhead is \$52,000 per year, and total fixed selling and administrative expense is \$37,950.

**Required:**

1. Calculate the variable cost per unit and the contribution margin per unit.
2. Calculate the contribution margin ratio and the variable cost ratio.

- Calculate the break-even units.
- Prepare a contribution margin income statement at the break-even number of units.

**Exercise 15-25 CONTRIBUTION MARGIN, CONTRIBUTION MARGIN RATIO, BREAK-EVEN POINT IN UNITS, BREAK-EVEN SALES REVENUE**

OBJECTIVE > 1

Next year, Jefferson Company expects to sell 140,000 units at \$7.60 each. Variable costs are 60 percent of sales price. Fixed costs total \$349,600.

**Required:**

- Calculate the contribution margin per unit.
- Calculate the break-even point in units.
- Calculate the break-even sales revenue.
- Prepare an income statement for Jefferson at break even.

**Exercise 15-26 CONTRIBUTION MARGIN RATIO, VARIABLE COST RATIO, BREAK-EVEN SALES REVENUE**

OBJECTIVE > 1

The controller of Sandoval Company prepared the following projected income statement:

Sales	\$90,000
Less: Variable costs	<u>72,000</u>
Contribution margin	\$18,000
Less: Fixed costs	<u>6,900</u>
Operating income	<u>\$11,100</u>

**Required:**

- Calculate the contribution margin ratio.
- Calculate the variable cost ratio.
- Calculate the break-even sales revenue for Sandoval.

**Exercise 15-27 INCOME STATEMENT, BREAK-EVEN UNITS, UNITS TO EARN TARGET INCOME**

OBJECTIVE > 2

Goslin Company sold 27,000 units last year at \$14 each. Variable cost was \$9.50, and fixed costs were \$126,000.

**Required:**

- Prepare an income statement for Goslin Company for last year.
- Calculate the break-even point in units.
- Calculate the units that Goslin must sell to earn operating income of \$9,900 next year.

**Exercise 15-28 UNITS SOLD TO BREAK EVEN, UNIT VARIABLE COST, UNIT MANUFACTURING COST, UNITS TO EARN TARGET INCOME**

OBJECTIVE > 1

Prachi Company produces and sells disposable foil baking pans to retailers for \$2.45 per pan. The variable costs per pan are as follows:

Direct materials	\$0.27
Direct labor	0.58
Variable overhead	0.63
Variable selling	0.17

Fixed manufacturing costs total \$131,650 per year. Administrative costs (all fixed) total \$18,350.

**Required:**

- Compute the number of pans that must be sold for Prachi to break even.
- What is the unit variable cost? What is the unit variable manufacturing cost? Which is used in cost-volume-profit analysis and why?

3. How many pans must be sold for Prachi to earn operating income of \$12,600?
4. How much sales revenue must Prachi have to earn operating income of \$12,600?

**OBJECTIVE** > **5** **Exercise 15-29 MARGIN OF SAFETY**

Chase Company produces and sells strings of colorful indoor/outdoor lights for holiday display to retailers for \$6.28 per string. The variable costs per string are as follows:

Direct materials	\$1.27
Direct labor	1.58
Variable overhead	0.63
Variable selling	0.17

Fixed manufacturing costs total \$231,650 per year. Administrative costs (all fixed) total \$315,390. Chase expects to sell 380,000 strings of light next year.

**Required:**

1. Calculate the break-even point in units.
2. Calculate the margin of safety in units.
3. Calculate the margin of safety in dollars.

**OBJECTIVE** > **1** **Exercise 15-30 CONTRIBUTION MARGIN, UNIT AMOUNTS, BREAK-EVEN UNITS**



Information on four independent companies follows. Calculate the correct amount for each question mark. (Round your answers to two significant digits.)

	A	B	C	D
Sales	\$15,000	\$ ?	\$ ?	\$10,600
Total variable costs	<u>5,000</u>	<u>11,700</u>	<u>9,750</u>	<u>?</u>
Total contribution margin	\$10,000	\$ 3,900	\$ ?	\$ ?
Total fixed costs	<u>?</u>	<u>4,000</u>	<u>?</u>	<u>4,452</u>
Operating income (loss)	<u>\$ 500</u>	<u>\$ ?</u>	<u>\$ 364</u>	<u>\$ 848</u>
Units sold	?	1,300	125	1,000
Price per unit	\$ 5.00	?	\$ 130	?
Variable cost per unit	?	\$ 9	?	?
Contribution margin per unit	?	\$ 3	?	?
Contribution margin ratio	?	?	40%	?
Break even in units	?	?	?	?

**OBJECTIVE** > **1** **2** **5** **Exercise 15-31 SALES REVENUE APPROACH, VARIABLE COST RATIO, CONTRIBUTION MARGIN RATIO**

Rezler Company's controller prepared the following budgeted income statement for the coming year:

Sales	\$315,000
Less: Variable expenses	<u>141,750</u>
Contribution margin	\$173,250
Less: Fixed expenses	<u>63,000</u>
Operating income	<u>\$110,250</u>

**Required:**

1. What is Rezler's variable cost ratio? What is its contribution margin ratio?
2. Suppose Rezler's actual revenues are \$30,000 more than budgeted. By how much will operating income increase? Give the answer without preparing a new income statement.
3. How much sales revenue must Rezler earn to break even? Prepare a contribution margin income statement to verify the accuracy of your answer.
4. What is Rezler's expected margin of safety?
5. What is Rezler's margin of safety if sales revenue is \$280,000?

**Exercise 15-32 MULTIPLE-PRODUCT BREAK EVEN****OBJECTIVE** > 4

Switzer Company produces and sells yoga-training products: how-to DVDs and a basic equipment set (blocks, strap, and small pillows). Last year, Switzer sold 10,000 DVDs and 5,000 equipment sets. Information on the two products is as follows:

	DVDs	Equipment Sets
Price	\$12	\$15
Variable cost per unit	4	6

Total fixed costs are \$70,000.

**Required:**

1. What is the sales mix of DVDs and equipment sets?
2. Compute the break-even quantity of each product.

**Exercise 15-33 MULTIPLE-PRODUCT BREAK EVEN, BREAK-EVEN SALES REVENUE****OBJECTIVE** > 1 5

Refer to the data in **Exercise 15-32**. Suppose that in the coming year, Switzer plans to produce an extra-thick yoga mat for sale to health clubs. The company estimates that 20,000 mats can be sold at a price of \$18 and a variable cost per unit of \$13. Fixed costs must be increased by \$48,350 (making total fixed costs of \$118,350). Assume that anticipated sales of the other products, as well as their prices and variable costs, remain the same.

**Required:**

1. What is the sales mix of DVDs, equipment sets, and yoga mats?
2. Compute the break-even quantity of each product.
3. Prepare an income statement for Switzer for the coming year. What is the overall contribution margin ratio? The overall break-even sales revenue?
4. Compute the margin of safety for the coming year in sales dollars. (Round the contribution margin ratio to three significant digits; round the break-even sales revenue to the nearest dollar.)

**Exercise 15-34 CONTRIBUTION MARGIN RATIO, BREAK-EVEN SALES REVENUE, AND MARGIN OF SAFETY FOR MULTIPLE-PRODUCT FIRM****OBJECTIVE** > 1 4 5

Sonora Company produces and sells pottery chimineas (small clay outdoor fireplaces). The chimineas come in three models: small basic, large basic, and carved (ornately shaped and carved). In the coming year, Sonora sold 30,000 small basic models, 50,000 large basic models, and 10,000 carved models. Information on the three models is as follows:

	Small	Large	Carved
Price	\$120	\$200	\$350
Variable cost per unit	70	150	275

Total fixed costs are \$446,500.

**Required:**

1. What is the sales mix of small basic to large basic to carved models?
2. Compute the break-even quantity of each product.
3. Prepare an income statement for Sonora for the coming year. What is the overall contribution margin ratio? The overall break-even sales revenue?
4. Compute the margin of safety for the coming year.

**Exercise 15-35 COST-VOLUME-PROFIT GRAPHS****OBJECTIVE** > 3

Lotts Company produces and sells one product. The selling price is \$10, and the unit variable cost is \$6. Total fixed costs are \$10,000.

**Required:**

1. Prepare a CVP graph with “Units Sold” as the horizontal axis and “\$ Profit” as the vertical axis. Label the break-even point on the horizontal axis.

2. Prepare CVP graphs for each of the following independent scenarios:
  - a. Fixed costs increase by \$5,000.
  - b. Unit variable cost increases to \$7.
  - c. Unit selling price increases to \$12.
  - d. Assume that fixed costs increase by \$5,000 and unit variable cost is \$7.

**OBJECTIVE** > 1 **Exercise 15-36 BASIC COST-VOLUME-PROFIT CONCEPTS**

Berry Company produces a single product. The projected income statement for the coming year is as follows:

Sales (18,000 units @ \$60)	\$1,080,000
Less: Variable costs	<u>594,000</u>
Contribution margin	\$ 486,000
Less: Fixed costs	<u>540,000</u>
Operating income	<u><u>\$ (54,000)</u></u>

**Required:**

1. Compute the unit contribution margin and the units that must be sold to break even.
2. Suppose 30,000 units are sold above break even. What is the operating income?
3. Compute the contribution margin ratio and the break-even point in dollars. Suppose that revenues are \$200,000 more than expected *for the coming year*. What would the total operating income be?

**OBJECTIVE** > 1 5 **Exercise 15-37 MARGIN OF SAFETY AND OPERATING LEVERAGE**

Agador Company produces a single product. The projected income statement for the coming year is as follows:

Sales (50,000 units @ \$45)	\$2,250,000
Less: Variable costs	<u>945,000</u>
Contribution margin	\$1,305,000
Less: Fixed costs	<u>916,650</u>
Operating income	<u><u>\$ 388,350</u></u>

(Round all dollar answers to the nearest dollar. Round fractional answers to two significant digits.)

**Required:**

1. Compute the break-even sales dollars.
2. Compute the margin of safety in sales dollars.
3. Compute the degree of operating leverage (rounded to two decimal places).
4. Compute the new operating income if sales are 20 percent higher than expected. (Round to the nearest dollar.)

**OBJECTIVE** > 1 4 **Exercise 15-38 MULTIPLE-PRODUCT BREAK EVEN**

Parker Pottery produces a line of vases and a line of ceramic figurines. Each line uses the same equipment and labor; hence, there are no traceable fixed costs. Common fixed costs equal \$30,000. Parker's accountant has begun to assess the profitability of the two lines and has gathered the following data for last year:

	Vases	Figurines
Price	\$ 40	\$ 70
Variable cost	<u>30</u>	<u>42</u>
Contribution margin	<u>\$ 10</u>	<u>\$ 28</u>
Number of units	1,000	500

**Required:**

1. Compute the number of vases and the number of figurines that must be sold for the company to break even.
2. Parker Pottery is considering upgrading its factory to improve the quality of its products. The upgrade will add \$5,260 per year to total fixed costs. If the upgrade is successful, the projected sales of vases will be 1,500, and figurine sales will increase to 1,000 units. What is the new break-even point in units for each of the products?

**Exercise 15-39 BREAK-EVEN UNITS, CONTRIBUTION MARGIN RATIO, MULTIPLE-PRODUCT BREAK EVEN, MARGIN OF SAFETY, DEGREE OF OPERATING LEVERAGE**
**OBJECTIVE** > 1 2 4 5

Rad-Brad, Inc.'s projected operating income (based on sales of 350,000 units) for the coming year is as follows:

	<b>Total</b>
Sales	\$8,400,000
Less: Variable expenses	<u>6,720,000</u>
Contribution margin	\$1,680,000
Less: Fixed expenses	<u>1,512,000</u>
Operating income	<u><u>\$ 168,000</u></u>

**Required:**

1. Compute:
  - a. Variable cost per unit
  - b. Contribution margin per unit
  - c. Contribution margin ratio
  - d. Break-even point in units.
  - e. Break-even point in sales dollars.
2. How many units must be sold to earn operating income of \$300,000?
3. Compute the additional operating income that Rad-Brad's would earn if sales were \$50,000 more than expected.
4. For the projected level of sales, compute the margin of safety in units, and then in sales dollars.
5. Compute the degree of operating leverage.
6. Compute the new operating income if sales are 10 percent higher than expected.

## Problems

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**Problem 15-40 BREAK-EVEN UNITS, CONTRIBUTION MARGIN RATIO, MARGIN OF SAFETY**
**OBJECTIVE** > 1 2 5

Bandaleria Company's projected profit for the coming year is as follows:

	<b>Total</b>	<b>Per Unit</b>
Sales	\$2,480,000	\$20
Less: Variable expenses	<u>1,488,000</u>	<u>12</u>
Contribution margin	\$ 992,000	<u>\$ 8</u>
Less: Fixed expenses	<u>716,800</u>	
Operating income	<u><u>\$ 275,200</u></u>	

**Required:**

1. Compute the break-even point in units.
2. How many units must be sold to earn a profit of \$640,000?
3. Compute the contribution margin ratio. Using that ratio, compute the additional profit that Bandaleria would earn if sales were \$50,000 more than expected.
4. For the projected level of sales, compute the margin of safety in units.

**OBJECTIVE** > **1** **5** **Problem 15-41 BREAK-EVEN UNITS, OPERATING INCOME, MARGIN OF SAFETY**

Dory Manufacturing Company produces T-shirts screen-printed with the logos of various sports teams. Each shirt is priced at \$10 and has a unit variable cost of \$5. Total fixed costs are \$96,000.

**Required:**

1. Compute the break-even point in units.
2. Suppose that Dory could reduce its fixed costs by \$13,500 by reducing the amount of setup and engineering time needed. How many units must be sold to break even in this case?
3. How does the reduction in fixed costs affect the break-even point? Operating income? The margin of safety?

**OBJECTIVE** > **1** **2** **5** **Problem 15-42 CONTRIBUTION MARGIN, BREAK-EVEN UNITS, BREAK-EVEN SALES, MARGIN OF SAFETY, DEGREE OF OPERATING LEVERAGE**

Sohrwide Company produces a variety of chemicals. One division makes reagents for laboratories. The division's projected income statement for the coming year is:

Sales (128,000 units @ \$50)	\$6,400,000
Less: Variable expenses	<u>4,480,000</u>
Contribution margin	\$1,920,000
Less: Fixed expenses	<u>1,000,000</u>
Operating income	<u>\$ 920,000</u>

**Required:**

1. Compute the contribution margin per unit, and calculate the break-even point in units (round to the nearest unit). Calculate the contribution margin ratio and the break-even sales revenue.
2. The divisional manager has decided to increase the advertising budget by \$100,000. This will increase sales revenues by \$1 million. By how much will operating income increase or decrease as a result of this action?
3. Suppose sales revenues exceed the estimated amount on the income statement by \$315,000. Without preparing a new income statement, by how much are profits underestimated?
4. Compute the margin of safety based on the original income statement.
5. Compute the degree of operating leverage based on the original income statement. If sales revenues are 20 percent greater than expected, what is the percentage increase in operating income? Round operating leverage to two decimal places.

**OBJECTIVE** > **2** **4** **Problem 15-43 MULTIPLE-PRODUCT ANALYSIS, CHANGES IN SALES MIX, SALES TO EARN TARGET OPERATING INCOME**

Gosnell Company produces two products: squares and circles. The projected income for the coming year, segmented by product line, follows:

	Squares	Circles	Total
Sales	\$300,000	\$2,500,000	\$2,800,000
Less: Variable expenses	<u>100,000</u>	<u>500,000</u>	<u>600,000</u>
Contribution margin	\$200,000	\$2,000,000	\$2,200,000
Less: Direct fixed expenses	<u>28,000</u>	<u>1,500,000</u>	<u>1,528,000</u>
Product margin	<u>\$172,000</u>	<u>\$ 500,000</u>	<u>\$ 672,000</u>
Less: Common fixed expenses			<u>100,000</u>
Operating income			<u>\$ 572,000</u>

The selling prices are \$30 for squares and \$50 for circles.

**Required:**

1. Compute the number of units of each product that must be sold for Gosnell Company to break even.
2. Assume that the marketing manager changes the sales mix of the two products so that the ratio is three squares to five circles. Repeat Requirement 1.
3. Refer to the original data. Suppose that Gosnell can increase the sales of squares with increased advertising. The extra advertising would cost an additional \$245,000, and some of the potential purchasers of circles would switch to squares. In total, sales of squares would increase by 25,000 units, and sales of circles would decrease by 5,000 units. Would Gosnell be better off with this strategy?

**Problem 15-44 COST-VOLUME-PROFIT EQUATION, BASIC CONCEPTS, SOLVING FOR UNKNOWNNS****OBJECTIVE** > 1 2 3 5

Nutri-Tress Company produces combination shampoos and conditioners in individual-use bottles for hotels. Each bottle sells for \$0.36. The variable costs for each bottle (materials, labor, and overhead) total \$0.27. The total fixed costs are \$58,500. During the most recent year, 830,000 bottles were sold.

**Required:**

1. What is the break-even point in units for Nutri-Tress? What is the margin of safety in units for the most recent year?
2. Prepare an income statement for Nutri-Tress's most recent year.
3. How many units must be sold for Nutri-Tress to earn a profit of \$36,000?
4. What is the level of sales dollars needed for Nutri-Tress to earn operating income of 20 percent of sales?

**Problem 15-45 CONTRIBUTION MARGIN RATIO, BREAK-EVEN SALES, OPERATING LEVERAGE****OBJECTIVE** > 1 5

Doerhing Company produces plastic mailboxes. The projected income statement for the coming year follows:

Sales	\$560,400
Less: Variable costs	<u>257,784</u>
Contribution margin	\$302,616
Less: Fixed costs	<u>150,000</u>
Operating income	<u><u>\$152,616</u></u>

**Required:**

1. Compute the contribution margin ratio for the mailboxes.
2. How much revenue must Doerhing earn in order to break even?
3. What is the effect on the contribution margin ratio if the unit selling price and unit variable cost each increase by 10 percent?
4. Suppose that management has decided to give a 3 percent commission on all sales. The projected income statement does not reflect this commission. Recompute the contribution margin ratio, assuming that the commission will be paid. What effect does this have on the break-even point?
5. If the commission is paid as described in Requirement 4, management expects sales revenues to increase by \$80,000. How will this affect operating leverage? Is it a sound decision to implement the commission? Support your answer with appropriate computations.

**Problem 15-46 MULTIPLE PRODUCTS, BREAK-EVEN ANALYSIS, OPERATING LEVERAGE****OBJECTIVE** > 4 5

Carlyle Lighting Products produces two different types of lamps: a floor lamp and a desk lamp. Floor lamps sell for \$30, and desk lamps sell for \$20. The projected income statement for the coming year follows:

Sales	\$600,000
Less: Variable costs	<u>400,000</u>
Contribution margin	\$200,000
Less: Fixed costs	<u>150,000</u>
Operating income	<u>\$ 50,000</u>

The owner of Carlyle estimates that 60 percent of the sales revenues will be produced by floor lamps and the remaining 40 percent by desk lamps. Floor lamps are also responsible for 60 percent of the variable expenses. Of the fixed expenses, one-third are common to both products, and one-half are directly traceable to the floor lamp product line.

**Required:**

1. Compute the sales revenue that must be earned for Carlyle to break even.
2. Compute the number of floor lamps and desk lamps that must be sold for Carlyle to break even.
3. Compute the degree of operating leverage for Carlyle Lighting Products. Now assume that the actual revenues will be 40 percent higher than the projected revenues. By what percentage will profits increase with this change in sales volume?

**OBJECTIVE** > 1 4

**Problem 15-47 MULTIPLE-PRODUCT BREAK EVEN**

Polaris Inc. manufactures two types of metal stampings for the automobile industry: door handles and trim kits. Fixed costs equal \$146,000. Each door handle sells for \$12 and has variable costs of \$9; each trim kit sells for \$8 and has variable costs of \$5.

**Required:**

1. What are the contribution margin per unit and the contribution margin ratio for door handles and for trim kits?
2. If Polaris sells 20,000 door handles and 40,000 trim kits, what is the operating income?
3. How many door handles and how many trim kits must be sold for Polaris to break even?
4. Assume that Polaris has the opportunity to rearrange its plant to produce only trim kits. If this is done, fixed costs will decrease by \$35,000, and 70,000 trim kits can be produced and sold. Is this a good idea? Explain.

**OBJECTIVE** > 1 5

**Problem 15-48 COST-VOLUME-PROFIT, MARGIN OF SAFETY**

Victoria Company produces a single product. Last year's income statement is as follows:

Sales (29,000 units)	\$1,218,000
Less: Variable costs	<u>812,000</u>
Contribution margin	\$ 406,000
Less: Fixed costs	<u>300,000</u>
Operating income	<u>\$ 106,000</u>

**Required:**

1. Compute the break-even point in units and sales dollars.
2. What was the margin of safety for Victoria Company last year?
3. Suppose that Victoria Company is considering an investment in new technology that will increase fixed costs by \$250,000 per year but will lower variable costs to 45 percent of sales. Units sold will remain unchanged. Prepare a budgeted income statement assuming that Victoria makes this investment. What is the new break-even point in units and sales dollars, assuming that the investment is made?

**OBJECTIVE** > 1 5

**Problem 15-49 COST-VOLUME-PROFIT, MARGIN OF SAFETY**

Isaac Company had revenues of \$930,000 last year with total variable costs of \$353,400 and fixed costs of \$310,000.

**Required:**

1. What is the variable cost ratio for Isaac? What is the contribution margin ratio?
2. What is the break-even point in sales revenue?
3. What was the margin of safety for Isaac last year?
4. Isaac is considering starting a multimedia advertising campaign that is supposed to increase sales by \$7,500 per year. The campaign will cost \$5,000. Is the advertising campaign a good idea? Explain.

**Problem 15-50 USING THE BREAK-EVEN EQUATIONS TO SOLVE FOR PRICE AND VARIABLE COST PER UNIT** OBJECTIVE > 1

Solve the following independent problems.

**Required:**

1. Sarah Company's break-even point is 1,500 units. Variable cost per unit is \$300; total fixed costs are \$120,000 per year. What price does Sarah charge?
2. Jesper Company charges a price of \$3.50; total fixed costs are \$160,000 per year, and the break-even point is 128,000 units. What is the variable cost per unit?

**Problem 15-51 CONTRIBUTION MARGIN, COST-VOLUME-PROFIT, MARGIN OF SAFETY** OBJECTIVE > 1 2 5

Candyland Inc. produces a particularly rich praline fudge. Each 10-ounce box sells for \$5.60. Variable unit costs are as follows:

Pecans	\$0.70
Sugar	0.35
Butter	1.85
Other ingredients	0.34
Box, packing material	0.76
Selling commission	0.20

Fixed overhead cost is \$32,300 per year. Fixed selling and administrative costs are \$12,500 per year. Candyland sold 35,000 boxes last year.

**Required:**

1. What is the contribution margin per unit for a box of praline fudge? What is the contribution margin ratio?
2. How many boxes must be sold to break even? What is the break-even sales revenue?
3. What was Candyland's operating income last year?
4. What was the margin of safety?
5. Suppose that Candyland Inc. raises the price to \$6.20 per box but anticipates a sales drop to 31,500 boxes. What will be the new break-even point in units? Should Candyland raise the price? Explain.

**Problem 15-52 BREAK-EVEN SALES, OPERATING LEVERAGE, CHANGE IN INCOME** OBJECTIVE > 1 5

Income statements for two different companies in the same industry are as follows:

	Company A	Company B
Sales	\$500,000	\$500,000
Less: Variable costs	400,000	200,000
Contribution margin	\$100,000	\$300,000
Less: Fixed costs	50,000	250,000
Operating income	\$ 50,000	\$ 50,000

**Required:**

1. Compute the degree of operating leverage for each company.
2. Compute the break-even point for each company. Explain why the break-even point for Company B is higher.

3. Suppose that both companies experience a 50 percent increase in revenues. Compute the percentage change in profits for each company. Explain why the percentage increase in Company B's profits is so much larger than that of Company A.

**OBJECTIVE** > **1** **5**



**Problem 15-53 CONTRIBUTION MARGIN, BREAK-EVEN SALES, MARGIN OF SAFETY**

Suppose that Kicker had the following sales and cost experience (in thousands of dollars) for May of the current year and for May of the prior year:

	May, Current Year	May, Prior Year
Total sales	\$ 43,560	\$ 41,700
Less:		
Purchase price paid	(17,000)	(16,000)
Additional labor and supplies	(1,400)	(1,200)
Commissions	<u>(1,250)</u>	<u>(1,100)</u>
Contribution margin	\$ 23,910	\$ 23,400
Less:		
Fixed warehouse cost	(680)	(500)
Fixed administrative cost	(4,300)	(4,300)
Fixed selling cost	(5,600)	(5,000)
Research and development	<u>(9,750)</u>	<u>(4,000)</u>
Operating income	<u>\$ 3,580</u>	<u>\$ 9,600</u>



In August of the prior year, Kicker started an intensive quality program designed to enable it to build original equipment manufacture (OEM) speaker systems for a major automobile company. The program was housed in research and development. In the beginning of the current year, Kicker's accounting department exercised tighter control over sales commissions, ensuring that no dubious (e.g., double) payments were made. The increased sales in the current year required additional warehouse space that Kicker rented in town.

**Required:**

1. Calculate the contribution margin ratio for May of both years.
2. Calculate the break-even point in sales dollars for both years.
3. Calculate the margin of safety in sales dollars for both years.
4. Analyze the differences shown by your calculations in Requirements 1, 2, and 3.

## Cases

**OBJECTIVE** > **1** **4**

**Case 15-54 COST-VOLUME-PROFIT WITH MULTIPLE PRODUCTS, SALES MIX CHANGES, CHANGES IN FIXED AND VARIABLE COSTS**

Artistic Woodcrafting Inc. began several years ago as a one-person cabinet-making operation. Employees were added as the business expanded. Last year, sales volume totaled \$850,000. Volume for the first five months of the current year totaled \$600,000, and sales were expected to be \$1.6 million for the entire year. Unfortunately, the cabinet business in the region where Artistic Woodcrafting is located is highly competitive. More than 200 cabinet shops are all competing for the same business.

Artistic currently offers two different quality grades of cabinets: Grade I and Grade II, with Grade I being the higher quality. The average unit selling prices, unit variable costs, and direct fixed costs are as follows:

	Unit Price	Unit Variable Cost	Direct Fixed Cost
Grade I	\$3,400	\$2,686	\$95,000
Grade II	1,600	1,328	95,000

Common fixed costs (fixed costs not traceable to either cabinet) are \$35,000. Currently, for every three Grade I cabinets sold, seven Grade II cabinets are sold.

**Required:**

1. Calculate the number of Grade I and Grade II cabinets that are expected to be sold during the current year.
2. Calculate the number of Grade I and Grade II cabinets that must be sold for the company to break even.
3. Artistic Woodcrafting can buy computer-controlled machines that will make doors, drawers, and frames. If the machines are purchased, the variable costs for each type of cabinet will decrease by 9 percent, but common fixed costs will increase by \$44,000. Compute the effect on operating income, and also calculate the new break-even point. Assume the machines are purchased at the beginning of the sixth month. Fixed costs for the company are incurred uniformly throughout the year.
4. Refer to the original data. Artistic Woodcrafting is considering adding a retail outlet. This will increase common fixed costs by \$70,000 per year. As a result of adding the retail outlet, the additional publicity and emphasis on quality will allow the firm to change the sales mix to 1:1. The retail outlet is also expected to increase sales by 30 percent. Assume that the outlet is opened at the beginning of the sixth month. Calculate the effect on the company's expected profits for the current year, and calculate the new break-even point. Assume that fixed costs are incurred uniformly throughout the year.

**Case 15-55 ETHICS AND A COST-VOLUME-PROFIT APPLICATION**

**OBJECTIVE**  **1**

Danna Lumus, the marketing manager for a division that produces a variety of paper products, is considering the divisional manager's request for a sales forecast for a new line of paper napkins. The divisional manager has been gathering data so that he can choose between two different production processes. The first process would have a variable cost of \$10 per case produced and fixed costs of \$100,000. The second process would have a variable cost of \$6 per case and fixed costs of \$200,000. The selling price would be \$30 per case. Danna had just completed a marketing analysis that projects annual sales of 30,000 cases.

Danna is reluctant to report the 30,000 forecast to the divisional manager. She knows that the first process would be labor intensive, whereas the second would be largely automated with little labor and no requirement for an additional production supervisor. If the first process is chosen, Jerry Johnson, a good friend, will be appointed as the line supervisor. If the second process is chosen, Jerry and an entire line of laborers will be laid off. After some consideration, Danna revises the projected sales downward to 22,000 cases.

She believes that the revision downward is justified. Since it will lead the divisional manager to choose the manual system, it shows a sensitivity to the needs of current employees—a sensitivity that she is afraid her divisional manager does not possess. He is too focused on quantitative factors in his decision making and usually ignores the qualitative aspects.

**Required:**

1. Compute the break-even point for each process.
2. Compute the sales volume for which the two processes are equally profitable. Identify the range of sales for which the manual process is more profitable than the automated process. Identify the range of sales for which the automated process is more profitable than the manual process. Why does the divisional manager want the sales forecast?
3. Discuss Danna's decision to alter the sales forecast. Do you agree with it? Is she acting ethically? Is her decision justified since it helps a number of employees retain their employment? Should the impact on employees be factored into decisions? In fact, is it unethical not to consider the impact of decisions on employees?

# M

## aking the Connection: Integrative Multi-Chapter Exercise



### Cost Behavior and Cost-Volume-Profit Analysis for Many Glacier Hotel

Chapters	Objectives	Cornerstones
14-15	14-3	14-2
	15-1	15-2
	15-2	15-5
	15-4	15-7
	15-5	15-9

The purpose of this integrated exercise is to demonstrate the interrelationship between cost estimation techniques and subsequent uses of cost information. In particular, this exercise illustrates how the variable and fixed cost information estimated from a high-low analysis can be used in a single- and multiple-product CVP analysis.

### Using the High-Low Method to Estimate Variable and Fixed Costs

Located on Swiftcurrent Lake in Glacier National Park, Many Glacier Hotel was built in 1915 by the Great Northern Railway. In an effort to supplement its lodging revenue, the hotel decided in 1998 to begin manufacturing and selling small wooden canoes decorated with symbols hand painted by Native Americans living near the park. Due to the great success of the canoes, the hotel began manufacturing and selling paddles as well in 2001. Many hotel guests purchase a canoe and paddles for use in self-guided tours of Swiftcurrent Lake. Because production of the two products began in different years, the canoes and paddles are produced in separate production facilities and employ different laborers. Each canoe sells for \$500, and each paddle sells for \$50. A 2001 fire destroyed the hotel's accounting records. However, a new system put into place before the 2002 season provides the following aggregated data for the hotel's canoe and paddle manufacturing and marketing activities:

#### Manufacturing Data:

Year	Number of Canoes Manufactured	Total Canoe Manufacturing Costs	Year	Number of Paddles Manufactured	Total Paddle Manufacturing Costs
2007	250	106,000	2007	900	38,500
2006	275	115,000	2006	1,200	49,000
2005	240	108,000	2005	1,000	42,000
2004	310	122,000	2004	1,100	45,500
2003	350	130,000	2003	1,400	56,000
2002	400	140,000	2002	1,700	66,500

#### Marketing Data:

Year	Number of Canoes Sold	Total Canoe Marketing Costs	Year	Number of Paddles Sold	Total Paddle Marketing Costs
2007	250	45,000	2007	900	7,500
2006	275	47,500	2006	1,200	9,000
2005	240	44,000	2005	1,000	8,000
2004	310	51,000	2004	1,100	8,500
2003	350	55,000	2003	1,400	10,000
2002	400	60,000	2002	1,700	11,500

**Required:**

1. High-Low Cost Estimation Method
  - a. Use the high-low method to estimate the per-unit variable costs and total fixed costs for the *canoe* product line.
  - b. Use the high-low method to estimate the per-unit variable costs and total fixed costs for the *paddle* product line.

2. Cost-Volume-Profit Analysis, Single-Product Setting

Use CVP analysis to calculate the break-even point in units for:

- a. The *canoe* product line *only* (i.e., single-product setting)
  - b. The *paddle* product line *only* (i.e., single-product setting)
3. Cost-Volume-Profit Analysis, Multiple-Product Setting

The hotel's accounting system data show an average sales mix of approximately 300 canoes and 1,200 paddles each season. Significantly more paddles are sold relative to canoes because some inexperienced canoe guests accidentally break one or more paddles, while other guests purchase additional paddles as presents for friends and relatives. In addition, for this multiple-product CVP analysis, assume the existence of an additional \$30,000 of common fixed costs for a customer service hotline used for both canoe and paddle customers. Use CVP analysis to calculate the break-even point in units for both the canoe and paddle product lines combined (i.e., the multiple-product setting).

4. Cost Classification
  - a. Classify the manufacturing costs, marketing costs, and customer service hotline costs either as production expenses or period expenses.
  - b. For the period expenses, further classify them into either selling expenses or general and administrative expenses.
5. Sensitivity Cost-Volume-Profit Analysis and Production Versus Period Expenses, Multiple-Product Setting

If both the variable and fixed *production* expenses (refer to your answer to part 1) associated with the *canoe* product line increased by 5% (beyond the estimate from the high-low analysis), how many canoes and paddles would need to be sold in order to earn a target income of \$96,000? Assume the same sales mix and additional fixed costs as in part 4.

6. Margin of Safety

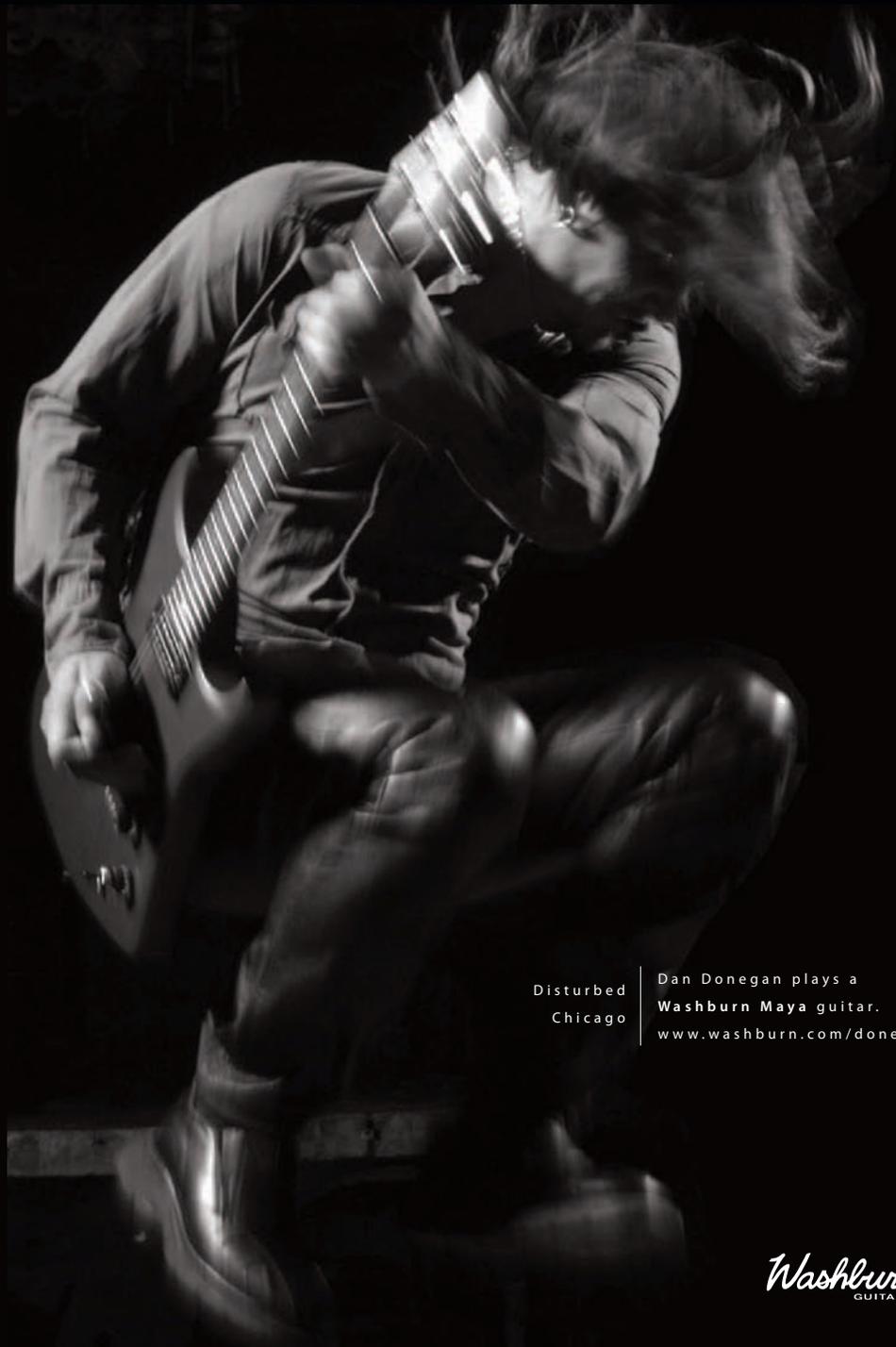
Calculate the hotel's margin of safety (both in units and in sales dollars) for Many Glacier Hotel, assuming it sells 700 canoes and 2,500 paddles next year.

# 16

## Job-Order Costing

After studying Chapter 16, you should be able to:

- **1** Describe the differences between job-order costing and process costing, and identify the types of firms that would use each method.
- **2** Compute the predetermined overhead rate, and use the rate to assign overhead to units or services produced.
- **3** Identify and set up the source documents used in job-order costing.
- **4** Describe the cost flows associated with job-order costing.
- **5** (Appendix 16A) Prepare the journal entries associated with job-order costing.
- **6** (Appendix 16B) Allocate support department costs to producing departments.



Disturbed  
Chicago

Dan Donegan plays a  
Washburn Maya guitar.  
[www.washburn.com/donegan](http://www.washburn.com/donegan)



# **E**xperience Managerial Decisions with Washburn Guitars

Founded in 1883 just north of Chicago, **Washburn Guitars** manufactures high-quality acoustic and electric guitars for musicians ranging from garage bands to some of the world's most famous bands. (See [www.washburn.com/artists/index.aspx](http://www.washburn.com/artists/index.aspx) for a listing of artists playing Washburn guitars.) Washburn produces many guitar series. Each series has many different models that require the use of varied resources. For example, one of Washburn's recent offerings is the Damen Idol, which retails for \$2,249. The Damen is named after Damen Avenue in Chicago's Wicker Park, which according to VP of Marketing Kevin Lello is "a hot spot for the finest alternative, pop and punk musicians." As an example of the complexity and individuality of Washburn's guitars, the Damen model features a mahogany body, flame maple top, mahogany neck with cream binding, rosewood fingerboard, Seymour Duncan Custom pickups in the bridge and a Seymour Duncan '59 in the neck, a Tone Pros Bridge and Tailpiece, and numerous other options for frets, scaling, finishing, and tuning. Currently playing the Damen Idol are Joe Trohman from Fall Out Boy, Aaron Dugan of Matisyahu, Mike Kennerty from The All American Rejects, Shaun Glass from Soil, and Marty Casey from the Lovehammers and INXS. Many guitar buyers, including most professionals, request various

product customizations. For example, Washburn's Custom Shop Pilsen guitar was made especially for Billy Sawilchik to play the National Anthem at Game 2 of the 2005 American League Championship Series between the White Sox and Angels. While customization can create great publicity for Washburn, it also creates significant design and product differences between guitars, even those within the same model line of a given series. This variability results in resource consumption differences, which means that Washburn must estimate the cost of each guitar job according to how the customer desires to customize the order. Washburn managers rely heavily on their effective job-order costing system to help them understand the costs associated with such product alterations. This ensures that Washburn continues to be profitable well into the twenty-first century.

*Washburn*  
GUITARS®

**OBJECTIVE** > 1

Describe the differences between job-order costing and process costing, and identify the types of firms that would use each method.

## Characteristics of the Job-Order Environment

Companies can be divided into two major types, depending on whether or not their products/services are unique. Manufacturing and service firms producing unique products or services require a job-order accounting system. Washburn Guitars falls into this category. On the other hand, those firms producing similar products or services can use a process-costing accounting system. BP, one of the world's largest oil producers, falls into this latter category as its barrels of oil are indistinguishable from one another. The characteristics of a company's actual production process give rise to whether it needs a job-order or a process-costing accounting system.

### Here's The

In the 1970s, Kicker began operations in Steve Irby's garage. Steve was an engineering student at Oklahoma State University and also a keyboard player with a local band. The band needed speakers but couldn't afford new ones. Steve and his father built wooden boxes and fitted them with secondhand components. Word spread, and other bands asked for speakers. Steve partnered with a friend to fill the orders. Then, a friend who worked in the oil fields asked if Steve could rig up speakers for his pickup truck. Long days bouncing over rough fields went more smoothly with music, but the built-in audio systems at the time were awful. Steve designed and built a speaker to fit behind the driver's seat, and Kicker was born.



### Real Kicker

At first, each job was made to order to fit a particular truck or car. The price Steve charged depended heavily on the cost of the job. Since each job was different, the various costs had to be computed individually. Clearly, the costs of wood, fabric, glue, and components were traceable to each job. Steve could also trace labor time. But the other costs of design time, use of power tools, and space were lumped together to create an overhead rate. To the extent that the price of a job was greater than its costs, Steve earned a profit.



## Job-Order Production and Costing

Firms operating in job-order industries produce a wide variety of services or products that are quite distinct from each other. Customized or built-to-order products fit into this category, as do services that vary from customer to customer. A **job**, then, is one distinct unit or set of units. For example, it may be a remodeling job for the Ruiz family, or a set of 12 tables for the children's reading room of the local library. Common job-order processes include printing, construction, furniture making, medical and dental services, automobile repair, and beautician services. Often a job is associated with a particular customer order. The key feature of job-order costing is that the cost of one job differs from that of another and must be kept track of separately.

For job-order production systems, costs are accumulated by job. This approach to assigning costs is called a **job-order costing system**. In a job-order firm, collecting costs by job provides vital information for management. For example, prices frequently are based on costs in a job-order environment.

## Process Production and Costing

Firms in process industries mass-produce large quantities of similar or homogeneous products. Examples of process manufacturers include food, cement, petroleum, and chemical firms. One gallon of paint is the same as another gallon; one bottle of aspirin is the same as another bottle. The important point is that the cost of one unit of a product is identical to the cost of another. Service firms can also use a process-costing approach. For example, check-clearing departments of banks incur a uniform cost to clear a check, no matter the size of the check or the name of the payee.

Process firms accumulate production costs by process or by department for a given period of time. The output for the process for that period of time is measured.

Unit costs are computed by dividing the process costs for the given period by the output of the period. This approach to cost accumulation is known as a **process-costing system** and is examined in detail in Chapter 17. A comparison of job-order costing and process costing is given in Exhibit 16-1.

## Exhibit 16-1

## Comparison of Job-Order and Process Costing

Job-Order Costing	Process Costing
<ol style="list-style-type: none"> <li>1. Wide variety of distinct products</li> <li>2. Costs accumulated by job</li> <li>3. Unit cost computed by dividing total job costs by units produced on that job</li> </ol>	<ol style="list-style-type: none"> <li>1. Homogeneous products</li> <li>2. Costs accumulated by process or department</li> <li>3. Unit cost computed by dividing process costs of the period by the units produced in the period</li> </ol>

## Production Costs in Job-Order Costing

While the variety of product-costing definitions discussed in Chapter 13 applies to both job-order and process costing, we will use the traditional definition to illustrate job-order costing procedures. That is, production costs consist of direct materials, direct labor, and overhead. Direct materials and direct labor are typically fairly easy to trace to individual jobs. In fact, this tracing will be considered later in this chapter in the section on source documents. It is overhead that presents the problem. By definition, overhead is all production costs other than direct materials and direct labor. Some of these might be easily traced to jobs, but most cannot. The solution is to apply overhead to production. The next section examines in detail the way overhead is treated.

## Normal Costing and Overhead Application

Unit costs are very important because managers need accurate cost information on materials, labor, and overhead when making decisions. For example, **Bechtel Construction**, whose projects include the Channel Tunnel connecting England and France and Boston's "Big Dig," typically bills its clients at set points throughout construction. As a result, it is important that the unit cost be generated in a timely fashion. Job-order costing using a normal cost system will give the company the unit cost information it needs.

## OBJECTIVE &gt; 2

Compute the predetermined overhead rate, and use the rate to assign overhead to units or services produced.

## Actual Costing versus Normal Costing

Two ways are commonly used to measure the costs associated with production: actual costing and normal costing. Actual costing requires the firm to use the actual cost of all direct materials, direct labor, and overhead used in production to determine unit cost.

While intuitively reasonable, this method has drawbacks. Normal costing requires the firm to assign actual costs of direct materials and direct labor to units produced and to apply overhead to units based on a predetermined estimate. Normal costing is more widely used in practice.

**Actual Costing** In an **actual cost system**, only *actual* costs of direct materials, direct labor, and overhead are used to determine unit cost. Strict actual cost systems are rarely used

## CONCEPT Q&amp;A

Give an example of a business in your community that would use job-order costing, and tell why it would be appropriate. Give an example of a business in your community that would use process costing and why it would be appropriate.

Answers will vary. One possible example: A tax accounting firm would keep track of costs by job because some tax returns are relatively simple, while others are complex and require time to fill out additional forms and to do necessary research. A "while you wait" oil change shop would use process costing (but cost the oil required separately) since each car would take about the same amount of time and supplies to perform the oil change.

Possible Answer:

because they cannot provide accurate unit cost information on a timely basis. Per-unit computation of the direct materials and direct labor costs is not the problem. The main problem with using actual costing is overhead. Overhead items do not have the direct relationship that direct materials and direct labor do. For example, how much of a security guard's salary should be assigned to a unit of product or service? Even if the firm averages overhead cost by totaling manufacturing overhead costs for a given period and then divides this total by the number of units produced, distorted costs can occur. The distortion can be traced to uneven incurrence of overhead costs and uneven production from period to period.

The first problem is that many overhead costs are not incurred uniformly throughout the year. For example, actual repair cost occurs whenever a machine breakdown occurs. This timing can make overhead costs in the month of a machine breakdown higher than in other months. The second problem, nonuniform production levels, can mean that low production in one month would give rise to high unit overhead costs, and high production in another month would give rise to low unit overhead costs. Yet the production process and total overhead costs may remain unchanged. Clearly, one solution would be to wait until the end of the year to total the actual overhead costs and divide by the total actual production.

Unfortunately, waiting until the end of the year to compute a unit overhead cost is unacceptable. A company needs unit cost information throughout the year. This information is needed on a timely basis both for interim financial statements and to help managers make decisions such as pricing. Most decisions requiring unit cost information simply cannot wait until the end of the year. Managers must react to day-to-day conditions in the marketplace in order to maintain a sound competitive position.

**Normal Costing** Normal costing solves the problems associated with actual costing. A **normal cost system** determines unit cost by adding actual direct materials, actual direct labor, and estimated overhead. Overhead can be estimated by approximating the year's actual overhead at the *beginning* of the year and then using a predetermined rate throughout the year to obtain the needed unit cost information. Virtually all firms use normal costing.

## Importance of Unit Costs to Manufacturing Firms

Unit cost is a critical piece of information for a manufacturer. Unit costs are essential for valuing inventory, determining income, and making a number of important decisions.

Disclosing the cost of inventories and determining income are financial reporting requirements that a firm faces at the end of each period. In order to report the cost of its inventories, a firm must know the number of units on hand and the unit cost. The cost of goods sold (COGS), used to determine income, also requires knowledge of the units sold and their unit cost.

It should be pointed out that full cost information is useful as an input for a number of important internal decisions as well as for financial reporting. In the long run, for any product to be viable, its price must cover its full cost. Decisions to introduce a new product, to continue a current product, and to analyze long-run prices are examples of important internal decisions that rely on full unit cost information.

### CONCEPT Q&A

The TV reality series *Trading Spaces* involves two pairs of homeowners who, with the guidance of an interior designer and the help of a professional carpenter, redo one room in each other's house. Each pair has 48 hours and \$1,000 to accomplish the renovation. At the end of each show, the host and interior designer total up the "costs" of the redecoration project. Typically, the cost comes in at pennies under \$1,000. What costs are included in the \$1,000? What costs are not? Does each redecoration really cost under \$1,000? (*Hint: Think about direct materials, direct labor, and overhead in your answer.*)

*Possible Answer:* The \$1,000 is used to cover the cost of furniture, fabrics, and materials. It does not cover the services of the designer or carpenter. There is clearly a good deal of overhead involved that includes the power tools, carpentry supplies (nails, glue), hand tools, sewing machine(s), and so on. The completed room costs considerably more than \$1,000.

## Importance of Unit Costs to Service Firms

Like manufacturing firms, service and nonprofit firms also require unit cost information. Conceptually, the way companies accumulate and assign costs is the same whether or not the firm is a manufacturer. The service firm must first identify

the service “unit” being provided. A hospital would accumulate costs by patient, patient day, and type of procedure (e.g., X-ray, complete blood count test). A governmental agency must also identify the service provided. For example, city government might provide household trash collection and calculate the cost by truck run or number of houses served.

Service firms use cost data in much the same way that manufacturing firms do. They use costs to determine profitability, the feasibility of introducing new services, and so on. However, because service firms do not produce physical products, they do not need to value work-in-process and finished goods inventories. Of course, they may have supplies, and the inventory of supplies is simply valued at historical cost.

Nonprofit firms must track costs to be sure that they provide their services in a cost-efficient way. Governmental agencies have a fiduciary responsibility to taxpayers to use funds wisely. Fiduciary responsibility requires accurate accounting for costs. Without such responsibility, questionable results can occur, such as the federal government’s alleged \$400 hammer scandals (see Chapter 23 for a discussion of ethics involving cost-plus pricing).<sup>1</sup>

A cost accounting system measures and assigns costs so that the unit cost of a product or service can be determined. Unit cost is a critical piece of information for both manufacturing and service firms. Bidding is a common requirement in the markets for specialized products and services (e.g., such as bids for special tools, audits, legal services, and medical tests and procedures). For example, it would be virtually impossible for **Ernst & Young** to submit a meaningful bid to one of its large audit clients without knowing the unit costs of the products or services to be produced. Because unit cost information is so vital, its accuracy is essential.

## Normal Costing and Estimating Overhead

In normal costing, overhead must be estimated and applied to production. The basics of overhead application can be described in three steps. The first step is to calculate the predetermined overhead rate. The second step is to apply overhead to production throughout the year. The third step is to reconcile the difference between the total actual overhead incurred during the year and the total overhead applied to production.

**Calculating the Predetermined Overhead Rate** The **predetermined overhead rate** is calculated at the beginning of the year by dividing the total estimated annual overhead by the total estimated level of associated activity or cost driver. Estimated overhead is simply the firm’s best estimate of the amount of overhead (utilities, indirect labor, depreciation, etc.) to be incurred in the coming year. The estimate is often based on last year’s figures and is adjusted for anticipated changes in the coming year.

The associated activity level depends on which activity is best associated with overhead. Often, the activity chosen is the number of direct labor hours or the direct labor cost. This makes sense when much of overhead cost is associated with direct labor (e.g., fringe benefits, worker safety training programs, the cost of running the personnel department). The number of machine hours could be a good choice for a company with automated production. Then, much of the overhead cost might consist of equipment maintenance, depreciation on machinery, electricity to run the machinery, and so on. The estimated activity level is simply the number of direct labor hours, or machine hours, expected for that activity in the coming year.

The predetermined overhead rate is calculated using the following formula:

$$\text{Overhead Rate} = \frac{\text{Estimated Annual Overhead}}{\text{Estimated Annual Activity Level}}$$

<sup>1</sup>Charles Fenyvesi, “Supercollider Supercosts,” *U.S. News & World Report*, Vol. 114, Issue 25 (June 28, 1993): 18.

Notice that the predetermined overhead rate includes estimated amounts in *both* the numerator and the denominator. This estimation is necessary because the predetermined overhead rate is calculated in advance, usually at the beginning of the year. It is impossible to use actual overhead or actual activity level for the year because at that time, the company does not know what the actual levels will be. Therefore, only estimated or budgeted amounts are used in calculating the predetermined overhead rate.

## Applying Overhead to Production

Once the overhead rate has been computed, the company can begin to apply overhead to production. **Applied overhead** is found by multiplying the predetermined overhead rate by the actual use of the associated activity for the period. Suppose that a company has an overhead rate of \$5 per machine hour. In the first week of January, the company used 9,000 hours of machine time. The overhead applied to the week's production is \$45,000 ( $\$5 \times 9,000$ ). The total cost of product for that first week is the actual direct materials and direct labor, plus the applied overhead. The concept is the same for any time period. So, if the company runs its machines for 50,000 hours in the month of January, applied overhead for January would be \$250,000 ( $\$5 \times 50,000$ ). **Cornerstone 16-1** shows how to calculate the predetermined overhead rate and how to use that rate to apply overhead to production.

## Reconciling Applied Overhead with Actual Overhead

Recall that two types of overhead must be taken into consideration. One is actual overhead, and those costs are tracked throughout the year in the overhead account. The second type is applied overhead. Overhead applied to production is computed throughout the year and is added to actual direct materials and actual direct labor to get total product cost. At the end of the year, however, it is time to reconcile any difference between actual and applied overhead and to correct the cost of goods sold account to reflect actual overhead spending.

Suppose that Proto Company had actual overhead of \$400,000 for the year but had applied \$390,000 to production. Notice that the amount of overhead applied to



### CORNERSTONE 16-1



## HOW TO Calculate the Predetermined Overhead Rate and Apply Overhead to Production

### Information:

At the beginning of the year, Argus Company estimated the following costs:

Overhead	\$360,000
Direct labor cost	720,000

Argus uses normal costing and applies overhead on the basis of direct labor cost. (Direct labor cost is equal to total direct labor hours worked multiplied by the wage rate.) For the month of February, direct labor cost was \$56,000.

### Required:

1. Calculate the predetermined overhead rate for the year.
2. Calculate the overhead applied to production in February.

### Solution:

1. Predetermined overhead rate =  $\frac{\$360,000}{\$720,000}$   
= 0.50, or 50 percent of direct labor cost
2. Overhead applied to February production =  $0.50 \times \$56,000 = \$28,000$

production (\$390,000) differs from the actual overhead (\$400,000). Since the predetermined overhead rate is based on estimated data, applied overhead will rarely equal actual overhead. Since only \$390,000 was applied in our example, the firm has *underapplied* overhead by \$10,000. If applied overhead had been \$410,000, then too much overhead would have been applied to production. The firm would have *overapplied* overhead by \$10,000. The difference between actual overhead and applied overhead is called an **overhead variance**. If actual overhead is greater than applied overhead, then the variance is called **underapplied overhead**. If actual overhead is less than applied overhead, then the variance is called **overapplied overhead**. If overhead has been underapplied, then product cost has been understated; in this case, the cost appears lower than it really is. Conversely, if overhead has been overapplied, then product cost has been overstated; in this case, the cost appears higher than it really is. Exhibit 16-2 illustrates the concepts of over- and underapplied overhead.

Overhead variances occur because it is impossible to perfectly estimate future overhead costs and production activity. The presence of overhead variances is virtually inevitable. A problem arises if the overhead variances are not corrected. At year-end, costs reported on the financial statements must be actual, not estimated, amounts. Thus, something must be done with the overhead variance. Most often, the entire overhead variance is assigned to Cost of Goods Sold. This practice is justified on the basis of materiality, the same principle used to justify expensing the entire cost of a stapler in the period acquired rather than depreciating its cost over the life of the stapler. Since the overhead variance is usually relatively small, the method of disposition is not a critical matter. All production costs should appear in cost of goods sold eventually. Thus, the overhead variance is added to Cost of Goods Sold, if underapplied, and subtracted from Cost of Goods Sold, if overapplied. For example, assume that Proto Company has an ending balance in its cost of goods sold account equal to \$607,000. The underapplied overhead variance of \$10,000 would be added to produce a new adjusted balance of \$617,000. (Since applied overhead was \$390,000, and actual overhead was \$400,000, production costs were *understated* by \$10,000. Cost of Goods Sold must be increased to correct the problem.) If the variance had been overapplied, it would have been subtracted from Cost of Goods Sold to produce a new balance of \$597,000. **Cornerstone 16-2** shows how to reconcile actual overhead with applied overhead for the Argus Company example.

If the overhead variance is material, or large, another approach would be taken. That approach, allocating the variance among the ending balances of Work in Process, Finished Goods, and Cost of Goods Sold, is discussed in more detail in later accounting courses.

Exhibit 16-2

### Actual and Applied Overhead





## CORNERSTONE 16-2



### HOW TO Reconcile Actual Overhead with Applied Overhead

#### Information:

At the beginning of the year, Argus Company estimated the following:

Overhead	\$360,000
Direct labor cost	720,000

By the end of the year, actual data are:

Overhead	\$375,400
Direct labor cost	750,000

Argus uses normal costing and applies overhead on the basis of direct labor cost. At the end of the year, Cost of Goods Sold (before adjusting for any overhead variance) is \$632,000.

#### Required:

1. Calculate the overhead variance for the year.
2. Dispose of the overhead variance by adjusting Cost of Goods Sold.

#### Solution:

1. Predetermined overhead rate =  $\frac{\$360,000}{\$720,000} = 0.50$  of direct labor cost

$$\text{Overhead applied for the year} = 0.50 \times \$750,000 = \$375,000$$

Actual overhead	\$375,400
Applied overhead	375,000
Overhead variance—underapplied	\$ 400

2.

Unadjusted COGS	\$632,000
Add: Overhead variance—underapplied	400
Adjusted COGS	\$632,400

### Departmental Overhead Rates

The description of overhead application so far has emphasized the plantwide overhead rate. A **plantwide overhead rate** is a single overhead rate calculated by using all estimated overhead for a factory divided by the estimated activity level across the entire factory. However, some companies believe that multiple overhead rates give more accurate costing information. Service firms, or service departments of manufacturing firms, can also use separate overhead rates to charge out their services.

Departmental overhead rates are a widely used type of multiple overhead rate. A **departmental overhead rate** is simply estimated overhead for a department divided by the estimated activity level for that same department. The steps involved in calculating and applying overhead are the same as those involved for one plantwide overhead rate. The company has as many overhead rates as it has departments. **Cornerstone 16-3** shows how to calculate and apply departmental overhead rates.

It is important to realize that departmental overhead rates simply carve total overhead into two or more parts. The departments can be added back to get plantwide overhead. **Cornerstone 16-4** shows how this is done.

## HOW TO Calculate Predetermined Departmental Overhead Rates and Apply Overhead to Production

### Information:

At the beginning of the year, Sorrel Company estimated the following:

	Machining Department	Assembly Department	Total
Overhead	\$240,000	\$360,000	\$600,000
Direct labor hours	135,000	240,000	375,000
Machine hours	200,000	—	200,000

Sorrel uses departmental overhead rates. In the machining department, overhead is applied on the basis of machine hours. In the assembly department, overhead is applied on the basis of direct labor hours. Actual data for the month of June are as follows:

	Machining Department	Assembly Department	Total
Overhead	\$22,500	\$30,750	\$53,250
Direct labor hours	11,000	20,000	31,000
Machine hours	17,000	—	17,000

### Required:

- Calculate the predetermined overhead rates for the machining and assembly departments.
- Calculate the overhead applied to production in each department for the month of June.
- By how much has each department's overhead been overapplied? Underapplied?

### Solution:

$$1. \text{ Machining department overhead rate} = \frac{\$240,000}{200,000} = \$1.20 \text{ per machine hour}$$

$$\text{Assembly department overhead rate} = \frac{\$360,000}{240,000} = \$1.50 \text{ per direct labor hour}$$

- Overhead applied to machining in June =  $\$1.20 \times 17,000 = \$20,400$   
Overhead applied to assembly in June =  $\$1.50 \times 20,000 = \$30,000$

	Machining Department	Assembly Department
Actual overhead	\$22,500	\$30,750
Applied overhead	20,400	30,000
Underapplied overhead	<u>\$ 2,100</u>	<u>\$ 750</u>



## CORNERSTONE 16-3



Considerable emphasis has been placed on describing how overhead costs are treated because this is the key to normal costing. Now it is time to see how normal costing is used to develop unit costs in the job-order costing system.



## CORNERSTONE 16-4



### HOW TO Convert Departmental Data to Plantwide Data to Calculate the Overhead Rate and Apply Overhead to Production

#### Information:

At the beginning of the year, Sorrel Company estimated the following:

	Machining Department	Assembly Department	Total
Overhead	\$240,000	\$360,000	\$600,000
Direct labor hours	135,000	240,000	375,000
Machine hours	200,000	—	200,000

Sorrel has decided to use a plantwide overhead rate based on direct labor hours. Actual data for the month of June are as follows:

	Machining Department	Assembly Department	Total
Overhead	\$22,500	\$30,750	\$53,250
Direct labor hours	11,000	20,000	31,000
Machine hours	17,000	—	17,000

#### Required:

1. Calculate the predetermined plantwide overhead rate.
2. Calculate the overhead applied to production for the month of June.
3. Calculate the overhead variance for the month of June.

#### Solution:

1. Predetermined plantwide overhead rate =  $\frac{\$600,000}{375,000}$   
= \$1.60 per direct labor hour
2. Overhead applied in June =  $\$1.60 \times 31,000 = \$49,600$
3. Overhead Variance = Actual Overhead – Applied Overhead  
=  $\$53,250 - \$49,600$   
= \$3,650 underapplied

### Unit Costs in the Job-Order System

In a job-order environment, predetermined overhead rates are always used because the completion of a job rarely coincides with the completion of a fiscal year. Therefore, in the remainder of this chapter, normal costing is used.

The unit cost of a job is the total cost of the job (materials used on the job, labor worked on the job, and applied overhead) divided by the number of units in the job. Although the concept is simple, the practical reality of the computation can be somewhat more complex because of the recordkeeping involved. Let's look at a simple example.

Suppose that Stan Johnson forms a new company, Johnson Leathergoods, which specializes in the production of custom leather products. Stan believes that there is a market for one-of-a-kind leather purses, briefcases, and backpacks. In January, its first month of operation, he obtains two orders: the first is for 20 leather backpacks for a local sporting goods store; the second is for 10 distinctively tooled briefcases for the coaches of a local college. Stan agrees to provide these orders at a price of cost plus 50 percent. The first order, the backpacks, will require direct materials (leather,

thread, buckles), direct labor (cutting, sewing, assembling), and overhead. Assume that overhead is applied using direct labor hours. Suppose that the materials cost \$1,000 and the direct labor costs \$1,080 (120 hours at \$9 per hour). If the predetermined overhead rate is \$2 per direct labor hour, then the overhead applied to this job is \$240 (120 hours at \$2 per hour). The total cost of the backpacks is \$2,320, and the unit cost is \$116, computed as follows:

Direct materials	\$1,000
Direct labor	1,080
Overhead	<u>240</u>
Total cost	\$2,320
÷ Number of units	<u>÷ 20</u>
Unit cost	<u>\$ 116</u>

Since cost is so closely linked to price in this case, it is easy to see that Stan will charge the sporting goods store \$3,480 (cost of \$2,320 plus 50 percent of \$2,320), or \$174 per backpack.

This is a simplified example of how Stan will arrive at the total cost of a single job. But how does he know that actual materials will cost \$1,000 or that actual direct labor for this particular job will come to \$1,080? In order to determine those figures, Stan will need to keep track of costs using a variety of source documents. These documents are described in the next section.

## Keeping Track of Job Costs with Source Documents

### OBJECTIVE > 3

Identify and set up the source documents used in job-order costing.

Accounting for job-order production begins by preparing the source documents that are used to keep track of the costs of jobs. In a job-order firm, where price is so often based on cost, it is critically important to keep careful track of the costs of a job.

**ETHICS** Ethical issues arise when a firm adds costs from one job to the job-order sheet of another job. The first job is undercosted and underpriced while the second job is overcosted and overpriced. Customers rely on the professionalism and honesty of the job-order firm in recordkeeping. ♦

## Job-Order Cost Sheet

Every time a new job is started, a job-order cost sheet is prepared. The earlier computation for Stan's backpack job, which lists the total cost of materials, labor, and overhead for a single job, is the simplest example of a job-order cost sheet. The **job-order cost sheet** is prepared for every job; it is subsidiary to the work-in-process account and is the primary document for accumulating all costs related to a particular job. Exhibit 16-3 illustrates a simple job-order cost sheet.

### Exhibit 16-3

#### Job-Order Cost Sheet

Johnson Leathersgoods Job-Order Cost Sheet	
Job Name: <u>Backpacks</u>	Date Started: <u>Jan. 3, 20XX</u> Date Completed: <u>Jan. 29, 20XX</u>
Direct materials	\$1,000
Direct labor	1,080
Applied overhead	<u>240</u>
Total cost	\$2,320
÷ Number of units	<u>÷ 20</u>
Unit cost	<u>\$ 116</u>

**CONCEPT Q&A**

Job-order cost sheets are subsidiary to the work-in-process account. Can you think of other accounts that have subsidiary accounts? (Hint: Consider Accounts Receivable or Accounts Payable. What might their respective subsidiary accounts be?)

*Accounts Receivable is a control account; its subsidiary accounts are named (or numbered) by customers having an account with the company. Similarly, Accounts Payable has subsidiary accounts for each person/company to whom money is owed.*

**Possible Answer:**

The job-order cost sheet contains all information pertinent to a job. For a simple job, the job-order cost sheet is quite brief, containing only the job description (backpacks) and cost of materials, labor, and overhead added during the month.

Johnson Leathergoods had only two jobs in January; these could be easily identified by calling them “Backpacks” and “Briefcases.” Some companies may find that the customer’s name is sufficient to identify a job. For example, a construction company may identify its custom houses as the “Kumar Residence” or the “Malkovich Residence.”

As more and more jobs are produced, a company will usually find it most convenient to number them. For example, it may number them as Job 13, Job 22, or Job 44. Perhaps the job number starts with the year so that the first job of 2008 is 2008-1, the second is 2008-2, and so on. The key

point is that each job is unique and must have a uniquely identifiable name. This name, or job-order number, heads the job-order cost sheet.

Work in process consists of all incomplete work. In a job-order system, this will be all of the unfinished jobs. The balance in Work in Process at the end of the month will be the total of all the job-order cost sheets for the incomplete jobs.

A job-order costing system must have the ability to identify the quantity of direct materials, direct labor, and overhead consumed by each job. In other words, documentation and procedures are needed to associate the manufacturing inputs used by a job with the job itself. This need is satisfied through the use of materials requisitions for direct materials, time tickets for direct labor, and source documents for other activity drivers that might be used in applying overhead.

**Materials Requisitions**

The cost of direct materials is assigned to a job by the use of a source document known as a **materials requisition form**, which is illustrated in Exhibit 16-4. Notice that the form asks for the type, quantity, and unit price of the direct materials issued and, most importantly, the number of the job. Using this form, the cost accounting department can enter the cost of direct materials onto the correct job-order cost sheet.

If the accounting system is automated, this posting may entail directly entering the data at a computer terminal, using the materials requisition forms as source docu-

**Exhibit 16-4**

**Materials Requisition Form**

Materials Requisition Number: <u>012</u>			
Date: <u>January 11, 20XX</u>			
Department: <u>Assembly</u>			
Job: <u>Briefcases</u>			
Description	Quantity	Cost/Unit	Total Cost
Buckles	10	\$3	\$30
Authorized Signature <u>Jim Lawson</u>			

ments. A program enters the cost of direct materials into the record for each job. In addition to providing essential information for assigning direct materials costs to jobs, the materials requisition form may also include other data items, such as a requisition number, a date, and a signature. These items are useful for maintaining proper control over a firm’s inventory of direct materials. The signature, for example, transfers responsibility for the materials from the storage area to the person receiving the materials, usually a production supervisor.

No attempt is made to trace the cost of other materials, such as supplies, lubricants, and the like, to a particular job. You will recall that these indirect materials are assigned to jobs through the predetermined overhead rate.

### Time Tickets

Direct labor must be associated with each particular job. The means by which direct labor costs are assigned to individual jobs is the source document known as a **time ticket** (Exhibit 16-5). Each day, the employee fills out a time ticket that identifies his or her name, wage rate, and the hours worked on each job. These time tickets are collected and transferred to the cost accounting department where the information is used to post the cost of direct labor to individual jobs. Again, in an automated system, posting involves entering the data into the computer.

Time tickets are used only for direct laborers. Since indirect labor is common to all jobs, these costs belong to overhead and are allocated using one or more predetermined overhead rates.

### CONCEPT Q&A

Suppose that Johnson Leathergoods created an automated tooling department and decides to track the number of machine hours used on each job. Design a source document for this purpose.

*The form might be similar to the time ticket shown in Exhibit 16-5. However, the hourly rate and amount columns could be deleted and a column added for the initials of the worker entering the information.*

**Possible Answer:**

### Source Documents for Other Activity

The company may use an overhead application base other than direct labor hours. In that case, other source documents may be required. For example, machine hours may be used to apply overhead. Then, a new document must be developed. A source document that will track the machine hours used by each job can be modeled on job time tickets.

**Exhibit 16-5**

#### Time Ticket

<b>Job Time Ticket #:</b> <u>008</u>					
Employee Name: <u>Ed Wilson</u>					
Date: <u>January 12, 20XX</u>					
Start Time	Stop Time	Total Time	Hourly Rate	Amount	Job Number
8:00	10:00	2	\$9	\$18	Backpacks
10:00	11:00	1	9	9	Briefcases
11:00	12:00	1	9	9	Backpacks
1:00	5:00	4	9	36	Backpacks
Approved by: <u>Jim Lawson</u> (Department Supervisor)					

All completed job-order cost sheets of a firm can serve as a subsidiary ledger for the finished goods inventory. Then, the work-in-process account consists of all of the job-order cost sheets for the unfinished jobs. The finished goods inventory account consists of all the job-order cost sheets for jobs that are complete but not yet sold. As finished goods are sold and shipped, the cost records will be pulled (or deleted) from the finished goods inventory file. These records then form the basis for calculating a period's cost of goods sold. We will examine the flow of costs through these accounts next.

**OBJECTIVE** > **4**

Describe the cost flows associated with job-order costing.

## The Flow of Costs through the Accounts

---

Cost flow describes the way costs are accounted for from the point at which they are incurred to the point at which they are recognized as an expense on the income statement. The principal interest in a job-order costing system is the flow of manufacturing costs. Accordingly, we begin with a description of exactly how the three manufacturing cost elements—direct materials, direct labor, and overhead—flow through Work in Process, into Finished Foods, and, finally, into Cost of Goods Sold.

The simplified job-shop environment provided by Johnson Leathersgoods will continue to serve as an example. To start the business, Stan leased a small building and bought the necessary production equipment. Recall that he obtained two orders for January: one for 20 backpacks for a local sporting goods store and a second for 10 briefcases for the coaches of a local college. Both orders will be sold for manufacturing costs plus 50 percent. Stan expects to average two orders per month for the first year of operation.

Stan created two job-order cost sheets, one for each order. The first job-order cost sheet is for the backpacks; the second is for the briefcases.

### Accounting for Materials

Since the company is just starting business, it has no beginning inventories. To produce the backpacks and briefcases in January and to have a supply of materials on hand at the beginning of February, Stan purchases, on account, \$2,500 of raw materials (leather, webbing for backpack straps, heavy-duty thread, buckles). Physically, the materials are put in a materials storeroom. In the accounting records, the raw materials and the accounts payable accounts are each increased by \$2,500. Raw Materials is an inventory account (it appears on the balance sheet under current assets). It also is the controlling account for all raw materials. Any purchase increases the raw materials account.

When the production supervisor needs materials for a job, materials are removed from the storeroom. The cost of the materials is removed from the raw materials account and added to the work-in-process account. Of course, in a job-order environment, the materials moved from the storeroom to work stations on the factory floor must be “tagged” with the appropriate job name. Suppose that Stan needs \$1,000 of materials for the backpacks and \$500 for the briefcases. Then, the job-order cost sheet for the backpacks would show \$1,000 for direct materials, and the job-order cost sheet for the briefcases would show \$500 for direct materials. Exhibit 16-6 summarizes the raw materials cost flow into these two jobs.

The raw materials account increased by \$2,500 due to purchases and decreased by \$1,500 as materials were withdrawn for use in production. So, what is the balance in the raw materials account after these two transactions? It is \$1,000. This is calculated by taking the beginning balance in the raw materials account of \$0, adding \$2,500 of purchases, and subtracting \$1,500 of materials used in production.

### Accounting for Direct Labor Cost

Since two jobs were in progress during January, Stan must determine not only the total number of direct labor hours worked but also the time worked on each job. The backpacks required 120 hours at an average wage rate of \$9 per hour, for a total

Exhibit 16-6

## Summary of Materials Cost Flows

	A	B	C	D	E	F	G	H
1	<b>Raw Materials Account</b>							
2	Beginning balance		\$ 0					
3	Add: Purchases		2,500					
4	Less: Direct materials charged to jobs		1,500					
5	Ending balance		<u>\$1,000</u>					
6								
7	<b>Work-in-Process Account</b>							
8	<b>Job: Backpacks</b>				<b>Job: Briefcases</b>			
9	Direct materials		\$1,000		Direct materials		\$500	
10	Direct labor				Direct labor			
11	Applied overhead				Applied overhead			
12	Total cost				Total cost			
13	Number of units		÷ 20		Number of units		÷ 10	
14	Unit cost				Unit cost			
15								

direct labor cost of \$1,080. For the briefcases, the total was \$450, based on 50 hours at an average hourly wage of \$9. These amounts are posted to each job's cost sheet. The summary of the labor cost flows is given in Exhibit 16-7. Notice that the direct labor costs assigned to the two jobs exactly equal the total labor costs assigned to Work in Process. Remember that the labor cost flows reflect only direct labor cost. Indirect labor is assigned as part of overhead.

More accounts are involved in this transaction than meet the eye in Exhibit 16-7. Accounting for labor cost is a complex process because the company must keep track of FICA, Medicare, federal and state unemployment taxes, vacation time, and so on. We will concentrate on the concept that direct labor adds to the cost of the product or service and not on the details of the various labor-related accounts.

Exhibit 16-7

## Summary of Direct Labor Cost Flows

	A	B	C	D	E	F	G	H
1	<b>Wages Payable Account</b>							
2	Direct labor hours for backpacks		120					
3	Direct labor hours for briefcases		50					
4	Total direct labor hours		<u>170</u>					
5	Wage rate		× \$9					
6	Total direct labor		<u>\$1,530</u>					
7								
8	<b>Work-in-Process Account</b>							
9	<b>Job: Backpacks</b>				<b>Job: Briefcases</b>			
10	Direct materials		\$1,000		Direct materials		\$500	
11	Direct labor		1,080		Direct labor		450	
12	Applied overhead				Applied overhead			
13	Total cost				Total cost			
14	Number of units		÷ 20		Number of units		÷ 10	
15	Unit cost				Unit cost			
16								

## Accounting for Overhead

The use of normal costing means that actual overhead costs are not assigned directly to jobs. Overhead is applied to each job by using a predetermined rate. Actual overhead costs incurred must be accounted for as well, but on an overall (not a job-specific) basis.

Overhead costs can be assigned using a single plantwide overhead rate or departmental rates. Typically, direct labor hours is the measure used to calculate a plantwide overhead rate, and departmental rates are based on drivers such as direct labor hours, machine hours, or direct materials dollars. The use of a plantwide rate has the virtue of being simple and reduces data collection requirements. To illustrate these two features, assume that total estimated overhead cost for Johnson Leathergoods is \$9,600, and the estimated direct labor hours total 4,800 hours. Accordingly, the predetermined overhead rate is:

$$\text{Overhead Rate} = \frac{\$9,600}{4,800} = \$2 \text{ per Direct Labor Hour}$$

For the backpacks, with a total of 120 hours worked, the amount of applied overhead cost posted to the job-order cost sheet is \$240 ( $\$2 \times 120$ ). For the briefcases, the applied overhead cost is \$100 ( $\$2 \times 50$ ). Note also that assigning overhead to jobs only requires a rate and the direct labor hours used by the job. Since direct labor hours are already being collected to assign direct labor costs to jobs, overhead assignment will not demand any additional data collection.

## Accounting for Actual Overhead Costs

Overhead has been applied to the jobs, but what about the actual overhead incurred? To illustrate how actual overhead costs are recorded, assume that Johnson Leathergoods incurred the following indirect costs for January:

Lease payment	\$200
Utilities	50
Equipment depreciation	100
Indirect labor	<u>65</u>
Total overhead costs	<u>\$415</u>

It is important to understand that the actual overhead costs never enter the work-in-process account. The usual procedure is to record actual overhead to the overhead control account. Then, at the end of a period (typically a year), actual overhead is reconciled with applied overhead, and, if the variance is immaterial, it is closed to Cost of Goods Sold.

For Johnson Leathergoods at the end of January, actual overhead incurred is \$415, while applied overhead is \$340. Therefore, the overhead variance of \$75 ( $\$415 - \$340$ ) means that overhead is underapplied for the month of January.

The flow of overhead costs is summarized in Exhibit 16-8. Notice that the total overhead applied from all jobs is entered in the work-in-process account.

Let's take a moment to recap. The cost of a job includes direct materials, direct labor, and applied overhead. These costs are entered on the job-order cost sheet. Work in Process, at any point in time, is the total of the costs on all open job-order cost sheets. When the job is complete, it must leave Work in Process and be entered into Finished Goods or Cost of Goods Sold.

## Accounting for Finished Goods

When a job is complete, direct materials, direct labor, and applied overhead amounts are totaled to yield the manufacturing cost of the job. Simultaneously, the costs of the completed job are transferred from the work-in-process account to the finished goods account.

Exhibit 16-8

Summary of Overhead Cost Flows

	A	B	C	D	E	F	G	H
1	<b>Actual Overhead Account</b>			<b>Applied Overhead Account</b>				
2	Lease		\$200		Direct labor hours		170	
3	Utilities		50		Overhead rate		× \$2	
4	Equipment depreciation		100		Total applied overhead			340
5	Indirect labor		65					
6	<b>Total actual overhead</b>		<b>\$415</b>					
7								
8	<b>Work-in-Process Account</b>							
9	<b>Job: Backpacks</b>				<b>Job: Briefcases</b>			
10	Direct materials		\$1,000		Direct materials		\$500	
11	Direct labor		1,080		Direct labor		450	
12	Applied overhead		240		Applied overhead		100	
13	<b>Total cost</b>				<b>Total cost</b>			
14	Number of units		÷ 20		Number of units		÷ 10	
15	Unit cost				Unit cost			

For example, assume that the backpacks were finished in January with the completed cost sheet shown in Exhibit 16-8. Since the backpacks are finished, the total manufacturing costs of \$2,320 must be transferred from the work-in-process account to the finished goods account. A summary of the cost flows occurring when a job is finished is shown in Exhibit 16-9.

Exhibit 16-9

Summary of Cost Flows from Work in Process to Finished Goods

	A	B	C	D	E	F	G	H
1	<b>Work-in-Process Account BEFORE Transfer of Backpacks to Finished Goods</b>							
2	<b>Job: Backpacks</b>				<b>Job: Briefcases</b>			
3	Direct materials		\$1,000		Direct materials		\$ 500	
4	Direct labor		1,080		Direct labor		450	
5	Applied overhead		240		Applied overhead		100	
6	<b>Total cost</b>		<b>\$2,320</b>		<b>Total cost</b>		<b>\$1,050</b>	
7	Number of units		÷ 20		Number of units			
8	Unit cost*		\$ 116		Unit cost*			
9								
10	<b>Work-in-Process Account AFTER Transfer of Backpacks to Finished Goods</b>							
11	<b>Job: Briefcases</b>							
12	Direct materials		\$ 500					
13	Direct labor		450					
14	Applied overhead		100					
15	<b>Total cost</b>		<b>\$1,050</b>					
16	Number of units							
17	Unit cost							
18								
19	<b>Finished Goods Account</b>							
20	Beginning balance		\$ 0					
21	Add: Completed backpacks		2,320					
22	Less: Jobs sold		0					
23	<b>Ending balance</b>		<b>\$2,320</b>					
24								

\*Unit cost information is included for backpacks because they are finished. The briefcases are still in process, so no unit cost is calculated.

The completion of a job is an important step in the flow of manufacturing costs. The cost of the finished job must be removed from Work in Process, added to Finished Goods, and, eventually, added to the cost of goods sold on the income statement. To ensure accuracy in computing these costs, a cost of goods manufactured statement is prepared. The schedule of cost of goods manufactured presented in Exhibit 16-10 summarizes the production activity of Johnson Leathergoods for January. It is important to note that applied overhead is used to arrive at the cost of goods manufactured. Both work-in-process and finished goods inventories are carried at normal cost rather than actual cost.

Notice that ending work in process is \$1,050. Where did this figure come from? Of the two jobs, the backpacks were finished and transferred to finished goods. The briefcases are still in process, however, and the manufacturing costs assigned thus far are direct materials, \$500; direct labor, \$450; and overhead applied, \$100. The total of these costs gives the cost of ending work in process. You may want to check these figures against the job-order cost sheet for briefcases shown at the top right of Exhibit 16-9.

## Accounting for Cost of Goods Sold

In a job-order firm, units can be produced for a particular customer, or they can be produced with the expectation of selling the units later. If a job is produced especially for a customer (as with the backpacks) and then shipped to the customer, then the cost of the finished job becomes the cost of goods sold. When the backpacks are finished, Cost of Goods Sold increases by \$2,320, while Work in Process decreases by the same amount (the job is no longer incomplete, so its costs cannot stay in Work in Process). Then, the sale is recognized by increasing both Sales Revenue and Accounts Receivable by \$3,480 (cost plus 50 percent of cost, or \$2,320 + \$1,160).

A schedule of cost of goods sold usually is prepared at the end of each reporting period (e.g., monthly and quarterly). Exhibit 16-11 presents such a schedule for Johnson Leathergoods for January. Typically, the overhead variance is not material and, therefore, is closed to the cost of goods sold account. The cost of goods sold before an adjustment for an overhead variance is called **normal cost of goods sold**. After the adjustment for the period's overhead variance takes place, the result is called

### Exhibit 16-10

#### Schedule of Cost of Goods Manufactured

Johnson Leathergoods Schedule of Cost of Goods Manufactured For the Month of January		
Direct materials:		
Beginning raw materials inventory	\$ 0	
Purchases of raw materials	<u>2,500</u>	
Total raw materials available	\$2,500	
Ending raw materials	<u>1,000</u>	
Total raw materials used		\$1,500
Direct labor		1,530
Overhead:		
Lease	\$ 200	
Utilities	50	
Depreciation	100	
Indirect labor	<u>65</u>	
	\$ 415	
Less: Underapplied overhead	<u>75</u>	
Overhead applied		<u>340</u>
Current manufacturing costs		\$3,370
Add: Beginning work in process		<u>0</u>
Total manufacturing costs		\$3,370
Less: Ending work in process		<u>1,050</u>
Cost of goods manufactured		<u>\$2,320</u>

## Exhibit 16-11

## Statement of Cost of Goods Sold

Statement of Cost of Goods Sold	
Beginning finished goods inventory	\$ 0
Cost of goods manufactured	2,320
Goods available for sale	\$2,320
Less: Ending finished goods inventory	0
Normal cost of goods sold	\$2,320
Add: Underapplied overhead	75
Adjusted cost of goods sold	<u>\$2,395</u>

the **adjusted cost of goods sold**. It is this latter figure that appears as an expense on the income statement.

However, closing the overhead variance to the cost of goods sold account is not done until the end of the year. Variances are expected each month because of nonuniform production and nonuniform actual overhead costs. As the year unfolds, these monthly variances should, by and large, offset each other so that the year-end variance is small. Nonetheless, to illustrate how the year-end overhead variance would be treated, we will close out the overhead variance experienced by Johnson Leathergoods in January.

Notice that there are two cost of goods sold figures in Exhibit 16-11. The first is normal cost of goods sold and is equal to actual direct materials, actual direct labor, and applied overhead for the jobs that were sold. The second figure is adjusted cost of goods sold. The adjusted cost of goods sold is equal to normal cost of goods sold plus or minus the overhead variance. In this case, overhead has been underapplied (actual overhead of \$415 is \$75 higher than the applied overhead of \$340), so this amount is added to normal cost of goods sold. If the overhead variance shows overapplied overhead, then that amount will be subtracted from normal cost of goods sold.

Suppose that the backpacks had not been ordered by a customer but had been produced with the expectation that they could be sold through a subsequent marketing effort. Then, all 20 units might not be sold at the same time. Assume that on January 31, there were 15 backpacks sold. In this case, the cost of goods sold figure is the unit cost times the number of units sold ( $\$116 \times 15$ , or \$1,740). The unit cost figure is found on the cost sheet in Exhibit 16-9.

Sometimes it is simpler to use a briefer version of the job-order cost sheet in order to calculate ending Work in Process, Finished Goods, and Cost of Good Sold. (This is particularly true when working homework and test questions.) **Cornerstone 16-5** shows how to set up such a version to calculate account balances.

## Accounting for Nonmanufacturing Costs

Manufacturing costs, however, are not the only costs experienced by a firm. Non-manufacturing costs are also incurred. Recall that costs associated with selling and general administrative activities are period costs. Selling and administrative costs are never assigned to the product; they are not part of the manufacturing cost flows.

To illustrate how these costs are accounted for, assume Johnson Leathergoods had the following additional transactions in January:

Advertising circulars	\$ 75
Sales commission	125
Office salaries	500
Depreciation, office equipment	50

The first two transactions fall in the category of selling expense and the last two into the category of administrative expense. So, the selling expense account would increase by \$200 ( $\$75 + \$125$ ), and the administrative expense account would increase by \$550 ( $\$500 + \$50$ ).



## CORNERSTONE 16-5



### HOW TO Prepare Brief Job-Order Cost Sheets

#### Information:

At the beginning of June, Galway Company had two jobs in process, Job 78 and Job 79, with the following accumulated cost information:

	Job 78	Job 79
Direct materials	\$1,000	\$ 800
Direct labor	600	1,000
Applied overhead	750	1,250
Balance, June 1	<u>\$2,350</u>	<u>\$3,050</u>

During June, two more jobs (80 and 81) were started. The following direct materials and direct labor costs were added to the four jobs during the month of June:

	Job 78	Job 79	Job 80	Job 81
Direct materials	\$500	\$1,110	\$ 900	\$100
Direct labor	400	1,400	2,000	320

At the end of June, Jobs 78, 79, and 80 were completed. Only Job 79 was sold. On June 1, the balance in Finished Goods was zero.

#### Required:

- Calculate the overhead rate based on direct labor cost.
- Prepare a brief job-order cost sheet for the four jobs. Show the balance as of June 1 as well as direct materials and direct labor added in June. Apply overhead to the four jobs for the month of June, and show the ending balances.
- Calculate the ending balances of Work in Process and Finished Goods as of June 30.
- Calculate Cost of Goods Sold for June.

#### Solution:

- Ordinarily, the predetermined overhead rate is calculated using estimated overhead and, in this case, estimated direct labor cost. Those figures were not given. However, it is possible to work backward from the applied overhead by the beginning of June for Jobs 78 and 79.

$$\text{Applied Overhead} = \text{Predetermined Overhead Rate} \times \text{Actual Activity Level}$$

For Job 78,

$$\$750 = \text{Predetermined Overhead Rate} \times \$600$$

$$\begin{aligned} \text{Predetermined Overhead Rate} &= \frac{\$750}{\$600} \\ &= 1.25, \text{ or } 125 \text{ Percent of Direct Labor Cost} \end{aligned}$$

(The predetermined overhead rate using Job 79 is identical.)

- |                           | Job 78         | Job 79          | Job 80          | Job 81        |
|---------------------------|----------------|-----------------|-----------------|---------------|
| Beginning balance, June 1 | \$2,350        | \$ 3,050        | \$ 0            | \$ 0          |
| Direct materials          | 500            | 1,110           | 900             | 100           |
| Direct labor              | 400            | 1,400           | 2,000           | 320           |
| Applied overhead          | 500*           | 1,750*          | 2,500*          | 400*          |
| Total, June 30            | <u>\$3,750</u> | <u>\$ 7,310</u> | <u>\$ 5,400</u> | <u>\$ 820</u> |

\* \$500 = \$400 × 1.25; \$1,750 = \$1,400 × 1.25; \$2,500 = \$2,000 × 1.25; \$400 = \$320 × 1.25

3. By the end of June, Jobs 78, 79, and 80 have been transferred out of Work in Process. Therefore, the ending balance in Work in Process consists only of Job 81.

Work in process, June 30	\$820
--------------------------	-------

While three jobs (78, 79, and 80) were transferred out of Work in Process and into Finished Goods during June, only two jobs remain (Jobs 78 and 80).

Finished goods, June 1	\$ 0
Job 78	3,750
Job 80	5,400
Finished goods, June 30	<u>\$9,150</u>

4. One job, Job 79, was sold during June.

Cost of Goods Sold	\$7,310
--------------------	---------



**CORNERSTONE**  
**16-5**  
*(continued)*

Controlling accounts accumulate all of the selling and administrative expenses for a period. At the end of the period, all of these costs flow to the period's income statement. An income statement for Johnson Leathersgoods is shown in Exhibit 16-12.

With the preparation of the income statement, the flow of costs through the manufacturing, selling, and administrative expense accounts is complete. A more detailed look at the actual accounting for these cost flows is undertaken in Appendix 16A to this chapter.

**Exhibit 16-12**

**Income Statement**

Johnson Leathersgoods Income Statement For the Month Ended January 31, 20XX		
Sales		\$3,480
Less: Cost of goods sold		<u>2,395</u>
Gross margin		\$1,085
Less selling and administrative expenses:		
Selling expenses	\$200	
Administrative expenses	<u>550</u>	<u>750</u>
Net operating income		<u>\$ 335</u>

## Summary of Learning Objectives

- LO1. Describe the differences between job-order costing and process costing, and identify the types of firms that would use each method.**
- Job-order firms collect costs by job.
  - Job-order firms produce heterogeneous products/services—each unit or batch has a different total cost.
  - Job-order firms include construction, custom cabinetry, dentistry, medical services, and automotive repair.

- Process firms produce homogeneous products.
  - In process firms, the cost of one batch or unit is the same as another batch or unit.
  - Process firms include paint manufacturing, check clearing, and toy manufacturing.
- LO2. Compute the predetermined overhead rate, and use the rate to assign overhead to units or services produced.**
- Predetermined overhead is total budgeted overhead divided by total budgeted activity level.
  - Overhead is applied by multiplying the rate by the actual activity usage.
  - Applied overhead is added to total actual direct materials and direct labor cost, which is divided by number of units to yield unit cost.
- LO3. Identify and set up the source documents used in job-order costing.**
- Job-order cost sheets summarize all costs associated with a job.
  - Materials requisition forms are used to request direct materials for a job.
  - Time tickets show the number of labor hours worked on a job.
- LO4. Describe the cost flows associated with job-order costing.**
- The job-order cost sheet is subsidiary to the work-in-process account.
  - The balance in Work in Process consists of the balances of all incomplete jobs.
  - The cost of a finished job is transferred out of Work in Process and into Finished Goods.
  - The cost of jobs sold is transferred out of Finished Goods and into Cost of Goods Sold.

## Summary of Important Equations

1. 
$$\text{Predetermined Overhead Rate} = \frac{\text{Estimated Annual Overhead}}{\text{Estimated Annual Activity Level}}$$
2. 
$$\text{Applied Overhead} = \text{Predetermined Overhead Rate} \times \text{Actual Activity Usage}$$
3. 
$$\text{Overhead Variance} = \text{Applied Overhead} - \text{Actual Overhead}$$
4. 
$$\text{Adjusted COGS} = \text{Unadjusted COGS} \pm \text{Overhead Variance}$$
  
(*Note: Applied Overhead > Actual Overhead means Overapplied Overhead*  
*Applied Overhead < Actual Overhead means Underapplied Overhead*)
5. 
$$\text{Departmental Overhead Rate} = \frac{\text{Estimated Departmental Overhead}}{\text{Estimated Departmental Activity Level}}$$
6. 
$$\text{Total Product Cost} = \text{Total Direct Materials} + \text{Total Direct Labor} + \text{Applied Overhead}$$
7. 
$$\text{Unit Product Cost} = \frac{\text{Total Product Cost}}{\text{Number of Units}}$$



### CORNERSTONES FOR CHAPTER 16

- CORNERSTONE 16-1** How to calculate the predetermined overhead rate and apply overhead to production, page 858
- CORNERSTONE 16-2** How to reconcile actual overhead with applied overhead, page 860
- CORNERSTONE 16-3** How to calculate predetermined departmental overhead rates and apply overhead to production, page 861
- CORNERSTONE 16-4** How to convert departmental data to plantwide data to calculate the overhead rate and apply overhead to production, page 862
- CORNERSTONE 16-5** How to prepare brief job-order cost sheets, page 872

## Key Terms

Actual cost system, 855	Normal cost system, 856
Adjusted cost of goods sold, 871	Overapplied overhead, 859
Applied overhead, 858	Overhead variance, 859
Departmental overhead rate, 860	Plantwide overhead rate, 860
Job, 854	Predetermined overhead rate, 857
Job-order cost sheet, 863	Process-costing system, 855
Job-order costing system, 854	Time ticket, 865
Materials requisition form, 864	Underapplied overhead, 859
Normal cost of goods sold, 870	

## Appendix 16A: Journal Entries Associated with Job-Order Costing

### OBJECTIVE 5

Prepare the journal entries associated with job-order costing.

The transactions that flow through the accounts in job-order costing are entered into the accounting system by making journal entries and posting them to the accounts.

Let's summarize the various transactions that occurred during the month of January for Johnson Leathergoods.

1. Purchased raw materials costing \$2,500 on account.
2. Requisitioned materials costing \$1,500 for use in production.
3. Recognized direct labor costing \$1,530 (that is, it was not paid in cash but was shown as a liability in the wages payable account).
4. Applied overhead to production at the rate of \$2 per direct labor hour. A total of 170 direct labor hours were worked.
5. Incurred actual overhead costs of \$415.
6. Completed the backpack job and transferred it to Finished Goods.
7. Sold the backpack job at cost plus 50 percent.
8. Closed underapplied overhead to Cost of Goods Sold.

The journal entries for each of the above transactions are as follows:

1. Raw Materials	2,500	
Accounts Payable		2,500
2. Work in Process	1,500	
Raw Materials		1,500
3. Work in Process	1,530	
Wages Payable		1,530
4. Work in Process	340	
Overhead Control		340
5. Overhead Control	415	
Lease Payable		200
Utilities Payable		50
Accumulated Depreciation		100
Wages Payable		65
6. Finished Goods	2,320	
Work in Process		2,320
7. Cost of Goods Sold	2,320	
Finished Goods		2,320
Accounts Receivable	3,480	
Sales Revenue		3,480
8. Cost of Goods Sold	75	
Overhead Control		75

Journal entry 1 shows that the purchase of materials increases the raw materials account as well as the accounts payable account. In other words, the company has increased both assets (materials on hand) and liabilities (through Accounts Payable).

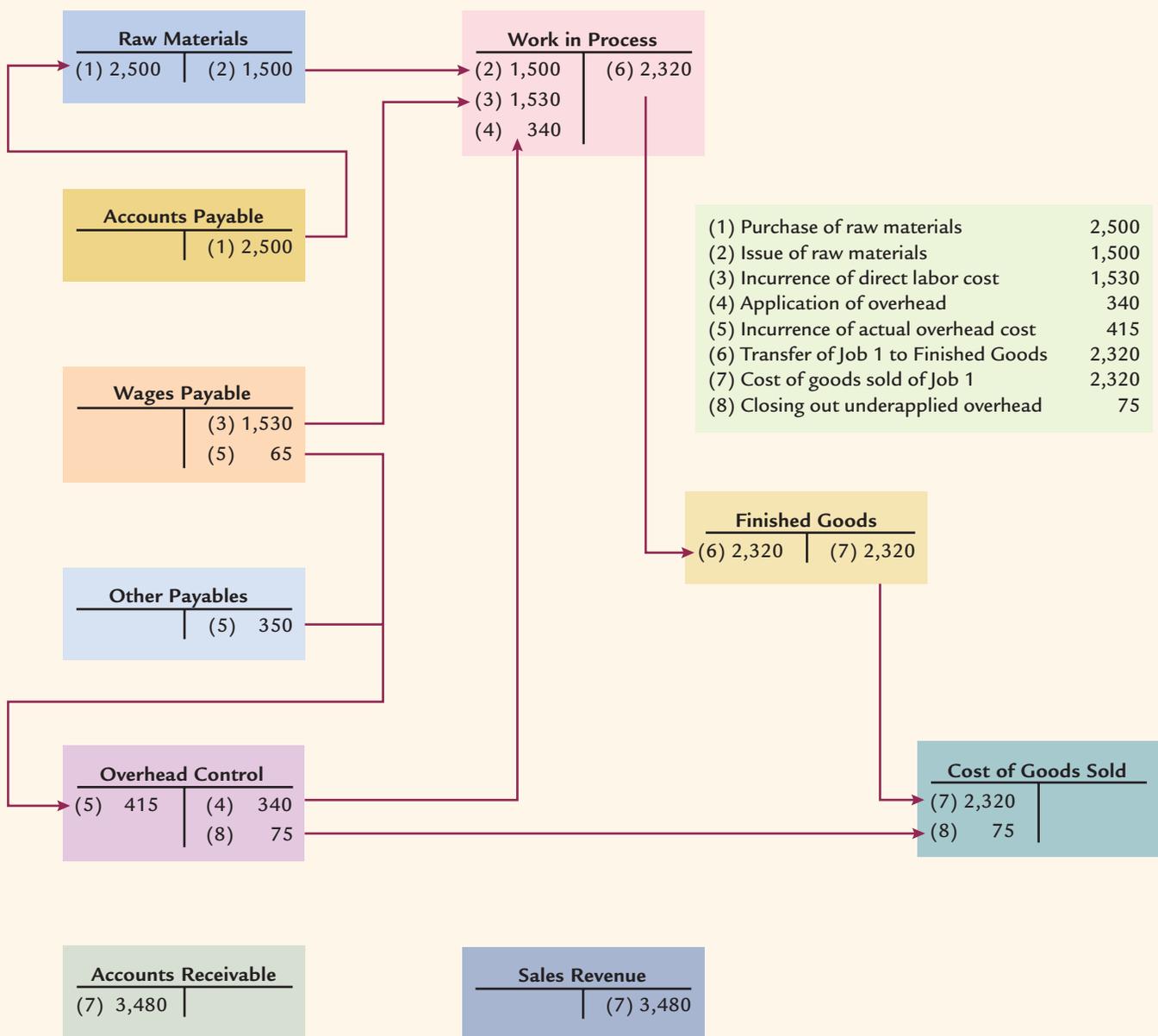
Entry 2 shows the transfer from the materials storeroom to the factory floor. In other words, the materials are no longer awaiting requisition; they are being used. Therefore, the work-in-process account goes up, but the raw materials account goes down.

Entry 3 recognizes the contribution of direct labor. The amount of direct labor wages is added to Work in Process and also is added to the liability account, Wages Payable.

Entry 4 recognizes the application of overhead to the jobs. Since 170 hours of direct labor were worked, and the overhead rate is \$2 per direct labor hour, then \$340 has been applied to overhead. Notice that this overhead application increases the work-in-process account and shows as a credit to Overhead Control.

**Exhibit 16-13**

**Posting of Journal Entries to the Accounts**



Entry 5 shows that the actual overhead incurred is debited to Overhead Control. The credit is to the various payable accounts.

Entry 6 shows the transfer of the backpack job from Work in Process to Finished Goods. We find the appropriate cost by referring to the job-order cost sheet in Exhibit 16-9.

Entry 7 consists of two journal entries. First, we recognize the cost of the backpack job by debiting Cost of Goods Sold for the cost and crediting Finished Goods. This entry mirrors the physical movement of the backpacks out of the warehouse and to the customer. Second, the sales price is shown. It is very important to separate the cost of the job from the sale. This always requires two entries.

Finally, in entry 8, we check the overhead control account. It has a debit balance of \$75, indicating that the overhead variance is \$75 underapplied. To bring the balance to zero, then, Overhead Control must be credited \$75, and Cost of Goods Sold must be debited \$75.

Exhibit 16-13 summarizes these journal entries and posts them to the appropriate accounts.

## Appendix 16A: Summary of Learning Objectives

### LO5. Prepare the journal entries associated with job-order costing.

- Direct materials and direct labor are charged to Work in Process.
- Applied overhead costs are charged to Work in Process. Actual overhead costs are charged to Overhead Control.
- When units are completed, their total cost is debited to Finished Goods and credited to Work in Process.
- When units are sold, their total cost is debited to Cost of Goods Sold and credited to Finished Goods.

## Appendix 16B: Support Department Cost Allocation

### OBJECTIVE 6

Allocate support department costs to producing departments.

The costs of resources shared by two or more services or products are referred to as **common costs**. For example, the cost of a maintenance department is shared by producing departments that use these services. How to assign these shared costs to individual producing departments is the focus of this appendix.

### Types of Departments

Nearly every company or factory has producing departments and support departments. **Producing departments** are directly responsible for creating the products or services sold to customers. For example, a public accounting firm might have producing departments devoted to auditing, tax, and management advisory services. In a factory, producing departments are those that work directly on the products being manufactured, such as the grinding and assembly departments. **Support departments** provide essential services for producing departments, but they do not actually make the product or service being sold. Examples include the maintenance, grounds, engineering, housekeeping, personnel, and photocopying departments.

Once producing and support departments have been identified, overhead costs that belong exclusively to each department are identified—these are direct overhead costs. For example, a factory cafeteria would have direct costs such as food, salaries of cooks and servers, depreciation on dishwashers and stoves, and supplies (e.g., dishwasher detergent, napkins, plastic forks). Direct overhead costs of a producing department would include supplies, supervisory salaries, and depreciation on equipment used in that department. Overhead that cannot easily be assigned to a producing or support department is assigned to a catchall department such as “general factory.”

Once the direct overhead costs of each department are determined, the next step is to assign the support department costs to producing departments. These costs are assigned to producing departments by using **causal factors** (drivers) that measure the consumption of the services. Each producing department’s share of the support department costs is added to that department’s direct overhead cost. This total

estimated overhead is then divided by a unit-level driver to obtain a predetermined overhead rate for each producing department. Overhead rates are calculated only for producing departments because products only pass through producing departments. Exhibit 16-14 summarizes the steps involved. Steps 1 through 4 are explained in this appendix; steps 5 and 6 are explained in Cornerstone 16-3 of this chapter.

**ETHICS** Deliberations about discontinuing a support department need to be kept confidential. Ethical professional practice requires this and more. For example, it may be tempting to use confidential information about the discontinuance of a support department to provide an unfair advantage to a friend or relative who may be the owner of an outside service firm that essentially would be replacing the support department. ♦

Clearly, then, there are good reasons for allocating support department costs. The validity of these reasons, however, depends on the accuracy and fairness of the cost assignments made.

## Methods of Support Department Cost Allocation

A plantwide overhead rate adds together all of the direct overhead costs of the producing departments and all costs of any support departments to calculate a single plantwide overhead rate and assign overhead to units produced. However, many firms find that a single overhead rate does not adequately assign costs to various products. In that case, departmental overhead rates may be used. Then it is necessary to allocate support department costs to the producing departments in order to calculate departmental overhead rates.

The three methods of assigning costs of multiple support departments to producing departments are the *direct method*, the *sequential method*, and the *reciprocal method*. The direct method ignores interactions and assigns support department costs directly to producing departments. Ignoring these interactions and allocating service costs directly to producing departments may produce unfair and inaccurate cost assignments. For example, the power department, although a support department, may use 30 percent of the services of the maintenance department. By not assigning some maintenance costs to the power department, its costs are understated. As a result, a producing department that is a heavy user of power and an average or below-average user of maintenance may then receive, under the direct method, a cost allocation that is understated. The sequential method considers some of the interaction effects, and the reciprocal method fully considers all interactions. In determining which support department cost allocation method to use, companies must determine the extent of support department interaction and weigh the individual costs and benefits of each method. In the next three sections, the direct, sequential, and reciprocal methods are discussed.

### Exhibit 16-14

#### **Steps for Determining Product Costs by Using Predetermined Departmental Overhead Rates**

1. Departmentalize the firm.
2. Classify each department as a support department or a producing department.
3. Trace all overhead costs in the firm to a support department or producing department.
4. Assign support department costs to the producing departments using drivers that measure the consumption of support department services.
5. Calculate predetermined overhead rates for producing departments.
6. Assign overhead costs to the units of individual products using the predetermined overhead rates.

**Direct Method** The **direct method** ignores support department interactions and assigns support department costs *only* to the producing departments. The direct method is the simplest and most straightforward way to assign support department costs.

Exhibit 16-15 illustrates the way support department costs are allocated to producing departments using the direct method. We see that by using the direct method, support department cost is assigned to producing departments only. No cost from one support department is given to another support department. Thus, no support department interaction is recognized. **Cornerstone 16-6** shows how the direct method is used to assign the costs of two support departments to two producing departments. Notice that the interactions of the service departments are ignored and do not enter the calculations for assigning costs to producing departments.

**CONCEPT Q&A**

What is the major disadvantage of the direct method?

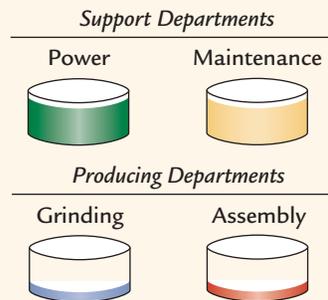
**Possible Answer:** It ignores the interactions that may exist among support departments.

**Sequential Method of Allocation** The **sequential (or step) method** of allocation recognizes that interactions among support departments occur. However, the sequential method does not fully account for support department interaction. Cost allocations are performed in a step-down fashion, following a predetermined ranking procedure. Usually, the sequence is defined by ranking the support departments in order of the amount of service rendered, from the greatest to the least, where degree of service is measured by the direct costs of each support department.

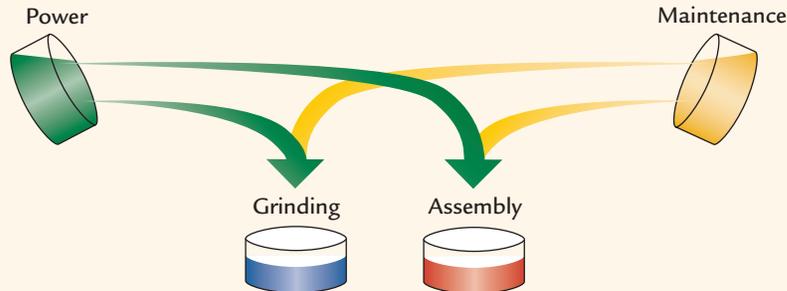
Exhibit 16-15

**Illustration of the Direct Method**

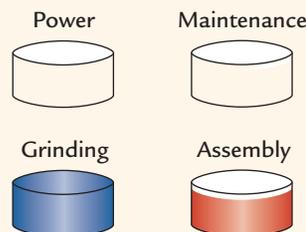
Suppose there are two support departments, Power and Maintenance, and two producing departments, Grinding and Assembly, each with a “bucket” of directly traceable overhead cost.  
*Objective:* Distribute all maintenance and power costs to Grinding and Assembly using the direct method.



Direct method—Allocate maintenance and power costs only to Grinding and Assembly.



After allocation—Zero cost in maintenance and power; all overhead cost is in Grinding and Assembly.





## CORNERSTONE 16-6



### HOW TO Assign Support Department Costs by Using the Direct Method

#### Information:

Departmental data:

	Support Departments		Producing Departments	
	Power	Maintenance	Grinding	Assembly
Direct overhead costs*	\$250,000	\$160,000	\$100,000	\$ 60,000
Expected activity:				
Kilowatt-hours	—	200,000	600,000	200,000
Maintenance hours	1,000	—	4,500	4,500

\* Overhead costs that are directly traceable to the department.

#### Required:

Using the direct method, assign the support department costs to the producing departments.

#### Solution:

Calculate usage or allocation ratios:

	Grinding	Assembly
Power: $600,000 / (600,000 + 200,000)$	0.75	—
$200,000 / (600,000 + 200,000)$	—	0.25
Maintenance: $4,500 / (4,500 + 4,500)$	0.50	—
$4,500 / (4,500 + 4,500)$	—	0.50

	Support Departments		Producing Departments	
	Power	Maintenance	Grinding	Assembly
Direct costs	\$ 250,000	\$ 160,000	\$100,000	\$ 60,000
Power <sup>a</sup>	(250,000)	—	187,500	62,500
Maintenance <sup>b</sup>		(160,000)	80,000	80,000
Total	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$367,500</u>	<u>\$202,500</u>

<sup>a</sup> Using the allocation ratios for Power:  $0.75 \times \$250,000$ ;  $0.25 \times \$250,000$ .

<sup>b</sup> Using the allocation ratios for Maintenance:  $0.50 \times \$160,000$ ;  $0.50 \times \$160,000$ .

Exhibit 16-16 provides a visual portrayal of the sequential method. First, the support departments are ranked, usually in accordance with direct costs; here, the power department is first, then the maintenance department. Next, power costs are allocated to the maintenance department and the two producing departments. Finally, the costs of the maintenance department are allocated only to producing departments.

The costs of the support department rendering the greatest service are assigned to all support departments below it in the sequence and to all producing departments. The costs of the support department next in sequence are similarly allocated and so on. In the sequential method, once a support department's costs are allocated, it never receives a subsequent allocation from another support department. In other words, costs of a support department are never allocated to support departments above it in the sequence. Also, note that the costs allocated from a support department are its direct costs plus any costs it receives in allocations from other support departments.

**Cornerstone 16-7** shows how to assign support department cost to producing departments by using the sequential method. The power department will be allocated first since its

Exhibit 16-16

**Illustration of the Sequential Method**

Suppose there are two support departments, Power and Maintenance, and two producing departments, Grinding and Assembly, each with a “bucket” of directly traceable overhead cost.

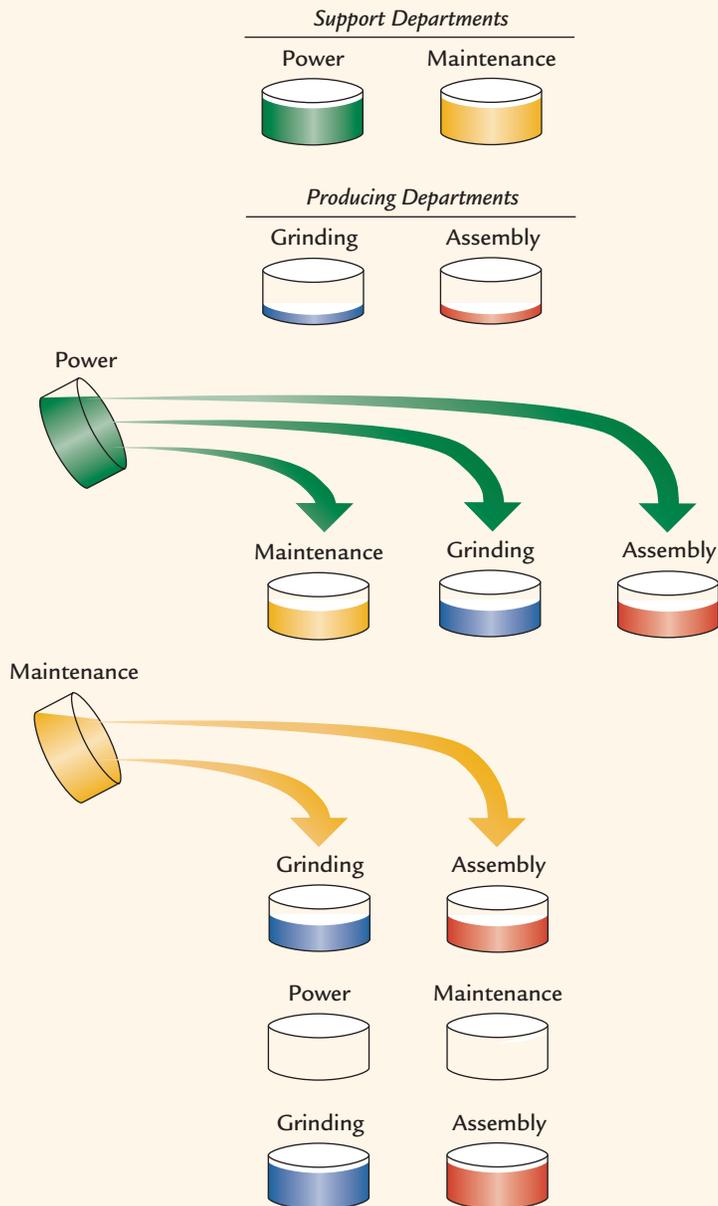
*Objective:* Distribute all maintenance and power costs to Grinding and Assembly using the sequential method.

Step 1: Rank service departments—#1 Power, #2 Maintenance.

Step 2: Distribute power to Maintenance, Grinding, and Assembly.

Then, distribute maintenance to Grinding and Assembly.

After allocation—Zero cost in Maintenance and Power; all overhead cost is in Grinding and Assembly.



direct cost is higher, followed by the maintenance department. Note that the allocation ratios for the maintenance department ignore the usage by the power department because Power is above Maintenance in the allocation sequence. Unlike the direct method, the sequential method recognizes some interactions among the support departments. The reciprocal method corrects this deficiency.

**Reciprocal Method of Allocation** The **reciprocal method** of allocation recognizes all interactions among support departments. Under the reciprocal method, one support department’s use by another figures in determining the total cost of each support department, where the total cost reflects interactions among the support departments. Then, the new total of support department costs is allocated to the producing departments. This method fully accounts for support department interaction by using a system of simultaneous linear equations. The

**CONCEPT Q&A**

Why is the sequential method considered to be more accurate than the direct method?

*The sequential method considers some of the interactions among service departments.*

**Possible Answer:**



## CORNERSTONE 16-7



### HOW TO Assign Support Department Costs by Using the Sequential Method

#### Information:

Departmental data:

	Support Departments		Producing Departments	
	Power	Maintenance	Grinding	Assembly
Direct costs*	\$250,000	\$160,000	\$100,000	\$ 60,000
Expected activity:				
Kilowatt-hours	—	200,000	600,000	200,000
Maintenance hours	1,000	—	4,500	4,500

\* Overhead costs that are directly traceable to the department.

#### Required:

Using the sequential method, assign the support department costs to the producing departments.

#### Solution:

Calculate usage ratios:

	Maintenance	Grinding	Assembly
Power: $200,000 / (200,000 + 600,000 + 200,000)$	0.20	—	—
$600,000 / (200,000 + 600,000 + 200,000)$	—	0.60	—
$200,000 / (200,000 + 600,000 + 200,000)$	—	—	0.20
Maintenance: $4,500 / (4,500 + 4,500)$	—	0.50	—
$4,500 / (4,500 + 4,500)$	—	—	0.50

	Support Departments		Producing Departments	
	Power	Maintenance	Grinding	Assembly
Direct costs	\$ 250,000	\$ 160,000	\$100,000	\$ 60,000
Power <sup>a</sup>	(250,000)	50,000	150,000	50,000
Maintenance <sup>b</sup>	—	(210,000)	105,000	105,000
	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$355,000</u>	<u>\$215,000</u>

<sup>a</sup> Using the usage ratios for Power:  $0.20 \times \$250,000$ ;  $0.60 \times \$250,000$ ;  $0.20 \times \$250,000$ .

<sup>b</sup> Using the usage ratios for Maintenance:  $0.50 \times \$210,000$ ;  $0.50 \times \$210,000$ .

reciprocal method is not widely used due to its complexity. This method will not be illustrated; rather, its complete description is left to a more advanced course.

Another factor in allocating support department cost is the rapid change in technology. Many firms currently find that support department cost allocation is useful for them. However, the move toward activity-based costing and just-in-time manufacturing can virtually eliminate the need for support department cost allocation.

## Appendix 16B: Summary of Learning Objectives

### LO6. Allocate support department costs to producing departments.

- Producing departments actually make the products or services. Support departments provide service to the producing departments.
- When departmental overhead rates are used, the costs of support departments must be allocated to the producing departments.
- Three methods of support department cost allocation are direct method, sequential method, and reciprocal method.

**CORNERSTONE 16-6** How to assign support department costs by using the direct method, page 880

**CORNERSTONE 16-7** How to assign support department costs by using the sequential method, page 882



## CORNERSTONES FOR APPENDIX 16B

## Key Terms for Appendix 16B

Causal factors, 877

Common costs, 877

Direct method, 879

Producing departments, 877

Reciprocal method, 881

Sequential (or step) method, 879

Support departments, 877

## Review Problems

### I. Job Cost Using Plantwide and Departmental Overhead Rates

Lindberg Company uses a normal job-order costing system. There are two departments, Assembly and Finishing, through which most jobs pass. Selected budgeted and actual data for the past year follow:

	Assembly	Finishing
Budgeted overhead	\$330,000	\$1,000,000
Actual overhead	110,000	520,000
Expected activity (direct labor hours)	150,000	25,000
Expected machine hours	25,000	125,000

During the year, several jobs were completed. Data pertaining to one such job, Job 330, follow:

Direct materials	\$730,000
Direct labor cost:	
Assembly (5,000 hours @ \$12 per hr.)	\$60,000
Finishing (400 hours @ \$12 per hr.)	\$4,800
Machine hours used:	
Assembly	100
Finishing	1,200
Units produced	10,000

Lindberg Company uses a plantwide predetermined overhead rate based on direct labor hours (DLH) to assign overhead to jobs.

#### Required:

1. Compute the predetermined overhead rate.
2. Using the predetermined rate, compute the per-unit manufacturing cost for Job 330. (Round the unit cost to the nearest cent.)
3. Recalculate the unit manufacturing cost for Job 330 using departmental overhead rates. Use direct labor hours for Assembly and machine hours for Finishing.

#### Solution:

1. Predetermined overhead rate =  $\$1,330,000 / 175,000 = \$7.60$  per DLH. Add the budgeted overhead for the two departments, and divide by the total expected direct labor hours (DLH = 150,000 + 25,000).

2.	Direct materials	\$730,000
	Direct labor (\$12 × 5,400)	64,800
	Overhead (\$7.60 × 5,400 DLH)	41,040
	Total manufacturing costs	<u>\$835,840</u>
	Unit cost (\$835,840/10,000)	\$ 83.58

$$3. \text{ Predetermined Rate for Assembly} = \frac{\$330,000}{150,000} = \$2.20 \text{ per DLH.}$$

$$\text{Predetermined Rate for Finishing} = \frac{\$1,000,000}{125,000} = \$8 \text{ per Machine Hour}$$

	Direct materials	\$730,000
	Direct labor	64,800
	Overhead:	
	Assembly (\$2.20 × 5,000)	11,000
	Finishing (\$8 × 1,200)	9,600
	Total manufacturing costs	<u>\$815,400</u>
	Unit cost (\$815,400/10,000)	\$ 81.54

## II. Calculation of Work in Process and Cost of Goods Sold with Multiple Jobs

KKB (Kennedy Kitchen and Bath) Company designs and installs upscale kitchens and bathrooms. On May 1, there were three jobs in process, Jobs 77, 78, and 79. During May, two more jobs were started, Jobs 80 and 81. By May 31, Jobs 77, 78, and 80 were completed. The following data were gathered:

	Job 77	Job 78	Job 79	Job 80	Job 81
5/1 Balance	\$875	\$1,140	\$410	\$ 0	\$ 0
Direct materials	690	320	500	3,500	2,750
Direct labor	450	420	80	1,800	1,300

Overhead is applied at the rate of 150 percent of direct labor cost. Jobs are sold at cost plus 30 percent. Operating expenses for May totaled \$2,700.

### Required:

1. Prepare job-order cost sheets for each job as of May 31.
2. Calculate the ending balance in Work in Process (as of May 31) and Cost of Goods Sold for May.
3. Construct an income statement for KKB Company for the month of May.

### Solution:

1.		Job 77	Job 78	Job 79	Job 80	Job 81
	5/1 Balance	\$ 875	\$1,140	\$ 410	\$ 0	\$ 0
	Direct materials	690	320	500	3,500	2,750
	Direct labor	450	420	80	1,800	1,300
	Applied overhead	675	630	120	2,700	1,950
	Totals	<u>\$2,690</u>	<u>\$2,510</u>	<u>\$1,110</u>	<u>\$8,000</u>	<u>\$6,000</u>

$$2. \text{ Ending Balance in Work in Process} = \text{Job 79} + \text{Job 81} \\ = \$1,110 + \$6,000 \\ = \$7,110$$

$$\text{Cost of Goods Sold for May} = \text{Job 77} + \text{Job 78} + \text{Job 80} \\ = \$2,690 + \$2,510 + \$8,000 \\ = \$13,200$$

3.

**KKB Company**  
**Income Statement**  
**For the Month Ended May 31, 20XX**

Sales*	\$17,160
Cost of goods sold	13,200
Gross margin	\$ 3,960
Less: Operating expenses	2,700
Operating income	\$ 1,260

\* Sales = \$13,200 + 0.30(\$13,200) = \$17,160

### III. Allocation: Direct and Sequential Methods

Barok Manufacturing produces machine parts on a job-order basis. Most business is obtained through bidding. Most firms competing with Barok bid full cost plus a 20 percent markup. Recently, with the expectation of gaining more sales, Barok reduced its markup from 25 percent to 20 percent. The company operates two service departments and two producing departments. The budgeted costs and the normal activity levels for each department are given below.

	Service Departments		Producing Departments	
	A	B	C	D
Direct overhead costs	\$100,000	\$200,000	\$100,000	\$50,000
Number of employees	8	7	30	30
Maintenance hours	2,000	200	6,400	1,600
Machine hours	—	—	10,000	1,000
Labor hours	—	—	1,000	10,000

The direct costs of Department A are allocated on the basis of employees; those of Department B are allocated on the basis of maintenance hours. Departmental overhead rates are used to assign costs to products. Department C uses machine hours, and Department D uses labor hours.

The firm is preparing to bid on a job (Job K) that requires three machine hours per unit produced in Department C and no time in Department D. The expected prime costs per unit are \$67.

#### Required:

1. Allocate the service costs to the producing departments by using the direct method.
2. What will the bid be for Job K if the direct method of allocation is used?
3. Allocate the service costs to the producing departments by using the sequential method.
4. What will the bid be for Job K if the sequential method is used?

#### Solution:

	Service Departments		Producing Departments	
	A	B	C	D
Direct overhead costs	\$ 100,000	\$ 200,000	\$100,000	\$ 50,000
Department A <sup>a</sup>	(100,000)	—	50,000	50,000
Department B <sup>b</sup>	—	(200,000)	160,000	40,000
Total	\$ 0	\$ 0	\$310,000	\$140,000

<sup>a</sup> Department A costs are allocated on the basis of the number of employees in the producing departments, Departments C and D. The percentage of Department A cost allocated to Department C =  $30/(30 + 30) = 0.50$ . Cost of Department A allocated to Department C =  $0.50 \times \$100,000 = \$50,000$ . The percentage of Department A cost allocated to Department D =  $30/(30 + 30) = 0.50$ . Cost of Department A allocated to Department D =  $0.50 \times \$100,000 = \$50,000$ .

<sup>b</sup> Department B costs are allocated on the basis of maintenance hours used in the producing departments, Departments C and D. The percentage of Department B cost allocated to Department C =  $6,400/(6,400 + 1,600) = 0.80$ . Cost of Department B allocated to Department C =  $0.80 \times \$200,000 = \$160,000$ . The percentage of Department B cost allocated to Department D =  $1,600/(6,400 + 1,600) = 0.20$ . Cost of Department B allocated to Department D =  $0.20 \times \$200,000 = \$40,000$ .

2. Department C: Overhead rate =  $\$310,000/10,000 = \$31$  per machine hour.  
Product cost and bid price:

Prime cost	\$ 67
Overhead (3 × \$31)	93
Total unit cost	<u>\$160</u>

$$\text{Bid price} = \$160 \times 1.2 = \$192$$

3.	Service Departments		Producing Departments	
	A	B	C	D
Direct overhead costs	\$ 100,000	\$ 200,000	\$100,000	\$ 50,000
Department B <sup>a</sup>	40,000	(200,000)	128,000	32,000
Department A <sup>b</sup>	<u>(140,000)</u>	<u>—</u>	<u>70,000</u>	<u>70,000</u>
Total	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$298,000</u>	<u>\$152,000</u>

<sup>a</sup> Department B ranks first because its direct costs are higher than those of Department A. Department B costs are allocated on the basis of maintenance hours used in Department A, and producing Departments C and D. Percent of Department B cost allocated to Department A is  $0.20 [2,000/(2,000 + 6,400 + 1,600)]$ ; cost of Department B allocated to Department A =  $0.20 \times \$200,000 = \$40,000$ . The percentage of Department B cost allocated to Department C =  $6,400/(2,000 + 6,400 + 1,600) = 0.64$ . Cost of Department B allocated to Department C =  $0.64 \times \$200,000 = \$128,000$ . The percentage of Department B cost allocated to Department D =  $1,600/(2,000 + 6,400 + 1,600) = 0.16$ . Cost of Department B allocated to Department D =  $0.16 \times \$200,000 = \$32,000$ .

<sup>b</sup> Department A costs are allocated on the basis of number of employees in the producing departments, Departments C and D. The percentage of Department A cost allocated to Department C =  $30/(30 + 30) = 0.50$ . Cost of Department A allocated to Department C =  $0.50 \times \$140,000 = \$70,000$ . The percentage of Department A cost allocated to Department D =  $30/(30 + 30) = 0.50$ . Cost of Department A allocated to Department D =  $0.50 \times \$140,000 = \$70,000$ . (Note: Department A cost is no longer \$100,000. It is \$140,000 due to the \$40,000 that was allocated from Department B.)

4. Department C: Overhead rate =  $\$298,000/10,000 = \$29.80$  per machine hour.  
Product cost and bid price:

Prime cost	\$ 67.00
Overhead (3 × \$29.80)	89.40
Total unit cost	<u>\$156.40</u>

$$\text{Bid price} = \$156.40 \times 1.2 = \$187.68$$

## Discussion Questions

1. What are job-order costing and process costing? What types of firms use job-order costing? Process costing?
2. Give some examples of service firms that might use job-order costing, and explain why it is used in those firms.
3. What is normal costing? How does it differ from actual costing?
4. Why are actual overhead rates seldom used in practice?
5. Explain how overhead is assigned to production when a predetermined overhead rate is used.
6. What is underapplied overhead? When Cost of Goods Sold is adjusted for underapplied overhead, will the cost increase or decrease? Why?
7. What is overapplied overhead? When Cost of Goods Sold is adjusted for overapplied overhead, will the cost increase or decrease? Why?
8. Suppose that you and a friend decide to set up a lawn mowing service next summer. Describe the source documents that you would need to account for your activities.
9. Why might a company decide to use departmental overhead rates instead of a plantwide overhead rate?
10. What is the role of materials requisition forms in a job-order costing system? Time tickets? Predetermined overhead rates?

11. Carver Company uses a plantwide overhead rate based on direct labor cost. Suppose that during the year, Carver raises its wage rate for direct labor. How would that affect overhead applied? The total cost of jobs?
12. What is an overhead variance? How is it accounted for typically?
13. Is the cost of a job related to the price charged? Explain.
14. If a company decides to increase advertising expense by \$25,000, how will that affect the predetermined overhead rate? Eventual cost of goods sold?
15. How can a departmental overhead system be converted to a plantwide overhead system?
16. (Appendix 16B) Describe the difference between producing and support departments.
17. (Appendix 16B) Assume that a company has decided not to allocate any support department costs to producing departments. Describe the likely behavior of the managers of the producing departments. Would this be good or bad? Explain why allocation would correct this type of behavior.
18. (Appendix 16B) Why is it important to identify and use causal factors to allocate support department costs?
19. (Appendix 16B) Identify some possible causal factors for the following support departments:
  - a. Cafeteria
  - b. Custodial services
  - c. Laundry
  - d. Receiving, shipping, and storage
  - e. Maintenance
  - f. Personnel
  - g. Accounting
20. (Appendix 16B) Explain the difference between the direct method and the sequential method.

## Multiple-Choice Exercises

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### 16-1 Which of the following statements is true?

- a. Job-order costing is used only in manufacturing firms.
- b. The job cost sheet is subsidiary to the work-in-process account.
- c. Job-order costing is simpler to use than process costing because the recordkeeping requirements are less.
- d. Process costing is used only for services.
- e. All of the above are true.

### 16-2 The ending balance of which of the following accounts is calculated by summing the totals of the open (unfinished) job-order cost sheets?

- a. Raw Materials
- b. Work in Process
- c. Finished Goods
- d. Cost of Goods Sold
- e. Overhead Control

### 16-3 In a normal costing system, the cost of a job includes:

- a. actual direct materials, actual direct labor, and actual overhead.
- b. estimated direct materials, estimated direct labor, and estimated overhead.
- c. actual direct materials, actual direct labor, actual overhead, and actual selling cost.
- d. actual direct materials, actual direct labor, and estimated (applied) overhead.
- e. none of the above. Job-order costing requires the use of actual, not normal, costing.

**16-4 The predetermined overhead rate is:**

- calculated at the end of each month.
- calculated at the end of the year.
- equal to actual overhead divided by actual activity level for a period.
- equal to estimated overhead divided by actual activity level for a period.
- calculated at the beginning of the year.

**16-5 The predetermined overhead rate equals:**

- actual overhead divided by actual activity level for a period.
- estimated overhead divided by estimated activity level for a period.
- actual overhead minus estimated overhead.
- actual overhead multiplied by actual activity level for a period.
- one-twelfth of estimated overhead.

**16-6 Applied overhead is:**

- an important part of normal costing.
- never used in normal costing.
- an important part of actual costing.
- the predetermined overhead rate multiplied by estimated activity level.
- the predetermined overhead rate multiplied by estimated activity level for the month.

**16-7 The overhead variance is overapplied if:**

- actual overhead is less than applied overhead.
- actual overhead is more than applied overhead.
- applied overhead is less than actual overhead.
- estimated overhead is less than applied overhead.
- estimated overhead is more than applied overhead.

**16-8 Which of the following is typically a job-order costing firm?**

- Paint manufacturer
- Pharmaceutical manufacturer
- Large regional medical center
- Cement manufacturer
- Cleaning products manufacturer

**16-9 Which of the following is typically a process-costing firm?**

- Paint manufacturer
- Custom cabinetmaker
- Large regional medical center
- Law office
- Custom framing shop

**16-10 When materials are requisitioned for use in production in a job-order costing firm, the cost of materials is added to the:**

- raw materials account.
- work-in-process account.
- finished goods account.
- accounts payable account.
- cost of goods sold account.

**16-11 When a job is completed, the total cost of the job is:**

- subtracted from the raw materials account.
- subtracted from the work-in-process account.
- subtracted from the finished goods account.
- added to the accounts payable account.
- subtracted from the cost of goods sold account.

**16-12** The costs of a job are accounted for on the:

- materials requisition sheet.
- time ticket.
- requisition for overhead application.
- job-order cost sheet.
- sales invoice.

**16-13** Wilson Company has a predetermined overhead rate of \$5 per direct labor hour. The job-order cost sheet for Job 145 shows 1,000 direct labor hours costing \$10,000 and materials requisitions totaling \$7,500. Job 145 had 500 units completed and transferred to Finished Goods. What is the cost per unit for Job 145?

- \$35
- \$135
- \$30
- \$45
- \$22,500

**16-14 (Appendix 16A)** When a job costing \$2,000 is finished but not sold, the following journal entry is made:

- |    |                    |       |       |
|----|--------------------|-------|-------|
| a. | Cost of Goods Sold | 2,000 |       |
|    | Finished Goods     |       | 2,000 |
| b. | Finished Goods     | 2,000 |       |
|    | Cost of Goods Sold |       | 2,000 |
| c. | Finished Goods     | 2,000 |       |
|    | Work in Process    |       | 2,000 |
| d. | Work in Process    | 2,000 |       |
|    | Finished Goods     |       | 2,000 |
| e. | Cost of Goods Sold | 2,000 |       |
|    | Sales              |       | 2,000 |

**16-15 (Appendix 16B)** Those departments responsible for creating products or services that are sold to customers are referred to as:

- profit making departments.
- support departments.
- cost centers.
- production departments.
- none of the above.

**16-16 (Appendix 16B)** Those departments that provide essential services to producing departments are referred to as:

- revenue generating departments.
- support departments.
- profit centers.
- production departments.
- none of the above.

**16-17 (Appendix 16B)** An example of a producing department is:

- a materials storeroom.
- the maintenance department.
- engineering design.
- assembly.
- all of the above.

**16-18 (Appendix 16B)** An example of a support department is:

- data processing.
- personnel.
- a materials storeroom.
- payroll.
- all of the above.

**16-19 (Appendix 16B)** The method that assigns support department costs only to producing departments in proportion to each department's usage of the service is known as:

- the sequential method.
- the proportional method.
- the reciprocal method.
- the direct method.
- none of the above.

**16-20 (Appendix 16B)** The method that assigns support department costs by giving partial recognition to support department interactions is known as:

- the sequential method.
- the proportional method.
- the reciprocal method.
- the direct method.
- none of the above.

**16-21 (Appendix 16B)** The method that assigns support department costs by giving full recognition to support department interactions is known as:

- the sequential method.
- the proportional method.
- the reciprocal method.
- the direct method.
- none of the above.

## Cornerstone Exercises

**OBJECTIVE** > **2**  
**CORNERSTONE 16-1**

**Cornerstone Exercise 16-22** **PREDETERMINED OVERHEAD RATE, OVERHEAD APPLICATION**

At the beginning of the year, Kreskin Company estimated the following costs:

Overhead	\$450,000
Direct labor cost	600,000

Kreskin uses normal costing and applies overhead on the basis of direct labor cost. (Direct labor cost is equal to total direct labor hours worked multiplied by the wage rate.) For the month of December, direct labor cost was \$38,900.

**Required:**

- Calculate the predetermined overhead rate for the year.
- Calculate the overhead applied to production in December.

**OBJECTIVE** > **2**  
**CORNERSTONE 16-2**

**Cornerstone Exercise 16-23** **OVERHEAD VARIANCE (OVER-OR UNDERAPPLIED), CLOSING TO COST OF GOODS SOLD**

At the end of the year, Kreskin Company provided the following actual information:

Overhead	\$456,500
Direct labor cost	607,200

Kreskin uses normal costing and applies overhead at the rate of 75 percent of direct labor cost. At the end of the year, Cost of Goods Sold (before adjusting for any overhead variance) was \$890,000.

**Required:**

1. Calculate the overhead variance for the year.
2. Dispose of the overhead variance by adjusting Cost of Goods Sold.

**Cornerstone Exercise 16-24** PREDETERMINED DEPARTMENTAL OVERHEAD RATES, APPLYING OVERHEAD TO PRODUCTION

**OBJECTIVE** > 2  
**CORNERSTONE 16-3**

At the beginning of the year, Badger Company estimated the following:

	Cutting Department	Sewing Department	Total
Overhead	\$378,000	\$450,000	\$828,000
Direct labor hours	131,200	200,000	331,200
Machine hours	210,000	—	210,000

Badger uses departmental overhead rates. In the cutting department, overhead is applied on the basis of machine hours. In the sewing department, overhead is applied on the basis of direct labor hours. Actual data for the month of June are as follows:

	Cutting Department	Sewing Department	Total
Overhead	\$32,612	\$35,750	\$68,362
Direct labor hours	11,800	16,000	27,800
Machine hours	17,840	—	17,840

**Required:**

1. Calculate the predetermined overhead rates for the cutting and sewing departments.
2. Calculate the overhead applied to production in each department for the month of June.
3. By how much has each department's overhead been overapplied? Underapplied?

**Cornerstone Exercise 16-25** CONVERT DEPARTMENTAL DATA TO PLANTWIDE DATA, PLANTWIDE OVERHEAD RATE, APPLY OVERHEAD TO PRODUCTION

**OBJECTIVE** > 2  
**CORNERSTONE 16-4**

At the beginning of the year, Badger Company estimated the following:

	Cutting Department	Sewing Department	Total
Overhead	\$378,000	\$450,000	\$828,000
Direct labor hours	131,200	200,000	331,200
Machine hours	210,000	—	210,000

Badger has decided to use a plantwide overhead rate based on direct labor hours. Actual data for the month of June are as follows:

	Cutting Department	Sewing Department	Total
Overhead	\$32,612	\$35,750	\$68,362
Direct labor hours	11,800	16,000	27,800
Machine hours	17,840	—	17,840

**Required:**

1. Calculate the predetermined plantwide overhead rate.
2. Calculate the overhead applied to production for the month of June.
3. Calculate the overhead variance for the month of June.

**OBJECTIVE** > **3**  
**CORNERSTONE 16-5**
**Cornerstone Exercise 16-26 PREPARE JOB-ORDER COST SHEETS, PREDETERMINED OVERHEAD RATE, ENDING BALANCE OF WIP, FINISHED GOODS, AND COGS**

At the beginning of June, Donegal Company had two jobs in process, Job 44 and Job 45, with the following accumulated cost information:

	Job 44	Job 45
Direct materials	\$4,600	\$ 500
Direct labor	1,200	1,000
Applied overhead	<u>750</u>	<u>1,300</u>
Balance, June 1	<u>\$6,550</u>	<u>\$2,800</u>

During June, two more jobs (46 and 47) were started. The following direct materials and direct labor costs were added to the four jobs during the month of June:

	Job 44	Job 45	Job 46	Job 47
Direct materials	\$1,500	\$6,110	\$ 800	\$700
Direct labor	1,000	2,400	2,000	600

At the end of June, Jobs 44, 45, and 47 were completed. Only Job 45 was sold. On June 1, the balance in Finished Goods was zero.

**Required:**

1. Calculate the overhead rate based on direct labor cost.
2. Prepare a brief job-order cost sheet for the four jobs. Show the balance as of June 1 as well as direct materials and direct labor added in June. Apply overhead to the four jobs for the month of June, and show the ending balances.
3. Calculate the ending balances of Work in Process and Finished Goods as of June 30.
4. Calculate the Cost of Goods Sold for June.

**OBJECTIVE** > **6**  
**CORNERSTONE 16-6**
**Cornerstone Exercise 16-27 (APPENDIX 16B) ASSIGNING SUPPORT DEPARTMENT COSTS BY USING THE DIRECT METHOD**

Vanderber Company manufactures a product in a factory that has two producing departments, Cutting and Sewing, and two support departments, S1 and S2. The activity driver for S1 is number of employees, and the activity driver for S2 is number of maintenance hours. The following data pertain to Vanderber Company:

	Support Departments		Producing Departments	
	S1	S2	Cutting	Sewing
Direct costs	\$180,000	\$150,000	\$122,000	\$90,500
Normal activity:				
Number of employees	—	30	63	147
Maintenance hours	1,200	—	16,000	4,000

**Required:**

1. Calculate the cost assignment ratios to be used under the direct method for Departments S1 and S2. (Each support department will have two ratios—one for Cutting and the other for Sewing.)
2. Allocate the support department costs to the producing departments by using the direct method.

**OBJECTIVE** > **6**  
**CORNERSTONE 16-7**
**Cornerstone Exercise 16-28 (APPENDIX 16B) SEQUENTIAL METHOD**

Lanoka Company manufactures pottery in two producing departments: Shaping and Firing. Three support departments support the following production departments: Power, General Factory, and Human Resources. Budgeted data on the five departments are as follows:



	Support Departments			Producing Departments	
	Power	General Factory	Human Resources	Shaping	Firing
Direct overhead costs	\$90,000	\$167,000	\$84,000	\$75,000	\$234,000
Kilowatt-hours	—	13,000	25,000	30,000	70,000
Square feet	2,000	—	6,000	24,000	8,000
Direct labor hours	—	—	—	4,000	6,000

Power is allocated on the basis of kilowatt-hours, general factory is allocated on the basis of square footage, and human resources is allocated on the basis of direct labor hours. The company does not break overhead into fixed and variable components.

**Required:**

1. Calculate the cost assignment ratios to be used under the sequential method for power and general factory.
2. Allocate the overhead costs to the producing departments by using the sequential method.

## Exercises

### Exercise 16-29 JOB-ORDER COSTING VERSUS PROCESS COSTING

#### OBJECTIVE > 1

- a. Paint manufacturing
- b. Auto manufacturing
- c. Toy manufacturing
- d. Custom cabinet making
- e. Airplane manufacturing (e.g., 767s)
- f. Personal computer assembly
- g. Furniture making
- h. Custom furniture making
- i. Dental services
- j. Hospital services
- k. Paper manufacturing
- l. Auto repair
- m. Architectural services
- n. Landscape design services
- o. Light bulb manufacturing

**Required:**

Identify each of these preceding types of businesses as either job-order or process costing.

### Exercise 16-30 JOB-ORDER COSTING VERSUS PROCESS COSTING

#### OBJECTIVE > 1

- a. Auto manufacturing
- b. Dental services
- c. Auto repair
- d. Costume making

**Required:**

For each of the given types of industries, give an example of a firm that would use job-order costing. Then, give an example of a firm that would use process costing.

**OBJECTIVE** > **2** **Exercise 16-31 CALCULATING THE PREDETERMINED OVERHEAD RATE, APPLYING OVERHEAD TO PRODUCTION**

At the beginning of the year, Natrina Company estimated the following:

Overhead	\$570,000
Direct labor hours	95,000

Natrina uses normal costing and applies overhead on the basis of direct labor hours. For the month of March, direct labor hours were 7,400.

**Required:**

1. Calculate the predetermined overhead rate for Natrina.
2. Calculate the overhead applied to production in March.

**OBJECTIVE** > **2** **Exercise 16-32 CALCULATING THE PREDETERMINED OVERHEAD RATE, APPLYING OVERHEAD TO PRODUCTION, RECONCILING OVERHEAD AT THE END OF THE YEAR, ADJUSTING COST OF GOODS SOLD FOR UNDER- AND OVERAPPLIED OVERHEAD**

At the beginning of the year, Olivar Company estimated the following:

Overhead	\$216,000
Direct labor hours	80,000

Olivar uses normal costing and applies overhead on the basis of direct labor hours. For the month of January, direct labor hours were 7,950. By the end of the year, Olivar showed the following actual amounts:

Overhead	\$226,000
Direct labor hours	82,600

Assume that unadjusted Cost of Goods Sold for Olivar was \$235,670.

**Required:**

1. Calculate the predetermined overhead rate for Olivar.
2. Calculate the overhead applied to production in January.
3. Calculate the total applied overhead for the year. Was overhead over- or underapplied? By how much?
4. Calculate adjusted Cost of Goods Sold after adjusting for the overhead variance.

**OBJECTIVE** > **2** **Exercise 16-33 CALCULATING DEPARTMENTAL OVERHEAD RATES AND APPLYING OVERHEAD TO PRODUCTION**

At the beginning of the year, Videosym Company estimated the following:

	Assembly Department	Testing Department	Total
Overhead	\$620,000	\$180,000	\$800,000
Direct labor hours	155,000	20,000	175,000
Machine hours	80,000	120,000	200,000

Videosym uses departmental overhead rates. In the assembly department, overhead is applied on the basis of direct labor hours. In the testing department, overhead is applied on the basis of machine hours. Actual data for the month of March are as follows:

	Assembly Department	Testing Department	Total
Overhead	\$53,000	\$15,500	\$68,500
Direct labor hours	13,000	1,680	14,680
Machine hours	6,800	13,050	19,850

**Required:**

1. Calculate the predetermined overhead rates for the assembly and testing departments.

- Calculate the overhead applied to production in each department for the month of March.
- By how much has each department's overhead been overapplied? Underapplied?

**Exercise 16-34 JOB-ORDER COST SHEET****OBJECTIVE** > 3

On June 1, Job 24 had a beginning balance of \$330. During June, direct materials of \$475 and direct labor of \$280 were added to the job. Overhead is applied to production at the rate of 75 percent of direct labor cost.

**Required:**

- Set up a simple job-order cost sheet for Job 24. What is the total cost of Job 24?
- If Job 24 consisted of five units, what is the unit cost?

**Exercise 16-35 SOURCE DOCUMENTS****OBJECTIVE** > 3

For each of the following independent situations, give the source document that would be referred to for the necessary information.

**Required:**

- Direct materials costing \$460 are requisitioned for use on a job.
- Greiner's Garage uses a job-order costing system. Overhead is applied to jobs based on direct labor hours. Which source document gives the number of direct labor hours worked on Job 2005-276?
- Pasilla Investigative Services bills clients on a monthly basis for costs to date. Job 3-48 involved an investigator following the client's business partner for a week by automobile. Mileage is billed at number of miles times \$0.75.
- The foreman on the Jackson job wonders what the actual direct materials cost was for that job.

**Exercise 16-36 APPLYING OVERHEAD TO JOBS, COSTING JOBS****OBJECTIVE** > 4

Herron Company designs and builds retaining walls for individual customers. On August 1, there were two jobs in process: Job 730 with a beginning balance of \$10,400, and Job 731 with a beginning balance of \$8,600. Herron applies overhead at the rate of \$11 per direct labor hour. Direct labor wages average \$10 per hour.

Data on August costs for all jobs are as follows:

	Job 730	Job 731	Job 732	Job 733
Direct materials	\$1,200	\$8,000	\$2,100	\$3,000
Direct labor cost	1,800	4,000	200	800

During August, Jobs 732 and 733 were started. Job 730 was completed on August 17, and the client was billed at cost plus 40 percent. All other jobs remained in process.

**Required:**

- Calculate the number of direct labor hours that were worked on each job in August.
- Calculate the overhead applied to each job during the month of August.
- Prepare job-order cost sheets for each job as of the end of August.
- Calculate the balance in Work in Process on August 31.
- What is the price of Job 730?

**Exercise 16-37 APPLYING OVERHEAD TO JOBS, COSTING JOBS****OBJECTIVE** > 4

Perrine Company builds internal conveyor equipment to client specifications. On October 1, Job 877 was in process with a cost of \$20,520 to date.

During October, Jobs 878, 879, and 880 were started. Data on costs added during October for all jobs are as follows:

	Job 877	Job 878	Job 879	Job 880
Direct materials	\$13,960	\$ 7,000	\$ 350	\$4,800
Direct labor	13,800	10,000	1,500	4,000

Overhead is applied to production at the rate of 85 percent of direct labor cost. Job 878 was completed on October 28, and the client was billed at cost plus 50 percent. All other jobs remained in process.

**Required:**

1. Prepare a brief job-order cost sheet showing the October 1 balances of all four jobs, plus the direct materials and direct labor costs during October. (There is no need to calculate applied overhead at this point or to total the costs.)
2. Calculate the overhead applied during October.
3. Calculate the balance in Work in Process on October 31.
4. What is the price of Job 878?

**OBJECTIVE** > **4**

**Exercise 16-38 BALANCE OF WORK IN PROCESS AND FINISHED GOODS, COST OF GOODS SOLD**

Voeltr Company uses job-order costing. At the end of the month, the following information was gathered:

Job #	Total Cost	Complete?	Sold?
301	\$ 610	Yes	No
302	1,300	Yes	Yes
303	460	No	No
304	2,670	Yes	No
305	3,800	Yes	No
306	230	No	No
307	300	Yes	Yes
308	650	No	No
309	1,035	No	No
310	217	No	No

The beginning balance of Finished Goods was zero.

**Required:**

1. Calculate the balance in Work in Process at the end of the month.
2. Calculate the balance in Finished Goods at the end of the month.
3. Calculate Cost of Goods Sold for the month.

**OBJECTIVE** > **4**

**Exercise 16-39 JOB-ORDER COST SHEETS, BALANCE IN WORK IN PROCESS AND FINISHED GOODS**



Berne Company, a job-order costing firm, worked on three jobs in July. Data are as follows:

	Job 73	Job 74	Job 75
Balance, 7/1	\$8,450	\$0	\$0
Direct materials	\$7,450	\$12,300	\$16,150
Direct labor	\$12,000	\$10,500	\$23,000
Machine hours	400	350	1,000

Overhead is applied to jobs at the rate of \$20 per machine hour. By July 31, Jobs 73 and 75 were completed. Jobs 70 and 73 were sold. Job 74 remained in process. On July 1, the balance in Finished Goods was \$49,000 (consisting of Job 70 for \$19,000 and Job 72 for \$30,000).

Berne prices its jobs at cost plus 30 percent. During July, variable marketing expenses were 10 percent of sales, and fixed marketing expenses were \$2,000; administrative expenses were \$4,800.

**Required:**

1. Prepare job-order cost sheets for all jobs in process during July, showing all costs through July 31.

- Calculate the balance in Work in Process on July 31.
- Calculate the balance in Finished Goods on July 31.
- Calculate Cost of Goods Sold for July.
- Prepare an income statement for Berne Company for the month of July.

**Exercise 16-40 COST FLOWS****OBJECTIVE** > **4**

Consider the following independent jobs. Overhead is applied in Department 1 at the rate of \$6 per direct labor hour. Overhead is applied in Department 2 at the rate of \$8 per machine hour. Direct labor wages average \$10 per hour in each department.

	Job 213	Job 214	Job 217	Job 225
Total sales revenue	\$?	\$4,375	\$5,600	\$1,150
Price per unit	\$12	\$?	\$14	\$5
Materials used in production	\$365	\$?	\$488	\$207
Department 1, direct labor cost	\$?	\$700	\$2,000	\$230
Department 1, machine hours	15	35	50	12
Department 2, direct labor cost	\$50	\$100	\$?	\$0
Department 2, machine hours	25	50	?	?
Department 1, overhead applied	\$90	\$?	\$1,200	\$138
Department 2, overhead applied	\$?	\$400	\$160	\$0
Total manufacturing cost	\$855	\$3,073	\$?	\$575
Number of units	?	350	400	?
Unit cost	\$8.55	\$?	\$9.87	\$?

**Required:**

Fill in the missing data for each job.

**Exercise 16-41 JOB COST FLOWS****OBJECTIVE** > **4**

Ionia Company uses a normal job-order costing system. The company has two departments through which most jobs pass. Overhead is applied using a plantwide overhead rate of \$12 per direct labor hour. During the year, several jobs were completed. Data pertaining to one such job, Job 9-601, follow:

Direct materials	\$18,000
Direct labor cost:	
Department A (6,000 hours @ \$6)	\$36,000
Department B (1,000 hours @ \$6)	\$6,000
Machine hours used:	
Department A	100
Department B	1,200
Units produced	10,000

**Required:**

- Compute the total cost of Job 9-601.
- Compute the per-unit manufacturing cost for Job 9-601.

*For Requirements 3 and 4, assume that Ionia uses departmental overhead rates. In Department A, overhead is applied at the rate of \$3 per direct labor hour. In Department B, overhead is applied at the rate of \$7 per machine hour.*

- Compute the total cost of Job 9-601.
- Compute the per-unit manufacturing cost for Job 9-601.

**Exercise 16-42 CALCULATION OF WORK IN PROCESS AND COST OF GOODS SOLD WITH MULTIPLE JOBS****OBJECTIVE** > **4**

Greenthumb Landscape Design designs landscape plans and plants the material for clients. On April 1, there were three jobs in process, Jobs 68, 69, and 70. During April, two more jobs were started, Jobs 71 and 72. By April 30, Jobs 69, 70, and 72 were completed and sold. The following data were gathered:

	Job 68	Job 69	Job 70	Job 71	Job 72
Balance, April 1	\$540	\$1,230	\$990	—	—
Direct materials	700	560	75	\$3,500	\$2,750
Direct labor	500	600	90	2,500	2,000

Overhead is applied at the rate of 120 percent of direct labor cost. Jobs are sold at cost plus 40 percent. Selling and administrative expenses for April totaled \$3,670.

**Required:**

1. Prepare job-order cost sheets for each job as of April 30.
2. Calculate the ending balance in Work in Process (as of April 30) and Cost of Goods Sold for April.
3. Construct an income statement for Greenthumb Landscape Design for the month of April.

**OBJECTIVE** > **5** **Exercise 16-43 (APPENDIX 16A) JOURNAL ENTRIES**

Garrity, Inc. uses a job-order costing system. During the month of May, the following transactions occurred:

- a. Purchased materials on account for \$27,800.
- b. Requisitioned materials totaling \$21,000 for use in production. Of the total, \$9,300 was for Job 58, \$6,900 for Job 59, and the remainder for Job 60.
- c. Incurred direct labor for the month of \$27,000, with an average wage of \$15 per hour. Job 58 used 800 hours; Job 59, 600 hours; and Job 60, 400 hours.
- d. Incurred and paid actual overhead of \$15,500 (credit Various Payables).
- e. Charged overhead to production at the rate of \$7.50 per direct labor hour.
- f. Completed and transferred Jobs 58 and 59 to Finished Goods.
- g. Sold Job 57 (see beginning balance of Finished Goods) and Job 58 to their respective clients on account for a price of cost plus 40 percent.

Beginning balances as of May 1 were:

Materials	\$ 5,170
Work in Process	0
Finished Goods (Job 58)	31,400

**Required:**

1. Prepare the journal entries for transactions (a) through (g).
2. Prepare brief job-order cost sheets for Jobs 58, 59, and 60.
3. Calculate the ending balance of Raw Materials.
4. Calculate the ending balance of Work in Process.
5. Calculate the ending balance of Finished Goods.

**OBJECTIVE** > **6** **Exercise 16-44 (APPENDIX 16B) DIRECT METHOD OF SUPPORT DEPARTMENT COST ALLOCATION**

Dexter Company is divided into two operating divisions: Battery and Small Motors. The company allocates power and human resources costs to each operating division using the direct method. Power costs are allocated on the basis of the number of machine hours and human resources costs on the basis of the number of employees. Support department cost allocations using the direct method are based on the following data:

	Support Departments		Operating Divisions	
	Power	Human Resources	Battery	Small Motors
Overhead costs	\$100,000	\$205,000	\$180,000	\$93,500
Machine hours	2,000	2,000	5,000	3,000
Number of employees	20	30	20	60
Direct labor hours			15,000	80,000

**Required:**

1. Calculate the allocation ratios for Power and Human Resources. (Carry these calculations out to three significant digits.)
2. Allocate the support service costs to the producing departments.
3. Assume departmental overhead rates are based on direct labor hours. Calculate the overhead rate for the Battery Division and for the Small Motors Division. (Round overhead rates to the nearest cent.)

**Exercise 16-45 (APPENDIX 16B) SEQUENTIAL METHOD OF SUPPORT DEPARTMENT COST ALLOCATION****OBJECTIVE** > 6

Refer to **Exercise 16-44** for data. Now assume that Dexter Company uses the sequential method to allocate support department costs to the producing departments. Human Resources is allocated first in the sequential method for Dexter.

**Required:**

1. Calculate the allocation ratios for Power and Human Resources. (Carry these calculations out to three significant digits.)
2. Allocate the support service costs to the producing departments.
3. Assume departmental overhead rates are based on direct labor hours. Calculate the overhead rate for the Battery Division and for the Small Motors Division. (Round overhead rates to the nearest cent.)

## Problems

**Problem 16-46 OVERHEAD APPLICATION AND JOB-ORDER COSTING****OBJECTIVE** > 2 4

Julian Company is a job-order costing firm that uses a plantwide overhead rate based on direct labor hours. Estimated information for the year is as follows:

Overhead	\$665,000
Direct labor hours	100,000

Julian worked on five jobs in July. Data are as follows:

	Job 210	Job 211	Job 212	Job 213	Job 214
Balance, July 1	\$32,780	\$51,770	\$29,600	\$0	\$0
Direct materials	\$25,500	\$39,800	\$24,450	\$13,600	\$18,420
Direct labor cost	\$60,000	\$28,500	\$41,500	\$23,000	\$21,300
Direct labor hours	4,000	1,900	2,700	1,500	1,400

By July 31, Jobs 210 and 212 were completed and sold. The remaining jobs were in process.

**Required:**

1. Calculate the plantwide overhead rate for Julian Company.
2. Prepare job-order cost sheets for each job showing all costs through July 31.
3. Calculate the balance in Work in Process on July 31.
4. Calculate Cost of Goods Sold for July.

**Problem 16-47 JOB COST, SOURCE DOCUMENTS****OBJECTIVE** > 1 3

Spade Millhone Detective Agency performs investigative work for a variety of clients. Recently, Alban Insurance Company asked Spade Millhone to investigate a series of suspicious claims for whiplash. In each case, the claimant was driving on a freeway and was suddenly rear-ended by an Alban-insured client. The claimants were all driving old, uninsured automobiles. The Alban clients reported that the claimants suddenly changed lanes in front of them, and the accidents were unavoidable. Alban suspected that these “accidents” were the result of insurance fraud. Basically, the claimants cruised the

freeways in virtually worthless cars, attempting to cut in front of expensive late-model cars that would surely be insured. Alban believed that the injuries were faked.

Rex Spade spent 37 hours shadowing the claimants and taking pictures as necessary. His surveillance methods located the office of a doctor used by all claimants. He also took pictures of claimants performing tasks that they had sworn were now impossible to perform due to whiplash injuries. Victoria Millhone spent 48 hours using the Internet to research court records in surrounding states to locate the names of the claimants and their doctor. She found a pattern of similar insurance claims for each of the claimants.

Spade Millhone Detective Agency bills clients for detective time at \$120 per hour. Mileage is charged at \$0.50 per mile. The agency logged in 510 miles on the Alban job. The film and developing amounted to \$120.

**Required:**

1. Prepare a job-order cost sheet for the Alban job.
2. Why is overhead not specified in the charges? How does Spade Millhone charge clients for the use of overhead (e.g., the ongoing costs of their office—supplies, paper for notes and reports, telephone, utilities)?
3. The mileage is tallied from a source document. Design a source document for this use, and make up data for it that would total the 510 miles driven on the Alban job.

**OBJECTIVE** > **4**

**Problem 16-48 CALCULATING ENDING WORK IN PROCESS, INCOME STATEMENT**

Uehler Prosthetics Company produces artificial limbs for individuals. Each prosthetic is unique. On January 1, three jobs, identified by the name of the person being fitted with the prosthetic, were in process with the following costs:

	Asher	Styne	Wollner
Direct materials	\$100	\$ 340	\$ 780
Direct labor	350	700	1,050
Applied overhead	<u>280</u>	<u>560</u>	<u>840</u>
Total	<u>\$730</u>	<u>\$1,600</u>	<u>\$2,670</u>

During the month of January, two more jobs were started, Johns and Burton. Materials and labor costs incurred by each job in January are as follows:

	Materials	Direct Labor
Asher	\$ 600	\$ 300
Styne	550	200
Wollner	860	250
Johns	1,310	1,650
Burton	260	180

Wollner and Johns' prosthetics were completed and sold by January 31.

**Required:**

1. If overhead is applied on the basis of direct labor dollars, what is the overhead rate?
2. Prepare simple job-order cost sheets for each of the five jobs in process during January.
3. What is the ending balance of Work in Process on January 31? What is the Cost of Goods Sold in January?
4. Suppose that Uehler Prosthetics Company prices its jobs at cost plus 20 percent. In addition, during January, marketing and administrative costs of \$850 were incurred. Prepare an income statement for the month of January.

**OBJECTIVE** > **2**

**Problem 16-49 OVERHEAD APPLIED TO JOBS, DEPARTMENTAL OVERHEAD RATES**

Watson Products Inc. uses a normal job-order costing system. Currently, a plantwide overhead rate based on machine hours is used. Marlon Burke, the plant manager, has heard that departmental overhead rates can offer significantly better cost assignments

than a plantwide rate can offer. Watson has the following data for its two departments for the coming year:

	Department A	Department B
Overhead costs (expected)	\$50,000	\$22,000
Normal activity (machine hours)	20,000	16,000

**Required:**

1. Compute a predetermined overhead rate for the plant as a whole based on machine hours.
2. Compute predetermined overhead rates for each department using machine hours. (Carry your calculations out to three decimal places.)
3. Job 73 used 20 machine hours from Department A and 50 machine hours from Department B. Job 74 used 50 machine hours from Department A and 20 machine hours from Department B. Compute the overhead cost assigned to each job using the plantwide rate computed in Requirement 1. Repeat the computation using the departmental rates found in Requirement 2. Which of the two approaches gives the fairer assignment? Why?
4. Repeat Requirement 3, assuming the expected overhead cost for Department B is \$40,000 (not \$22,000). For this company, would you recommend departmental rates over a plantwide rate?

**Problem 16-50 OVERHEAD RATES, UNIT COSTS**

Xanning Company manufactures specialty tools to customer order. There are three producing departments. Departmental information on budgeted overhead and various activity measures for the coming year is as follows:

**OBJECTIVE** 2



	Welding	Assembly	Finishing
Estimated overhead	\$200,000	\$22,000	\$250,000
Direct labor hours	4,500	10,000	6,000
Direct labor cost	\$90,000	\$150,000	\$120,000
Machine hours	5,000	1,000	2,000

Currently, overhead is applied on the basis of machine hours using a plantwide rate. However, Janine, the controller, has been wondering whether it might be worthwhile to use departmental overhead rates. She has analyzed the overhead costs and drivers for the various departments and decided that Welding and Finishing should base their overhead rates on machine hours and that Assembly should base its overhead rate on direct labor hours.

Janine has been asked to prepare bids for two jobs with the following information:

	Job 1	Job 2
Direct materials	\$4,500	\$8,600
Direct labor cost	\$1,000	\$2,000
Direct labor hours:		
Welding	10	20
Assembly	60	20
Finishing	30	80
Number of machine hours:		
Welding	50	30
Assembly	40	5
Finishing	110	165

The typical bid price includes a 30 percent markup over full manufacturing cost.

**Required:**

1. Calculate a plantwide rate for Xanning Company based on machine hours. What is the bid price of each job using this rate?
2. Calculate departmental overhead rates for the producing departments. What is the bid price of each job using these rates? (Round all answers to the nearest dollar.)

## OBJECTIVE &gt; 2 4

**Problem 16-51 CALCULATE JOB COST AND USE IT TO CALCULATE PRICE**

Suppose that back in the 1970s, Steve was asked to build speakers for two friends. The first friend, Jan, needed a speaker for her band. The second friend, Ed, needed a speaker built into the back of his hatchback automobile. Steve figured the following costs for each:

	Jan's Job	Ed's Job
Materials	\$50	\$75
Labor hours	10	20

Steve knew that Jan's job would be easier, since he had experience in building the type of speaker she needed. Her job would not require any special equipment or specialized fitting. Ed's job, on the other hand, required specialized design and precise fitting. Steve thought he might need to build a mock-up of the speaker first, to fit it into the space. In addition, he might have to add to his tool collection to complete the job. Normally, Steve figured a wage rate of \$6 per hour and charged 20 percent of labor and materials as an overhead rate.

**Required:**

1. Prepare job-order cost sheets for the two jobs, showing total cost.
2. Which cost do you think is more likely to be accurate? How might Steve build in some of the uncertainty of Ed's job into a budgeted cost?

## OBJECTIVE &gt; 4 5

**Problem 16-52 (APPENDIX 16A) UNIT COST, ENDING WORK IN PROCESS, JOURNAL ENTRIES**

During August, Pamell Inc. worked on two jobs. Data relating to these two jobs follow:

	Job 64	Job 65
Units in each order	50	100
Units sold	50	—
Materials requisitioned	\$1,240	\$985
Direct labor hours	410	583
Direct labor cost	\$6,150	\$8,745

Overhead is assigned on the basis of direct labor hours at a rate of \$12. During August, Job 64 was completed and transferred to Finished Goods. Job 65 was the only unfinished job at the end of the month.

**Required:**

1. Calculate the per-unit cost of Job 64.
2. Compute the ending balance in the work-in-process account.
3. Prepare the journal entries reflecting the completion and sale on account of Job 64. The selling price is 160 percent of cost.

## OBJECTIVE &gt; 4 5

**Problem 16-53 (APPENDIX 16A) JOURNAL ENTRIES, JOB COSTS**

The following transactions occurred during the month of April for Kearney Company:

- a. Purchased materials costing \$3,000 on account.
- b. Requisitioned materials totaling \$1,700 for use in production, \$500 for Job 443 and the remainder for Job 444.
- c. Recorded 50 hours of direct labor on Job 443 and 100 hours on Job 444 for the month. Direct laborers are paid at the rate of \$8 per hour.
- d. Applied overhead using a plantwide rate of \$7.50 per direct labor hour.
- e. Incurred and paid in cash actual overhead for the month of \$1,230.
- f. Completed and transferred Job 443 to Finished Goods.
- g. Sold on account Job 442, which had been completed and transferred to Finished Goods in March, for cost (\$2,000) plus 25 percent.

**Required:**

1. Prepare journal entries for transactions (a) through (e).
2. Prepare job-order cost sheets for Jobs 443 and 444. Prepare journal entries for transactions (f) and (g).
3. Prepare a statement of cost of goods manufactured for April. Assume that the beginning balance in the raw materials account was \$1,400 and that the beginning balance in the work-in-process account was zero.

**Problem 16-54 (APPENDIX 16A) PREDETERMINED OVERHEAD RATES, VARIANCES, COST FLOWS**

OBJECTIVE &gt; 2 4 5

Barrymore Costume Company, located in New York City, sews costumes for plays and musicals. Barrymore considers itself primarily a service firm, as it never produces costumes without a pre-existing order and only purchases materials to the specifications of the particular job. Any finished goods ending inventory is temporary and is zeroed out as soon as the show producer pays for the order. Overhead is applied on the basis of direct labor cost. During the first quarter of the year, the following activity took place in each of the accounts listed:

Work in Process			Finished Goods				
Bal.	17,000	Complete	245,000	Bal.	40,000	Sold	210,000
DL	80,000			Complete	245,000		
OH	140,000			Bal.	75,000		
DM	40,000						
Bal.	32,000						
Overhead			Cost of Goods Sold				
	138,500		140,000		210,000		
		Bal.	1,500				

Job 32 was the only job in process at the end of the first quarter. A total of 1,000 direct labor hours at \$10 per hour were charged to Job 32.

**Required:**

1. Assuming that overhead is applied on the basis of direct labor cost, what was the overhead rate used during the first quarter of the year?
2. What was the applied overhead for the first quarter? The actual overhead? The under- or overapplied overhead?
3. What was the cost of the goods manufactured for the quarter?
4. Assume that the overhead variance is closed to the cost of goods sold account. Prepare the journal entry to close out the overhead control account. What is the adjusted balance in Cost of Goods Sold?
5. For Job 32, identify the costs incurred for direct materials, direct labor, and overhead.

**Problem 16-55 (APPENDIX 16A) OVERHEAD APPLICATION, JOURNAL ENTRIES, JOB COST**

OBJECTIVE &gt; 2 4 5

At the beginning of the year, Paxton Company budgeted overhead of \$180,000 as well as 15,000 direct labor hours. During the year, Job K456 was completed with the following information: direct materials cost, \$2,340; direct labor cost, \$3,600. The average wage for Paxton Company employees is \$10 per hour.

By the end of the year, 15,400 direct labor hours had actually been worked, and Paxton Company incurred the following actual overhead costs for the year:

Equipment lease	\$ 5,000
Depreciation on building	20,000
Indirect labor	100,000
Utilities	15,000
Other overhead	45,000



**Required:**

1. Calculate the overhead rate for the year.
2. Calculate the total cost of Job K456.
3. Prepare the journal entries to record actual overhead and to apply overhead to production for the year.
4. Is overhead overapplied or underapplied? By how much?
5. Assuming that the normal cost of goods sold for the year is \$700,000, what is the adjusted cost of goods sold?

**OBJECTIVE** > **1** **4** **5****Problem 16-56 (APPENDIX 16A) JOURNAL ENTRIES, T-ACCOUNTS**

Lowder Inc. builds custom conveyor systems for warehouses and distribution centers. During the month of July, the following occurred:

- a. Purchased materials on account for \$42,630.
- b. Requisitioned materials totaling \$27,000 for use in production: \$12,500 for Job 703 and the remainder for Job 704.
- c. Recorded direct labor payroll for the month of \$26,320 with an average wage of \$14 per hour. Job 703 required 780 direct labor hours; Job 704 required 1,100 direct labor hours.
- d. Incurred and paid actual overhead of \$19,950.
- e. Charged overhead to production at the rate of \$10 per direct labor hour.
- f. Completed Job 703 and transferred it to finished goods.
- g. Kept Job 704, which was started during July, in process at the end of the month.
- h. Sold Job 700, which had been completed in May, on account for cost plus 30 percent.

Beginning balances as of July 1 were:

Raw Materials	\$ 6,070
Work in Process (for Job 703)	10,000
Finished Goods (for Job 700)	6,240

**Required:**

1. Prepare the journal entries for events (a) through (e).
2. Prepare simple job-order cost sheets for Jobs 703 and 704.
3. Prepare the journal entries for events (f) and (h).
4. Calculate the ending balances of the following:
  - a. Raw Materials
  - b. Work in Process
  - c. Finished Goods

**OBJECTIVE** > **6****Problem 16-57 (APPENDIX 16B) SUPPORT DEPARTMENT COST ALLOCATION**

MedServices Inc. is divided into two operating departments: Laboratory and Tissue Pathology. The company allocates delivery and accounting costs to each operating department. Delivery costs include the costs of a fleet of vans and drivers that drive throughout the state each day to clinics and doctors' offices to pick up samples and deliver them to the centrally located laboratory and tissue pathology offices. Delivery costs are allocated on the basis of number of samples. Accounting costs are allocated on the basis of the number of transactions processed. No effort is made to separate fixed and variable costs; however, only budgeted costs are allocated. Allocations for the coming year are based on the following data:

	Support Departments		Producing Departments	
	Delivery	Accounting	Laboratory	Pathology
Overhead costs	\$240,000	\$270,000	\$345,000	\$456,000
Number of samples	—	—	70,200	46,800
Transactions processed	2,000	200	24,700	13,300

**Required:**

1. Assign the support department costs by using the direct method.
2. Assign the support department costs by using the sequential method.

**Problem 16-58 (APPENDIX 16B) SUPPORT DEPARTMENT COST ALLOCATION: COMPARISON OF METHODS OF ALLOCATION**

Bender Automotive Works Inc. manufactures a variety of front-end assemblies for automobiles. A front-end assembly is the unified front of an automobile that includes the headlamps, fender, and surrounding metal/plastic. Bender has two producing departments: Drilling and Assembly. Usually, the front-end assemblies are ordered in batches of 100.

Two support departments provide support for Bender's operating units: Maintenance and Power. Budgeted data for the coming quarter follow. The company does not separate fixed and variable costs.

	Support Departments		Producing Departments	
	Maintenance	Power	Drilling	Assembly
Overhead costs	\$320,000	\$400,000	\$163,000	\$ 90,000
Machine hours	—	22,500	30,000	7,500
Kilowatt-hours	40,000	—	36,000	324,000
Direct labor hours	—	—	5,000	40,000

The predetermined overhead rate for Drilling is computed on the basis of machine hours; direct labor hours are used for Assembly.

Recently, a truck manufacturer requested a bid on a three-year contract that would supply front-end assemblies to a nearby factory. The prime costs for a batch of 100 front-end assemblies are \$1,817. It takes two machine hours to produce a batch in the drilling department and 50 direct labor hours to assemble the 100 front-end assemblies in the assembly department.

Bender's policy is to bid full manufacturing cost, plus 15 percent.

**Required:**

1. Prepare bids for Bender Automotive Works by using each of the following allocation methods:
  - a. Direct method.
  - b. Sequential method.
2. Which method most accurately reflects the cost of producing the front-end assemblies? Why?

**Cases****Case 16-59 OVERHEAD ASSIGNMENT: ACTUAL AND NORMAL ACTIVITY COMPARED**

Reynolds Printing Company specializes in wedding announcements. Reynolds uses an actual job-order costing system. An actual overhead rate is calculated at the end of each month using actual direct labor hours and overhead for the month. Once the actual cost of a job is determined, the customer is billed at actual cost plus 50 percent.

During April, Mrs. Lucky, a good friend of owner Jane Reynolds, ordered three sets of wedding announcements to be delivered May 10, June 10, and July 10, respectively. Reynolds scheduled production for each order on May 7, June 7, and July 7, respectively. The orders were assigned job numbers 115, 116, and 117, respectively.

**OBJECTIVE** > **6****OBJECTIVE** > **1** **2**

Reynolds assured Mrs. Lucky that she would attend each of her daughters' weddings. Out of sympathy and friendship, she also offered a lower price. Instead of cost plus 50 percent, she gave her a special price of cost plus 25 percent. Additionally, she agreed to wait until the final wedding to bill for the three jobs.

On August 15, Reynolds asked her accountant to bring her the completed job-order cost sheets for Jobs 115, 116, and 117. She also gave instructions to lower the price as had been agreed upon. The cost sheets revealed the following information:

	Job 115	Job 116	Job 117
Cost of direct materials	\$250.00	\$250.00	\$250.00
Cost of direct labor (5 hours)	25.00	25.00	25.00
Cost of overhead	200.00	400.00	400.00
Total cost	<u>\$475.00</u>	<u>\$675.00</u>	<u>\$675.00</u>
Total price	<u>\$593.75</u>	<u>\$843.75</u>	<u>\$843.75</u>
Number of announcements	500	500	500

Reynolds could not understand why the overhead costs assigned to Jobs 116 and 117 were so much higher than those for Job 115. She asked for an overhead cost summary sheet for the months of May, June, and July, which showed that actual overhead costs were \$20,000 each month. She also discovered that direct labor hours worked on all jobs were 500 hours in May and 250 hours each in June and July.

**Required:**

1. How do you think Mrs. Lucky will feel when she receives the bill for the three sets of wedding announcements?
2. Explain how the overhead costs were assigned to each job.
3. Assume that Reynolds's average activity is 500 hours per month and that the company usually experiences overhead costs of \$240,000 each year. Can you recommend a better way to assign overhead costs to jobs? Recompute the cost of each job and its price given your method of overhead cost assignment. Which method do you think is best? Why?

**OBJECTIVE** > **2** **5**

**Case 16-60 ASSIGNING OVERHEAD TO JOBS—ETHICAL ISSUES**

Tonya Martin, CMA and controller of the Parts Division of Gunderson Inc., was meeting with Doug Adams, manager of the division. The topic of discussion was the assignment of overhead costs to jobs and their impact on the division's pricing decisions. Their conversation was as follows:

**Tonya:** Doug, as you know, about 25 percent of our business is based on government contracts, with the other 75 percent based on jobs from private sources won through bidding. During the last several years, our private business has declined. We have been losing more bids than usual. After some careful investigation, I have concluded that we are overpricing some jobs because of improper assignment of overhead costs. Some jobs are also being underpriced. Unfortunately, the jobs being overpriced are coming from our higher-volume, labor-intensive products; thus, we are losing business.

**Doug:** I think I understand. Jobs associated with our high-volume products are being assigned more overhead than they should be receiving. Then, when we add our standard 40 percent markup, we end up with a higher price than our competitors, who assign costs more accurately.

**Tonya:** Exactly. We have two producing departments, one labor-intensive and the other machine-intensive. The labor-intensive department generates much less overhead than the machine-intensive department. Furthermore, virtually all of our high-volume jobs are labor-intensive. We have been using a plantwide rate based on direct labor hours to assign overhead to all jobs. As a result, the high-volume, labor-intensive jobs receive a greater share of the machine-intensive department's overhead than they deserve. This problem can be greatly alleviated by switching to

departmental overhead rates. For example, an average high-volume job would be assigned \$100,000 of overhead using a plantwide rate and only \$70,000 using departmental rates. The change would lower our bidding price on high-volume jobs by an average of \$42,000 per job. By increasing the accuracy of our product costing, we can make better pricing decisions and win back much of our private-sector business.

**Doug:** Sounds good. When can you implement the change in overhead rates?

**Tonya:** It won't take long. I can have the new system working within four to six weeks—certainly by the start of the new fiscal year.

**Doug:** Hold it. I just thought of a possible complication. As I recall, most of our government contract work is done in the labor-intensive department. This new overhead assignment scheme will push down the cost on the government jobs, and we will lose revenues. They pay us full cost plus our standard markup. This business is not threatened by our current costing procedures, but we can't switch our rates for only the private business. Government auditors would question the lack of consistency in our costing procedures.

**Tonya:** You do have a point. I thought of this issue also. According to my estimates, we will gain more revenues from the private sector than we will lose from our government contracts. Besides, the costs of our government jobs are distorted; in effect, we are overcharging the government.

**Doug:** They don't know that and never will unless we switch our overhead assignment procedures. I think I have the solution. Officially, let's keep our plantwide overhead rate. All of the official records will reflect this overhead costing approach for both our private and government business. Unofficially, I want you to develop a separate set of books that can be used to generate the information we need to prepare competitive bids for our private-sector business.

**Required:**

1. Do you believe that the solution proposed by Doug is ethical? Explain.
2. Suppose that Tonya decides that Doug's solution is not right and objects strongly. Further suppose that, despite Tonya's objections, Doug insists strongly on implementing the action. What should Tonya do?

# 17

## Process Costing

After studying Chapter 17, you should be able to:

- **1** Describe the basic characteristics and cost flows associated with process manufacturing.
- **2** Define *equivalent units* and explain their role in process costing. Explain the differences between the weighted average method and the FIFO method of accounting for process costs.
- **3** Prepare a departmental production report using the weighted average method.
- **4** Explain how nonuniform inputs and multiple processing departments affect process costing.
- **5** (Appendix) Prepare a departmental production report using the FIFO method.





# **E**xperience Managerial Decisions with **BP**

The only consideration that most people give to gasoline is the price charged at the local pump. However, **BP**, one of the largest energy companies in the world, has been thinking about this issue and a lot more for quite a long time. BP was founded in 1901 after William D’Arcy obtained permission from the shah of Persia to dig for oil in what is now the Iranian desert. BP drastically expanded its reach as it built a new refinery in Australia in 1924 and then established new exploration and excavation sites in places such as Canada, South America, Africa, and Europe, in addition to its Middle Eastern sites. As of the early 21st century, BP had active excavation and production occurring in 22 countries. BP runs its processes nonstop—24 hours a day, 365 days a year—to produce to full capacity, which represents 2.6 million barrels of oil each day or approximately 30 barrels every second! Producing that much of anything is a bit mind-boggling, which hints at the importance of BP’s effective process-costing system in determining the costs associated with its numerous products, which include gasoline, heating fuel, greases, and asphalt.

In order to determine costs for a particular process, BP needs to know the total costs of production and the total number of units processed in a specified period of time. The costs include raw crude oil, which varies widely from sweet West Texas crude to heavier Canadian crude, plus labor and management overhead. Other costs include catalysts, which enhance the reactivity to make a molecule actually turn into something else, and chemicals, which become part of the final product. BP goes to a lot of trouble to combine its process-costing system outputs, current market prices, and a linear programming model in order to calculate the most profitable mix of products to produce from a given mix of raw crude materials. Determining the costs associated with running a refinery with a continuous production process is complex. However, by calculating process costs and carefully setting production levels and product mixes, BP is able to manage this complex process at its facilities around the globe, thereby providing continued big profits for use in future energy discovery and distribution efforts.

**OBJECTIVE** > 1

Describe the basic characteristics and cost flows associated with process manufacturing.

## Characteristics of Process Manufacturing

A company's production process helps to determine the best way of accounting for its costs. Let's assume that a large number of similar products pass through an identical set of processes. Since each product within a product line passing through the three processes would receive similar "doses" of materials, labor, and overhead, the company's accountant would see no need to accumulate costs by batches (a job-order costing system). Instead, the accountant should recommend accumulating costs by process.

Process costing works well whenever relatively homogeneous products pass through a series of processes and they receive similar amounts of manufacturing costs. Large manufacturing plants, such as for chemicals, tires, and food, use process costing. For example, Americans purchase about 100 million bags of chocolate chips every year, many of which are made by **Nestle**. Nestle accounts for the costs of its vast chocolate chip production by using a process-costing system.

Let's consider the process-costing environment of **Healthblend Nutritional Supplements**, which manufactures various products including minerals, herbs, and vitamins. Healthblend uses three processes, each centered in a producing department: picking, encapsulating, and bottling. In the picking department, direct labor selects the appropriate herbs, vitamins, minerals, and inert materials (typically some binder such as cornstarch) for the product to be manufactured. Then, the materials are measured and combined in a mixer to blend them thoroughly. When the mix is complete, the resulting mixture is sent to the encapsulating department. In encapsulating, the vitamin, mineral, or herb blend is loaded into a machine that fills one-half of a gelatin capsule. The filled half is matched to another half of the capsule, and a safety seal is applied. This process is entirely mechanized. Overhead in this department consists of depreciation on machinery, maintenance of machinery, supervision, fringe benefits, lights, and power. The final department is the bottling department. Filled capsules are transferred to this department, loaded into a hopper, and automatically counted into bottles. Filled bottles are mechanically capped, and direct labor then manually packs the correct number of bottles into boxes to ship to retail outlets.

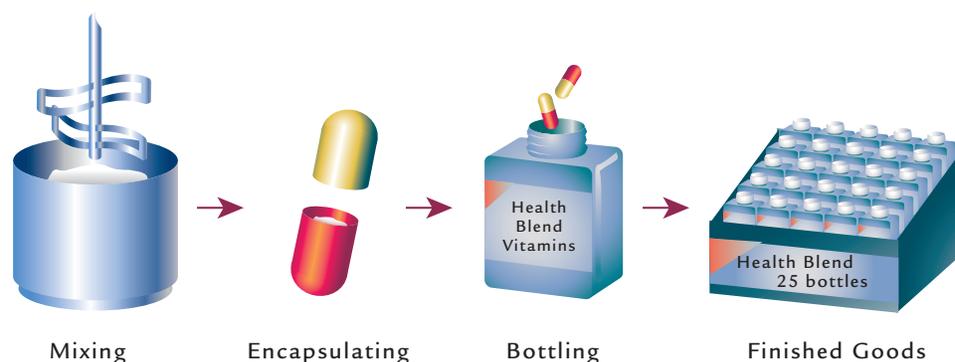
### Types of Processes

Production at Healthblend Nutritional Supplements is an example of sequential processing. **Sequential processing** requires that units pass through one process before they can be worked on in later processes. Exhibit 17-1 shows the sequential pattern of the manufacture of Healthblend's minerals, herbs, and vitamins.

To summarize, in a process firm, units typically pass through a series of manufacturing or producing departments; in each department or process is an operation that

Exhibit 17-1

#### Sequential Processing Illustrated



brings a product one step closer to completion. As well, in each department, materials, labor, and overhead may be needed. Upon completion of a particular process, the partially completed goods are transferred to the next department. After passing through the final department, the goods are completed and transferred to the warehouse.

**Parallel processing** is another processing pattern that requires two or more sequential processes to produce a finished good. Partially completed units (e.g., two subcomponents) can be worked on simultaneously in different processes and then brought together in a final process for completion. Consider, for example, the manufacture of hard disk drives for personal computers. In one series of processes, write heads and cartridge disk drives are produced, assembled, and tested. In a second series of processes, printed circuit boards are produced and tested. These two major subcomponents then come together for assembly in the final process. Exhibit 17-2 portrays this type of process pattern. Notice that processes 1 and 2 can occur independently of (or parallel to) processes 3 and 4.

Other forms of parallel processes also exist. However, regardless of which processing pattern exists within a firm, all units produced share a common property. Since units are homogeneous and subjected to the same operations for a given process, each unit produced in a period should receive the same unit cost. Understanding how unit costs are computed requires an understanding of the manufacturing cost flows that take place in a process-costing firm.

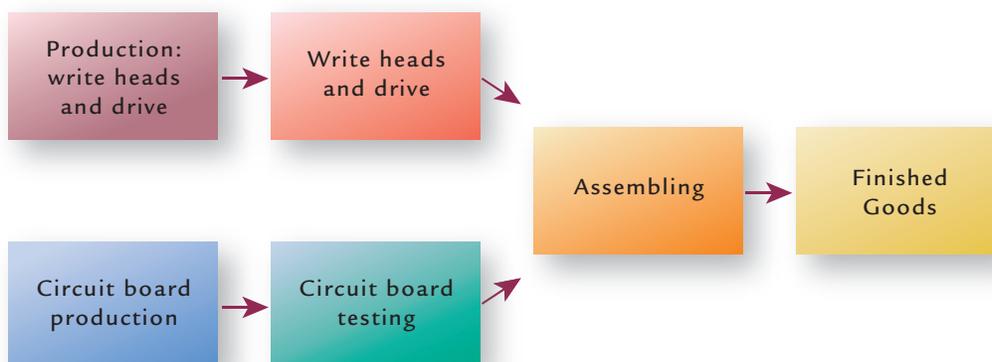
## How Costs Flow through the Accounts in Process Costing

The manufacturing cost flows for a process-costing system are generally the same as those for a job-order system. As raw materials are purchased, the cost of these materials flows into a raw materials inventory account. Similarly, raw materials, direct labor, and applied overhead costs flow into a work-in-process (WIP) account. When goods are completed, the cost of the completed goods is transferred from WIP to the finished goods account. Finally, as goods are sold, the cost of the finished goods is transferred to the cost of goods sold account. The journal entries generally parallel those described in a job-order costing system.

Although job-order and process cost flows are generally similar, some differences exist. In process costing, each producing department has its own WIP account. As goods are completed in one department, they are transferred to the next department. Exhibit 17-3 illustrates this process for Healthblend. Notice that a product (let's say multivitamins) starts out in the picking department, where the proper amounts of vitamin, mineral, and inert materials are mixed. Picking direct labor and applied

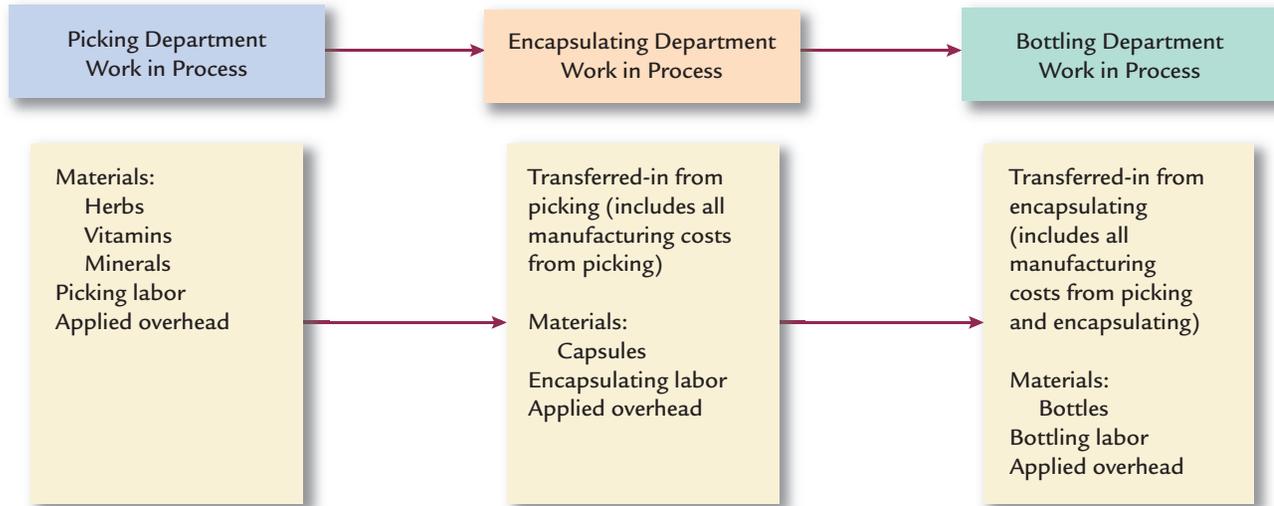
Exhibit 17-2

### Parallel Processing Illustrated



**Exhibit 17-3**

**Flow of Manufacturing Costs through the Accounts of a Process-Costing Firm**



**CONCEPT Q&A**

Will process costing be the same for sequential and parallel processing systems?

Yes. Process-costing procedures are the same for both process settings. Costs are collected by process and are assigned to units produced by the process. Each process undergoes this costing action regardless of whether it is a member of a sequential or a parallel process system. Once goods are costed, they are transferred out to the next process.

Possible Answer:

overhead are recognized and added to the picking WIP account. When the mixture is properly blended, it is transferred to the encapsulating department, where capsules are filled. The filled capsules are transferred out to the bottling department. In bottling, the capsules are bottled, and the bottles are packaged. The important point is that as the product is transferred from one department to another, so are all of the costs attached to the product. By the end of the process, all manufacturing costs end up in the final department (here, bottling) with the final product. Let's attach some costs to the various departments and follow them through the accounts. **Cornerstone 17-1** shows how cost flows are computed when there are no WIP inventories.



**CORNERSTONE 17-1**



**HOW TO Calculate Cost Flows without Work in Process**

**Information:**

Suppose that Healthblend decides to produce 2,000 bottles of multivitamins with the following costs:

	Picking Department	Encapsulating Department	Bottling Department
Direct materials	\$1,700	\$1,000	\$800
Direct labor	50	60	300
Applied overhead	450	500	600

**Required:**

1. Calculate the costs transferred out of each department.
2. Prepare journal entries that reflect these cost transfers.

**Solution:**

1.

	Picking Department	Encapsulating Department	Bottling Department
Direct materials	\$1,700	\$1,000	\$ 800
Direct labor	50	60	300
Applied overhead	450	500	600
Costs added	<u>\$2,200</u>	<u>\$1,560</u>	<u>\$1,700</u>
Costs transferred in	0	2,200	3,760
Costs transferred out	<u>\$2,200</u>	<u>\$3,760</u>	<u>\$5,460</u>

**CORNERSTONE**  
**17-1**  
*(continued)*

2. Journal entries:

Work in Process (Encapsulating)	2,200	
Work in Process (Picking)		2,200
Work in Process (Bottling)	3,760	
Work in Process (Encapsulating)		3,760
Finished Goods	5,460	
Work in Process (Bottling)		5,460

Cornerstone 17-1 shows that when the multivitamin mixture is transferred from the picking department to the encapsulating department, it takes \$2,200 of cost along with it. **Transferred-in costs** are costs transferred from a prior process to a subsequent process. From the viewpoint of the subsequent process, transferred-in costs are a type of raw material cost. The same relationship exists between the encapsulating and bottling departments. The completed bottles of multivitamins are transferred to the finished goods warehouse at a total cost of \$5,460.

## Accumulating Costs in the Production Report

In process costing, costs are accumulated by department for a period of time. The **production report** is the document that summarizes the manufacturing activity that takes place in a process department for a given period of time. A production report contains information on costs transferred in from prior departments as well as costs added in the department such as direct materials, direct labor, and overhead; it is subsidiary to the WIP account, just as the job-order cost sheet is subsidiary to the WIP account in a job-order costing system.

A production report provides information about the physical units processed in a department and also about the manufacturing costs associated with them. Thus, a production report is divided into a unit information section and a cost information section. The unit information section has two major subdivisions: (1) units to account for and (2) units accounted for. Similarly, the cost information section has two major subdivisions: (1) costs to account for and (2) costs accounted for. A production report traces the flow of units through a department, identifies the costs charged to the department, shows the computation of unit costs, and reveals the disposition of the department's costs for the reporting period.

## ANALYTICAL Q&A

Encapsulating transferred \$5,000 of partially completed goods to Bottling. Bottling added \$3,000 of manufacturing cost and then transferred the completed goods to the finished goods warehouse. What two journal entries would be made for these transactions?

8,000		Work in Process (Bottling)
	8,000	Finished Goods
5,000		Work in Process (Encapsulating)
	5,000	Work in Process (Bottling)

**Answer:**

## Service and Manufacturing Firms

Any product or service that is basically homogeneous and repetitively produced can take advantage of a process-costing approach. Let's look at three possibilities: services, manufacturing firms with a just-in-time (JIT) orientation, and traditional manufacturing firms.

Check processing in a bank, teeth cleaning by a hygienist, air travel between Dallas and Los Angeles, sorting mail by zip code, and laundering and pressing shirts are examples of homogeneous services that are repetitively produced. Although services cannot be stored, it is possible for firms engaged in service production to have WIP inventories. For example, a batch of tax returns can be partially completed at the end of a period. However, many services are provided so quickly that there are no WIP inventories. Teeth cleaning, funerals, surgical operations, sonograms, and carpet cleaning are a few examples where WIP inventories would be virtually nonexistent. Therefore, process costing for services is relatively simple. The total costs for the period are divided by the number of services provided to compute unit cost.

Manufacturing firms may also operate without significant WIP inventories. Specifically, firms that have adopted a JIT approach to manufacturing view the carrying of unnecessary inventories as wasteful. These firms try to reduce WIP inventories to very low levels. Furthermore, JIT firms usually structure their manufacturing so that process costing can be used to determine product costs.

In many JIT firms, work cells are created that produce a product or subassembly from start to finish. Costs are collected by cell for a period of time, and output for the cell is measured for the same period. Unit costs are computed by dividing the costs of the period by output of the period. There is no ambiguity concerning what costs belong to the period and how output is measured. One of the objectives of JIT manufacturing is simplification. Keep this in mind as you study the process-costing requirements of manufacturing firms that carry WIP inventories. The difference between the two settings is impressive and illustrates one of the significant benefits of JIT.

Finally, traditional manufacturing firms may have significant beginning and ending WIP inventories. It is the presence of these inventories that leads to much of the complication surrounding process costing. These complications are due to several factors such as the presence of beginning and ending WIP inventories and different approaches to the treatment of beginning inventory cost. These complicating factors are discussed in the following sections.

### OBJECTIVE 2

Define *equivalent units* and explain their role in process costing. Explain the differences between the weighted average method and the FIFO method of accounting for process costs.

## The Impact of Work-in-Process Inventories on Process Costing

The computation of unit cost for the work performed during a period is a key part of the production report. This unit cost is needed both to compute the cost of goods transferred out of a department and to value ending work-in-process (EWIP) inventory. Conceptually, calculating the unit cost is easy—just divide total cost by the number of units produced. However, the presence of WIP inventories causes two problems. First, defining the units produced can be difficult, given that some units produced during a period are complete, while those in ending inventory are not. This is handled through the concept of equivalent units of production. Second, how should the costs and work of beginning work-in-process (BWIP) be treated? Should they be counted with the current period work and costs or treated separately? Two methods have been developed to solve this problem: the weighted average method and the FIFO method.

### Equivalent Units of Production

By definition, EWIP is not complete. Thus, a unit completed and transferred out during the period is not identical (or equivalent) to one in EWIP inventory, and the cost attached to the two units should not be the same. In computing the unit cost, the output of the period must be defined. A major problem of process costing is making this definition.

To illustrate the output problem of process costing, assume that Department A had the following data for October:

Units in BWIP	—
Units completed	1,000
Units in EWIP (25 percent complete)	600
Total manufacturing costs	\$11,500

What is the output in October for this department? 1,000? 1,600? If the answer is 1,000 units, the effort expended on the units in EWIP is ignored. Furthermore, the manufacturing costs incurred in October belong to both the units completed and to the partially completed units in EWIP. On the other hand, if the answer is 1,600 units, the fact that the 600 units in EWIP are only partially completed is ignored. Somehow, output must be measured so that it reflects the effort expended on both completed and partially completed units.

The solution is to calculate equivalent units of output.

**Equivalent units of output** are the complete units that could have been produced given the total amount of manufacturing effort expended for the period under consideration. Determining equivalent units of output for transferred-out units is easy; a unit would not be transferred out unless it were complete. Thus, every transferred-out unit is an equivalent unit. Units remaining in EWIP inventory, however, are not complete. Thus, someone in production must “eyeball” EWIP to estimate its degree of completion. Estimating the degree of completion is an act that requires judgment and, at the same time, ethical behavior. For example, overestimating the degree of completion will increase the equivalent units of output and decrease per-unit costs. This outcome, in turn, would cause an increase in both income (cost of goods sold will be less) and in assets (WIP cost will increase). Deliberately overestimating the degree of completion would clearly be in violation of ethical professional practice. **Cornerstone 17-2** illustrates how to calculate equivalent units of production, with the assumption that the degree of completion has been fairly assessed and stated.

## ANALYTICAL Q&A

In March, a company completed 8,000 tons of aluminum ingots and had 2,500 tons of ingots in EWIP, 60 percent complete. Calculate the equivalent units for March.

$$\text{Equivalent units} = 8,000 + (0.6 \times 2,500) = 9,500.$$

Answer:

### HOW TO Calculate Equivalent Units of Production: No Beginning Work in Process

#### Concept:

	=	
100 units completed	=	100 equivalent units

	=	
200 units, 50 percent complete	=	100 equivalent units

#### Information:

October data: 1,000 units completed; 600 units, 25 percent complete

#### Required:

Calculate the equivalent units for October.

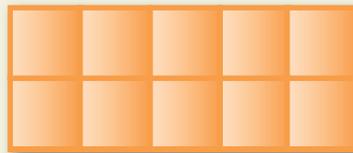


### CORNERSTONE 17-2



**CORNERSTONE**  
**17-2**  
(continued)

**Solution:**



1,000 units completed = 1,000 equivalent units



600 units  $\times$  0.25 = 150 equivalent units  
October output = 1,150 equivalent units

Knowing the output for a period and the manufacturing costs for the department for that period, a unit cost can be calculated. The unit cost can then be used to determine the cost of units transferred out and the cost of the units in EWIP. **Cornerstone 17-3** shows how the calculations are done when there is no BWIP. The unit cost of \$10 is used to assign a cost of \$10,000 ( $\$10 \times 1,000$ ) to the 1,000 units transferred out and a cost of \$1,500 ( $\$10 \times 150$ ) to the 600 units in EWIP. Notice that the cost of the EWIP is obtained by multiplying the unit cost by the equivalent units, not the actual number of partially completed units.



**CORNERSTONE**  
**17-3**



**HOW TO Measure Output and Assign Costs: No Beginning Work in Process**

**Information:**

Manufacturing costs of the period, \$11,500; units transferred out, 1,000; units in EWIP, 600 (25 percent complete).

**Required:**

1. Calculate the equivalent units of production.
2. Calculate the unit cost, the cost of goods transferred out, and the cost of EWIP.

**Solution:**

1. Equivalent units:

Units completed	1,000
Units in EWIP $\times$ 25 percent (600 $\times$ 0.25)	<u>150</u>
Equivalent units	<u>1,150</u>

2. Cost assignment:

$$\text{Cost per equivalent unit} = \frac{\$11,500}{1,150} = \$10$$

$$\text{Cost of goods transferred out} = \$10 \text{ per unit} \times 1,000 \text{ equivalent units} = \$10,000$$

$$\text{Cost of EWIP} = \$10 \text{ per unit} \times 150 \text{ equivalent units} = \$1,500$$

## Two Methods of Treating Beginning Work-in-Process Inventory

The calculations illustrated by Cornerstones 17-2 and 17-3 become more complicated when there are BWIP inventories. The work done on these partially completed units represents prior-period work, and the costs assigned to them are prior-period costs. In computing a current-period unit cost for a department, two approaches have evolved for dealing with the prior-period output and prior-period costs found in BWIP: the weighted average method and the FIFO method.

The **weighted average costing method** combines beginning inventory costs and work done with current-period costs and work to calculate this period's unit cost. In essence, the costs and work carried over from the prior period are counted as if they belong to the current period. Thus, beginning inventory work and costs are pooled with current work and costs, and an average unit cost is computed and applied to both units transferred out and units remaining in ending inventory.

The **FIFO costing method**, on the other hand, separates work and costs of the equivalent units in beginning inventory from work and costs of the equivalent units produced during the current period. Only current work and costs are used to calculate this period's unit cost. It is assumed that units from beginning inventory are completed first and transferred out. The costs of these units include the costs of the work done in the prior period as well as the current-period costs necessary to complete the units. Units started in the current period are divided into two categories: units started and completed and units started but not finished (EWIP). Units in both of these categories are valued using the current period's cost per equivalent unit.

If product costs do not change from period to period, or if there is no BWIP inventory, the FIFO and weighted average methods yield the same results. The weighted average method is discussed in more detail in the next section. Further discussion of the FIFO method is found in the chapter appendix.

## Weighted Average Costing

The weighted average costing method treats beginning inventory costs and the accompanying equivalent output as if they belong to the current period. This is done for costs by adding the manufacturing costs in BWIP to the manufacturing costs incurred during the current period. The total cost is treated as if it were the current period's total manufacturing cost. Similarly, beginning inventory output and current period output are merged in the calculation of equivalent units. Under the weighted average method, equivalent units of output are computed by adding units completed to equivalent units in EWIP. Notice that the equivalent units in BWIP are included in the computation. Consequently, these units are counted as part of the current period's equivalent units of output.

### Overview of the Weighted Average Method

The essential conceptual and computational features of the weighted average method are illustrated by **Cornerstone 17-4**. The example uses production data for Healthblend's picking department for July. The objective is to calculate a unit cost for July and to use this unit cost to value goods transferred out and EWIP. Unit cost is simply costs of the period divided by output of the period. Thus, output needs to be calculated and costs defined for July to value goods transferred out and EWIP.

## ANALYTICAL Q&A

During March, a molding process transferred out 9,000 equivalent units to the grinding department and had 1,250 equivalent units in EWIP. The cost per equivalent unit for March was \$8.00. Calculate the cost of goods transferred out and the cost of the EWIP.

Cost of goods transferred out:  $\$8.00 \times 9,000 = \$72,000$ ; EWIP:  $\$8.00 \times 1,250 = \$10,000$ .

Answer:

### OBJECTIVE 3

Prepare a departmental production report using the weighted average method.

## CONCEPT Q&A

What is the key difference between FIFO and the weighted average costing methods?

FIFO treats work and costs in BWIP separately from the work and costs of the current period. Weighted average rolls back and picks up the work and costs of BWIP and counts them as if they belong to the current period's work and costs.

Possible Answer:

Cornerstone 17-4 illustrates that costs from BWIP are pooled with costs added to production during July. These total pooled costs (\$13,650) are averaged and assigned to units transferred out and to units in EWIP. On the output side, it is necessary to concentrate on the degree of completion of all units at the end of the period. There is no need to be concerned with the percentage of completion of BWIP inventory. The only issue is whether these units are complete or not by the end of July. Thus, equivalent units are computed by pooling manufacturing efforts from June and July.



**CORNERSTONE  
17-4**



**HOW TO Measure Output and Assign Costs:  
Weighted Average Method**

**Information:**

Production:	
Units in process, July 1, 75 percent complete	20,000 gallons
Units completed and transferred out	50,000 gallons
Units in process, July 31, 25 percent complete	10,000 gallons
Costs:	
Work in process, July 1	\$ 3,525
Costs added during July	10,125

**Required:**

1. Calculate an output measure for July.
2. Assign costs to units transferred out and EWIP using the weighted average method.

**Solution:**

1. Equivalent units:

Key:  = 10,000 units completed  = 10,000 units, 25% complete

Output for July:  
60,000 total units → Become 52,500 equivalent units

Units completed:  
BWIP:

 = 20,000

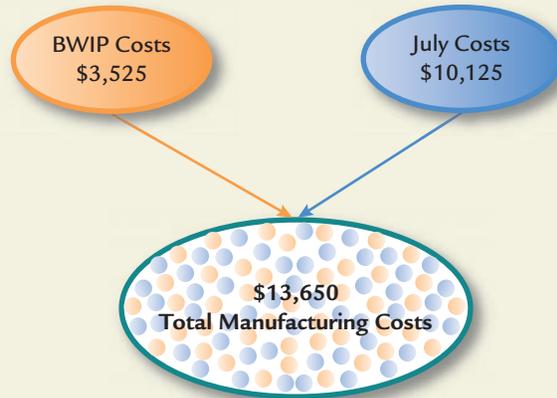
Units started and completed:

 = 30,000 50,000

+ EWIP, 25% complete:

 = 2,500  
52,500

## 2. Cost assignment:

**CORNERSTONE**  
**17-4**  
*(continued)*


$$\text{Cost/unit} = \$13,650 / 52,500 = \$0.26$$

Transferred out ( $\$0.26 \times 50,000$ )	\$13,000
EWIP ( $\$0.26 \times 2,500$ )	650
Total cost assigned	<u>\$13,650</u>

## Five Steps in Preparing a Production Report

The elements of Cornerstone 17-4 are used to prepare a production report. Recall that the production report summarizes cost and manufacturing activity for a producing department for a given period of time. The production report is subsidiary to the WIP account for a department. The following five steps describe the general pattern of a process-costing production report:

1. Physical flow analysis.
2. Calculation of equivalent units.
3. Computation of unit cost.
4. Valuation of inventories (goods transferred out and EWIP).
5. Cost reconciliation.

These five steps provide structure to the method of accounting for process costs.

**Step 1: Physical Flow Analysis** The purpose of step 1 is to trace the physical units of production. Physical units are not equivalent units; they are units that may be in any stage of completion. The **physical flow schedule**, like the one shown by **Cornerstone 17-5** for Healthblend's picking department, provides an analysis of the physical flow of units. To construct the schedule from the information given in the example, two calculations are needed.

- Units started and completed in this period are obtained by subtracting the units in BWIP from the total units completed.
- The units started are obtained by adding the units started and completed to the units in EWIP.

## ANALYTICAL Q&A

The weighted average cost per equivalent unit for April is \$10. There were 3,800 units completed and transferred out during April and 750 units in EWIP, 40 percent complete. Calculate the cost of goods transferred out and the cost assigned to EWIP.

$$\text{Cost of goods transferred out: } \$10 \times 3,800 = \$38,000; \text{ EWIP} = \$10 \times 0.4 \times 750 = \$3,000.$$

Answer:



## CORNERSTONE 17-5



### HOW TO Prepare a Physical Flow Schedule

#### Information:

Production:		
Units in process, July 1, 75 percent complete		20,000 gallons
Units completed and transferred out		50,000 gallons
Units in process, July 31, 25 percent complete		10,000 gallons

#### Required:

Prepare a physical flow schedule.

#### Solution:

$$\begin{aligned} \text{Units Started and Completed} &= \text{Units Completed} - \text{Units, BWIP} \\ &= 50,000 - 20,000 \\ &= 30,000 \end{aligned}$$

$$\begin{aligned} \text{Units Started} &= \text{Units Started and Completed} + \text{Units, EWIP} \\ &= 30,000 + 10,000 \\ &= 40,000 \end{aligned}$$

#### Physical flow schedule:

Units to account for:		
Units in BWIP (75 percent complete)	20,000	
Units started during the period	<u>40,000</u>	
Total units to account for	<u>60,000</u>	
Units accounted for:		
Units completed and transferred out:		
Started and completed	30,000	
From beginning work in process	<u>20,000</u>	50,000
Units in EWIP (25 percent complete)		<u>10,000</u>
Total units accounted for		<u>60,000</u>

Notice that the “Total units to account for” must equal the “Total units accounted for.” The physical flow schedule is important because it contains the information needed to calculate equivalent units (step 2).

**Step 2: Calculation of Equivalent Units** Given the information in the physical flow schedule, the weighted average equivalent units for July can be calculated as follows:

Units completed	50,000
Add: Units in ending work in process × Fraction complete (10,000 units × 25 percent)	<u>2,500</u>
Equivalent units of output	<u>52,500</u>

Notice that July’s output is measured as 52,500 units, 50,000 units completed and transferred out and 2,500 equivalent units from ending inventory (10,000 × 25 percent). What about beginning inventory? There were 20,000 units in beginning inventory, 75 percent complete. These units are included in the 50,000 units completed and transferred out during the month. Thus, the weighted average method treats beginning inventory units as if they were started and

## ANALYTICAL Q&A

The following data are provided for the month of April:

Units in process, April 1, 40 percent complete	6,000 cases
Units completed and transferred out	20,000 cases

How many units were started and completed during April?

$$\text{Answer: } \text{Units started and completed} = 20,000 - 6,000 = 14,000$$

completed during the current period. Because of this, the equivalent unit schedule shown in step 2 shows only the total units completed. There is no need to show whether the units completed are from July or from BWIP as was done by Cornerstone 17-4.

**Step 3: Computation of Unit Cost** In addition to July output, July manufacturing costs are needed to compute a unit cost. The weighted average method rolls back and includes the manufacturing costs associated with the units in BWIP and counts these costs as if they belong to July. Thus, as Cornerstone 17-4 illustrated, these costs are pooled to define total manufacturing costs for July as \$13,650 (\$3,525 + \$10,125). The manufacturing costs carried over from the prior period (\$3,525) are treated as if they were current period costs. The unit cost for July is July's pooled costs divided by the equivalent output for July:

$$\begin{aligned}\text{Unit cost} &= \frac{\$13,650}{52,500} \\ &= \$0.26 \text{ per equivalent unit}\end{aligned}$$

**Step 4: Valuation of Inventories** Cornerstone 17-4 also showed how to value goods transferred out and EWIP. Using the unit cost of \$0.26, we value the two inventories as follows:

- Cost of goods transferred to the encapsulating department is \$13,000 (50,000 units  $\times$  \$0.26 per unit)
- Cost of EWIP is \$650 (2,500 equivalent units  $\times$  \$0.26 per unit).

Notice that units completed (from step 1), equivalent units in EWIP (from step 2), and the unit cost (from step 3) were all needed to value both goods transferred out and EWIP.

**Step 5: Cost Reconciliation** The total manufacturing costs assigned to inventories are as follows:

Goods transferred out	\$13,000
Goods in EWIP	<u>650</u>
Total costs accounted for	<u><u>\$13,650</u></u>

The manufacturing costs to account for are also \$13,650.

BWIP	\$ 3,525
Incurred during the period	<u>10,125</u>
Total costs to account for	<u><u>\$13,650</u></u>

Thus, **cost reconciliation** checks to see if the costs to account for are exactly assigned to inventories. Remember, the total costs assigned to goods transferred out and to EWIP must agree with the total costs in BWIP and the manufacturing costs incurred during the current period.

## Production Report

Steps 1 through 5 provide all of the information needed to prepare a production report for the picking department for July. The method for preparing this report is shown in [Cornerstone 17-6](#).

## ANALYTICAL Q&A

During June, 5,000 units were completed and transferred out, and there were 1,500 units in EWIP, 80 percent complete. How many equivalent units were completed in June, using the weighted average method?

$$\text{Equivalent units} = 5,000 + (0.8 \times 1,500) = 6,200$$

Answer:

## ANALYTICAL Q&A

June had the following costs to account for:

BWIP: \$4,000

Incurred in June: \$27,000

There were 6,200 equivalent units produced in June. What is the unit cost for June using the weighted average method?

$$\text{Unit cost} = \$31,000 / 6,200 = \$5.00$$

Answer:



## CORNERSTONE 17-6



### HOW TO Prepare a Production Report: Weighted Average Method

#### Information:

Steps 1 to 5 of the Healthblend Company example.

#### Required:

Prepare a production report.

#### Solution:

**Healthblend Company**  
**Picking Department**  
**Production Report For July 2009**  
**(Weighted Average Method)**

#### UNIT INFORMATION

##### **Physical Flow**

Units to account for:		Units accounted for:	
Units in beginning work in process	20,000	Units completed	50,000
Units started	<u>40,000</u>	Units in ending work in process	<u>10,000</u>
Total units to account for	<u>60,000</u>	Total units accounted for	<u>60,000</u>

##### **Equivalent Units**

Units completed	50,000
Units in ending work in process	<u>2,500</u>
Total equivalent units	<u>52,500</u>

#### COST INFORMATION

Costs to account for:	
Beginning work in process	\$ 3,525
Incurred during the period	<u>10,125</u>
Total costs to account for	<u>\$13,650</u>
Cost per equivalent unit	\$ 0.26

	Transferred Out	Ending Work in Process	Total
Costs accounted for:			
Goods transferred out (\$0.26 × 50,000)	\$13,000	—	\$13,000
Goods in ending work in process (\$0.26 × 2,500)	—	\$650	<u>650</u>
Total costs accounted for	<u>\$13,000</u>	<u>\$650</u>	<u>\$13,650</u>

### Evaluation of the Weighted Average Method

The major benefit of the weighted average method is simplicity. By treating units in BWIP as belonging to the current period, all equivalent units belong to the same category when it comes to calculating unit costs. Thus, unit cost computations are simplified. The main disadvantage of this method is reduced accuracy in computing unit costs for current period output and for units in BWIP. If the unit cost in a

process is relatively stable from one period to the next, the weighted average method is reasonably accurate. However, if the price of manufacturing inputs increases significantly from one period to the next, the unit cost of current output is understated, and the unit cost of BWIP units is overstated. If greater accuracy in computing unit costs is desired, a company should use the FIFO method to determine unit costs.

## Multiple Inputs and Multiple Departments

Accounting for production under process costing is complicated by nonuniform application of manufacturing inputs and the presence of multiple processing departments. How process-costing methods address these complications will now be discussed.

### OBJECTIVE > 4

Explain how nonuniform inputs and multiple processing departments affect process costing.

## Nonuniform Application of Manufacturing Inputs

Up to this point, we have assumed that WIP being 60 percent complete meant that 60 percent of materials, labor, and overhead needed to complete the process have been used and that another 40 percent are needed to finish the units. In other words, we have assumed that manufacturing inputs are applied uniformly as the manufacturing process unfolds.

### Here's The

Stillwater Designs builds a limited number of items on site. The manufacturing activities include designing and building prototypes and rebuilding of warranty returns (only of certain models such as the square L7s). Rebuilding of warranty returns follows a process manufacturing structure. All units are alike and go through the same steps. First, the woofers are removed from the cabinet, and the cabinet is stripped and cleaned. The speaker is torn down to its structures with all chemicals and glues removed. The speaker is passed through a demagnetizing process so that all metal pieces and shavings can be removed. The speaker is rebuilt using a recone kit to replace damaged and defective parts. Once the cabinets and speakers are ready, they are assembled, tested, and boxed. Assembly involves placing the speakers in the enclosures (cabinets) and connecting the wire harnesses. There are two tests: the in-phase test and the air-leak test. The in-phase test is to make sure that the power is hooked up correctly. Overall checking for air leaks is the final test. The product must



### Real Kicker

be properly sealed because an air leak can damage the woofer.

Notice that the rebuilding and assembly processes are sequential. When finished, the rebuilt speakers and cabinets are transferred from the rebuilding process to the assembly process. Also, note that the cost of the final product is the cost of the materials transferred in from the rebuilding process, plus the cost of the other components and materials added, plus the assembly conversion cost. For example, at the end of the assembly process, the assembled product is packaged for delivery. In this simple process application, it is easy to see that some materials are added at the beginning of the assembly process (the cabinet and components) and some at the end of the process (packaging). The Kicker example also makes it possible to catch a glimpse of how process costing handles multiple departments.



Assuming uniform application of conversion costs (direct labor and overhead) is not unreasonable. Direct labor input is usually needed throughout the process, and overhead is normally assigned on the basis of direct labor hours. Direct materials, on the other hand, are not as likely to be applied uniformly. In many instances, materials are added at either the beginning or the end of the process.

For example, look at the differences in Healthblend's three departments. In the picking and encapsulating departments, all materials are added at the beginning of the process. However, in the bottling department, materials are added both at the beginning (filled capsules and bottles) and at the end (bottle caps and boxes).

WIP in the picking department that is 50 percent complete with respect to conversion inputs would be 100 percent complete with respect to the material inputs. But WIP in bottling that is 50 percent complete with respect to conversion would be 100 percent complete with respect to bottles and transferred-in capsules, but 0 percent complete with respect to bottle caps and boxes.

Different percentage completion figures for manufacturing inputs pose a problem for the calculation of equivalent units, unit cost, and valuation of EWIP (steps 2–4). Fortunately, the solution is relatively simple. Equivalent unit calculations are done for each category of manufacturing input. Thus, equivalent units are calculated for each category of materials and for conversion cost. Next, a unit cost for each category is computed. The individual category costs are then used in step 4 to cost out EWIP. The total unit cost is used to calculate the cost of goods transferred out in the same way as when there was only one input category. **Cornerstone 17-7** shows how to calculate steps 2 through 4 with nonuniform inputs, using the weighted average method.



**CORNERSTONE  
17-7**



**HOW TO Calculate Equivalent Units, Unit Costs, and Value Inventories with Nonuniform Inputs**

**Information:**

The picking department of Healthblend has the following data for September:

Production:	
Units in process, September 1, 50 percent complete*	10,000
Units completed and transferred out	60,000
Units in process, September 30, 40 percent complete*	20,000
Costs:	
WIP, September 1:	
Materials	\$ 1,600
Conversion costs	200
Total	<u>\$ 1,800</u>
Current costs:	
Materials	\$12,000
Conversion costs	3,200
Total	<u>\$15,200</u>

\* With respect to conversion costs, all materials are added at the beginning of the process.

**Required:**

Calculate steps 2 through 4 using the weighted average method.

**Solution:**

**Step 2:** Calculation of equivalent units, nonuniform application:

	Materials	Conversion
Units completed	60,000	60,000
Add: Units in ending work in process ×		
Fraction complete:		
20,000 × 100 percent	20,000	—
20,000 × 40 percent	—	8,000
Equivalent units of output	<u>80,000</u>	<u>68,000</u>

**Step 3:** Calculation of unit costs:

$$\begin{aligned} \text{Unit Materials Cost} &= (\$1,600 + \$12,000)/80,000 \\ &= \$0.17 \end{aligned}$$

$$\begin{aligned} \text{Unit Conversion Cost} &= (\$200 + \$3,200)/68,000 \\ &= \$0.05 \end{aligned}$$

$$\begin{aligned} \text{Total Unit Cost} &= \text{Unit Materials Cost} + \text{Unit Conversion Cost} \\ &= \$0.17 + \$0.05 \\ &= \$0.22 \text{ per Completed Unit} \end{aligned}$$

**Step 4:** Valuation of EWIP and goods transferred out:

The cost of EWIP is as follows:

Materials: $\$0.17 \times 20,000$	\$3,400
Conversion: $\$0.05 \times 8,000$	400
Total cost	<u>\$3,800</u>

Valuation of goods transferred out:

$$\text{Cost of goods transferred out} = \$0.22 \times 60,000 = \$13,200$$

**CORNERSTONE**  
**17-7**  
*(continued)*

For illustrative purposes, a production report, based on Cornerstone 17-7, is shown in Exhibit 17-4. As the example shows, applying manufacturing inputs at different stages of a process poses no serious problems. However, the effort required has increased.

## Exhibit 17-4

**Production Report: Weighted Average Method**

**Healthblend Company**  
**Picking Department**  
**Production Report for September 2009**  
**(Weighted Average Method)**

**UNIT INFORMATION**

Units to account for:	Units accounted for:
Units in beginning work in process	Units completed
10,000	60,000
Units started during the period	Units in ending work in process
<u>70,000</u>	<u>20,000</u>
Total units to account for	Total units accounted for
<u>80,000</u>	<u>80,000</u>

**Equivalent Units**

	Materials	Conversion Cost
Units completed	60,000	60,000
Units in ending work in process	<u>20,000</u>	<u>8,000</u>
Total equivalent units	<u>80,000</u>	<u>68,000</u>

**COST INFORMATION**

	Materials	Conversion Cost	Total
Costs to account for:			
Beginning work in process	\$ 1,600	\$ 200	\$ 1,800
Incurred during the period	<u>12,000</u>	<u>3,200</u>	<u>15,200</u>
Total costs to account for	<u>\$13,600</u>	<u>\$3,400</u>	<u>\$17,000</u>
Cost per equivalent unit	\$ 0.17	\$ 0.05	\$ 0.22

	Transferred Out	Ending Work in Process	Total
Costs accounted for:			
Goods transferred out ( $\$0.22 \times 60,000$ )	\$13,200	—	\$13,200
Goods in ending work in process:			
Materials ( $\$0.17 \times 20,000$ )	—	\$3,400	3,400
Conversion ( $\$0.05 \times 8,000$ )	—	<u>400</u>	<u>400</u>
Total costs accounted for	<u>\$13,200</u>	<u>\$3,800</u>	<u>\$17,000</u>

**ANALYTICAL Q&A**

A mixing process produced 200 equivalent units of material and 500 equivalent units of conversion activity during the month. If the materials cost was \$400 and the conversion cost was \$1,000, what is the cost per equivalent unit for the month?

**Answer:**

$$\text{Unit cost} = \text{Unit materials cost} + \text{Unit conversion cost} = (\$400/200) + (\$1,000/500) = \$2 + \$2 = \$4$$

**Multiple Departments**

In process manufacturing, some departments receive partially completed goods from prior departments. The usual approach is to treat transferred-in goods as a separate material category when calculating equivalent units. Thus, the department receiving transferred-in goods would have *three* input categories: one for the transferred-in materials, one for materials added, and one for conversion costs.

In dealing with transferred-in goods, two important points should be remembered. First, the cost of this material is the cost of the goods transferred out as computed in the prior department. Second, the units started in the subsequent department correspond to the units transferred out from the

prior department (assuming that there is a one-to-one relationship between the output measures of both departments). **Cornerstone 17-8** shows how to calculate the first three process-costing steps when there are transferred-in goods, where steps 2 and 3 are restricted to the transferred-in category.

The only additional complication introduced in the analysis for a subsequent department is the presence of the transferred-in category. As has just been shown,



**CORNERSTONE  
17-8**



**HOW TO Calculate the Physical Flow Schedule, Equivalent Units, and Unit Costs with Transferred-In Goods**

**Information:**

For September, Healthblend’s encapsulating department had 15,000 units in beginning inventory (with transferred-in costs of \$3,000) and completed 70,000 units during the month. Further, the picking department completed and transferred out 60,000 units at a cost of \$13,200 in September.

**Required:**

1. Prepare a physical flow schedule with transferred-in goods.
2. Calculate equivalent units for the transferred-in category.
3. Calculate unit cost for the transferred-in category.

**Solution:**

1. In constructing a physical flow schedule for the encapsulating department, its dependence on the picking department must be considered:

Units to account for:	
Units in BWIP	15,000
Units transferred in during September	<u>60,000</u>
Total units to account for	<u><u>75,000</u></u>
Units accounted for:	
Units completed and transferred out:	
Started and completed	55,000
From BWIP	15,000
Units in EWIP	<u>5,000</u>
Total units accounted for	<u><u>75,000</u></u>

2. Equivalent units for the transferred-in category only:

Transferred in:	
Units completed	70,000
Add: Units in EWIP × Fraction complete (5,000 × 100 percent)*	<u>5,000</u>
Equivalent units of output	<u>75,000</u>

\* Remember that the EWIP is 100 percent complete with respect to transferred-in costs, not to all costs of the encapsulating department.

3. To find the unit cost for the transferred-in category, we add the cost of the units transferred in from picking in September to the transferred-in costs in BWIP and divide by transferred-in equivalent units:

$$\begin{aligned}\text{Unit cost (transferred-in category)} &= (\$13,200 + \$3,000)/75,000 \\ &= \$16,200/75,000 \\ &= \$0.216\end{aligned}$$

**CORNERSTONE**  
**17-8**  
*(continued)*

dealing with this category is similar to handling any other category. However, it must be remembered that the current cost of this special type of raw material is the cost of the units transferred in from the prior process and that the units transferred in are the units started.

### CONCEPT Q&A

How are transferred-in goods viewed and treated by the department receiving them?

*Transferred-in goods are viewed as materials added at the beginning of the process. They are treated as a separate input category, and equivalent units and a unit cost are calculated for transferred-in materials.*

Possible Answer:

## Summary of Learning Objectives

- LO1. Describe the basic characteristics and cost flows associated with process manufacturing.**
- Cost flows under process costing are similar to those under job-order costing.
  - Raw materials are purchased and debited to the raw materials account.
  - Direct materials used in production, direct labor, and applied overhead are charged to the WIP account.
  - In a production process with several processes, there is a WIP account for each department or process. Goods completed in one department are transferred out to the next department.
  - When units are completed in the final department or process, their cost is credited to Work in Process and is debited to Finished Goods.
- LO2. Define *equivalent units* and explain their role in process costing. Explain the differences between the weighted average method and the FIFO method of accounting for process costs.**
- Equivalent units of production are the complete units that could have been produced given the total amount of manufacturing effort expended during the period.

- The number of physical units is multiplied by the percentage of completion to calculate equivalent units.
- The weighted average costing method combines beginning inventory costs to compute unit costs.
- The FIFO costing method separates units in beginning inventory from those produced during the current period.

**LO3. Prepare a departmental production report using the weighted average method.**

- The production report summarizes the manufacturing activity occurring in a department for a given period.
- It discloses information concerning the physical flow of units, equivalent units, unit costs, and the disposition of the manufacturing costs associated with the period.

**LO4. Explain how nonuniform inputs and multiple processing departments affect process costing.**

- Nonuniform inputs and multiple departments are easily handled by process-costing methods.
- When inputs are added nonuniformly, equivalent units and unit cost are calculated for each separate input category.
- The adjustment for multiple departments is also relatively simple.
- The goods transferred from a prior department to a subsequent department are treated as a material added at the beginning of the process. Thus, there is a separate transferred-in materials category, where the equivalent units and unit cost are calculated.



**CORNERSTONES  
FOR CHAPTER 17**

**CORNERSTONE 17-1** How to calculate cost flows without work in process, page 912

**CORNERSTONE 17-2** How to calculate equivalent units of production: no beginning work in process, page 915

**CORNERSTONE 17-3** How to measure output and assign costs: no beginning work in process, page 916

**CORNERSTONE 17-4** How to measure output and assign costs: weighted average method, page 918

**CORNERSTONE 17-5** How to prepare a physical flow schedule, page 920

**CORNERSTONE 17-6** How to prepare a production report: weighted average method, page 922

**CORNERSTONE 17-7** How to calculate equivalent units, unit costs, and value inventories with nonuniform inputs, page 924

**CORNERSTONE 17-8** How to calculate the physical flow schedule, equivalent units, and unit costs with transferred-in goods, page 926

## Key Terms

Cost reconciliation, 921  
 Equivalent units of output, 915  
 FIFO costing method, 917  
 Parallel processing, 911  
 Physical flow schedule, 919

Production report, 913  
 Sequential processing, 910  
 Transferred-in costs, 913  
 Weighted average costing method, 917

## Appendix: Production Report—First-In, First-Out Costing

### OBJECTIVE 5

Prepare a departmental production report using the FIFO method.

Under the FIFO costing method, the equivalent units and manufacturing costs in BWIP are excluded from the current period unit cost calculation. This method recognizes that the work and costs carried over from the prior period legitimately belong to that period.

### Differences between the First-In, First-Out and Weighted Average Methods

If changes occur in the prices of the manufacturing inputs from one period to the next, then FIFO produces a more accurate (i.e., more current) unit cost than does the weighted average method. A more accurate unit cost means better cost control, better pricing decisions, and so on. Keep in mind that if the period is as short as a week or a month, however, the unit costs calculated under the two methods are not likely to differ much. In that case, the FIFO method has little, if anything, to offer over the weighted average method. Perhaps for this reason, many firms use the weighted average method.

Since FIFO excludes prior-period work and costs, it is necessary to create two categories of completed units. FIFO assumes that units in BWIP are completed first, before any new units are started. Thus, one category of completed units is BWIP units. The second category is for those units started and completed during the current period.

For example, assume that a department had 20,000 units in BWIP and completed and transferred out a total of 50,000 units. Of the 50,000 completed units, 20,000 are the units initially found in WIP. The remaining 30,000 were started and completed during the current period.

These two categories of completed units are needed in the FIFO method so that each category can be costed correctly. For the units started and completed, the unit cost is obtained by dividing total current manufacturing costs by the current period equivalent output. However, for the BWIP units, the total associated manufacturing costs are the sum of the prior period costs plus the costs incurred in the current period to finish the units.

### Example of the First-In, First-Out Method

**Cornerstone 17-9** shows how FIFO handles output and cost calculations. The computations of Cornerstone 17-9 are based on the same Healthblend data used for the weighted average method (Cornerstone 17-4). Using the same data highlights the differences between the two methods. Cornerstone 17-9 shows that the equivalent unit calculation measures only the output for the current period. Cornerstone 17-9 also reveals that costs from the current period and costs carried over from June (beginning inventory costs) are not pooled to calculate July's unit cost. The unit cost calculation uses only July (current period) costs. The five steps to cost out production follow.

**Step 1: Physical Flow Analysis** The purpose of step 1 is to trace the physical units of production. As with the weighted average method, in the FIFO method, a physical flow schedule is prepared. This schedule is identical for both methods and for convenience is presented again in Exhibit 17-5. (See Cornerstone 17-5 for details on how to prepare this schedule.)

**Step 2: Calculation of Equivalent Units** Cornerstone 17-9 illustrates the calculation of equivalent units under the FIFO method and is summarized as follows without the graphic detail.



**CORNERSTONE**  
**17-9**



**HOW TO Calculate Output and Cost Assignments:  
First-In, First-Out Method**

**Information:**

Production:		
Units in process, July 1, 75 percent complete		20,000 gallons
Units completed and transferred out		50,000 gallons
Units in process, July 31, 25 percent complete		10,000 gallons
Costs:		
Work in process, July 1		\$ 3,525
Costs added during July		10,125

**Required:**

1. Calculate the output measure for July.
2. Assign costs to units transferred out and EWIP using the FIFO method.

**Solution:**

1. Equivalent units:

Key:  = 10,000 units completed

 = 10,000 units, 25% complete

Output for July:  
60,000 total units  $\longrightarrow$  Become 37,500 equivalent units

BWIP: To be completed (20,000  $\times$  25%):

 = 5,000

+ Units started and completed:

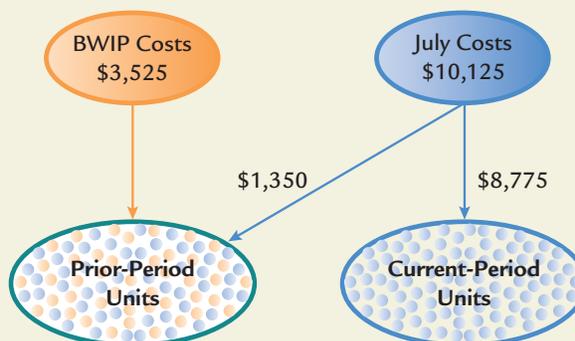
 = 30,000

+ EWIP: Started but not completed

(10,000  $\times$  0.25)

 = 2,500  
= 37,500

2. Cost assignment:  
Costs for July:



$$\text{Cost/unit} = \$10,125/37,500 = \$0.27$$

Transferred out:

Cost from BWIP (prior period carryover)	\$ 3,525	
To complete BWIP ( $\$0.27 \times 5,000$ )	1,350	
Started and completed ( $\$0.27 \times 30,000$ )	8,100	
Total	\$12,975	
EWIP ( $\$0.27 \times 2,500$ )	675	
Total cost assigned	\$13,650	

**CORNERSTONE**  
**17-9**  
*(continued)*

Units started and completed	30,000
Add: Units in BWIP $\times$ Fraction to be completed ( $20,000 \times 25$ percent)	5,000
Add: Units in EWIP $\times$ Fraction complete ( $10,000 \times 25$ percent)	2,500
Equivalent units of output	<u>37,500</u>

From the equivalent unit computation, one difference between weighted average and FIFO becomes immediately apparent. Under FIFO, the equivalent units in BWIP (work done in the prior period) are not counted as part of the total equivalent work. Only the equivalent work to be completed this period is counted. The equivalent work to be completed for the units from the prior period is computed by multiplying the number of units in BWIP by the percentage of work remaining. Since in this example the percentage of work done in the prior period is 75 percent, the percentage left to be completed this period is 25 percent, or an equivalent of 5,000 additional units of work.

The effect of excluding prior period effort is to produce the current period equivalent output. Recall that under the weighted average method, 52,500 equivalent units were computed for this month. Under FIFO, only 37,500 units are calculated for the same month. These 37,500 units represent current period output. The difference, of course, is explained by the fact that the weighted average method rolls back and counts the 15,000 equivalent units of prior period work ( $20,000$  units BWIP  $\times$  75 percent) as belonging to this period.

**Step 3: Computation of Unit Cost** The additional manufacturing costs incurred in the current period are \$10,125. Thus, the current period unit manufacturing cost is  $\$10,125/37,500$ , or \$0.27. Notice that the costs of beginning inventory are excluded from this calculation. Only current period manufacturing costs are used.

**Step 4: Valuation of Inventories** Cornerstone 17-9 shows FIFO values for EWIP and goods transferred out. Since all equivalent units in ending work in process are current period units, the cost of EWIP is simply  $\$0.27 \times 2,500$ , or \$675, the same value

## ANALYTICAL Q&A

For August, there are 40,000 units in BWIP that are 30 percent complete and 20,000 units in EWIP that are 60 percent complete. There were 80,000 units started and completed. How many equivalent units were produced in August using the FIFO method?

$$\text{Equivalent units} = 80,000 + (0.70 \times 40,000) + (0.60 \times 20,000) = 120,000$$

**Answer:**

### Physical Flow Schedule

Units to account for:		
Units in beginning work in process (75 percent complete)		20,000
Units started during the period		40,000
Total units to account for		<u>60,000</u>
Units accounted for:		
Units completed:		
Started and completed	30,000	
From beginning work in process	<u>20,000</u>	50,000
Units in ending work in process (25 percent complete)		10,000
Total units accounted for		<u>60,000</u>

Exhibit 17-5

## CONCEPT Q&A

The FIFO cost per equivalent unit for July was \$12. The BWIP had 25,000 units, 20 percent complete, with \$50,000 of costs carried over from June. What is the total cost that these 25,000 units will contribute to the cost of goods transferred out?

$$(\$12 \times 25,000 \times 0.8) + (\$50,000) = \$290,000$$

Possible Answer:

that the weighted average method would produce. However, when it comes to valuing goods transferred out, a significant difference emerges between the weighted average method and FIFO.

Under weighted average, the cost of goods transferred out is simply the unit cost times the units completed. Under FIFO, however, there are two sources of completed units: 20,000 units from beginning inventory and 30,000 units started and completed. The cost of the 30,000 units that were started and completed in the current period and transferred out is \$8,100 ( $\$0.27 \times 30,000$ ). For these units, the use of the current period unit cost is entirely appropriate. However, the cost of the BWIP units that were transferred out is another matter. These units started the period with \$3,525 of manufacturing costs already

incurred and 15,000 units of equivalent output already completed. To finish these units, the equivalent of 5,000 units were needed. The cost of finishing the units in BWIP is \$1,350 ( $\$0.27 \times 5,000$ ). Adding this \$1,350 to the \$3,525 in cost carried over from the prior period gives a total manufacturing cost for these units of \$4,875. The unit cost of these 20,000 units, then, is about \$0.244 ( $\$4,875/20,000$ ).

**Step 5: Cost Reconciliation** The total costs assigned to production are as follows:

Goods transferred out:	
Units in BWIP	\$ 4,875
Units started and completed	8,100
Goods in EWIP	<u>675</u>
Total costs accounted for	<u>\$13,650</u>

The total manufacturing costs to account for during the period are:

BWIP	\$ 3,525
Incurred during the period	<u>10,125</u>
Total costs to account for	<u>\$13,650</u>

The costs assigned, thus, equal the costs to account for. With the completion of step 5, the production report can be prepared. **Cornerstone 17-10** shows how to prepare this report for FIFO.



### CORNERSTONE 17-10



## HOW TO Prepare a Production Report: First-In, First-Out Method

### Information:

The five steps for the Healthblend Company.

### Required:

Prepare a production report for July 2009 (FIFO method).

### Solution:

**Healthblend Company  
Picking Department  
Production Report For July 2009  
(FIFO Method)**

#### UNIT INFORMATION

Units to account for:	
Units in beginning work in process	20,000
Units started during the period	<u>40,000</u>
Total units to account for	<u>60,000</u>

	Physical Flow	Equivalent Units	<b>CORNERSTONE 17-10 (continued)</b>		
Units accounted for:					
Units started and completed	30,000	30,000			
Units completed from beginning work in process	20,000	5,000			
Units in ending work in process	10,000	2,500			
Total units accounted for	<u>60,000</u>	<u>37,500</u>			
<b>COST INFORMATION</b>					
Costs to account for:					
Beginning work in process		\$ 3,525			
Incurred during the period		<u>10,125</u>			
Total costs to account for		<u>\$13,650</u>			
Cost per equivalent unit (\$10,125/37,500)		\$ 0.27			
	Transferred Out	Ending Work in Process	Total		
Costs accounted for:					
Units in beginning work in process:					
From prior period	\$ 3,525	—	\$ 3,525		
From current period (\$0.27 × 5,000)	1,350	—	1,350		
Units started and completed (\$0.27 × 30,000)	8,100	—	8,100		
Goods in ending work in process (\$0.27 × 2,500)	—	\$675	675		
Total costs accounted for	<u>\$12,975</u>	<u>\$675</u>	<u>\$13,650</u>		

## Appendix: Summary of Learning Objectives

A production report prepared according to the FIFO method separates the cost of BWIP from the cost of the current period. BWIP is assumed to be completed and transferred out first. Costs from BWIP are not pooled with the current period costs in computing unit cost. Additionally, equivalent units of production exclude work done in the prior period. When calculating the cost of goods transferred out, the prior period costs are added to the costs of completing the units in BWIP, and then these costs are added to the costs of units started and completed.

**CORNERSTONE 17-9** How to calculate output and cost assignments: first-in, first-out method, page 930

**CORNERSTONE 17-10** How to prepare a production report: first-in, first-out method, page 932



**CORNERSTONES  
FOR APPENDIX**

## Review Problems

### I. Process Costing

Springville Company, which uses the weighted average method, produces a product that passes through two departments: Blending and Cooking. In the blending department, all materials are added at the beginning of the process. All other manufacturing inputs are added uniformly. The following information pertains to the mixing department for February:

- a. BWIP, May 1: 100,000 pounds, 40 percent complete with respect to conversion costs. The costs assigned to this work are as follows:

Materials	\$20,000
Labor	10,000
Overhead	30,000

- b. EWIP, May 31: 50,000 pounds, 60 percent complete with respect to conversion costs.
- c. Units completed and transferred out: 370,000 pounds. The following costs were added during the month:

Materials	\$211,000
Labor	100,000
Overhead	270,000

#### Required:

1. Prepare a physical flow schedule.
2. Prepare a schedule of equivalent units.
3. Compute the cost per equivalent unit.
4. Compute the cost of goods transferred out and the cost of EWIP.
5. Prepare a cost reconciliation.

#### Solution:

1. Physical flow schedule:

Units to account for:		
Units in BWIP	100,000	
Units started	<u>320,000</u>	
Total units to account for	<u>420,000</u>	
Units accounted for:		
Units completed and transferred out:		
Started and completed	270,000	
From BWIP	<u>100,000</u>	370,000
Units in EWIP		<u>50,000</u>
Total units accounted for		<u>420,000</u>

2. Schedule of equivalent units:

	Materials	Conversion
Units completed	370,000	370,000
Units in EWIP × Fraction complete:		
Materials (50,000 × 100 percent)	50,000	—
Conversion (50,000 × 60 percent)	<u>—</u>	<u>30,000</u>
Equivalent units of output	<u>420,000</u>	<u>400,000</u>

## 3. Cost per equivalent unit:

$$\begin{aligned}\text{Materials unit cost} &= (\$20,000 + \$211,000)/420,000 \\ &= \$0.550 \\ \text{Conversion unit cost} &= (\$40,000 + \$370,000)/400,000 \\ &= \$1.025 \\ \text{Total unit cost} &= \$1.575 \text{ per equivalent unit}\end{aligned}$$

## 4. Cost of goods transferred out and cost of EWIP:

$$\begin{aligned}\text{Cost of goods transferred out} &= \$1.575 \times 370,000 \\ &= \$582,750 \\ \text{Cost of EWIP} &= (\$0.550 \times 50,000) + (\$1.025 \times 30,000) \\ &= \$58,250\end{aligned}$$

## 5. Cost reconciliation:

Costs to account for:	
BWIP	\$ 60,000
Incurring during the period	<u>581,000</u>
Total costs to account for	<u>\$641,000</u>
Costs accounted for:	
Goods transferred out	\$582,750
WIP	<u>58,250</u>
Total costs accounted for	<u>\$641,000</u>

**II. Process Costing**

Now suppose that Springville Company uses the FIFO method for inventory valuations. Springville produces a product that passes through two departments: Blending and Cooking. In the blending department, all materials are added at the beginning of the process. All other manufacturing inputs are added uniformly. The following information pertains to the blending department for February:

- a. BWIP, February 1: 100,000 pounds, 40 percent complete with respect to conversion costs. The costs assigned to this work are as follows:

Materials	\$20,000
Labor	10,000
Overhead	30,000

- b. EWIP, February 28: 50,000 pounds, 60 percent complete with respect to conversion costs.
- c. Units completed and transferred out: 370,000 pounds. The following costs were added during the month:

Materials	\$211,000
Labor	100,000
Overhead	270,000

**Required:**

1. Prepare a physical flow schedule.
2. Prepare a schedule of equivalent units.
3. Compute the cost per equivalent unit.
4. Compute the cost of goods transferred out and the cost of EWIP.

**Solution:**

## 1. Physical flow schedule:

Units to account for:		
Units in BWIP	100,000	
Units started	<u>320,000</u>	
Total units to account for	<u>420,000</u>	
Units accounted for:		
Units completed and transferred out:		
Started and completed	270,000	
From BWIP	<u>100,000</u>	370,000
Units in EWIP		<u>50,000</u>
Total units accounted for		<u>420,000</u>

## 2. Schedule of equivalent units:

	Direct Materials	Conversion Costs
Units started and completed	270,000	270,000
Units, BWIP × Percentage complete	—	60,000
Units, EWIP × Percentage complete:		
Direct materials (50,000 × 100 percent)	50,000	—
Conversion costs (50,000 × 60 percent)	—	<u>30,000</u>
Equivalent units of output	<u>320,000</u>	<u>360,000</u>

## 3. Cost per equivalent unit:

DM unit cost \$211,000/320,000	\$0.659*
CC unit cost \$370,000/360,000	<u>1.028</u>
Total cost per equivalent unit	<u>\$1.687</u>

\* Rounded.

## 4. Cost of goods transferred out and cost of EWIP:

$$\begin{aligned} \text{Cost of goods transferred out} &= (\$1.687 \times 270,000) + (\$1.028 \times 60,000) \\ &\quad + \$60,000 = \$577,170 \end{aligned}$$

$$\text{Cost of EWIP} = (\$0.659 \times 50,000) + (\$1.028 \times 30,000) = \$63,790$$

**Discussion Questions**

1. Distinguish between sequential processing and parallel processing.
2. Describe the differences between process costing and job-order costing.
3. What are equivalent units? Why are they needed in a process-costing system?
4. Under the weighted average method, how are prior period costs and output treated? How are they treated under the FIFO method?
5. Under what conditions will the weighted average and FIFO methods give the same results?
6. How is the equivalent unit calculation affected when materials are added at the beginning or end of the process rather than uniformly throughout the process?
7. Explain why transferred-in costs are a special type of raw material for the receiving department.
8. What are the similarities in and differences between the manufacturing cost flows for job-order firms and process firms?

9. What journal entry would be made as goods are transferred out from one department to another department? From the final department to the warehouse?
10. Describe the five steps in accounting for the manufacturing activity of a processing department, and explain how they interrelate.
11. What is a production report? What purpose does this report serve?
12. In assigning costs to goods transferred out, how do the weighted average and FIFO methods differ?
13. Describe the effect of automation on the process accounting system.
14. How does the adoption of a JIT approach to manufacturing affect process costing?
15. How would process costing for services differ from process costing for manufactured goods?

## Multiple-Choice Exercises

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### 17-1 Process costing works well whenever:

- a. heterogeneous products pass through a series of processes and receive similar doses of materials, labor, and overhead.
- b. homogeneous products pass through a series of processes and receive similar amounts of materials, labor, and overhead.
- c. homogeneous products pass through a series of processes and receive similar doses of conversion inputs and different doses of material inputs.
- d. material cost is accumulated by process and conversion cost is accumulated by process.
- e. none of the above.

### 17-2 Operation costing works well whenever:

- a. heterogeneous products pass through a series of processes and receive similar doses of materials, labor, and overhead.
- b. homogeneous products pass through a series of processes and receive similar doses of materials, labor, and overhead.
- c. homogeneous products pass through a series of processes and receive similar doses of conversion inputs and different doses of material inputs.
- d. material cost is accumulated by process and conversion cost is accumulated by process.
- e. none of the above.

### 17-3 Sequential processing is characterized by:

- a. a pattern where partially completed units are worked on simultaneously.
- b. a pattern where different partially completed units must pass through parallel processes before being brought together in a final process.
- c. a pattern where partially completed units must pass through one process before they can be worked on in later processes.
- d. a pattern where partially completed units must be purchased from outside suppliers and delivered to the final process in a sequential time mode.
- e. none of the above.

### 17-4 To record the transfer of costs from a prior process to a subsequent process, the following entry would be made:

- a. debit Finished Goods and credit Work in Process.
- b. debit Work in Process (subsequent department) and credit Transferred-In Materials.
- c. debit Work in Process (prior department) and credit Work in Process (subsequent department).
- d. debit Work in Process (subsequent department) and credit Conversion Cost Control.
- e. none of the above.

**17-5** The costs transferred from a prior process to a subsequent process:

- a. are treated as another type of material cost.
- b. are referred to as transferred-in costs (for the receiving department).
- c. are referred to as the cost of goods transferred out (for the transferring department).
- d. all of the above.
- e. none of the above.

**17-6** During the month of May, the grinding department produced and transferred out 2,000 units. EWIP had 500 units, 60 percent complete. There was no BWIP. The equivalent units of output for May are:

- a. 2,000.
- b. 2,500.
- c. 2,300.
- d. 2,200.
- e. none of the above.

*Use the following information for Multiple-Choice Exercises 17-7 through 17-9.*

The drilling department incurred \$24,000 of manufacturing costs during the month of October. The department transferred out 2,000 units and had 400 equivalent units in EWIP. There was no BWIP.

**17-7** The unit cost for the month of October is:

- a. \$12.
- b. \$10.
- c. \$24.
- d. \$120.
- e. \$100.

**17-8** The cost of goods transferred out is:

- a. \$20,000.
- b. \$24,000.
- c. \$28,800.
- d. \$18,000.
- e. None of the above.

**17-9** The cost of EWIP is:

- a. \$400.
- b. \$4,800.
- c. \$4,000.
- d. \$8,800.
- e. none of the above.

**17-10** During May, Kimbrell Manufacturing completed and transferred out 100,000 units. In EWIP, there were 25,000 units, 80 percent complete. Using the weighted average method, the equivalent units are:

- a. 100,000 units.
- b. 125,000 units.
- c. 105,000 units.
- d. 110,000 units.
- e. 120,000 units.

**17-11** During June, Kimbrell Manufacturing completed and transferred out 100,000 units. In EWIP, there were 25,000 units, 40 percent complete. Using the weighted average method, the equivalent units are:

- a. 100,000 units.
- b. 125,000 units.
- c. 105,000 units.
- d. 110,000 units.
- e. 120,000 units.

**17-12** For August, Kimbrell Company has costs in BWIP equal to \$50,000. During August, the cost incurred was \$450,000. Using the weighted average method, Kimbrell had 125,000 equivalent units for August. There were 100,000 units transferred out during the month. The cost of goods transferred out is:

- a. \$500,000.
- b. \$400,000.
- c. \$450,000.
- d. \$360,000.
- e. \$50,000.

**17-13** For September, Murphy Company has manufacturing costs in BWIP equal to \$100,000. During September, the manufacturing costs incurred were \$650,000. Using the weighted average method, Murphy had 100,000 equivalent units for September. The equivalent unit cost for September is:

- a. \$1.00.
- b. \$7.50.
- c. \$6.50.
- d. \$6.00.
- e. \$6.62.

**17-14** During June, Faust Manufacturing started and completed 80,000 units. In BWIP, there were 25,000 units, 60 percent complete. In EWIP, there were 25,000 units, 40 percent complete. Using FIFO, the equivalent units are:

- a. 80,000 units.
- b. 100,000 units.
- c. 90,000 units.
- d. 105,000 units.
- e. 85,000 units.

**17-15** During July, Faust Manufacturing started and completed 80,000 units. In BWIP, there were 25,000 units, 20 percent complete. In EWIP, there were 25,000 units, 80 percent complete. Using FIFO, the equivalent units are:

- a. 80,000 units.
- b. 85,000 units.
- c. 65,000 units.
- d. 120,000 units.
- e. 100,000 units.

**17-16** Assume for August that Faust Manufacturing has manufacturing costs equal to \$80,000. During August, the cost incurred was \$720,000. Using the FIFO method, Faust had 120,000 equivalent units for August. The cost per equivalent unit for August is:

- a. \$6.12.
- b. \$6.50.
- c. \$5.60.
- d. \$6.67.
- e. \$6.00.

**17-17** For August, Lanny Company had 25,000 units in BWIP, 40 percent complete, with costs equal to \$36,000. During August, the cost incurred was \$450,000. Using the FIFO method, Lanny had 125,000 equivalent units for August. There were 100,000 units transferred out during the month. The cost of goods transferred out is:

- \$500,000.
- \$400,000.
- \$450,000.
- \$360,000.
- \$50,000.

**17-18** When materials are added either at the beginning or the end of the process, a unit cost should be calculated for the:

- materials and labor categories.
- materials category only.
- materials and conversion categories.
- conversion category only.
- labor category only.

**17-19** With nonuniform inputs, the cost of EWIP is calculated by:

- multiplying the unit cost in each input category by the equivalent units of each input found in EWIP.
- subtracting the cost of goods transferred out from the total cost of materials.
- adding the materials cost to the conversion cost.
- multiplying the total unit cost by the units in EWIP.
- none of the above.

**17-20** Transferred-in goods are treated by the receiving department as:

- units started for the period.
- a material added at the beginning of the process.
- a category of materials separate from conversion costs.
- All of the above.
- None of the above.

## Cornerstone Exercises

### OBJECTIVE > 1

#### CORNERSTONE 17-1

### Cornerstone Exercise 17-21 BASIC COST FLOWS

Sabor Company produces 18-ounce boxes of an oat cereal. Sabor uses three departments: Mixing, Cooking, and Packaging. During the month of August, Sabor produced 150,000 boxes with the following costs:

	Mixing Department	Cooking Department	Packaging Department
Direct materials	\$225,000	\$75,000	\$60,000
Direct labor	30,000	15,000	45,000
Applied overhead	45,000	22,500	67,500

#### Required:

- Calculate the costs transferred out of each department.
- Prepare journal entries that reflect these cost transfers.

**Cornerstone Exercise 17-22 EQUIVALENT UNITS, NO BEGINNING WORK IN PROCESS****OBJECTIVE** > **2**  
**CORNERSTONE 17-2**

Thomas Manufacturing produces cylinders used in internal combustion engines. During June, Thomas' welding department had the following data:

Units in BWIP	—
Units completed	20,000
Units in EWIP (40 percent complete)	3,000

**Required:**

Calculate June's output for the welding department in equivalent units of production.

**Cornerstone Exercise 17-23 UNIT COST, VALUING GOODS TRANSFERRED OUT AND EWIP****OBJECTIVE** > **2**  
**CORNERSTONE 17-3**

During the month of April, the molding department of Patterson Foundry completed and transferred out 28,000 units. At the end of April, there were 10,000 units in process, 60 percent complete. Paterson incurred manufacturing costs totaling \$408,000.

**Required:**

1. Calculate the unit cost.
2. Calculate the cost of goods transferred out and the cost of EWIP.

**Cornerstone Exercise 17-24 WEIGHTED AVERAGE METHOD, UNIT COST, VALUING INVENTORIES****OBJECTIVE** > **3**  
**CORNERSTONE 17-4**

Buckner Enterprises produces premier strawberry jam. Output is measured in pints. Buckner uses the weighted average method. During January, the company had the following production data:

Units in process, January 1, 60 percent complete	12,000 pints
Units completed and transferred out	80,000 pints
Units in process, January 31, 40 percent complete	25,000 pints
Costs:	
Work in process, January 1	\$ 18,000
Costs added during January	117,000

**Required:**

1. Using the weighted average method, calculate the equivalent units for January.
2. Calculate the unit cost for January.
3. Assign costs to units transferred out and EWIP.

**Cornerstone Exercise 17-25 PHYSICAL FLOW SCHEDULE****OBJECTIVE** > **3**  
**CORNERSTONE 17-5**

Lawson, Inc. just finished its second month of operations. Lawson mass produces integrated circuits. The following production information is provided for the month of November:

Units in process, November 1, 80 percent complete	75,000
Units completed and transferred out	450,000
Units in process, November 30, 60 percent complete	50,000

**Required:**

Prepare a physical flow schedule.

**Cornerstone Exercise 17-26 PRODUCTION REPORT, WEIGHTED AVERAGE****OBJECTIVE** > **3**  
**CORNERSTONE 17-6**

Kinnamon Inc. manufactures bicycle frames in two departments: Cutting and Welding. Kinnamon uses the weighted average method. Manufacturing costs are added uniformly throughout the process. The following are cost and production data for the cutting department for October:

Production:	
Units in process, October 1, 40 percent complete	5,000
Units completed and transferred out	34,000
Units in process, October 31, 60 percent complete	10,000
Costs:	
WIP, October 1	\$ 40,000
Costs added during October	760,000

**Required:**

Prepare a production report for the cutting department.

**OBJECTIVE** > **4**  
**CORNERSTONE 17-7**

**Cornerstone Exercise 17-27 NONUNIFORM INPUTS, WEIGHTED AVERAGE**

Jackson Inc. had the following production and cost information for its fabrication department during the month of March (materials are added at the beginning of the fabrication process):

Production:	
Units in process, March 1, 50 percent complete with respect to conversion	5,000
Units completed	32,600
Units in process, March 31, 40 percent complete	6,000
Costs:	
Work in process, March 1:	
Materials	\$ 10,000
Conversion costs	7,500
Total	<u>\$ 17,500</u>
Current costs:	
Materials	\$ 62,500
Conversion costs	105,000
Total	<u>\$167,500</u>

Jackson uses the weighted average method.

**Required:**

1. Prepare an equivalent units schedule.
2. Calculate the unit cost.
3. Calculate the cost of units transferred out and the cost of EWIP.

**OBJECTIVE** > **4**  
**CORNERSTONE 17-8**

**Cornerstone Exercise 17-28 TRANSFERRED-IN COST**

Energetics Inc. produces an energy drink. The product is sold by the gallon. The company has two departments: Mixing and Bottling. For July, the bottling department had 40,000 gallons in beginning inventory (with transferred-in costs of \$142,000) and completed 175,000 gallons during the month. Further, the mixing department completed and transferred out 160,000 units at a cost of \$458,000 in July.

**Required:**

1. Prepare a physical flow schedule for the bottling department.
2. Calculate equivalent units for the transferred-in category.
3. Calculate the unit cost for the transferred-in category.

**OBJECTIVE** > **5**  
**CORNERSTONE 17-9**

**Cornerstone Exercise 17-29 (APPENDIX) FIRST-IN, FIRST-OUT METHOD; EQUIVALENT UNITS**

Bebida Inc. produces soft drinks. Mixing is the first department and its output is measured in gallons. Bebida uses the FIFO method. All manufacturing costs are added uniformly. For August, the mixing department provided the following information:

Production:		
Units in process, August 1, 80 percent complete		20,000 gallons
Units completed and transferred out		138,000 gallons
Units in process, August 31, 75 percent complete		16,000 gallons
Costs:		
Work in process, August 1	\$ 19,200	
Costs added during August	180,900	

**Required:**

1. Calculate the equivalent units for August.
2. Calculate the unit cost.
3. Assign costs to units transferred out and EWIP using the FIFO method.

**Cornerstone Exercise 17-30 (APPENDIX) FIFO; PRODUCTION REPORT**

Refer to the data in **Cornerstone Exercise 17-29**.

**OBJECTIVE** > 5**CORNERSTONE 17-10****Required:**

Prepare a cost of production report.

## Exercises

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**Exercise 17-31 BASIC COST FLOWS****OBJECTIVE** > 1

Gardner Company produces a common machine component for industrial equipment. The component is produced in three departments: molding, grinding, and finishing. The following data are available for the month of September:



	Molding Department (\$)	Grinding Department (\$)	Finishing Department (\$)
Direct materials	30,800	3,800	2,450
Direct labor	2,300	5,600	3,800
Applied overhead	3,500	27,200	3,800

During September, 3,000 components were completed. There is no beginning or ending WIP in any department.

**Required:**

1. Prepare a schedule showing, for each department, the cost of direct materials, direct labor, applied overhead, product transferred in from a prior department, and total manufacturing cost.
2. Calculate the unit cost.

**Exercise 17-32 JOURNAL ENTRIES, BASIC COST FLOWS****OBJECTIVE** > 1

In October, Gardner Company had the following cost flows:

	Molding Department (\$)	Grinding Department (\$)	Finishing Department (\$)
Direct materials	35,800	5,000	3,600
Direct labor	3,000	5,800	4,800
Applied overhead	3,200	29,200	4,600
Transferred-in cost:			
From Molding		42,000	
From Grinding	—	—	82,000
Total cost	<u>42,000</u>	<u>82,000</u>	<u>95,000</u>

**Required:**

Prepare the journal entries to transfer costs from (a) Molding to Grinding, (b) Grinding to Finishing, and (c) Finishing to Finished Goods.

**OBJECTIVE** > **2****Exercise 17-33 EQUIVALENT UNITS, UNIT COST, VALUATION OF GOODS TRANSFERRED OUT AND ENDING WORK IN PROCESS**

The mixing department had the following data for the month of December:

Units in BWIP	—
Units completed	5,850
Units in EWIP (30 percent complete)	500
Total manufacturing costs	\$3,900

**Required:**

1. What is the output in equivalent units for December?
2. What is the unit manufacturing cost for December?
3. Calculate the cost of goods transferred out for December.
4. Calculate the value of December's EWIP.

**OBJECTIVE** > **3****Exercise 17-34 WEIGHTED AVERAGE METHOD, EQUIVALENT UNITS**

Lawson Company produces a product where all manufacturing inputs are applied uniformly. The company produced the following physical flow schedule for March:

Units to account for:	
Units in BWIP (40 percent complete)	15,000
Units started	<u>35,000</u>
Total units to account for	<u>50,000</u>
Units accounted for:	
Units completed:	
From BWIP	10,000
Started and completed	<u>32,000</u>
	42,000
Units, EWIP (75 percent complete)	8,000
Total units accounted for	<u>50,000</u>

**Required:**

Prepare a schedule of equivalent units using the weighted average method.

**OBJECTIVE** > **3****Exercise 17-35 WEIGHTED AVERAGE METHOD, UNIT COST, VALUING INVENTORIES**

Milton Inc. manufactures products that pass through two or more processes. During April, equivalent units were computed using the weighted average method:

Units completed	18,000
Units in EWIP × Fraction complete (12,000 × 60 percent)	<u>7,200</u>
Equivalent units of output	<u>25,200</u>
April's costs to account for are as follows:	
BWIP (40 percent complete)	\$ 3,360
Materials	30,000
Conversion cost	<u>12,000</u>
Total	<u>\$45,360</u>

**Required:**

1. Calculate the unit cost for April using the weighted average method.
2. Using the weighted average method, determine the cost of EWIP and the cost of the goods transferred out.

**Exercise 17-36 WEIGHTED AVERAGE METHOD, UNIT COSTS, VALUING INVENTORIES****OBJECTIVE** > **3**

Walser Inc. produces a product that passes through two processes. During February, equivalent units were calculated using the weighted average method:

Units completed	150,000
Add: Units in EWIP $\times$ Fraction complete (50,000 $\times$ 40 percent)	<u>20,000</u>
Equivalent units of output (weighted average)	170,000
Less: Units in BWIP $\times$ Fraction complete (25,000 $\times$ 70 percent)	<u>17,500</u>
Equivalent units of output (FIFO)	<u><u>152,500</u></u>

The costs that Walser had to account for during the month of February were as follows:

BWIP	\$ 105,000
Costs added	<u>993,000</u>
Total	<u><u>\$1,098,000</u></u>

**Required:**

1. Using the weighted average method, calculate unit cost.
2. Under the weighted average method, what is the total cost of units transferred out? What is the cost assigned to units in ending inventory?

**Exercise 17-37 PHYSICAL FLOW SCHEDULE****OBJECTIVE** > **3**

The following information was obtained for the first department of LPZ Company for April:

- a. BWIP had 30,500 units, 30 percent complete with respect to manufacturing costs.
- b. EWIP had 8,400 units, 25 percent complete with respect to manufacturing costs.
- c. LPZ started 33,000 units in April.

**Required:**

Prepare a physical flow schedule.

**Exercise 17-38 PHYSICAL FLOW, WEIGHTED AVERAGE METHOD****OBJECTIVE** > **3**

Nelrok Company manufactures fertilizer. Department 1 mixes the chemicals required for the fertilizer. The following data are for the year:

BWIP (40 percent complete)	25,000
Units started	142,500
Units in EWIP (60 percent complete)	35,000

**Required:**

Prepare a physical flow schedule.

**Exercise 17-39 PRODUCTION REPORT, WEIGHTED AVERAGE****OBJECTIVE** > **3**

Mino Inc. manufactures chocolate syrup in three departments: Cooking, Mixing, and Bottling. Mino uses the weighted average method. The following are cost and production data for the cooking department for April (assume that units are measured in gallons):

Production:	
Units in process, April 1, 60 percent complete	20,000
Units completed and transferred out	50,000
Units in process, April 30, 20 percent complete	10,000
Costs:	
WIP, April 1	\$ 93,600
Costs added during April	314,600

**Required:**

Prepare a production report for the cooking department.

**OBJECTIVE** > **4** **Exercise 17-40 NONUNIFORM INPUTS, EQUIVALENT UNITS**

Terry Linens Inc. manufactures bed and bath linens. The bath linens department sews terry cloth into towels of various sizes. Terry uses the weighted average method. All materials are added at the beginning of the process. The following data are for the bath linens department for August:

Production:	
Units in process, August 1, 25 percent complete*	10,000
Units completed and transferred out	60,000
Units in process, August 31, 60 percent complete	20,000

\* With respect to conversion costs.

**Required:**

Calculate equivalent units of production for the bath linens department for August.

**OBJECTIVE** > **4** **Exercise 17-41 UNIT COST AND COST ASSIGNMENT, NONUNIFORM INPUTS**

Loran Inc. had the following equivalent units schedule and cost for its fabrication department during the month of September:

	Materials	Conversion
Units completed	180,000	180,000
Add: Units in ending WIP $\times$ Fraction complete (60,000 $\times$ 60%)	60,000	36,000
Equivalent units of output	240,000	216,000
Costs:		
Work in process, September 1:		
Materials	\$ 147,000	
Conversion costs	7,875	
Total	<u>\$ 154,875</u>	
Current costs:		
Materials	\$1,053,000	
Conversion costs	236,205	
Total	<u>\$1,289,205</u>	

**Required:**

1. Calculate the unit cost for materials, for conversion, and in total for the fabrication department for September.
2. Calculate the cost of units transferred out and the cost of EWIP.

**OBJECTIVE** > **4** **Exercise 17-42 NONUNIFORM INPUTS, TRANSFERRED-IN COST**

Drysdale Dairy produces a variety of dairy products. In Department 12, cream (transferred in from Department 6) and other materials (sugar and flavorings) are mixed and churned to make ice cream. The following data are for Department 12 for August:

Production:	
Units in process, August 1, 25 percent complete*	40,000
Units completed and transferred out	120,000
Units in process, August 31, 60 percent complete*	30,000

\* With respect to conversion costs.

**Required:**

1. Prepare a physical flow schedule for the month.
2. Calculate equivalent units for the following categories: transferred-in, materials, and conversion.

**Exercise 17-43 TRANSFERRED-IN COST**

**OBJECTIVE** > 4

Golding's finishing department had the following data for the month of July:

	Transferred-In	Materials	Conversion
Units transferred out	60,000	60,000	60,000
Units in EWIP	15,000	15,000	9,000
Equivalent units	75,000	75,000	69,000
Costs:			
Work in process, July 1:			
Transferred-in from fabricating	\$ 2,100		
Materials	1,500		
Conversion costs	<u>3,000</u>		
Total	<u>\$ 6,600</u>		
Current costs:			
Transferred-in from fabricating	\$30,900		
Materials	22,500		
Conversion costs	<u>45,300</u>		
Total	<u>\$98,700</u>		

**Required:**

1. Calculate unit costs for the following categories: transferred-in, materials, and conversion.
2. Calculate total unit cost.

**Exercise 17-44 (APPENDIX) FIRST-IN, FIRST-OUT METHOD; EQUIVALENT UNITS**

**OBJECTIVE** > 5

Lawson Company produces a product where all manufacturing inputs are applied uniformly. The company produced the following physical flow schedule for March:

Units to account for:	
Units in BWIP (40 percent complete)	15,000
Units started	<u>35,000</u>
Total units to account for	<u>50,000</u>
Units accounted for:	
Units completed:	
From BWIP	10,000
Started and completed	<u>32,000</u>
	42,000
Units, EWIP (75 percent complete)	<u>8,000</u>
Total units accounted for	<u>50,000</u>

**Required:**

Prepare a schedule of equivalent units using the FIFO method.

**OBJECTIVE** > **5** **Exercise 17-45 (APPENDIX) FIRST-IN, FIRST-OUT METHOD; UNIT COST; VALUING INVENTORIES**

Loren Inc. manufactures products that pass through two or more processes. During April, equivalent units were computed using the FIFO method:

Units started and completed	4,600
Units in BWIP $\times$ Fraction to complete (60 percent)	840
Units in EWIP $\times$ Fraction complete (4,000 $\times$ 60 percent)	2,400
Equivalent units of output (FIFO)	<u>7,840</u>
April's costs to account for are as follows:	
BWIP (40 percent complete)	\$ 1,120
Materials	10,000
Conversion cost	4,000
Total	<u>\$15,120</u>

**Required:**

- Calculate the unit cost for April using the FIFO method. Round to two decimal places.
- Using the FIFO method, determine the cost of EWIP and the cost of the goods transferred out.

## Problems

**OBJECTIVE** > **1** **2** **Problem 17-46 BASIC FLOWS, EQUIVALENT UNITS**

Karsen Company produces a pain medication that passes through two departments: Mixing and Tableting. Karsen uses the weighted average method. Data for November for Mixing is as follows: BWIP was zero; EWIP had 2,400 units, 50 percent complete; and 28,000 units were started.

Tableting's data for November is as follows: BWIP was 1,600 units, 20 percent complete; and 800 units were in EWIP, 40 percent complete.

**Required:**

- For Mixing, calculate the following:
  - Number of units transferred to Tableting.
  - Equivalent units of production.
- For Tableting, calculate the number of units transferred out to Finished Goods.
- Suppose that the units in the mixing department are measured in ounces, while the units in Tableting are measured in bottles of 100 tablets, with a total weight of eight ounces (excluding the bottle). Decide how you would treat units that are measured differently, and then repeat Requirement 2 using this approach.

**OBJECTIVE** > **1** **2** **3** **4** **Problem 17-47 STEPS IN PREPARING A COST OF PRODUCTION REPORT**


Stillwater Designs is expanding its market by becoming an original equipment supplier to DaimlerChrysler. DaimlerChrysler will offer a high-end Kicker audio package for its Dodge Neon SRT4 line. As part of this effort, Stillwater Designs will produce the plastic cabinet prototypes that will house the Kicker speakers and amplifiers. After producing the prototype cabinets, their production will be outsourced. However, assembly will remain in-house. Stillwater Designs will assemble the product by placing the speakers and amplifiers (produced according to specifications by outside manufacturers) in the plastic cabinets. Plastic cabinets and Kicker speaker and amplifier components are added at the beginning of the assembly process.

Assume that Stillwater Designs uses the weighted average method to cost out the audio package. The following are cost and production data for the assembly process for April:

Production:	
Units in process, April 1, 60 percent complete	40,000
Units completed and transferred out	100,000
Units in process, April 30, 20 percent complete	20,000
Costs:	
WIP, April 1:	
Plastic cabinets	\$ 800,000
Kicker components	8,400,000
Conversion costs	3,600,000
Costs added during April:	
Plastic cabinets	\$ 1,600,000
Kicker components	16,800,000
Conversion costs	5,760,000

**Required:**

1. Prepare a physical flow analysis for the assembly department for the month of April.
2. Calculate equivalent units of production for the assembly department for the month of April.
3. Calculate unit cost for the assembly department for the month of April.
4. Calculate the cost of units transferred out and the cost of EWIP inventory.
5. Prepare a cost reconciliation for the assembly department for the month of April.

**Problem 17-48 STEPS FOR A COST OF PRODUCTION REPORT**

**OBJECTIVE** > **1** **3**

The owner of Stillwater Designs was pleased with the prospect of becoming an original equipment supplier to DaimlerChrysler. Stillwater designs will provide an audio package for the Dodge Neon SRT4 line. Assembling the plastic cabinets, speakers, and amplifiers for this audio package will be done in-house.

Assume that Stillwater Designs uses the weighted average method to cost out the audio package. The following are cost and production data for the assembly process for April:

Production:	
Units in process, April 1, 60 percent complete	40,000
Units completed and transferred out	100,000
Units in process, April 30, 20 percent complete	20,000
Costs:	
WIP, April 1:	
Plastic cabinets	\$ 800,000
Kicker components	8,400,000
Conversion costs	3,600,000
Costs added during April:	
Plastic cabinets	\$ 1,600,000
Kicker components	16,800,000
Conversion costs	5,760,000

**Required:**

1. Prepare a cost of production report for the assembly department for the month of April.
2. Write a one-page report that compares the purpose and content of the cost of production report with the job-order cost sheet.

**OBJECTIVE** > **1** **2** **3** **4**
**Problem 17-49 EQUIVALENT UNITS, UNIT COST, WEIGHTED AVERAGE**

Fino Linens Inc. manufactures bed and bath linens. The bath linens department sews terry cloth into towels of various sizes. Fino uses the weighted average method. All materials are added at the beginning of the process. The following data are for the bath linens department for August:

Production:	
Units in process, August 1, 60 percent complete	20,000
Units completed and transferred out	60,000
Units in process, August 31, 60 percent complete	20,000
Costs:	
WIP, August 1	\$11,520
Current costs	<u>72,000</u>
Total	<u>\$83,520</u>

**Required:**

1. Prepare a physical flow analysis for the bath linens department for August.
2. Calculate equivalent units of production for the bath linens department for August.
3. Calculate the unit cost for the bath linens department for August.
4. Show that the cost per unit calculated in Requirement 3 is a weighted average of the cost per equivalent unit in BWIP and the current (FIFO) cost per equivalent unit. (*Hint:* The weights are in proportion to the number of units from each source.)

**OBJECTIVE** > **3**
**Problem 17-50 COST OF PRODUCTION REPORT**


The owner of Fino Linens Inc., a manufacturer of bed and bath linens, insisted on a formal report that provided all the details of the weighted average method. In the manufacturing process, all materials are added at the beginning. The following data are for the bath linens department for August:

Production:	
Units in process, August 1, 60 percent complete	20,000
Units completed and transferred out	60,000
Units in process, August 31, 60 percent complete	20,000
Costs:	
WIP, August 1	\$11,520
Current costs	<u>72,000</u>
Total	<u>\$83,520</u>

**Required:**

Prepare a cost of production report for the bath linens department for August using the weighted average method.

**OBJECTIVE** > **1** **2** **3**
**Problem 17-51 WEIGHTED AVERAGE METHOD, PHYSICAL FLOW, EQUIVALENT UNITS, UNIT COSTS, COST ASSIGNMENT**

Yomasca Inc. manufactures various Halloween masks. Each mask is shaped from a piece of rubber in the molding department. The masks are then transferred to the finishing department, where they are painted and have elastic bands attached. Yomasca uses the weighted average method. In April, the molding department reported the following data:

- a. BWIP consisted of 6,000 units, 20 percent complete. Cost in beginning inventory totaled \$552.
- b. Costs added to production during the month were \$8,698.
- c. At the end of the month, 18,000 units were transferred out to Finishing. Then, 2,000 units remained in EWIP, 25 percent complete.

**Required:**

1. Prepare a physical flow schedule.
2. Calculate equivalent units of production.
3. Compute unit cost.
4. Calculate the cost of goods transferred to Finishing at the end of the month. Calculate the cost of ending inventory.
5. Assume that the masks are inspected at the end of the molding process. Of the 18,000 units inspected, 1,000 are rejected as faulty and are discarded. Thus, only 17,000 units are transferred to the finishing department. The manager of Yomasca considers all such spoilage as abnormal and does not want to assign any of this cost to the 17,000 good units produced and transferred to finishing. Your task is to determine the cost of this spoilage of 1,000 units and then to discuss how you would account for this spoilage cost. Now suppose that the manager feels that this spoilage cost is just part of the cost of producing the good units transferred out. Therefore, he wants to assign this cost to the good production. Explain how this would be handled. (*Hint:* Spoiled units are a type of output, and equivalent units of spoilage can be calculated.)

**Problem 17-52 WEIGHTED AVERAGE METHOD, SINGLE-DEPARTMENT ANALYSIS**OBJECTIVE > **1** **2** **3**

Jbooth Company produces a product that passes through an assembly process and a finishing process. All manufacturing costs are added uniformly for both processes. The following information was obtained for the assembly department for March:

- a. WIP, March 1, had 48,000 units (60 percent completed) and the following costs:

Direct materials	\$186,256
Direct labor	64,864
Overhead applied	34,400

- b. During March, 138,400 units were completed and transferred to the finishing department, and the following costs were added to production:

Direct materials	\$267,880
Direct labor	281,280
Overhead applied	117,144

- c. On March 31, there were 21,600 partially completed units in process. These units were 70 percent complete.

**Required:**

Prepare a production report for the assembly department for March using the weighted average method of costing. The report should disclose the physical flow of units, equivalent units, and unit costs and should track the disposition of manufacturing costs.

**Problem 17-53 FIRST-IN, FIRST-OUT METHOD; SINGLE-DEPARTMENT ANALYSIS; ONE COST CATEGORY**OBJECTIVE > **1** **2** **3**

Jbooth Company produces a product that passes through an assembly process and a finishing process. All manufacturing costs are added uniformly for both processes. The following information was obtained for the assembly department for March:

- a. WIP, March 1, had 48,000 units (60 percent completed) and the following costs:

Direct materials	\$186,256
Direct labor	64,864
Overhead applied	34,400



- b. During March, 138,400 units were completed and transferred to the finishing department, and the following costs were added to production:

Direct materials	\$267,880
Direct labor	281,280
Overhead applied	117,144

- c. On March 31, there were 21,600 partially completed units in process. These units were 70 percent complete.

**Required:**

Prepare a production report for the assembly department for March using the FIFO method of costing. (Carry the unit cost computation to four decimal places.)

**OBJECTIVE** > **1** **2** **3**

**Problem 17-54 WEIGHTED AVERAGE METHOD, SEPARATE MATERIALS COST**

Tyrone Company produces a variety of stationery products. One product, sealing wax sticks, passes through two processes: blending and molding. The weighted average method is used to account for the costs of production. After blending, the resulting product is sent to the molding department, where it is poured into molds and cooled. The following information relates to the blending process for August:

- a. WIP, August 1, had 20,000 pounds, 20 percent complete. Costs associated with partially completed units were:

Materials	\$220,000
Direct labor	30,000
Overhead applied	10,000

- b. WIP, August 31, had 30,000 pounds, 70 percent complete.  
 c. Units completed and transferred out totaled 500,000 pounds. Costs added during the month were (all inputs are added uniformly):

Materials	\$5,610,000
Direct labor	3,877,500
Overhead applied	1,292,500

**Required:**

- Prepare (a) a physical flow schedule and (b) an equivalent unit schedule.
- Calculate the unit cost. Round to four decimal places.
- Compute the cost of EWIP and the cost of goods transferred out.
- Prepare a cost reconciliation.
- Suppose that the materials added uniformly in blending are paraffin and pigment and that the manager of the company wants to know how much each of these materials costs per equivalent unit produced. The costs of the materials in BWIP are as follows:

Paraffin	\$120,000
Pigment	100,000

The costs of the materials added during the month are also given:

Paraffin	\$3,060,000
Pigment	2,550,000

Prepare an equivalent unit schedule with cost categories for each material. Calculate the cost per unit for each type of material.

**Problem 17-55 WEIGHTED AVERAGE METHOD, JOURNAL ENTRIES**OBJECTIVE > 1 2 3 4

Seacrest Company uses a process-costing system. The company manufactures a product that is processed in two departments, A and B. As work is completed, it is transferred out. The following summarizes the production activity and costs for November:

	Department A	Department B
Beginning inventories:		
Physical units	5,000	8,000
Costs:		
Transferred in	—	\$45,320
Direct materials	\$10,000	—
Conversion costs	\$6,900	\$16,800
Current production:		
Units started	25,000	?
Units transferred out	28,000	33,000
Costs:		
Transferred in	—	?
Direct materials	\$57,800	\$37,950
Conversion costs	\$95,220	\$128,100
Percentage completion:		
Beginning inventory	40%	50%
Ending inventory	80%	50%

**Required:**

- Using the weighted average method, prepare the following for Department A:
  - A physical flow schedule.
  - An equivalent unit calculation.
  - Calculation of unit costs. Round to two decimal places.
  - Cost of EWIP and cost of goods transferred out.
  - A cost reconciliation.
- Prepare journal entries that show the flow of manufacturing costs for Department A. Use a conversion cost control account for conversion costs. Many firms are now combining direct labor and overhead costs into one category. They are not tracking direct labor separately. Offer some reasons for this practice.

**Problem 17-56 WEIGHTED AVERAGE METHOD, NONUNIFORM INPUTS, MULTIPLE DEPARTMENTS**OBJECTIVE > 1 2 3 4

Benson Pharmaceuticals uses a process-costing system to compute the unit costs of the over-the-counter cold remedies that it produces. It has three departments: Picking, Encapsulating, and Bottling. In Picking, the ingredients for the cold capsules are measured, sifted, and blended. The mix is transferred out in gallon containers. The encapsulating department takes the powdered mix and places it in capsules. One gallon of powdered mix converts into 1,500 capsules. After the capsules are filled and polished, they are transferred to Bottling, where they are placed in bottles that are then affixed with a safety seal, lid, and label. Each bottle receives 50 capsules.

During March, the following results are available for the first two departments:

	Picking	Encapsulating
Beginning inventories:		
Physical units	10 gallons	4,000
Costs:		
Materials	\$252	\$32
Labor	\$282	\$20
Overhead	?	?
Transferred in	—	\$140

	Picking	Encapsulating
Current production:		
Transferred out	140 gallons	208,000
Ending inventory	20 gallons	6,000
Costs:		
Materials	\$3,636	\$1,573
Transferred in	—	?
Labor	\$4,618	\$1,944
Overhead	?	?
Percentage of completion:		
Beginning inventory	40%	50%
Ending inventory	50%	40%

Overhead in both departments is applied as a percentage of direct labor costs. In the picking department, overhead is 200 percent of direct labor. In the encapsulating department, the overhead rate is 150 percent of direct labor.

**Required:**

1. Prepare a production report for the picking department using the weighted average method. Follow the five steps outlined in the chapter. Round to two decimal places for the unit cost.
2. Prepare a production report for the encapsulating department using the weighted average method. Follow the five steps outlined in the chapter. Round to four decimal places for the unit cost.
3. Explain why the weighted average method is easier to use than FIFO. Explain when weighted average will give about the same results as FIFO.

**OBJECTIVE** 3

**Problem 17-57 PRODUCTION REPORT, ETHICAL BEHAVIOR**

Consider the following conversation between Gary Means, manager of a division that produces industrial machinery, and his controller, Donna Simpson, a certified management accountant and certified public accountant:

**Gary:** Donna, we have a real problem. Our operating cash is too low, and we are in desperate need of a loan. As you know, our financial position is marginal, and we need to show as much income as possible—and our assets need bolstering as well.

**Donna:** I understand the problem, but I don't see what can be done at this point. This is the last week of the fiscal year, and it looks like we'll report income just slightly above break even.

**Gary:** I know all this. What we need is some creative accounting. I have an idea that might help us, and I wanted to see if you would go along with it. We have 200 partially finished machines in process, about 20 percent complete. That compares with the 1,000 units that we completed and sold during the year. When you computed the per-unit cost, you used 1,040 equivalent units, giving us a manufacturing cost of \$1,500 per unit. That per-unit cost gives us cost of goods sold equal to \$1.5 million and ending work in process worth \$60,000. The presence of the work in process gives us a chance to improve our financial position. If we report the units in work in process as 80 percent complete, this will increase our equivalent units to 1,160. This, in turn, will decrease our unit cost to about \$1,345 and cost of goods sold to \$1.345 million. The value of our work in process will increase to \$215,200. With those financial stats, the loan would be a cinch.

**Donna:** Gary, I don't know. What you're suggesting is risky. It wouldn't take much auditing skill to catch this one.

**Gary:** You don't have to worry about that. The auditors won't be here for at least six to eight more weeks. By that time, we can have those partially completed units completed and sold. I can bury the labor cost by having some of our more loyal workers work overtime for some bonuses. The overtime will never be reported. And, as you know, bonuses come out of the corporate budget and are assigned to overhead—next year's

overhead. Donna, this will work. If we look good and get the loan to boot, corporate headquarters will treat us well. If we don't do this, we could lose our jobs.

**Required:**

1. Should Donna agree to Gary's proposal? Why or why not? To assist in deciding, review the corporate code of ethics standards described in Chapter 13 and read the Institute of Management Accountants "Statement of Ethical Professional Practice" found at [https://www.imanet.org/about\\_ethics\\_statement.asp](https://www.imanet.org/about_ethics_statement.asp). Do any of these apply?
2. Assume that Donna refuses to cooperate and that Gary accepts this decision and drops the matter. Does Donna have any obligation to report the divisional manager's behavior to a superior? Explain.
3. Assume that Donna refuses to cooperate; however, Gary insists that the changes be made. Now what should she do? What would you do?
4. Suppose that Donna is age 63 and that the prospects for employment elsewhere are bleak. Assume again that Gary insists that the changes be made. Donna also knows that his supervisor, the owner of the company, is his father-in-law. Under these circumstances, would your recommendations for Donna differ?

**Problem 17-58 (APPENDIX) FIRST-IN, FIRST-OUT METHOD; JOURNAL ENTRIES**

OBJECTIVE > 1 2 4 5

Seacrest Company uses a process-costing system. The company manufactures a product that is processed in two departments, A and B. As work is completed, it is transferred out. The following summarizes the production activity and costs for November:

	Department A	Department B
Beginning inventories:		
Physical units	5,000	8,000
Costs:		
Transferred in	—	\$45,320
Direct materials	\$10,000	—
Conversion costs	\$6,900	\$16,800
Current production:		
Units started	25,000	?
Units transferred out	28,000	33,000
Costs:		
Transferred in	—	?
Direct materials	\$57,800	\$37,950
Conversion costs	\$95,220	\$128,100
Percentage completion:		
Beginning inventory	40%	50%
Ending inventory	80%	50%

**Required:**

1. Using the FIFO method, prepare the following for Department A:
  - a. A physical flow schedule.
  - b. An equivalent unit calculation.
  - c. Calculation of unit costs. Round to two decimal places.
  - d. Cost of EWIP and cost of goods transferred out.
- e. A cost reconciliation.
2. Prepare journal entries that show the flow of manufacturing costs for Department A. Use a conversion cost control account for conversion costs. Many firms are now combining direct labor and overhead costs into one category. They are not tracking direct labor separately. Offer some reasons for this practice.

**Problem 17-59 (APPENDIX) FIRST-IN, FIRST-OUT METHOD**

OBJECTIVE > 5

Benson Pharmaceuticals uses a process-costing system to compute the unit costs of the over-the-counter cold remedies that it produces. It has three departments: Picking, Encapsulating, and Bottling. In Picking, the ingredients for the cold capsules are

measured, sifted, and blended. The mix is transferred out in gallon containers. The encapsulating department takes the powdered mix and places it in capsules. One gallon of powdered mix converts into 1,500 capsules. After the capsules are filled and polished, they are transferred to Bottling, where they are placed in bottles that are then affixed with a safety seal, lid, and label. Each bottle receives 50 capsules.

During March, the following results are available for the first two departments:

	Picking	Encapsulating
Beginning inventories:		
Physical units	10 gallons	4,000
Costs:		
Materials	\$252	\$32
Labor	\$282	\$20
Overhead	?	?
Transferred in	—	\$140
Current production:		
Transferred out	140 gallons	208,000
Ending inventory	20 gallons	6,000
Costs:		
Materials	\$3,636	\$1,573
Transferred in	—	?
Labor	\$4,618	\$1,944
Overhead	?	?
Percentage of completion:		
Beginning inventory	40%	50%
Ending inventory	50%	40%

Overhead in both departments is applied as a percentage of direct labor costs. In the picking department, overhead is 200 percent of direct labor. In the encapsulating department, the overhead rate is 150 percent of direct labor.

**Required:**

Prepare a production report for each department using the FIFO method. (*Hint:* For the second department, you must convert gallons to capsules.)

## Cases

**OBJECTIVE** > 1 2 3 4

### Case 17-60 PROCESS COSTING VERSUS ALTERNATIVE COSTING METHODS, IMPACT ON RESOURCE ALLOCATION DECISION

Golding Manufacturing, a division of Farnsworth Sporting Inc., produces two different models of bows and eight models of knives. The bow-manufacturing process involves the production of two major subassemblies: the limbs and the handles. The limbs pass through four sequential processes before reaching final assembly: layup, molding, fabricating, and finishing. In the layup department, limbs are created by laminating layers of wood. In the molding department, the limbs are heat-treated, under pressure, to form strong resilient limbs. In the fabricating department, any protruding glue or other processing residue is removed. Finally, in the finishing department, the limbs are cleaned with acetone, dried, and sprayed with the final finishes.

The handles pass through two processes before reaching final assembly: pattern and finishing. In the pattern department, blocks of wood are fed into a machine that is set to shape the handles. Different patterns are possible, depending on the machine's setting. After coming out of the machine, the handles are cleaned and smoothed. They then pass to the finishing department, where they are sprayed with the final finishes. In final assembly, the limbs and handles are assembled into different models using purchased parts such as pulley assemblies, weight-adjustment bolts, side plates, and string.

Golding, since its inception, has been using process costing to assign product costs. A predetermined overhead rate is used based on direct labor dollars (80 percent of direct labor dollars). Recently, Golding has hired a new controller, Karen Jenkins. After reviewing the product-costing procedures, Karen requested a meeting with the divisional manager, Aaron Suhr. The following is a transcript of their conversation.

**Karen:** Aaron, I have some concerns about our cost accounting system. We make two different models of bows and are treating them as if they were the same product. Now I know that the only real difference between the models is the handle. The processing of the handles is the same, but the handles differ significantly in the amount and quality of wood used. Our current costing does not reflect this difference in material input.

**Aaron:** Your predecessor is responsible. He believed that tracking the difference in material cost wasn't worth the effort. He simply didn't believe that it would make much difference in the unit cost of either model.

**Karen:** Well, he may have been right, but I have my doubts. If there is a significant difference, it could affect our views of which model is more important to the company. The additional bookkeeping isn't very stringent. All we have to worry about is the pattern department. The other departments fit what I view as a process-costing pattern.

**Aaron:** Why don't you look into it? If there is a significant difference, go ahead and adjust the costing system.

After the meeting, Karen decided to collect cost data on the two models: the Deluxe model and the Econo model. She decided to track the costs for one week. At the end of the week, she had collected the following data from the pattern department:

- a. There were a total of 2,500 bows completed: 1,000 Deluxe models and 1,500 Econo models.
- b. There was no BWIP; however, there were 300 units in EWIP: 200 Deluxe and 100 Econo models. Both models were 80 percent complete with respect to conversion costs and 100 percent complete with respect to materials.
- c. The pattern department experienced the following costs:

Direct materials	\$114,000
Direct labor	45,667

- d. On an experimental basis, the requisition forms for materials were modified to identify the dollar value of the materials used by the Econo and Deluxe models:

Econo model	\$30,000
Deluxe model	84,000

**Required:**

1. Compute the unit cost for the handles produced by the pattern department assuming that process costing is totally appropriate. Round unit cost to two decimal places.
2. Compute the unit cost of each handle using the separate cost information provided on materials. Round unit cost to two decimal places.
3. Compare the unit costs computed in Requirements 1 and 2. Is Karen justified in her belief that a pure process-costing relationship is not appropriate? Describe the costing system that you would recommend.
4. In the past, the marketing manager has requested more money for advertising the Econo line. Aaron has repeatedly refused to grant any increase in this product's advertising budget because its per-unit profit (selling price less manufacturing cost) is so low. Given the results in Requirements 1 through 3, was Aaron justified in his position?

**OBJECTIVE** > **1** **2** **3** **4**
**Case 17-61 EQUIVALENT UNITS; VALUATION OF WORK-IN-PROCESS INVENTORIES; FIRST-IN, FIRST-OUT VERSUS WEIGHTED AVERAGE**

AKL Foundry manufactures metal components for different kinds of equipment used by the aerospace, commercial aircraft, medical equipment, and electronic industries. The company uses investment casting to produce the required components. Investment casting consists of creating, in wax, a replica of the final product and pouring a hard shell around it. After removing the wax, molten metal is poured into the resulting cavity. What remains after the shell is broken is the desired metal object ready to be put to its designated use.

Metal components pass through eight processes: gating, shell creating, foundry work, cutoff, grinding, finishing, welding, and strengthening. Gating creates the wax mold and clusters the wax pattern around a sprue (a hole through which the molten metal will be poured through the gates into the mold in the foundry process), which is joined and supported by gates (flow channels) to form a tree of patterns. In the shell-creating process, the wax molds are alternately dipped in a ceramic slurry and a fluidized bed of progressively coarser refractory grain until a sufficiently thick shell (or mold) completely encases the wax pattern. After drying, the mold is sent to the foundry process. Here, the wax is melted out of the mold, and the shell is fired, strengthened, and brought to the proper temperature. Molten metal is then poured into the dewaxed shell. Finally, the ceramic shell is removed, and the finished product is sent to the cutoff process, where the parts are separated from the tree by the use of a band saw. The parts are then sent to the grinding process, where the gates that allowed the molten metal to flow into the ceramic cavities are ground off using large abrasive grinders. In the finishing process, rough edges caused by the grinders are removed by small handheld pneumatic tools. Parts that are flawed at this point are sent to welding for corrective treatment. The last process uses heat to treat the parts to bring them to the desired strength.

In 2007, the two partners who owned AKL Foundry decided to split up and divide the business. In dissolving their business relationship, they were faced with the problem of dividing the business assets equitably. Since the company had two plants—one in Arizona and one in New Mexico—a suggestion was made to split the business on the basis of geographic location. One partner would assume ownership of the plant in New Mexico, and the other would assume ownership of the plant in Arizona. However, this arrangement had one major complication: the amount of WIP inventory located in the Arizona plant.

The Arizona facilities had been in operation for more than a decade and were full of WIP. The New Mexico facility had been operational for only two years and had much smaller WIP inventories. The partner located in New Mexico argued that to disregard the unequal value of the WIP inventories would be grossly unfair.

Unfortunately, during the entire business history of AKL Foundry, WIP inventories had never been assigned any value. In computing the cost of goods sold each year, the company had followed the policy of adding depreciation to the out-of-pocket costs of direct labor, direct materials, and overhead. Accruals for the company are nearly nonexistent, and there are hardly ever any ending inventories of materials.

During 2007, the Arizona plant had sales of \$2,028,670. The cost of goods sold is itemized as follows:

Direct materials	\$378,000
Direct labor	530,300
Overhead	643,518

Upon request, the owners of AKL provided the following supplementary information (percentages are cumulative):

### Costs Used by Each Process as a Percentage of Total Cost

	Direct Materials (%)	Direct Total Labor Cost (%)
Gating	23	35
Shell creating	70	50
Foundry work	100	70
Cutoff	100	72
Grinding	100	80
Finishing	100	90
Welding	100	93
Strengthening	100	100

Gating had 10,000 units in BWIP, 60 percent complete. Assume that all materials are added at the beginning of each process. During the year, 50,000 units were completed and transferred out. The ending inventory had 11,000 unfinished units, 60 percent complete.

#### Required:

- The partners of AKL want a reasonable estimate of the cost of WIP inventories. Using the gating department's inventory as an example, prepare an estimate of the cost of the EWIP. What assumptions did you make? Did you use the FIFO or weighted average method? Why? Round unit cost to two decimal places.
- Assume that the shell-creating process has 8,000 units in BWIP, 20 percent complete. During the year, 50,000 units were completed and transferred out. (All 50,000 units were sold; no other units were sold.) The EWIP inventory had 8,000 units, 30 percent complete. Compute the value of the shell-creating department's EWIP. What additional assumptions had to be made?

# 18

## Activity-Based Costing and Management

After studying Chapter 18, you should be able to:

- **1** Explain why functional (or volume)-based costing approaches may produce distorted costs.
- **2** Explain how an activity-based costing system works for product costing.
- **3** Describe activity-based customer costing and activity-based supplier costing.
- **4** Explain how activity-based management can be used for cost reduction.





# **E**xperience Managerial Decisions with Cold Stone Creamery

Experts believe that ice cream as we currently know it was invented in the 1600s and was popularized in part by Charles I of England as he made it a staple of the royal table. Ice cream remains as popular as ever today. However, trips to the local ice cream parlor have changed dramatically over the past quarter century. **Cold Stone Creamery**, founded in 1988 in Tempe, Arizona, has helped to lead this change with its innovative new business model focused on making the ice cream trip an entertainment experience for the entire family. Cold Stone operates 1,400 stores worldwide, with another 1,000 franchises in the works. Cold Stone executives must understand and control the company's complex cost structure in order to profitably manage its ice cream empire. For example, its most popular product line—ice cream with “mix in” ingredients—boasts 16 basic ice cream flavors with 30 different ingredients and three sizes, which represents a total of over 1,400 possible ice cream product options! These impressively numerous selection opportunities are great for customers with varied tastes but are quite challenging for Cold Stone to manage given the different types of activities associated with different types of product orders. Therefore, Cold Stone adopted activity-based costing (ABC) first to identify the activity drivers associated with each type of ice

cream order and then to estimate the costs of these activities.

Two important drivers of costs for Cold Stone include ingredients and time, both of which vary significantly across different ice cream product orders. With the insights gained from its ABC analysis, Cold Stone understands the cost of various orders' preparation time, which is measured in seconds. In addition to labor, Cold Stone's ABC system considers the costs associated with training, uniforms, and employee benefits when estimating the cost of each second required in making each product. When combined with other costs, the ABC analysis provides an estimate of profit margin by product type. If a particular product is not making its expected margin, Cold Stone managers know to look at the activities involved in creating the product and to fine-tune that activity. Understanding its complex cost structure provides Cold Stone managers with a significant challenge. However, it is the mastery of this costing challenge that has provided Cold Stone with a valuable competitive advantage to become one of the most profitable and fastest-growing franchises in America.



**OBJECTIVE** > 1

Explain why functional (or volume)-based costing approaches may produce distorted costs.

## Limitations of Functional-Based Cost Accounting Systems

Plantwide and departmental rates based on direct labor hours, machine hours, or other volume-based measures have been used for decades to assign overhead costs to products and continue to be used successfully by many organizations. However, for many settings, this approach to costing is equivalent to an averaging approach and may produce distorted, or inaccurate, costs. Distorted costs can be a real problem in extremely competitive environments like the automobile industry, where in 2007 **General Motors**, for the first time in 76 years, lost its spot as the world's largest automaker as a result of unrelenting competition from an increasing number of competitors like **Toyota**. To understand why average costing can cause difficulties, consider the case where two individuals go out for dinner. One orders steak and lobster, costing \$40, and the other orders a chef salad, costing \$10. Thus, the total cost of the food is \$50. If the bill is split evenly between the two, each individual would pay \$25. The \$25 would be the average cost of the meals, but it doesn't represent well the actual cost of each meal. One meal is overstated by \$15, and the other is understated by \$15. If it is important to know the cost of each meal (e.g., so that the one ordering steak and lobster can be reimbursed by his company), then the averaging approach will not be suitable.

In the same way, plantwide and departmental rates can produce average costs that severely under- or overstate individual product costs. Product cost distortions can be damaging, particularly for those firms whose business environment is characterized by intense or increasing competitive pressures (often on a worldwide level), small profit margins, continuous improvement, total quality management, total customer satisfaction, and sophisticated technology. Firms operating in these types of business environments in particular need accurate cost information in order to make effective decisions. In order for accurate cost information to be produced, it is important that the firm's cost system accurately reflect the firm's underlying business, or economic, reality. However, as firms operating in an intensely competitive environment (or the other environments mentioned above) adopt new strategies to achieve competitive excellence, their cost accounting systems often must change to keep pace. Unfortunately, due to the time commitment and costs required to change cost systems, some firms do not change their systems when their business environment changes. Cost distortions subsequently result due to the poor matching between the firm's actual business reality and the cost system's representation of that reality. Thus it is important that the managerial accountant continually ask the question, "How well does the cost system's *representation* of my business match the economic *reality* of my business?" If the answer is "not very well," then it is likely that the cost system needs to be changed. Therefore, in much the same way that financial statements must be transparent for external users, the cost system must be transparent in its assignment of costs for internal users.

The need for more accurate product costs has forced many companies to take a serious look at their costing procedures. At least two major factors impair the ability of unit-based plantwide and departmental rates to assign overhead costs accurately: (1) the proportion of nonunit-related overhead costs to total overhead costs is large, and (2) the degree of product diversity is great.

### Nonunit-Related Overhead Costs

The use of either plantwide rates or departmental rates assumes that a product's consumption of overhead resources is related strictly to the units produced. For **unit-level activities**—activities that are performed each time a unit is produced—this assumption makes sense. Traditional, volume-based cost systems label the costs associated with these activities as variable in nature, because they increase or decrease in direct proportion to increases or decreases in the levels of these unit-level activities. All other costs (i.e., ones that are not unit-level) are considered fixed by volume-based cost systems.

But what if there are *nonunit-level activities*—activities that are not performed each time a unit of product is produced? The costs associated with these nonunit-level activities are unlikely to vary (i.e., increase or decrease) with units produced. However, sometimes these costs vary with some other factor(s), besides units, and identifying such factor(s) is very helpful in predicting and managing these costs. Proponents of activity-based costing (ABC) refer to the ABC cost hierarchy that categorizes costs either as *unit-level* (i.e., vary with output volume), *batch-level* (i.e., vary with the number of groups or batches that are run), *product-sustaining* (i.e., vary with the diversity of the product or service line), or *facility-sustaining* (i.e., do not vary with any factor but are necessary in operating the plant).<sup>1</sup> Exhibit 18-1 shows the activity-based costing hierarchy. ABC is discussed in detail later in this chapter, but the ABC cost hierarchy is identified at this point to illustrate its usefulness in helping managers realize that certain costs associated with nonunit-level activities are driven by other factors.

Consider the following two examples of nonunit-level activities: setting up equipment and reengineering products. Often, the same equipment is used to produce different products. Setting up equipment means to prepare it for the particular type of product being made. For example, a vat may be used to dye t-shirts. After completing a batch of 1,000 red t-shirts, the vat must be carefully cleaned before a batch of 3,000 green t-shirts is produced. Thus, setup costs are incurred each time a batch of products is produced. A batch may consist of 1,000 or 3,000 units, and the cost of setup is the same. Yet as more setups are done, setup costs increase. The number of setups (a batch-level cost), not the number of units produced (a unit-level cost), is a much better measure of the consumption of the setup activity.

At times, based on customer feedback, firms face the necessity of redesigning their products. This product reengineering activity is authorized by a document called an *engineering work order*. For example, **Rio Novo**, a Brazilian appliance manufacturer, may issue engineering work orders to correct design flaws of its refrigerators, freezers, and washers. Product reengineering costs may depend on the number of different engineering work orders (a product-sustaining cost) rather than the units produced of any given product. Thus, *nonunit-level drivers* such as setups and engineering orders are needed for accurate cost assignment of nonunit-level activities. Also, **JetBlue**'s decision to add a second type of jet, the Embraer 190, to its existing fleet of Airbus A320s, caused it to incur significant additional product-sustaining costs that it would not have incurred had it stayed with only one type of plane. These

## Exhibit 18-1

## ABC Hierarchy

Type of Cost	Description of Cost Driver	Example
Unit-level	Varies with output volume (eg., units); traditional variable costs	Cost of indirect materials for labeling each bottle of <b>Victoria's Secret</b> perfume
Batch-level	Varies with the number of batches produced	Cost of setting up laser engraving equipment for each batch of <b>Epilog</b> key chains
Product-sustaining	Varies with the number of product lines	Cost of inventory handling and warranty servicing of different brands carried by <b>Best Buy</b> electronics store
Facility-sustaining	Necessary to operate the plant facility but does not vary with units, batches, or product lines	Cost of General Motors plant manager salary

<sup>1</sup>R. Cooper, Cost Classification in Unit-Based and Activity-Based Manufacturing Cost Systems, *Journal of Cost Management for the Manufacturing Industry* (Fall 1990): 4-14.

additional product-sustaining costs included the costs for doubling the spare parts inventory, maintenance programs, and separate pilot-training tracks.<sup>2</sup> Therefore, **nonunit-level activity drivers** (i.e., batch, product-sustaining, and facility-sustaining) are factors that measure the consumption of nonunit-level activities by products and other cost objects, whereas **unit-level activity drivers** measure the consumption of unit-level activities. **Activity drivers**, then, are factors that measure the consumption of activities by products and other cost objects and can be classified as either *unit-level* or *nonunit-level*.

Using only unit-based activity drivers to assign nonunit-related overhead costs can create distorted product costs. The severity of this distortion depends on what proportion of total overhead costs these nonunit-based costs represent. For many companies, this percentage can be significant. This possibility suggests that some care should be exercised in assigning nonunit-based overhead costs. If nonunit-based overhead costs are only a small percentage of total overhead costs, then the distortion of product costs will be quite small. In such a case, using unit-based activity drivers to assign overhead costs is acceptable.

## CONCEPT Q&A

One department inspects each product produced. A second department inspects a small sample of each batch of products produced. Which inspection activity is unit-level, and which is nonunit-level?

*A unit-level activity is performed each time a unit is produced, whereas a nonunit-level activity is performed at times that do not correspond to individual unit production. Thus, inspection is unit-level for the first department and nonunit-level for the second department.*

**Possible Answer:**

## Product Diversity

The presence of significant nonunit overhead costs is a necessary but not sufficient condition for plantwide and departmental rate failure (i.e., distorted costs). For example, if products consume the nonunit-level overhead activities in the same proportion as the unit-level overhead activities, then no product-costing distortion will occur (with the use of traditional overhead assignment methods). The presence of product diversity is also necessary for product cost distortion to occur. **Product diversity** means that products consume overhead activities in systematically different proportions. This may occur for several reasons. For example, differences in product size, product complexity, setup time, and size of batches all can cause products to consume overhead at different rates. Regardless of the nature of the product diversity, product cost will be distorted whenever the quantity of unit-based overhead that a product consumes does not vary in direct proportion to the quantity consumed of nonunit-based overhead. The proportion of each activity consumed by a product is defined as the **consumption ratio**. How nonunit-level overhead costs and product diversity can produce distorted product costs is discussed next.

## Illustrating the Failure of Unit-Based Overhead Rates

To illustrate how traditional unit-based overhead rates can distort product costs, we will provide detailed information for Rio Novo's Porto Belho plant. The Porto Belho plant produces two models of washers: a deluxe and a regular model. The detailed data are provided in Exhibit 18-2 (assume that the measures are expected and actual outcomes). Because the quantity of regular models produced is 10 times greater than that of the deluxe, we can label the regular model a high-volume product and the deluxe model a low-volume product. The models are produced in batches.

Remember that prime costs represent direct materials and direct labor. Given that these costs are direct in nature, they can be traced to each individual unit produced. It is the indirect, or overhead, costs that typically are treated differently by different types of cost systems. Usually, activity-based cost systems generate more accurate cost data than unit-based cost systems because of their more appropriate treatment of overhead costs. For simplicity, only four types of overhead activities, performed by four distinct support departments, are assumed: setting up the equipment for each

<sup>2</sup>S. Carey, "Balancing Act: Amid JetBlue's rapid ascent, CEO adopts big rivals' traits," *The Wall Street Journal* (August 25, 2005).

## Exhibit 18-2

## Product-Costing Data

	Activity Usage Measures		
	Deluxe	Regular	Total
Units produced	10	100	110
Prime costs	\$800	\$8,000	\$8,800
Direct labor hours	20	80	100
Machine hours	10	40	50
Setup hours	3	1	4
Number of moves	6	4	10

Activity	Activity Cost Data (Overhead Activities)
	Activity Cost
Setting up equipment	\$1,200
Moving goods	800
Machining	1,500
Assembly	500
Total	<u>\$4,000</u>

batch (different configurations are needed for the electronic components associated with each model), moving a batch, machining, and assembly. Assembly is performed after each department's operations.

**Problems with Costing Accuracy** The activity usage data in Exhibit 18-2 reveal some serious problems with either plantwide or departmental rates for assigning overhead costs. The main problem with either procedure is the assumption that unit-level drivers such as machine hours or direct labor hours drive or cause all overhead costs.

From Exhibit 18-2, it can be seen that regular models, the high-volume product, use four times as many direct labor hours as deluxe models, the low-volume product (80 hours vs. 20 hours). Thus, if a plantwide rate is used, the regular models will be assigned four times more overhead cost than the deluxe models. But is this reasonable? Do unit-based drivers explain the consumption of all overhead activities? In particular, is it reasonable to assume that each product's consumption of overhead increases in direct proportion to the direct labor hours used? Now consider the four overhead activities to see if the unit-level drivers accurately reflect the demands of regular and deluxe model production.

Examination of the data in Exhibit 18-2 suggests that a significant portion of overhead costs is not driven or caused by direct labor hours. Each product's demands for setup and material-moving activities are more logically related to the setup hours and the number of moves, respectively. These nonunit activities represent 50 percent ( $\$2,000/\$4,000$ ) of the total overhead costs—a significant percentage. Notice that the low-volume product, deluxe models, uses three times more setup hours than the regular models (3/1) and one and a half as many moves (6/4). However, using a plantwide rate based on direct labor hours, a unit-based activity driver assigns four times more setup and material moving costs to the regular models than to the deluxe. Thus, product diversity exists, and we should expect product cost distortion because the quantity of unit-based overhead that each product consumes does not vary in direct proportion to the quantity consumed of nonunit-based overhead.

**Cornerstone 18-1** illustrates how to calculate the consumption ratios for the two products. Consumption ratios represent the proportion of each activity consumed by a product.

## ANALYTICAL Q&amp;A

The activity driver for the receiving activity is number of orders processed. Product A uses 10 orders, and Product B uses 30 orders. Calculate the consumption ratios for Product A and Product B.

$$\text{Product A} = 10/40 = 0.25; \text{Product B} = 30/40 = 0.75.$$

Answer:



## CORNERSTONE 18-1



### HOW TO Calculate Consumption Ratios

**Information:**

Activity usage information, Exhibit 18-2.

**Required:**

Calculate the consumption ratios for each product.

**Solution:**

First, we must identify the activity driver for each activity. Next, divide the amount of driver used for each product by the total driver quantity. We obtain the following:

Overhead Activity	Consumption Ratios		Activity Driver
	Deluxe Model	Regular Model	
Setting up equipment	0.75 <sup>a</sup>	0.25 <sup>a</sup>	Setup hours
Moving goods	0.60 <sup>b</sup>	0.40 <sup>b</sup>	Number of moves
Machining	0.20 <sup>c</sup>	0.80 <sup>c</sup>	Machine hours
Assembly	0.20 <sup>d</sup>	0.80 <sup>d</sup>	Direct labor hours

<sup>a</sup> 3/4 (deluxe) and 1/4 (regular).

<sup>b</sup> 6/10 (deluxe) and 4/10 (regular).

<sup>c</sup> 10/50 (deluxe) and 40/50 (regular).

<sup>d</sup> 20/100 (deluxe) and 80/100 (regular).

The consumption ratios suggest that a plantwide rate based on direct labor hours will overcost the regular models and undercost the deluxe models.

**Solving the Problem of Cost Distortion** The cost distortion just described can be solved by the use of activity rates. That is, rather than assigning the overhead costs by using a single, plantwide rate, why not calculate a rate for each overhead activity and then use these activity rates to assign overhead costs? **Cornerstone 18-2** shows how to calculate these rates.



## CORNERSTONE 18-2



### HOW TO Calculate Activity Rates

**Information:**

(from Exhibit 18-2)

Activity	Activity Cost (\$)	Driver	Driver Quantity
Setting up equipment	1,200	Setup hours	4
Moving goods	800	Number of moves	10
Machining	1,500	Machine hours	50
Assembly	500	Direct labor hours	100

**Required:**

Calculate activity rates.

**Solution:**

The rates are obtained by dividing the activity cost by the total driver quantity:

Setup rate:	$\$1,200/4$ setup hours = \$300 per setup hour
Materials handling rate:	$\$800/10$ moves = \$80 per move
Machining rate:	$\$1,500/50$ machine hours = \$30 per machine hour
Assembly rate:	$\$500/100$ direct labor hours = \$5 per direct labor hour

To assign overhead costs, the amount of activity consumed by each product is needed along with the activity rates. **Cornerstone 18-3** shows how to calculate the unit cost for each product by using activity rates. A visual summary is provided in Exhibit 18-3.

**Comparison of Functional-Based and Activity-Based Product Costs** A plantwide rate based on direct labor hours is calculated by dividing the total overhead costs by the total direct labor hours:  $\$4,000/100 = \$40$  per direct labor hour. The product cost for each product using this single unit-level overhead rate is calculated as follows:

	Deluxe	Regular
Prime costs	\$ 800	\$ 8,000
Overhead costs:		
$\$40 \times 20$	800	
$\$40 \times 80$		3,200
Total cost	\$1,600	\$11,200
Units produced	$\div 10$	$\div 100$
Unit cost	\$ 160	\$ 112

## ANALYTICAL Q&A

Inspecting provides 4,000 inspection hours and costs \$80,000 per year. What is the activity rate for inspecting?

$$\text{Rate} = \$80,000 / 4,000 \text{ inspection hours} = \$20 \text{ per inspection hour.}$$

Answer:

### HOW TO Calculate Activity-Based Unit Costs

#### Information:

	Deluxe	Regular	Activity Rate (\$)
Units produced per year	10	100	
Prime costs	\$800	\$8,000	
Setup hours	3	1	\$300
Number of moves	6	4	\$ 80
Machine hours	10	40	\$ 30
Direct labor hours	20	80	\$ 5

#### Required:

Calculate the unit cost for deluxe and regular models.

#### Solution:

	Deluxe	Regular
Prime costs	\$ 800	\$ 8,000
Overhead costs:		
Setups:		
$\$300 \times 3$ setup hours	900	
$\$300 \times 1$ setup hour		300
Moving materials:		
$\$80 \times 6$ moves	480	
$\$80 \times 4$ moves		320
Machining:		
$\$30 \times 10$ machine hours	300	
$\$30 \times 40$ machine hours		1,200
Assembly:		
$\$5 \times 20$ direct labor hours	100	
$\$5 \times 80$ direct labor hours		400
Total manufacturing costs	\$2,580	\$10,220
Units produced	$\div 10$	$\div 100$
Unit cost (Total costs/Units)	\$ 258	\$102.20

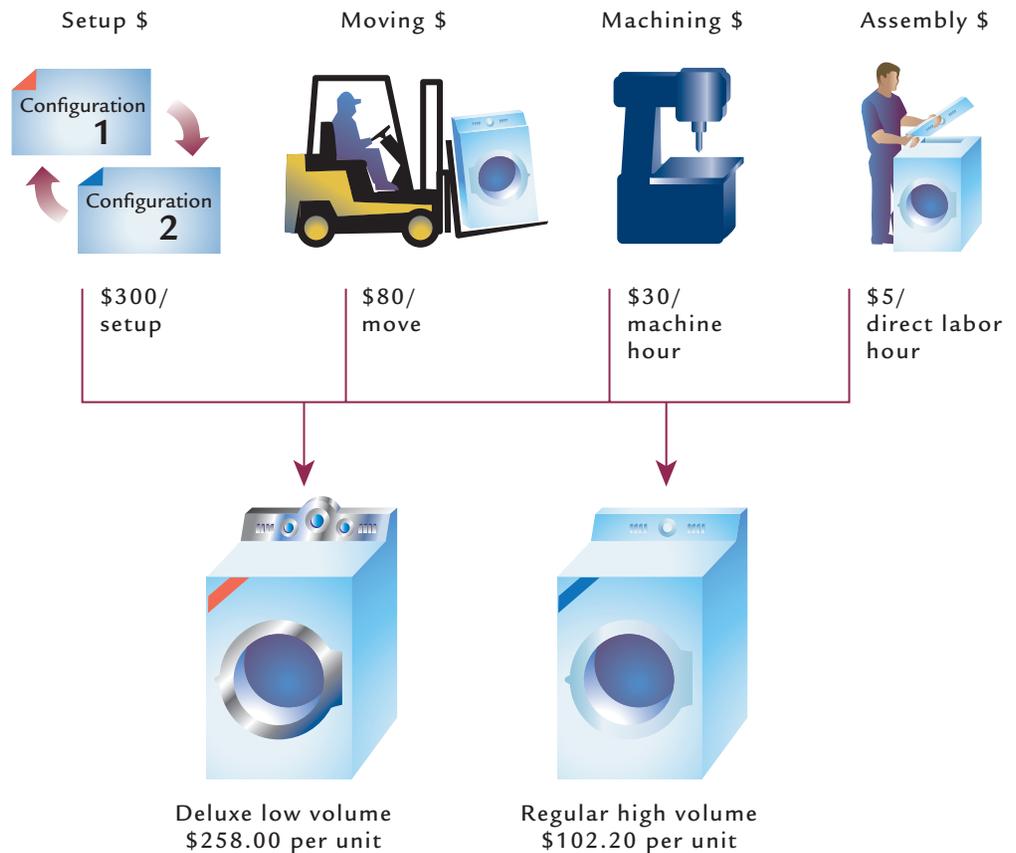


### CORNERSTONE 18-3



**Exhibit 18-3**

**Visual Summary of Cornerstones 18-2 and 18-3**



**ANALYTICAL Q&A**

Producing 5,000 units of a DVD player requires \$150,000 of prime costs, uses 1,000 machine hours, and takes 600 setup hours. The activity rates are \$20 per machine hour and \$50 per setup hour. What is the unit cost of a DVD player?

**Answer:**  $Unit\ cost = (\$150,000 + (\$20 \times 1,000) + (\$50 \times 600)) / 5,000 = \$40.$

Now compare these product costs with the activity-based cost of Cornerstone 18-3. This comparison clearly illustrates the effects of using only unit-based activity drivers to assign overhead costs. The activity-based cost assignment reflects the pattern of overhead consumption and is, therefore, the most accurate. Activity-based product costing reveals that functional-based costing undercosts the low volume deluxe models and overcosts the high volume regular models. In fact, the ABC assignment increases the reported cost of the deluxe models by \$98 per unit and decreases the reported cost of the regular models by almost \$10 per unit—a movement in the right direction given the pattern of overhead consumption. In a diverse product environment, activity-based costing promises greater accuracy, and given the importance of making decisions based on accurate facts, a detailed look at activity-based costing is certainly merited.

**ETHICS** One of the ethical standards of the Institute of Management Accountants (IMA) requires that its members maintain professional expertise by continually developing knowledge and skills. An interesting issue is whether accounting professionals who resist learning different cost management methods are exhibiting ethical behavior. At the very least, cost accounting professionals should learn about different approaches and assess whether the benefit-cost trade-offs justify their use. ♦

**OBJECTIVE** 2 Explain how an activity-based costing system works for product costing.

**Activity-Based Product Costing: Detailed Description**

Functional-based overhead costing involves two major stages: first, overhead costs are assigned to an organizational unit (plant or department), and second, overhead costs

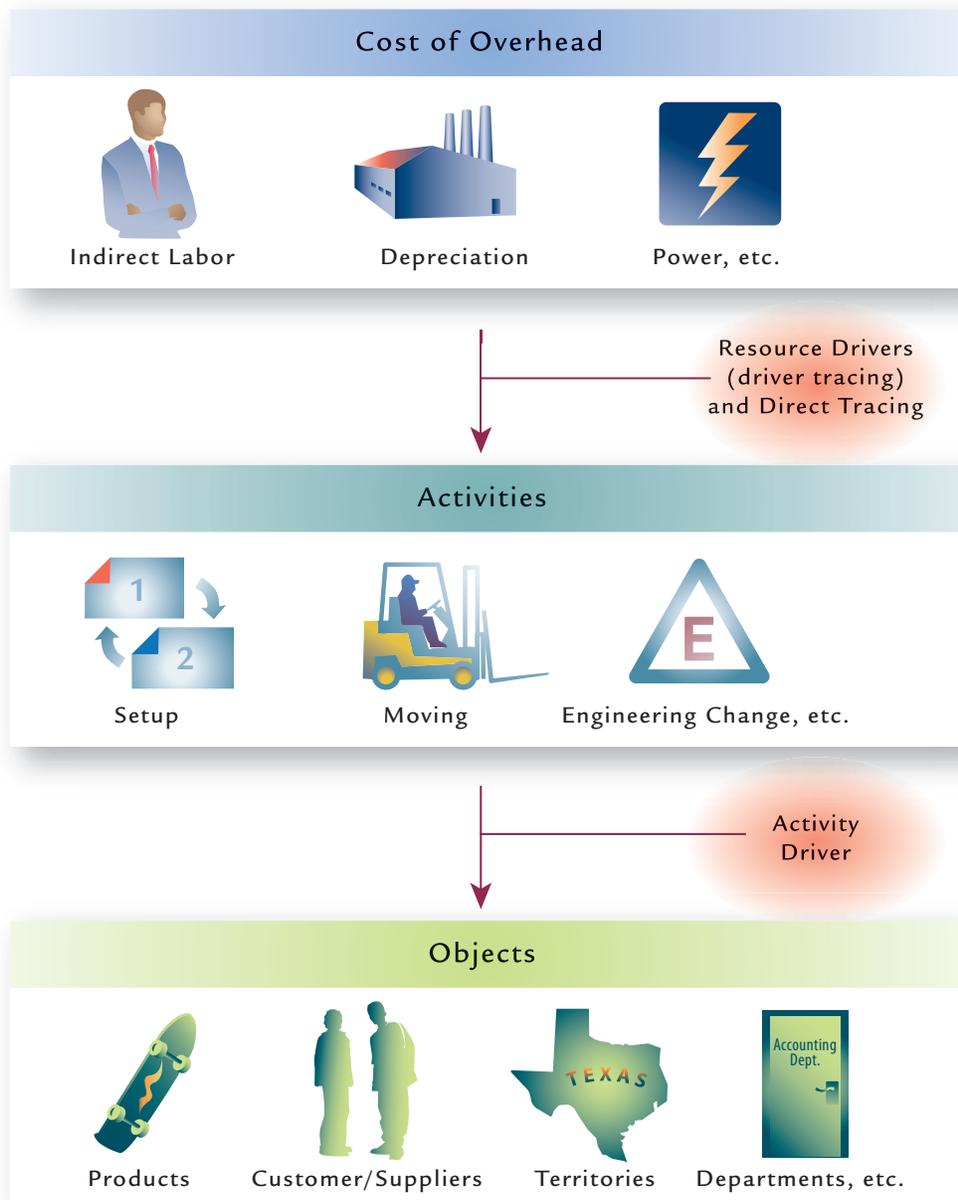
are then assigned to cost objects. As Exhibit 18-4 illustrates, an **activity-based costing (ABC) system** first traces costs to activities and then to cost objects. The underlying assumption is that activities consume resources, and cost objects, in turn, consume activities. Thus, ABC also is a two-stage process. An ABC system, however, emphasizes direct tracing and driver tracing (exploiting cause-and-effect relationships), while a volume-based costing system tends to be allocation-intensive (largely ignoring cause-and-effect relationships). As the Exhibit 18-4 model reveals, the focus of ABC is activities. Thus identifying activities must be the first step in designing an ABC system.

## Identifying Activities and Their Attributes

Since an activity is action taken or work performed by equipment or people for other people, identifying activities usually is accomplished by interviewing managers or

Exhibit 18-4

### Activity-Based Costing: Two-Stage Assignment



## CONCEPT Q&A

What are some key differences between ABC and volume-based costing?

ABC uses cause-and-effect relationships to assign overhead costs. Volume-based costing uses unit-based drivers such as direct labor hours, which often have nothing to do with the actual overhead resources consumed by a product.

Possible Answer:

representatives of functional work areas (departments). A set of key questions is asked in which answers provide much of the data needed for an ABC system. These interview-derived data are used to prepare an *activity dictionary*. An **activity dictionary** lists the activities in an organization along with some critical activity attributes. **Activity attributes** are financial and nonfinancial information items that describe individual activities. What attributes are used depends on the purpose. Examples of activity attributes associated with a costing objective include types of resources consumed, amount (percentage) of time spent on an activity by workers, cost objects that consume the activity output (reason for performing the activity), a measure of the activity output (activity driver), and the activity name. To prevent the number of

activities from becoming unmanageably large, a common rule of thumb employed by the interviewer is to tell the interviewee to ignore activities that require less than 5 percent of an individual's time.

**Set of Key Questions** Interview questions can be used to identify activities and activity attributes needed for costing purposes. The information derived from these questions serves as the basis for constructing an activity dictionary as well as providing data helpful for assigning resource costs to individual activities. The list is not exhaustive but serves to illustrate the nature of the information gathering process.

1. How many employees are in your department? (Activities consume labor.)
2. What do they do (please describe)? (Activities are people doing things for other people.)
3. Do customers outside your department use any equipment? (Activities also can be equipment working for other people. In other words, the equipment provides the service for someone by itself.)
4. What resources are used by each activity (equipment, materials, energy)? (Activities consume resources in addition to labor.)
5. What are the outputs of each activity? (Helps to identify activity drivers.)
6. Who or what uses the activity output? (Identifies the cost object: products, other activities, customers, etc.)
7. How much time do workers spend on each activity? Time on each activity by equipment? (Information needed to assign the cost of labor and equipment to activities.)

**Illustrative Example: Service Firm** Suppose that a manager of a bank's credit card department is interviewed and presented with the seven questions just listed. Consider the purpose and response to each question in the order indicated.

- *Question 1 (labor resource)*: There are five employees.
- *Question 2 (activity identification)*: There are three major activities: processing credit card transactions, issuing customer statements, and answering customer questions.
- *Question 3 (activity identification)*: Yes. Automatic bank tellers service customers who require cash advances.
- *Question 4 (resource identification)*: Each employee has his or her own computer, printer, and desk. Paper and other supplies are needed to operate the printers. Each employee has a telephone as well.
- *Question 5 (potential activity drivers)*: Processing transactions produces a posting for each transaction in our computer system and serves as a source for preparing the monthly statements. The number of monthly customer statements has to be the product for the issuing activity, and I suppose that customers served is the output for the answering activity. The number of cash advances measures the product

of the automatic teller activity, although the teller really generates more transactions for other products such as checking accounts. So, perhaps the number of teller transactions is the real output.

- *Question 6 (potential cost objects identified)*: We have three products: classic, gold, and platinum credit cards. Transactions are processed for these three types of cards, and statements are sent to clients holding these cards. Similarly, answers to questions are all directed to clients who hold these cards.
- *Question 7 (identifying resource drivers)*: I just completed a work survey and have the percentage of time calculated for each worker. All five clerks work on each of the three departmental activities. About 40 percent of their time is spent processing transactions, with the rest of their time split evenly between preparing statements and answering questions. Phone time is used only for answering client questions, and computer time is 70 percent transaction processing, 20 percent statement preparation, and 10 percent answering questions. Furthermore, my own time and that of my computer are 100 percent administrative.

## CONCEPT Q&A

What is the purpose of the interview questions?

**Possible Answer:**  
The purpose is to identify activities, drivers, and other important attributes essential for ABC.

**Activity Dictionary** Based on the answers to the survey, an activity dictionary can now be prepared. Exhibit 18-5 illustrates the dictionary for the credit card department. The activity dictionary names the activity (usually by using an action verb and an object that receives the action), describes the tasks that make up the activity, lists the users (cost objects), and identifies a measure of activity output (activity driver). The three products, classic, gold, and platinum credit cards, in turn, consume the activities. It is not unusual for a typical organization to produce an activity dictionary containing 200 to 300 activities.

## Assigning Costs to Activities

Once activities are identified and described, the next task is to determine how much it costs to perform each activity. This determination requires identification of the resources being consumed by each activity. Some cost system experts consider this task to be the most difficult one in creating an accurate cost system. Activities consume resources such as labor, materials, energy, and capital. The cost of these resources is found in the general ledger, but the money spent on each activity is not revealed. Thus, it becomes necessary to assign the resource costs to activities by using direct and driver tracing. For labor resources, a *work distribution matrix* often is used. A work distribution matrix identifies the amount of labor consumed by each activity and is derived from the interview process (or a written survey). Exhibit 18-6 provides an example of a work distribution matrix supplied by the manager of the credit card department for individual activities (refer to Question 7).

Exhibit 18-5

### Activity Dictionary: Credit Card Department

Activity Name	Activity Description	Cost Object(s)	Activity Driver
Processing	Sorting, keying, and transactions verifying	Credit cards	Number of transactions
Preparing statements	Reviewing, printing, stuffing, and mailing	Credit cards	Number of statements
Answering questions	Answering, logging, reviewing database, and making call backs	Credit cards	Number of cards
Providing automatic tellers	Accessing accounts, withdrawing funds	Credit cards, checking and savings accounts	Number of teller transactions

**Exhibit 18-6**

**Work Distribution Matrix**

Activity	Percentage of Time on Each Activity
Processing transactions	40%
Preparing statements	30%
Answering questions	30%

**CONCEPT Q&A**

How are resource costs assigned to activities?

Resource costs are assigned by using both direct tracing (for exclusive—direct—resources) and driver tracing (for shared—indirect—resources).

**Possible Answer:**

From Exhibit 18-4, we know that both direct tracing and driver tracing are used to assign resource costs to activities. For this example, the time spent on each activity is the basis for assigning the labor costs to the activity. If the time is 100 percent, then labor is exclusive to the activity, and the assignment method is direct tracing. If the resource is shared by several activities (as is the case of the clerical resource), then the assignment is driver tracing, and the drivers are called *resource drivers*. **Resource drivers** are factors that measure the consumption of resources by activities. Once resource drivers are identified, then the costs of the

resource can be assigned to the activity. **Cornerstone 18-4** shows how resource drivers and direct tracing are used to assign labor cost to the credit department activities.



**CORNERSTONE 18-4**



**HOW TO Assign Resource Costs to Activities by Using Direct Tracing and Resource Drivers**

**Information:**

Assume that each clerk is paid a salary of \$30,000 (\$150,000 total clerical cost for five clerks). Refer also to the work distribution matrix of Exhibit 18-6.

**Required:**

Assign the cost of labor to each of the activities in the credit department.

**Solution:**

The amount of labor cost assigned to each activity is given below. The percentages come from the work distribution matrix.

Processing transactions	\$60,000 (0.4 × \$150,000)
Preparing statements	\$45,000 (0.3 × \$150,000)
Answering questions	\$45,000 (0.3 × \$150,000)

Labor, of course, is not the only resource consumed by activities. Activities also consume materials, capital, and energy. The interview, for example, reveals that the activities within the credit card department use computers (capital), phones (capital), desks (capital), and paper (materials). The automatic teller activity uses the automatic teller (capital) and energy. The cost of these other resources must also be assigned to the various activities. They are assigned in the same way as was described for labor (using direct tracing and resource drivers). The cost of computers could be assigned by using direct tracing (for the supervising activity) and hours of usage for the remaining activities. From the interview, we know the relative usage of computers by each activity. The general ledger reveals that the cost per computer is \$1,200 per year. Thus, an additional \$6,000 (5 × \$1,200) would be assigned to three activities based on relative usage: 70 percent to processing transactions (\$4,200), 20 percent to preparing statements (\$1,200), and 10 percent to answering questions (\$600). Repeating this process for all resources, the total cost of each activity can be calculated. Exhibit 18-7 gives the cost of the activities associated with the credit card department under the assumption that all resource costs have been assigned (these numbers are assumed because all resource data are not given for their calculation).

## Exhibit 18-7

## Activity Costs, First Stage: Credit Card Department

Processing transactions	\$130,000
Preparing statements	102,000
Answering questions	92,400
Providing automatic tellers	250,000

## Assigning Costs to Products

From Cornerstone 18-3, we know that activity costs are assigned to products by multiplying a predetermined activity rate by the usage of the activity, as measured by activity drivers. Exhibit 18-5 identified the activity drivers for each of the four credit card activities: number of transactions for processing transactions, number of statements for preparing statements, number of calls for answering questions, and number of teller transactions for the activity of providing automatic tellers. To calculate an activity rate, the practical capacity of each activity must be determined. To assign costs, the amount of each activity consumed by each product must also be known. Assuming that the practical activity capacity is equal to the total activity usage by all products, the following actual data have been collected for the credit card example:

	Classic Card	Gold Card	Platinum Card	Total
Number of cards	5,000	3,000	2,000	10,000
Transactions processed	600,000	300,000	100,000	1,000,000
Number of statements	60,000	36,000	24,000	120,000
Number of calls	10,000	12,000	8,000	30,000
Number of teller transactions*	15,000	3,000	2,000	20,000

\* The number of teller transactions for the cards is 10 percent of the total transactions from all sources. Thus, teller transactions total 20,000 ( $0.10 \times 200,000$ ).

Applying Cornerstone 18-2 by using the data and costs from Exhibit 18-7, the activity rates are calculated as follows:

## Rate calculations:

Processing transactions:	$\$130,000/1,000,000 = \$0.13$ per transaction
Preparing statements:	$\$102,000/120,000 = \$0.85$ per statement
Answering questions:	$\$92,400/30,000 = \$3.08$ per call
Providing automatic tellers:	$\$250,000/200,000 = \$1.25$ per transaction

These rates provide the cost of each activity usage. Using these rates, costs are assigned as shown in Exhibit 18-8. However, we now know the whole story behind the development of the activity rates and usage measures. Furthermore, the banking setting emphasizes the utility of ABC in service organizations.

## Activity-Based Customer Costing and Activity-Based Supplier Costing

ABC systems originally became popular for their ability to improve product-costing accuracy by tracing activity costs to the products that consume the activities. However, since the beginning of the 21st century, the use of ABC has expanded into areas upstream (i.e., before the production section of the value chain—research and development, prototyping, etc.) and downstream (i.e., after the production section of the

## ANALYTICAL Q&amp;A

A company has three inspectors, each earning a salary of \$50,000. One inspector works exclusively on inspecting parts received from outside suppliers, while the other two spend 30 percent of their time inspecting parts and 70 percent of their time inspecting final products. How much labor cost should be assigned to the activity of inspecting parts?

$$\text{Answer: } \text{Cost assigned} = \$50,000 + (\$50,000 \times 0.30) + (\$50,000 \times 0.30) = \$80,000$$

## OBJECTIVE 3

Describe activity-based customer costing and activity-based supplier costing.

## Exhibit 18-8

## Assigning Costs: Final Stage

	Gold	Classic	Platinum
Processing transactions:			
$\$0.13 \times 600,000$	\$ 78,000		
$\$0.13 \times 300,000$		\$ 39,000	
$\$0.13 \times 100,000$			\$ 13,000
Preparing statements:			
$\$0.85 \times 60,000$	51,000		
$\$0.85 \times 36,000$		30,600	
$\$0.85 \times 24,000$			20,400
Answering questions:			
$\$3.08 \times 10,000$	30,800		
$\$3.08 \times 12,000$		36,960	
$\$3.08 \times 8,000$			24,640
Providing automatic tellers:			
$\$1.25 \times 15,000$	18,750		
$\$1.25 \times 3,000$		3,750	
$\$1.25 \times 2,000$			2,500
Total costs	<u>\$ 178,550</u>	<u>\$ 110,310</u>	<u>\$ 60,540</u>
Units	<u><math>\div 5,000</math></u>	<u><math>\div 3,000</math></u>	<u><math>\div 2,000</math></u>
Unit cost	<u>\$ 35.71</u>	<u>\$ 36.77</u>	<u>\$ 30.27</u>

value chain—marketing, distribution, customer service, etc.) from production. Specifically, ABC often is used to more accurately determine the upstream costs of suppliers and the downstream costs of customers. Knowing the costs of suppliers and customers can be vital information for improving a company's profitability.

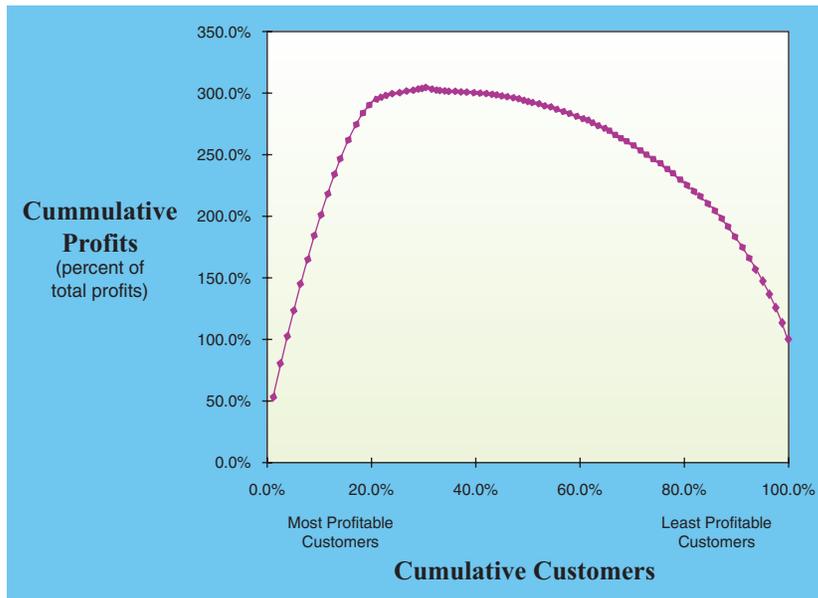
**LSI Logic**, a high-tech producer of semiconductors, implemented ABC customer costing and discovered that 10 percent of its customers were responsible for about 90 percent of its profits. LSI also discovered that it was actually losing money on about 50 percent of its customers. It worked to convert its unprofitable customers into profitable ones and invited those who would not provide a fair return to take their business elsewhere. As a consequence, LSI's sales decreased, but its profit tripled.<sup>3</sup> Exhibit 18-9 depicts this interesting yet common relationship between customers and their contribution to company profitability. Some managers refer to this graph as the "whale curve" of customer profitability, likely because of its resemblance to the shape of whale cresting at the water's surface. The important observation from the curve is that the customers to the left of the hump, or peak, increase the company's profitability, while the customers to the right decrease the company's profitability. Therefore, activity-based customer costing is helpful in determining where each customer falls on the curve and, subsequently, how each customer should therefore be treated given its position on the curve. Of particular interest are those customers to the far right because they severely decrease the company's profitability and need either to be terminated as unacceptably bad customers or altered in some way so as to become profitable customers for the company.

### Activity-Based Customer Costing

Customers are cost objects of fundamental interest. As the LSI Logic experience illustrates, customer management can produce significant gains in profit. It is possible to have customer diversity, just as it is possible to have product diversity. Customers can consume customer-driven activities in different proportions. Sources of customer diversity include order frequency, delivery frequency, geographic distance, sales and promotional support, and engineering support requirements. Knowing how much it costs to service different customers can be vital information for such purposes as

<sup>3</sup> Gary Cokins, "Are All of Your Customers Profitable (To You)?" (June 14, 2001): <http://www.bettermanagement.com/Library> (accessed January 2004).

### The Whale Curve of Cumulative Customer Profitability



setting pricing, determining customer mix, and improving profitability. Furthermore, because of diversity of customers, multiple drivers are needed to trace costs accurately. This outcome means that ABC can be useful to organizations that may have only one product, homogeneous products, or a just-in-time (JIT) structure where direct tracing diminishes the value of ABC for product costing.

**Customer Costing versus Product Costing** Assigning the costs of customer service to customers is done in the same way that manufacturing costs are assigned to products. Customer-driven activities such as order entry, order picking, shipping, making sales calls, and evaluating a client's credit are identified and listed in an activity dictionary. The cost of the resources consumed is assigned to activities, and the cost of the activities is assigned to individual customers. The same model and procedures that apply to products apply to customers as well. **Cornerstone 18-5** illustrates how ABC assigns costs to customers.

The activity-based cost assignments reveal a much different picture of the cost of servicing each type of customer. The smaller customer is costing more, attributable to smaller, more frequent orders and the evident need of the sales force to engage in more negotiations to make a sale.

What does this analysis tell management that it didn't know before? First, the large customer costs much less to service than the smaller customers and perhaps should be charged less. Second, it raises some significant questions relative to the smaller customers. For example, is it possible to encourage larger, less frequent orders? Perhaps offering discounts for larger orders would be appropriate. Why is it more difficult to sell to the smaller customers? Why are more calls needed? Are they less informed than the larger customer about the products? Can we improve profits by influencing our customers to change their buying behavior?

### Activity-Based Supplier Costing

ABC can also help a manager to identify the true cost of a firm's suppliers. The cost of a supplier is much more than the purchase price of the components or materials acquired. Just like customers, suppliers can affect many internal activities of a firm

### CONCEPT Q&A

How are costs assigned to customers by using the ABC approach?

Costs are traced to activities and then assigned to customers based on their usage of these activities.

Possible Answer:



## CORNERSTONE 18-5



### HOW TO Calculate Activity-Based Customer Costs

#### Information:

Milan Company produces precision parts for 11 major buyers. Of the 11 customers, one accounts for 50 percent of the sales, with the remaining 10 accounting for the rest of the sales. The 10 smaller customers purchase parts in roughly equal quantities. Orders placed by the smaller customers are about the same size. Data concerning Milan's customer activity follow:

	Large Customer	Ten Smaller Customers
Units purchased	500,000	500,000
Orders placed	2	200
Number of sales calls	10	210
Manufacturing costs	\$3,000,000	\$3,000,000
Order filling costs allocated*	\$202,000	\$202,000
Sales force costs allocated*	\$110,000	\$110,000

\* Allocated based on sales volume.

Currently, customer-driven costs are assigned to customers based on units sold, a unit-level driver.

#### Required:

Assign costs to customers by using an ABC approach.

#### Solution:

The appropriate drivers are orders placed and number of sales calls. The activity rates are:

$$\$404,000/202 \text{ orders} = \$2,000 \text{ per order}$$

$$\$220,000/220 \text{ calls} = \$1,000 \text{ per call}$$

Using this information, the customer-driven costs can be assigned to each group of customers as follows:

	Large Customer	Ten Smaller Customers
Order filling costs:		
$(\$2,000 \times 2)$	\$ 4,000	
$(\$2,000 \times 200)$		\$400,000
Sales force costs:		
$(\$1,000 \times 10)$	10,000	
$(\$1,000 \times 210)$		210,000
	<u>\$14,000</u>	<u>\$610,000</u>

and significantly increase the cost of purchasing. A more correct view is one where the costs associated with quality, reliability, and late deliveries are added to the purchase costs. Managers are then required to evaluate suppliers based on total cost, not just purchase price. ABC is the key to tracing costs relating to purchase, quality, reliability, and delivery performance to suppliers.

**Supplier Costing Methodology** Assigning the costs of supplier-related activities to suppliers follows the same pattern as ABC product and customer costing. Supplier-driven activities such as purchasing, receiving, inspection of incoming components, reworking products (because of defective components), expediting products (because of late deliveries of suppliers), and warranty work (due to defective supplier

components) are identified and listed in an activity dictionary. The cost of the resources consumed is assigned to these activities, and the cost of the activities is assigned to individual suppliers. **Cornerstone 18-6** illustrates how to use ABC for supplier costing.

## HOW TO Calculate Activity-Based Supplier Costs

### Information:

Assume that a purchasing manager uses two suppliers, Murray Inc. and Plata Associates, as the source of two machine parts: Part A1 and Part B2. Consider two activities: repairing products (under warranty) and expediting products. Repairing products occurs because of part failure (bought from suppliers). Expediting products occurs because suppliers are late in delivering needed parts. Activity cost information and other data needed for supplier costing follow:

- I. Activity Costs Caused by Suppliers (e.g., failed parts or late delivery)

Activity	Costs
Repairing products	\$800,000
Expediting products	\$200,000

- II. Supplier Data

	Murray Inc.		Plata Associates	
	Part A1	Part B2	Part A1	Part B2
Unit purchase price	\$20	\$52	\$24	\$56
Units purchased	80,000	40,000	10,000	10,000
Failed units	1,600	380	10	10
Late shipments	60	40	0	0

### Required:

Determine the cost of each supplier by using ABC.

### Solution:

Using the above data, the activity rates for assigning costs to suppliers are computed as follows:

$$\begin{aligned} \text{Repair rate} &= \$800,000 / 2,000^* \\ &= \$400 \text{ per failed part} \end{aligned}$$

$$*(1,600 + 380 + 10 + 10)$$

$$\begin{aligned} \text{Expediting rate} &= \$200,000 / 100^{**} \\ &= \$2,000 \text{ per late delivery} \end{aligned}$$

$$**(60 + 40)$$

Using these rates and the activity data, the total purchasing cost per unit of each component is computed:

	Murray Inc.		Plata Associates	
	Part A1	Part B2	Part A1	Part B2
Purchase cost:				
\$20 × 80,000	\$1,600,000			
\$52 × 40,000		\$2,080,000		
\$24 × 10,000			\$240,000	
\$56 × 10,000				\$560,000



## CORNERSTONE 18-6



**CORNERSTONE**  
**18-6**  
*(continued)*

	Murray Inc.		Plata Associates	
	Part A1	Part B2	Part A1	Part B2
Repairing products:				
\$400 × 1,600	640,000			
\$400 × 380		152,000		
\$400 × 10			4,000	
\$400 × 10				4,000
Expediting products:				
\$2,000 × 60	120,000			
\$2,000 × 40		80,000		
Total costs	\$2,360,000	\$2,312,000	\$ 244,000	\$ 564,000
Units	÷ 80,000	÷ 40,000	÷ 10,000	÷ 10,000
Total unit cost	\$ 29.50	\$ 57.80	\$ 24.40	\$ 56.40

**CONCEPT Q&A**

How are costs assigned to suppliers by using the ABC approach?

*Costs are traced to activities and are then assigned to suppliers based on a cause-and-effect relationship.*

Possible Answer:

The example in Cornerstone 18-6 shows that Murray, the “low-cost” supplier (as measured by the purchase price of the two parts), actually costs more when the supplier related activities of repairing and expediting are considered. If all costs are considered, then the choice becomes clear: Plata Associates is the better supplier with a higher-quality product, more on-time deliveries, and, consequently, a lower overall cost per unit.

**OBJECTIVE** 4

Explain how activity-based management can be used for cost reduction.

**Process-Value Analysis**

**Process-value analysis** is fundamental to **activity-based management**. It focuses on cost reduction instead of cost assignment and emphasizes the maximization of systemwide performance. As the model in Exhibit 18-10 illustrates, process-value analysis is concerned with (1) *driver analysis*, (2) *activity analysis*, and (3) *performance measurement*.

**Driver Analysis: The Search for Root Causes**

Managing activities requires an understanding of what causes activity costs. Every activity has inputs and outputs. **Activity inputs** are the resources consumed by the activity in producing its output. **Activity output** is the result or product of an activity. For example, if the activity is moving materials, the inputs would be such things as a forklift, a forklift driver, fuel (for the forklift), and crates. The output would be moved goods and materials. An **activity output measure** is the number of times the activity is performed. It is the quantifiable measure of the output. For example, the

Exhibit 18-10

**Process-Value Analysis Model**



number of moves or distance moved are possible output measures for the material moving activity.

The output measure effectively is a measure of the demands placed on an activity and is what we have been calling an *activity driver*. As the demands for an activity change, the cost of the activity can change. For example, as the number of programs written increases, the activity of writing programs may need to consume more inputs (labor, disks, paper, and so on). However, output measures, such as the number of programs, may not (and usually do not) correspond to the root causes of activity costs; rather, they are the consequences of the activity being performed. The purpose of driver analysis is to reveal root causes. Thus, **driver analysis** is the effort expended to identify those factors that are the root causes of activity costs. For example, an analysis may reveal that the root cause of the cost of moving materials is plant layout. Once the root cause is known, then action can be taken to improve the activity. Specifically, reorganizing plant layout can reduce the cost of moving materials.

Often, the root cause of the cost of an activity is also the root cause of other related activities. For example, the costs of inspecting purchased parts and reordering may both be caused by poor supplier quality. By working with suppliers to reduce the number of defective components supplied (or choosing suppliers that have fewer defects), the demand for both activities may then decrease, allowing the company to save money.

## Activity Analysis: Identifying and Assessing Value Content

The heart of process-value analysis is activity analysis. **Activity analysis** is the process of identifying, describing, and evaluating the activities that an organization performs. Activity analysis should produce four outcomes: (1) what activities are done; (2) how many people perform the activities; (3) the time and resources required to perform the activities; and (4) an assessment of the value of the activities to the organization, including a recommendation to select and keep only those that add value. Steps 1 through 3 have been described earlier and are common to the information needed for determining and assigning activity costs. Knowing how much an activity costs is clearly an important part of activity-based management. Step 4, determining the value-added content of activities, is concerned with cost reduction rather than cost assignment. Thus, some managerial accountants feel that this is the most important part of activity analysis. Activities can be classified as *value-added* or *nonvalue-added*.

**Value-Added Activities** Those activities necessary to remain in business are called **value-added activities**. Some activities—required activities—are necessary to comply with legal mandates. Activities needed to comply with the reporting requirements of the Securities and Exchange Commission (SEC) and the filing requirements of the Internal Revenue Service (IRS) are examples. These activities are value-added by *mandate*. The remaining activities in the firm are *discretionary*. A discretionary activity is classified as value-added provided it simultaneously satisfies three conditions: (1) the activity produces a change of state, (2) the change of state was not achievable by preceding activities, and (3) the activity enables other activities to be performed.

For example, consider the production of rods used in hydraulic cylinders. The first activity, cutting rods, cuts long rods into the correct lengths for the cylinders. Next, the cut rods are welded to cut plates. The cutting rod activity is value-added because (1) it causes a change of state—uncut rods become cut rods, (2) no prior activity was supposed to create

### CONCEPT Q&A

What is the purpose of driver analysis?

**Possible Answer:**  
The objective of driver analysis is to find the root causes of activity costs. By knowing root causes, costs can be managed effectively.

### CONCEPT Q&A

What is a value-added activity?

**Possible Answer:**  
A value-added activity is one that must be performed for the firm to remain in business.

this change of state, and (3) it enables the welding activity to be performed. Though the value-added properties are easy to see for an operational activity like cutting rods, what about a more general activity like supervising production workers? A managerial activity is specifically designed to manage other value-added activities—to ensure that they are performed in an efficient and timely manner. Supervision certainly satisfies the enabling condition. Is there a change in state? There are two ways of answering in the affirmative. First, supervising can be viewed as an enabling resource that is consumed by the operational activities that do produce a change of state. Thus, supervising is a secondary activity that serves as an input that is needed to help bring about the change of state expected for value-added primary activities. Second, it could be argued that the supervision brings order by changing the state from uncoordinated activities to coordinated activities. Once value-added activities are identified, we can define value-added costs. **Value-added costs** are the costs to perform value-added activities with perfect efficiency.

**Nonvalue-Added Activities** All activities other than those that are absolutely essential to remain in business, and therefore considered unnecessary, are referred to as **nonvalue-added activities**. A nonvalue-added activity can be identified by its failure to satisfy any one of the three previous defining conditions. Violation of the first two is the usual case for nonvalue-added activities. Inspecting cut rods (for correct length), for example, is a nonvalue-added activity. Inspection is a state-detection activity, not a state-changing activity (it tells us the state of the cut rod—whether it is the right length or not). Thus, it fails the first condition. Consider the activity of reworking goods or subassemblies. Rework is designed to bring a good from a non-conforming state to a conforming state. Thus, a change of state occurs. Yet the activity is nonvalue-added because it repeats work; it is doing something that should have been done by preceding activities (Condition 2 is violated).

**Nonvalue-added costs** are costs that are caused either by nonvalue-added activities or the inefficient performance of valued-added activities. For nonvalue-added activities, the nonvalue-added cost is the cost of the activity itself. For inefficient value-added activities, the activity cost must be broken into its value-added and nonvalue-added components. For example, if Receiving should use 10,000 receiving orders but uses 20,000, then half the cost of Receiving is value-added and half is nonvalue-added. The value-added component is the waste-free component of the value-added activity and is, therefore, the *value-added standard*. Due to increased competition, many firms are attempting to eliminate nonvalue-added activities because they add unnecessary cost and impede performance; firms are also striving to optimize value-added activities. Thus, activity analysis identifies and eventually eliminates all unnecessary activities and, simultaneously, increases the efficiency of necessary activities.

The theme of activity analysis is waste elimination. As waste is eliminated, costs are reduced. The cost reduction *follows* the elimination of waste. Note the value of managing the causes of the costs rather than the costs themselves. Though managing costs may increase the efficiency of an activity, if the activity is unnecessary, what does it matter if it's performed efficiently? An unnecessary activity is wasteful and should be eliminated. For example, moving raw materials and partially finished goods is often cited as a nonvalue-added activity. Installing an automated materials handling system may increase the efficiency of this activity, but changing to cellular manufacturing with on-site, just-in-time delivery of raw materials could virtually eliminate the activity. It's easy to see which is preferable.

**Examples of Nonvalue-Added Activities** Reordering parts, expediting production, and rework because of defective parts are all examples of nonvalue-added activities. Other examples include warranty work, handling customer complaints, and

## CONCEPT Q&A

How can a value-added activity have nonvalue-added costs?

*If a value-added activity is performed inefficiently, the inefficient component is waste and is the nonvalue-added cost.*

**Possible Answer:**

reporting defects. Nonvalue-added activities can exist anywhere in the organization. In the manufacturing operation, five major activities are often cited as wasteful and unnecessary:

1. *Scheduling.* An activity that uses time and resources to determine when different products have access to processes (or when and how many setups must be done) and how much will be produced.
2. *Moving.* An activity that uses time and resources to move raw materials, work in process, and finished goods from one department to another.
3. *Waiting.* An activity in which raw materials or work in process use time and resources by waiting on the next process.
4. *Inspecting.* An activity in which time and resources are spent ensuring that the product meets specifications.
5. *Storing.* An activity that uses time and resources while a good or raw material is held in inventory.

None of these activities adds any value for the customer. (Note that inspection would not be necessary if the product were produced correctly the first time and, therefore, adds no value for the customer.) The challenge of activity analysis is to find ways to produce the good without using any of these activities.

Here's The

Real Kicker

For Stillwater Designs, warranty work is a significant cost. Warranty work associated with defective products is typically labeled a nonvalue-added cost. Stillwater Designs recognizes the nonvalue-added nature of this activity and takes measures to eliminate the causes of the defective units. The company tracks return failures (over time) and provides this information to its research and development (R&D) department. R&D then uses this information to make design improvements on existing models (running changes) as well to change the design on future models. The objective of the design changes is to reduce the demand for the warranty activity, thus reducing warranty cost.

However, not all Kicker warranty costs can be classified as nonvalue-added. When products are returned, customer service decides whether or not the problem is covered

under warranty. Sometimes, problems are covered even though they are not attributable to a defective product. When the company decides to replace a nondefective product, it is making a conscious decision to increase customer satisfaction and brand loyalty. This part of the warranty cost is a "marketing warranty cost" and could be classified as a value-added cost. For example, customers sometimes buy amplifiers that are more powerful than the subwoofers can handle, resulting in burnt voice coils. By replacing the product (even though technically it's the customer's fault), the customer will be more likely to buy again and to provide good word-of-mouth advertising for Kicker products



**Cost Reduction** Activity management carries with it the objective of cost reduction. Competitive conditions dictate that companies must deliver customer desired products on time and at the lowest possible cost. These conditions mean that an organization must continually strive for cost improvement. Activity management can reduce costs in four ways:<sup>4</sup>

1. Activity elimination
2. Activity selection
3. Activity reduction
4. Activity sharing

**Activity elimination** focuses on nonvalue-added activities. Once activities that fail to add value are identified, measures must be taken to rid the organization of these activities. For example, the activity of inspecting incoming parts seems necessary to ensure that the product using the parts functions according to specifications. Use

<sup>4</sup>Peter B. B. Turney, "How Activity-Based Costing Helps Reduce Cost," *Journal of Cost Management* (Winter 1991): 29–35.

of a bad part can produce a bad final product. Yet this activity is necessary only because of the poor quality performance of the supplying firms. Selecting suppliers who are able to supply high-quality parts or who are willing to improve their quality performance to achieve this objective will eventually allow the elimination of incoming inspection. Cost reduction then follows.

**Activity selection** involves choosing among different sets of activities that are caused by competing strategies. Different strategies cause different activities. Different product design strategies, for example, can require significantly different activities. Activities, in turn, cause costs. Each product design strategy has its own set of activities and associated costs. All other things being equal, the lowest-cost design strategy should be chosen. In a continual improvement environment, redesign of existing products and processes can lead to a different, cheaper set of activities. Thus activity selection can have a significant effect on cost reduction.

**Activity reduction** decreases the time and resources required by an activity. This approach to cost reduction should be primarily aimed at improving the efficiency of necessary activities or a short-term strategy for improving nonvalue-added activities until they can be eliminated. Setup activity is a necessary activity that is often cited as an example for which less time and fewer resources need to be used. Finding ways to reduce setup time—and thus lower the cost of setups—is another example of the concept of gradual reductions in activity costs.

**Activity sharing** increases the efficiency of necessary activities by using economies of scale. Specifically, the quantity of the cost driver is increased without increasing the total cost of the activity itself. This lowers the per-unit cost of the cost driver and the amount of cost traceable to the products that consume the activity. For example, a new product can be designed to use components already being used by other products. By using existing components, the activities associated with these components already exist, and the company avoids the creation of a whole new set of activities.

**Cornerstone 18-7** shows how to determine the nonvalue-added cost of activities. Determining the cost is followed by a root-cause analysis and then by the selection of an approach to reduce the waste found in the activity. For example, defective products cause warranty work. Defective products, in turn, are caused by such factors as



## CORNERSTONE 18-7



### HOW TO Assess Nonvalue-Added Costs

#### Information:

Consider the following two activities: (1) Performing warranty work, cost: \$120,000. The warranty cost of the most efficient competitor is \$20,000. (2) Purchasing components, cost: \$200,000 (10,000 purchase orders). A benchmarking study reveals that the most efficient level will use 5,000 purchase orders and entail a cost of \$110,000.

#### Required:

Determine the nonvalue-added cost of each activity.

#### Solution:

Determine the value content of each activity: Is the activity nonvalue-added or value-added? Performing warranty work is nonvalue-added; it is done to correct something that wasn't done right the first time. Thus, the nonvalue-added cost of performing warranty work is \$120,000. The cost of the competitor is also nonvalue-added and has no bearing on the analysis. Root causes for warranty work are defective products. Purchasing components is necessary so that materials are available to produce products and, thus, is value-added. However, the activity is not performed efficiently, as revealed by the benchmarking study. The nonvalue-added cost is \$90,000 (\$200,000 – \$110,000).

defective internal processes, poor product design, and defective supplier components. Correcting the causes will lead to the elimination of the warranty activity. Inefficient purchasing could be attributable to such root causes as poor product design (too many components), orders that are incorrectly filled out, and defective supplier components (producing additional orders). Correcting the causes will reduce the demand for the purchasing activity, and as the activity is reduced, cost reduction will follow.

## Activity Performance Measurement

Assessing how well activities (and processes) are performed is fundamental to management's efforts to improve profitability. Activity performance measures exist in both financial and nonfinancial forms. These measures are designed to assess how well an activity was performed and the results achieved. They are also designed to reveal if constant improvement is being realized. Measures of activity performance center on three major dimensions: (1) efficiency, (2) quality, and (3) time.

*Efficiency* focuses on the relationship of activity inputs to activity outputs. For example, one way to improve activity efficiency is to produce the same activity output with lower cost for the inputs used. Thus cost and trends in cost become important measures of efficiency. *Quality* is concerned with doing the activity right the first time it is performed. If the activity output is defective, then the activity may need to be repeated, causing unnecessary cost and reduction in efficiency. Quality cost management is a major topical area and is discussed in more detail later in this chapter. The *time* required to perform an activity is also critical. Longer times usually mean more resource consumption and less ability to respond to customer demands. Time measures of performance tend to be nonfinancial, whereas efficiency and quality measures are both financial and nonfinancial.

*Cycle time* and *velocity* are two operational measures of time-based performance. Cycle time can be applied to any activity or process that produces an output, and it measures how long it takes to produce an output from start to finish. Consider the manufacturing process. In this case, **cycle time** is the length of time that it takes to produce a unit of output from the time raw materials are received (starting point of the cycle) until the good is delivered to finished goods inventory (finishing point of the cycle). Thus, cycle time is the time required to produce one unit of a product (time/units produced). **Velocity** is the number of units of output that can be produced in a given period of time (units produced/time). Notice that velocity is the reciprocal of cycle time. For the cycle time example, the velocity is two units per hour. **Cornerstone 18-8** demonstrates how to compute cycle time and velocity.

### CONCEPT Q&A

What are the three dimensions of performance for activities? Explain why they are important.

*Efficiency, quality, and time are the three performance dimensions. All three relate to the ability of a manager to reduce activity cost.*

Possible Answer:

### HOW TO Calculate Cycle Time and Velocity

#### Information:

Assume that a company takes 10,000 hours to produce 20,000 units of a product.

#### Required:

What is the velocity in hours? Cycle time in hours? Cycle time in minutes?

#### Solution:

Velocity =  $20,000/10,000 = 2$  units per hour;

Cycle time =  $10,000/20,000 = 1/2$  hour.

=  $10,000(60 \text{ minutes})/20,000 = 30$  minutes.



**CORNERSTONE**  
**18-8**



## Quality Cost Management

Activity-based management also is useful for understanding how quality costs can be managed. Quality costs can be substantial *in size* and a source of significant savings *if managed effectively*. Improving quality can produce significant improvements in profitability and overall efficiency. Quality improvement can increase profitability in two ways: (1) by increasing customer demand *and thus sales revenues* and (2) by decreasing costs. For example, when Toyota sold more cars and trucks than General Motors for the first time ever in 2007, some automotive industry experts attributed this crowning achievement to Toyota's long-time commitment to quality-related issues, such as quality cost management.<sup>5</sup>

Quality-linked activities are those activities performed because poor quality may or does exist. The costs of performing these activities are referred to as **costs of quality**. Thus, the costs of quality are associated with two subcategories of quality-related activities: *control activities* and *failure activities*. **Control activities** are performed by an organization to prevent or detect poor quality (because poor quality may exist). **Control costs** are the costs of performing control activities. Control activities are made up of prevention and appraisal activities.

**Prevention costs** are incurred to prevent poor quality in the products or services being produced. As prevention costs increase, we would expect the costs of failure to decrease. Examples of prevention costs are quality engineering, quality training programs, quality planning, quality reporting, supplier evaluation and selection, quality audits, quality circles, field trials, and design reviews.

**Appraisal costs** are incurred to determine whether products and services are conforming to their requirements or customer needs. Examples include inspecting and testing raw materials, packaging inspection, supervising appraisal activities, product acceptance, process acceptance, measurement (inspection and test) equipment, and outside endorsements. The main objective of the appraisal function is to prevent nonconforming goods from being shipped to customers.

**Failure activities** are performed by an organization or its customers in response to poor quality (poor quality does exist). **Failure costs** are the costs incurred by an organization because failure activities are performed. Notice that the definitions of *failure activities* and *failure costs* imply that customer response to poor quality can impose costs on an organization. The definitions of *quality-related activities* also imply four categories of quality costs: (1) prevention costs, (2) appraisal costs, (3) internal failure costs, and (4) external failure costs.

**Internal failure costs** are incurred when products and services do not conform to specifications or customer needs. This nonconformance is detected *before* the bad products or services (nonconforming, unreliable, not durable, and so on) are shipped or delivered to outside parties. These are the failures detected by appraisal activities. Examples of internal failure costs are scrap, rework, downtime (due to defects), reinspection, retesting, and design changes. These costs disappear if no defects exist.

**External failure costs** are incurred when products and services fail to conform to requirements or satisfy customer needs *after* being delivered to customers. Of all the costs of quality, this category can be the most devastating. For example, costs of recalls can run into the hundreds of millions of dollars. Other examples include lost sales because of poor product performance, returns and allowances because of poor quality, warranties, repairs, product liability, customer dissatisfaction, lost market share, and complaint adjustment. **Northwest Airlines** is notorious for placing near the bottom of customer satisfaction rankings, which some analysts believe consistently hurts its ticket sales. External failure costs, like internal failure costs, disappear if no defects exist.

## Environmental Cost Management

For many organizations, management of environmental costs is becoming a matter of high priority and a significant competitive issue. Many executives now believe that

<sup>5</sup>D. Jones, "Toyota's success pleases proponents of 'lean'," *USA Today* (May 3, 2007): 2B.

improving environmental quality may actually reduce environmental costs rather than increase them. For example, between 1992 and 1999, **Baxter International Inc.**, a producer of medical products, reduced toxic wastes emitted to air, water, and soil; increased recycling activity; and, as a consequence, reported environmental savings for the seven-year period of \$98 million.<sup>6</sup>

Before environmental cost information can be provided to management, environmental costs must be defined. Various possibilities exist; however, an appealing approach is to adopt a definition consistent with a total environmental quality model. Accordingly, environmental costs can be referred to as *environmental quality costs*. Similar to product quality, environmentally linked activities are those activities performed because poor environmental quality may or does exist. The costs of performing these activities are referred to as *environmental costs*. As with quality costs, **environmental costs** are associated with two subcategories of environmentally related activities: *control activities* and *failure activities*. In other words, environmental costs are associated with the creation, detection, remediation, and prevention of environmental degradation. With this definition, environmental costs are also classified into four analogous categories: prevention costs, detection costs, internal failure costs, and external failure costs. External failure costs, in turn, can be subdivided into realized and unrealized categories.

**Environmental prevention costs** are the costs of activities carried out to prevent the production of contaminants and/or waste that could cause damage to the environment. Examples of prevention activities include the following: evaluating and selecting suppliers, evaluating and selecting equipment to control pollution, designing processes and products to reduce or eliminate contaminants, training employees, studying environmental impacts, auditing environmental risks, undertaking environmental research, developing environmental management systems, and recycling products.

**Environmental detection costs** are the costs of activities executed to determine if products, processes, and other activities within the firm are in compliance with appropriate environmental standards. The environmental standards and procedures that a firm seeks to follow are defined in three ways: (1) regulatory laws of governments, (2) voluntary standards developed by private organizations, and (3) environmental policies developed by management. Examples of detection activities are auditing environmental activities, inspecting products and processes (for environmental compliance), developing environmental performance measures, carrying out contamination tests, verifying supplier environmental performance, and measuring levels of contamination.

**Environmental internal failure costs** are costs of activities performed because contaminants and waste have been produced but not discharged into the environment. Thus, internal failure costs are incurred to eliminate and manage contaminants or waste once produced. Internal failure activities have one of two goals: (1) to ensure that the contaminants and waste produced are not released to the environment or (2) to reduce the level of contaminants released to an amount that complies with environmental standards. Examples of internal failure activities include operating equipment to minimize or eliminate pollution, treating and disposing of toxic materials, maintaining pollution equipment, licensing facilities for producing contaminants, and recycling scrap.

**Environmental external failure costs** are the costs of activities performed after discharging contaminants and waste into the environment. **Realized external failure costs** are those incurred and paid for by the firm. **Unrealized external failure costs**, or **societal costs**, are caused by the firm but are incurred and paid for by parties outside the firm. Examples of realized external failure activities are cleaning up a polluted lake, cleaning up oil spills, cleaning up contaminated soil,

## CONCEPT Q&A

Why are there two categories of external failure costs?

**Possible Answer:** One category represents those external environmental costs that the firm causes and pays for, and the other category is those external environmental costs caused by the firm but paid for by parties outside the firm.

<sup>6</sup> Baxter Environmental Financial Statement, 1999, at <http://www.baxter.com/sustainability> (accessed October 2006).

using materials and energy inefficiently, settling personal injury claims from environmentally unsound practices, settling property damage claims, restoring land to its natural state, and losing sales from a bad environmental reputation. Examples of societal costs include receiving medical care because of polluted air (individual welfare), losing a lake for recreational use because of contamination (degradation), losing employment because of contamination (individual welfare), and damaging ecosystems from solid waste disposal (degradation).

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## Summary of Learning Objectives

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- LO1. Explain why functional (or volume)-based costing approaches may produce distorted costs.**
- Overhead costs have increased in significance over time and in many firms represent a much higher percentage of product costs than direct labor.
  - Many overhead activities are unrelated to the units produced.
  - Functional-based costing systems are not able to assign the costs of these nonunit-based overhead activities properly.
  - Nonunit-based overhead activities often are consumed by products in different proportions than are unit-based overhead activities. Because of this nonproportionality, assigning overhead by using only unit-based drivers can distort product costs.
  - If the nonunit-based overhead costs are a significant proportion of total overhead costs, the inaccuracy in cost assignments can be a serious matter.
- LO2. Explain how an activity-based costing system works for product costing.**
- Activities are identified and defined through the use of interviews and surveys. This information allows an activity dictionary to be constructed.
  - The activity dictionary lists activities and potential activity drivers, classifies activities as primary or secondary, and provides any other attributes deemed to be important.
  - Resource costs are assigned to activities by using direct tracing and resource drivers.
  - The costs of secondary activities are ultimately assigned to primary activities by using activity drivers.
  - Finally, the costs of primary activities are assigned to products, customers, and other cost objects.
  - The cost assignment process is described by the following general steps: (1) identifying the major activities and building an activity dictionary, (2) determining the cost of those activities, (3) identifying a measure of consumption for activity costs (activity drivers), (4) calculating an activity rate, (5) measuring the demands placed on activities by each product, and (6) calculating product costs.
- LO3. Describe activity-based customer costing and activity-based supplier costing.**
- Tracing customer-driven costs to customers can provide significant information to managers.
  - Accurate customer costs allow managers to make better pricing decisions, customer-mix decisions, and other customer-related decisions that improve profitability.
  - Tracing supplier-driven costs to suppliers can enable managers to choose the true low-cost suppliers, producing a stronger competitive position and increased profitability.

**LO4. Explain how activity-based management can be used for cost reduction.**

- Assigning costs accurately is vital for good decision making.
- Assigning the costs of an activity accurately does not address the issue of whether or not the activity should be performed or whether it is being performed efficiently.
- Activity-based management focuses on process-value analysis.
- Process-value analysis has three components: driver analysis, activity analysis, and performance evaluation. These three steps determine what activities are being done, why they are being done, and how well they are done.
- Understanding the root causes of activities provides the opportunities to manage activities so that costs can be reduced.
- Quality and environmental activities are particularly susceptible to activity-based management.
- Quality costs are costs that are incurred because poor product quality exists or may exist.
- Environmental costs are costs that are incurred because environmental degradation exists or may exist.

**CORNERSTONE 18-1** How to calculate consumption ratios, page 966

**CORNERSTONE 18-2** How to calculate activity rates, page 966

**CORNERSTONE 18-3** How to calculate activity-based unit costs, page 967

**CORNERSTONE 18-4** How to assign resource costs to activities by using direct tracing and resource drivers, page 972

**CORNERSTONE 18-5** How to calculate activity-based customer costs, page 976

**CORNERSTONE 18-6** How to calculate activity-based supplier costs, page 977

**CORNERSTONE 18-7** How to assess nonvalue-added costs, page 982

**CORNERSTONE 18-8** How to calculate cycle time and velocity, page 983



### CORNERSTONES FOR CHAPTER 18

## Key Terms

- |  |   |
|--|---|
| Activity analysis, 979                   | Costs of quality, 984                     |
| Activity attributes, 970                 | Cycle time, 983                           |
| Activity dictionary, 970                 | Driver analysis, 979                      |
| Activity drivers, 964                    | Environmental costs, 985                  |
| Activity elimination, 981                | Environmental detection costs, 985        |
| Activity inputs, 978                     | Environmental external failure costs, 985 |
| Activity output measure, 978             | Environmental internal failure costs, 985 |
| Activity output, 978                     | Environmental prevention costs, 985       |
| Activity reduction, 982                  | External failure costs, 984               |
| Activity selection, 982                  | Failure activities, 984                   |
| Activity sharing, 982                    | Failure costs, 984                        |
| Activity-based costing (ABC) system, 969 | Internal failure costs, 984               |
| Activity-based management, 978           | Nonunit-level activity drivers, 964       |
| Appraisal costs, 984                     | Nonvalue-added activities, 980            |
| Consumption ratio, 964                   |   |
| Control activities, 984                  |   |
| Control costs, 984                       |   |

Nonvalue-added costs, 980	Unit-level activity drivers, 964
Prevention costs, 984	Unrealized external failure costs, 985
Process-value analysis, 978	Value-added activities, 979
Product diversity, 964	Value-added costs, 980
Realized external failure costs, 985	Velocity, 983
Resource drivers, 972	
Societal costs, 985	
Unit-level activities, 962	

## Review Problems

### I. Plantwide Rates

Gee Company produces two types of stereo units: deluxe and regular. For the most recent year, Gee reports the following data:

Budgeted overhead	\$180,000
Expected activity (in direct labor hours)	50,000
Actual activity (in direct labor hours)	51,000
Actual overhead	\$200,000

	Deluxe	Regular
Units produced	5,000	50,000
Prime costs	\$40,000	\$300,000
Direct labor hours	5,000	46,000

#### Required:

1. Calculate a predetermined overhead rate based on direct labor hours.
2. What is the applied overhead?
3. What is the under- or overapplied overhead?
4. Calculate the unit cost of each stereo unit.

#### Solution:

1. Rate =  $\$180,000 / 50,000 = \$3.60$  per direct labor hour
2. Applied overhead =  $\$3.60 \times 51,000 = \$183,600$
3. Overhead variance =  $\$200,000 - \$183,600 = \$16,400$  underapplied
4. Unit cost:

	Deluxe	Regular
Prime costs	\$ 40,000	\$ 300,000
Overhead costs:		
$\$3.60 \times 5,000$	18,000	
$\$3.60 \times 46,000$		165,600
Total manufacturing costs	\$ 58,000	\$ 465,600
Units produced	$\div 5,000$	$\div 50,000$
Unit cost (total costs/units)	<u>\$ 11.60</u>	<u>\$ 9.31*</u>

\* Rounded.

### II. Departmental Rates

Gee Company gathers the following departmental data for a second year. Two types of stereo units are produced: deluxe and regular.

	Fabrication	Assembly
Budgeted overhead	\$120,000	\$60,000
Expected and actual usage (direct labor hours):		
Deluxe	3,000	2,000
Regular	<u>3,000</u>	<u>43,000</u>
	<u>6,000</u>	<u>45,000</u>

	Fabrication	Assembly
Expected and actual usage (machine hours):		
Deluxe	2,000	5,000
Regular	<u>18,000</u>	<u>5,000</u>
	<u>20,000</u>	<u>10,000</u>

In addition to the departmental data, the following information is provided:

	Deluxe	Regular
Units produced	5,000	50,000
Prime costs	\$40,000	\$300,000

**Required:**

- Calculate departmental overhead rates by using machine hours for fabrication and direct labor hours for assembly.
- Calculate the applied overhead by department.
- Calculate the applied overhead by product.
- Calculate unit costs.

**Solution:**

- Departmental rates  
 Fabrication:  $\$120,000/20,000 = \$6.00$  per machine hour  
 Assembly:  $\$60,000/45,000 = \$1.33^*$  per direct labor hour  
 \*Rounded.
- Applied overhead (by department):  
 Fabrication:  $\$6.00 \times 20,000 = \$120,000$   
 Assembly:  $\$1.33 \times 45,000 = \$59,850$
- Applied overhead (by product):  
 Deluxe:  $(\$6.00 \times 2,000) + (\$1.33 \times 2,000) = \$14,660$   
 Regular:  $(\$6.00 \times 18,000) + (\$1.33 \times 43,000) = \$165,190$
- Unit cost (rounded to the nearest cent):  
 Deluxe:  $(\$40,000 + \$14,660)/5,000 = \$10.93$   
 Regular:  $(\$300,000 + \$165,190)/50,000 = \$9.30$

**III. Activity-Based Rates**

Gee Company produces two types of stereo units: deluxe and regular. Activity data follow:

Activity Usage Measures	Product-Costing Data		
	Deluxe	Regular	Total
Units produced per year	5,000	50,000	55,000
Prime costs	\$39,000	\$369,000	\$408,000
Direct labor hours	5,000	45,000	50,000
Machine hours	10,000	90,000	100,000
Production runs	10	5	15
Number of moves	120	60	180

**Activity Cost Data (Overhead Activities)**

Activity	Cost
Setups	\$ 60,000
Material handling	30,000
Power	50,000
Testing	40,000
Total	<u>\$180,000</u>

**Required:**

1. Calculate the consumption ratios for each activity.
2. Group activities based on the consumption ratios.
3. Calculate a rate for each pooled group of activities.
4. Using the pool rates, calculate unit product costs.

**Solution:**

1. Consumption ratios:

Overhead Activity	Deluxe	Regular	Activity Driver
Setups	0.67 <sup>a</sup>	0.33 <sup>a</sup>	Production runs
Material handling	0.67 <sup>b</sup>	0.33 <sup>b</sup>	Number of moves
Power	0.10 <sup>c</sup>	0.90 <sup>c</sup>	Machine hours
Testing	0.10 <sup>d</sup>	0.90 <sup>d</sup>	Direct labor hours

<sup>a</sup> 10/15 (deluxe) and 5/15 (regular)

<sup>b</sup> 120/180 (deluxe) and 60/180 (regular)

<sup>c</sup> 10,000/100,000 (deluxe) and 90,000/100,000 (regular)

<sup>d</sup> 5,000/50,000 (deluxe) and 45,000/50,000 (regular)

2. Batch-level: setups and material handling  
Unit-level: power and testing
- 3.

Batch-Level Pool		Unit-Level Pool	
Setups	\$60,000	Power	\$ 50,000
Material handling	<u>30,000</u>	Testing	<u>40,000</u>
Total	\$90,000	Total	\$ 90,000
Runs	÷ 15	Machine hours	÷ 100,000
Pool rate	<u>\$ 6,000</u> per run	Pool rate	<u>\$ 0.90</u> per machine hour

4. Unit Costs: Activity-Based Costing

	Deluxe	Regular
Prime costs	\$ 39,000	\$ 369,000
Overhead costs:		
Batch-level pool:		
(\$6,000 × 10)	60,000	
(\$6,000 × 5)		30,000
Unit-level pool:		
(\$0.90 × 10,000)	9,000	
(\$0.90 × 90,000)		81,000
Total manufacturing costs	<u>\$ 108,000</u>	<u>\$ 480,000</u>
Units produced	÷ 5,000	÷ 50,000
Unit cost (total costs/units)	<u>\$ 21.60</u>	<u>\$ 9.60</u>

**IV. Environmental Costs**

At the beginning of 2009, Kleaner Company initiated a program to improve its environmental performance. Efforts were made to reduce the production and emission of

contaminating gaseous, solid, and liquid residues. By the end of the year, in an executive meeting, the environmental manager indicated that the company had made significant improvement in its environmental performance, reducing the emission of contaminating residues of all types. The president of the company was pleased with the reported success but wanted an assessment of the financial consequences of the environmental improvements. To satisfy this request, the following financial data were collected for 2008 and 2009 (all changes in costs are a result of environmental improvements):

	2008 (\$)	2009 (\$)
Sales	20,000,000	20,000,000
Evaluating and selecting suppliers	0	600,000
Treating and disposing of toxic materials	1,200,000	800,000
Inspecting processes (environmental objective)	200,000	300,000
Land restoration (annual fund contribution)	1,600,000	1,200,000
Maintaining pollution equipment	400,000	300,000
Testing for contaminants	150,000	100,000

#### Required:

Classify the costs as prevention, detection, internal failure, or external failure.

#### Solution:

Prevention costs: evaluating and selecting suppliers; detection costs: testing for contaminants and inspecting processes; internal failure: maintaining pollution equipment and treating and disposing of toxic materials; and external failure: land restoration.

## Discussion Questions

- Describe the two-stage process associated with plantwide overhead rates.
- Describe the two-stage process for departmental overhead rates.
- What are nonunit-level overhead activities? Nonunit-based cost drivers? Give some examples.
- What is meant by “product diversity”?
- What is an overhead consumption ratio?
- What is activity-based product costing?
- What is an activity dictionary?
- Explain how costs are assigned to activities.
- Describe the value of activity-based customer costing.
- Explain how ABC can help a firm identify its true low-cost suppliers.
- What is driver analysis? What role does it play in process-value analysis?
- What are value-added activities? Value-added costs?
- What are nonvalue-added activities? Nonvalue-added costs? Give an example of each.
- Identify and define four different ways to manage activities so that costs can be reduced.
- What is cycle time? Velocity?

## Multiple-Choice Exercises

**18-1** A unit-level driver is consumed by a product each and every time that:

- a batch of products is produced.
- a purchase order is issued.
- a unit is produced.
- a customer complains.
- none of the above.

**18-2 Which of the following is a nonunit-level driver?**

- Direct labor hours
- Machine hours
- Setup hours
- Direct materials
- Assembly hours

**18-3 Consider the information given on two products and their activity usage:**

	Laser Printer	Dot Matrix Printer
Units produced	1,000	4,000
Setup hours	800	400
Inspection hours	500	500
Machine hours	200	1,000

The consumption ratios for the setup activity for each product are:

- 0.167; 0.833.
- 0.333; 0.667.
- 0.500; 0.500.
- 0.20; 0.80.
- none of the above.

**18-4 Refer to the data for Multiple-Choice Exercise 18-3. Suppose that machine hours are used to assign all overhead costs to the two products. Select the best answer from the following:**

- Laser printers are undercosted, and dot matrix printers are overcosted.
- Laser printers and dot matrix printers are accurately costed.
- Laser printers are overcosted, and dot matrix printers are undercosted.
- Using inspection hours to assign overhead costs is the most accurate approach.
- None of the above.

**18-5 The first stage of ABC entails the assignment of:**

- resource costs to departments.
- activity costs to products or customers.
- resource costs to a plantwide pool.
- resource costs to individual activities.
- resource costs to distribution channels.

**18-6 The second stage of ABC entails the assignment of:**

- resource costs to departments.
- activity costs to products or customers.
- resource costs to a plantwide pool.
- resource costs to individual activities.
- resource costs to distribution channels.

**18-7 Interview questions are asked to determine:**

- what activities are being performed.
- who performs the activities.
- the relative amount of time spent on each activity by individual workers.
- possible activity drivers for assigning costs to products.
- all of the above.

**18-8** The receiving department employs one worker, who spends 75 percent of his time on the receiving activity and 25 percent of his time on inspecting products. His salary is \$40,000. The amount of cost assigned to the receiving activity is:

- a. \$34,000.
- b. \$40,000.
- c. \$10,000.
- d. \$30,000.
- e. none of the above.

**18-9** Assume that the moving activity has an expected cost of \$80,000. Expected direct labor hours are 20,000, and expected number of moves is 40,000. The best activity rate for moving is:

- a. \$4 per move.
- b. \$1.33 per hour-move.
- c. \$4 per hour.
- d. \$2 per move.
- e. none of the above.

**18-10** Which of the following is a true statement about activity-based customer costing?

- a. Customer diversity requires multiple drivers to trace costs accurately to customers.
- b. Customers can consume customer-driven activities in different proportions.
- c. It often produces changes in the company's customer mix.
- d. It often improves profitability.
- e. All of the above are true.

**18-11** Which of the following is a true statement about activity-based supplier costing?

- a. The cost of a supplier is the purchase price of the components or materials acquired.
- b. Suppliers can affect many internal activities of a firm and significantly increase the cost of purchasing.
- c. It encourages managers to evaluate suppliers based on purchase cost.
- d. It encourages managers to increase the number of suppliers.
- e. All of the above are true.

**18-12** This year, Lambert Company will ship 1,500,000 pounds of goods to customers at a cost of \$1,200,000. If a customer orders 10,000 pounds and produces \$200,000 of revenue (total revenue is \$20 million), the amount of shipping cost assigned to the customer by using ABC would be:

- a. cannot be determined.
- b. \$24,000 (2 percent of the shipping cost).
- c. \$8,000 (\$0.80 per pound shipped).
- d. \$12,000 (1 percent of the shipping cost).
- e. none of the above.

**18-13** Lambert Company has two suppliers: Deming and Leming. The cost of warranty work due to defective components is \$2,000,000. The total units repaired under warranty average 100,000, of which 90,000 have components from Deming and 10,000 have components from Leming. Select the items below that represent true statements.

- a. Components purchased from Deming cost \$200,000 more than their purchase price.
- b. Components purchased from Leming cost \$1,800,000 more than their purchase price.
- c. Components from Deming appear to be of higher quality.
- d. All of the above are true.
- e. None of the above is true.

**18-14** A forklift and its driver used for moving materials are examples of:

- a. activity outputs.
- b. activity output measures.
- c. resource drivers.
- d. activity inputs.
- e. root causes.

**18-15** Which of the following are nonvalue-added activities?

- a. Moving goods
- b. Storing goods
- c. Inspecting finished goods
- d. Reworking a defective product
- e. All of the above

**18-16** Suppose that a company is spending \$50,000 per year for inspecting, \$40,000 for purchasing, and \$60,000 for reworking products. A good estimate of nonvalue-added costs would be:

- a. \$110,000.
- b. \$50,000.
- c. \$60,000.
- d. \$90,000.
- e. \$100,000.

**18-17** The cost of inspecting incoming parts is most likely to be reduced by:

- a. activity sharing.
- b. activity selection.
- c. activity reduction.
- d. activity elimination.
- e. none of the above.

**18-18** Thom Company produces 100 units in 5 hours. The cycle time for Thom:

- a. is 20 units per hour.
- b. is 5 hours per unit.
- c. is 3 minutes per unit.
- d. is 1 hour per 20 units.
- e. cannot be calculated.

**18-19** Thom Company produces 100 units in 5 hours. The velocity for Thom:

- a. is 20 units per hour.
- b. is 5 hours per unit.
- c. is 3 minutes per unit.
- d. is 1 hour per 20 units.
- e. cannot be calculated.

**18-20** Striving to produce the same activity output with lower costs for the input used is concerned with which of the following dimensions of activity performance?

- a. Quality
- b. Time
- c. Activity sharing
- d. Efficiency
- e. Effectiveness

**18-21 Which of the following is a quality prevention cost?**

- a. Quality planning
- b. Supplier evaluation and selection
- c. Quality audits
- d. Field trials
- e. All of the above

**18-22 Which of the following is an appraisal cost (quality)?**

- a. Design reviews
- b. Quality reporting
- c. Manager of an inspection team
- d. Warranties
- e. Retesting

**18-23 Which of the following is an internal failure cost (quality)?**

- a. Supplier evaluation and selection
- b. Scrapped units
- c. Packaging inspection
- d. Product liability
- e. Complaint adjustment

**18-24 Which of the following is an external failure cost (quality)?**

- a. Lost market share
- b. Retesting
- c. Rework
- d. Design reviews
- e. All of the above

**18-25 Which of the following represents environmental detection costs?**

- a. Developing environmental performance measures
- b. Recycling products
- c. Disposing of toxic materials
- d. Carrying out contamination tests
- e. None of the above

**18-26 An example of an environmental internal failure cost is:**

- a. cleaning up oil spills.
- b. damaging ecosystems from solid waste disposal.
- c. verifying supplier environmental performance.
- d. measuring levels of contamination.
- e. none of the above.

**18-27 An example of a societal cost is:**

- a. maintaining pollution equipment.
- b. recycling scrap.
- c. disposing of toxic materials.
- d. medical care due to polluted air.
- e. all of the above.

**18-28 An example of an environmental prevention cost is:**

- a. restoring land to its natural state.
- b. developing environmental management systems.
- c. licensing facilities for producing contaminants.
- d. auditing environmental activities.
- e. treating toxic materials.

## Cornerstone Exercises

### OBJECTIVE > 1 Cornerstone Exercise 18-29 CONSUMPTION RATIOS

**CORNERSTONE 18-1** Rico Company produces two types of boots: cowboy and cowgirl. There are four activities associated with the two products. Drivers for the four activities are as follows:

	Cowboy	Cowgirl
Cutting hours	1,400	2,600
Assembly hours	1,000	1,500
Inspection hours	450	1,050
Rework hours	50	150

#### Required:

1. Calculate the consumption ratios for the four drivers.
2. Is there evidence of product diversity? Explain.

### OBJECTIVE > 1 Cornerstone Exercise 18-30 ACTIVITY RATES

**CORNERSTONE 18-2** Refer to **Cornerstone Exercise 18-29**. The following activity data have been collected:

Cutting	\$60,000
Assembling	25,000
Inspecting	12,000
Reworking	6,000

#### Required:

Calculate the activity rates that would be used to assign costs to each product.

### OBJECTIVE > 1 Cornerstone Exercise 18-31 CALCULATING ABC UNIT COSTS

**CORNERSTONE 18-3** Morrison Bank has collected the following information for four activities and two types of credit cards:

Activity	Driver	Classic	Gold	Activity Rate (\$)
Processing transactions	Transactions processed	5,000	3,000	0.15
Preparing statements	Number of statements	5,000	3,000	0.90
Answering questions	Number of calls	10,000	15,000	3.00
Providing ATMs	ATM transactions	20,000	6,000	1.20

There are 5,000 holders of Classic cards and 20,000 holders of the Gold cards.

#### Required:

Calculate the unit cost for Classic and Gold credit cards.

### OBJECTIVE > 2 Cornerstone Exercise 18-32 ASSIGNING COSTS TO ACTIVITIES

**CORNERSTONE 18-4** Norrison Automotive produces brake systems for major automobile producers. The accounts payable department at Norrison has five clerks who process and pay supplier invoices. The total cost of their salaries is \$250,000. The work distribution for the activities that they perform is as follows:

Activity	Percentage of Time on Each Activity
Comparing source documents	25%
Resolving discrepancies	45%
Processing payment	30%

#### Required:

Assign the cost of labor to each of the three activities in the accounts payable department.

**Cornerstone Exercise 18-33 ACTIVITY-BASED CUSTOMER COSTING****OBJECTIVE** > **3****CORNERSTONE 18-5**

Underwood Company produces sofas for 20 retail outlets. Of the 20 retail outlets, 19 are small, separately owned furniture stores and one is a retail chain. The retail chain buys 60 percent of the sofas produced. The 19 smaller customers purchase sofas in approximately equal quantities, where the orders are about the same size. Data concerning Underwood's customer activity are as follows:

	Large Retailer	Smaller Retailers
Units purchased	24,000	16,000
Orders placed	8	800
Number of sales calls	4	196
Manufacturing costs	\$14,400,000	\$9,600,000
Order filling costs allocated*	\$484,800	\$323,200
Sales force costs allocated*	\$240,000	\$160,000

\* Allocated based on sales volume.

Currently, customer-driven costs are assigned to customers based on units sold, a unit-level driver.

**Required:**

Assign costs to customers by using an ABC approach.

**Cornerstone Exercise 18-34 ACTIVITY-BASED SUPPLIER COSTING****OBJECTIVE** > **3****CORNERSTONE 18-6**

Webb Computers uses Alpha Electronics and La Paz Company to buy two electronic components used in the manufacture of its computers: Component 125X and Component 30Y. Consider two activities: testing and reordering components. After the two components are inserted, testing is done to ensure that the two components in the computer are working properly. Reordering occurs because one or both of the components have failed the test and it is necessary to replenish component inventories. Activity cost information and other data needed for supplier costing are as follows:

## I. Activity Costs Caused by Suppliers (testing failures and reordering as a result)

Activity	Costs (\$)
Testing components	600,000
Reordering components	150,000

## II. Supplier Data

	Alpha Electronics		La Paz Company	
	125X	30Y	125X	30Y
Unit purchase price	\$10	\$26	\$12	\$28
Units purchased	60,000	30,000	7,500	7,500
Failed tests	600	390	5	5
Number of reorders	30	20	0	0

**Required:**

Determine the cost of each supplier by using ABC.

**Cornerstone Exercise 18-35 NONVALUE-ADDED COSTS****OBJECTIVE** > **4****CORNERSTONE 18-7**

Dykes, Inc. has the following two activities: (1) Retesting reworked products, cost: \$160,000. The retesting cost of the most efficient competitor is \$50,000. (2) Welding subassemblies, cost: \$300,000 (15,000 welding hours). A benchmarking study reveals that the most efficient level for Dykes would use 12,000 welding hours and entail a cost of \$180,000.

**Required:**

Determine the nonvalue-added cost of each activity.

**OBJECTIVE** > **4** **Cornerstone Exercise 18-36 VELOCITY AND CYCLE TIME**

**CORNERSTONE 18-8** Kay Company takes 4,000 hours to produce 16,000 units of a product.

**Required:**

What is the velocity? Cycle time?

## Exercises

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**OBJECTIVE** > **1** **Exercise 18-37 CONSUMPTION RATIOS; ACTIVITY RATES**

Gladmark Company produces two types of get-well cards: scented and regular. Drivers for the four activities are as follows:

	Scented Cards	Regular Cards
Inspection hours	40	160
Setup hours	50	50
Machine hours	200	600
Number of moves	225	75

The following activity data have been collected:

Inspecting products	\$3,000
Setting up equipment	3,750
Machining	6,000
Moving materials	1,350

**Required:**

1. Calculate the consumption ratios for the four drivers.
2. Is there evidence of product diversity? Explain.
3. Calculate the activity rates that would be used to assign costs to each product.
4. Suppose that the activity rate for inspecting products is \$20 per inspection hour. How many hours of inspection are expected for the coming year?

**OBJECTIVE** > **2** **Exercise 18-38 ACTIVITY RATES**

Johanssen Company uses activity-based costing (ABC). Johansson manufactures outdoor water toys using two activities: plastic injection molding and decal application. Johansson's 2009 total budgeted overhead costs for these two activities are \$250,000 (70 percent for injection molding and 30 percent for decal application). Molding overhead costs are driven by the number of pounds of plastic that are molded together. Decal application overhead costs are driven by the number of decals applied to toys. The budgeted activity data for 2008 are as follows:

Pounds of plastic molded	1,750,000
Number of decals applied	187,500

**Required:**

1. Calculate the activity rate for the plastic injection molding activity.
2. Calculate the activity rate for the decal application activity.

**OBJECTIVE** > **2** **Exercise 18-39 COMPARING ABC AND PLANTWIDE OVERHEAD COST ASSIGNMENTS**

The Mackinaw Chocolate Company uses activity-based costing (ABC). The controller identified two activities and their budgeted costs:

Setting up equipment	\$ 36,000
Other overhead	120,000

Setting up equipment is based on setup hours, and other overhead is based on machine hours.

Mackinaw produces two products, Fudge and Cookies. Information on each product is as follows:

	Fudge	Cookies
Units produced	1,000	5,000
Setup hours	800	200
Oven hours	200	1,000

**Required:**

Round answers to two decimal places.

- Calculate the activity rate for:
  - setting up equipment
  - other overhead
- How much total overhead is assigned to Fudge using ABC?
- What is the unit overhead assigned to Fudge using ABC?
- Now, ignoring the ABC results, calculate the plantwide overhead rate, based on oven hours.
- How much total overhead is assigned to Fudge using the plantwide overhead rate?
- Explain why the total overhead assigned to Fudge is different under the ABC system (i.e., using the activity rates) than under the non-ABC system (i.e., using the plantwide rate).

**Exercise 18-40 ACTIVITY-BASED PRODUCT COSTING**

Suppose that a surgical ward has gathered the following information for four nursing activities and two types of patients:

	Driver	Patient Category		Activity Rate (\$)
		Normal	Intensive	
Treating patients	Treatments	4,000	20,000	8.00
Providing hygienic care	Hygienic hours	3,000	11,000	10.00
Responding to requests	Requests	20,000	50,000	4.00
Monitoring patients	Monitoring hours	15,000	180,000	1.50

**Required:**

- Determine the total nursing costs assigned to each patient category.
- Output is measured in patient days. Assuming that the normal patient category uses 10,000 patient days and the intensive patient category uses 8,000 patient days, calculate the nursing cost per patient day for each type of patient.

**Exercise 18-41 ASSIGNING COSTS TO ACTIVITIES, RESOURCE DRIVERS**

Receiving has three activities: unloading, counting goods, and inspecting. Unloading uses a forklift that is leased for \$12,000 per year. The forklift is used only for unloading. The fuel for the forklift is \$2,400 per year. Other operating costs (maintenance) for the forklift total \$1,000 per year. Inspection uses some special testing equipment that has a depreciation of \$800 per year and an operating cost of \$500. Receiving has three employees who have an average salary of \$40,000 per year. The work distribution matrix for the receiving personnel is as follows:

Activity	Percentage of Time on Each Activity (%)
Unloading	40
Counting	25
Inspecting	35

No other resources are used for these activities.

OBJECTIVE > 1 2



OBJECTIVE > 2

**Required:**

1. Calculate the cost of each activity.
2. Explain the two methods used to assign costs to activities.

**OBJECTIVE** > **2****Exercise 18-42 ACTIVITY-BASED CUSTOMER-DRIVEN COSTS**

Suppose that Stillwater Designs has two classes of distributors: JIT distributors and non-JIT distributors. The JIT distributor places small, frequent orders, and the non-JIT distributor tends to place larger, less frequent orders. Both types of distributors are buying the same product. Stillwater Designs provides the following information about customer-related activities and costs for the most recent quarter:

	JIT Distributors	Non-JIT Distributors
Sales orders	200	20
Sales calls	20	20
Service calls	100	50
Average order size	500	5,000
Manufacturing cost/unit	\$100	\$100
Customer costs:		
Processing sales orders	\$ 880,000	
Selling goods	320,000	
Servicing goods	300,000	
Total	<u>\$1,500,000</u>	

**Required:**

1. Calculate the total revenues per distributor category, and assign the customer costs to each distributor type by using revenues as the allocation base. Selling price for one unit is \$125.
2. Calculate the customer cost per distributor type using activity-based cost assignments. Discuss the merits of offering the non-JIT distributors a \$3 price decrease (assume that they are agitating for a price concession).
3. Assume that the JIT distributors are simply imposing the frequent orders on Stillwater Designs. No formal discussion has taken place between JIT customers and Stillwater Designs regarding the supply of goods on a JIT basis. The sales pattern has evolved over time. As an independent consultant, what would you suggest to Stillwater Designs' management?

**OBJECTIVE** > **3****Exercise 18-43 ACTIVITY-BASED SUPPLIER COSTING**

Hepworth Company manufactures heating systems. Hepworth produces all the parts necessary for its product except for one electronic component, which is purchased from two local suppliers: Wood Inc. and Hardy Company. Both suppliers are reliable and seldom deliver late; however, Wood sells the component for \$48 per unit, while Hardy sells the same component for \$43. Hepworth purchases 80 percent of its components from Hardy because of its lower price. The total annual demand is 2,000,000 components.

To help assess the cost effect of the two components, the following data were collected for supplier-related activities and suppliers:

## I. Activity Data

	Activity Cost (\$)
Inspecting components (sampling only)	240,000
Reworking products (due to failed component)	3,042,000
Warranty work (due to failed component)	4,800,000

## II. Supplier Data

	Wood Inc.	Hardy Company
Unit purchase price	\$48	\$43
Units purchased	400,000	1,600,000
Sampling hours*	40	1,960
Rework hours	180	2,820
Warranty hours	400	7,600

\* Sampling inspection for Wood's product has been reduced because the reject rate is so low.

**Required:**

- Calculate the cost per component for each supplier, taking into consideration the costs of the supplier-related activities and using the current prices and sales volume. Round the unit cost to two decimal places.
- Suppose that Hepworth loses \$2,000,000 in sales per year because of the reputation effect of defective units attributable to failed components. Using warranty hours, assign the cost of lost sales to each supplier. By how much would this change the cost of each supplier's component?

**Exercise 18-44 NONVALUE-ADDED COSTS****OBJECTIVE** 4

The following six situations are independent.

- A manual insertion process takes 30 minutes and 8 pounds of material to produce a product. Automating the insertion process requires 15 minutes of machine time and 7.5 pounds of material. The cost per labor hour is \$12, the cost per machine hour is \$8, and the cost per pound of materials is \$10.
- With its original design, a gear requires eight hours of setup time. By redesigning the gear so that the number of different grooves needed is reduced by 50 percent, the setup time is reduced by 75 percent. The cost per setup hour is \$50.
- A product currently requires six moves. By redesigning the manufacturing layout, the number of moves can be reduced from six to zero. The cost per move is \$20.
- Inspection time for a plant is 16,000 hours per year. The cost of inspection consists of salaries of eight inspectors, totaling \$320,000. Inspection also uses supplies costing \$5 per inspection hour. The company eliminated most defective components by eliminating low-quality suppliers. The number of production errors was reduced dramatically by installing a system of statistical process control. Further quality improvements were realized by redesigning the products, making them easier to manufacture. The net effect was to achieve a close to zero-defect state and eliminate the need for any inspection activity.
- Each unit of a product requires six components. The average number of components is 6.5 due to component failure, requiring rework and extra components. Developing relations with the right suppliers and increasing the quality of the purchased component can reduce the average number of components to six components per unit. The cost per component is \$500.
- A plant produces 100 different electronic products. Each product requires an average of eight components that are purchased externally. The components are different for each part. By redesigning the products, it is possible to produce the 100 products so that they all have four components in common. This will reduce the demand for purchasing, receiving, and paying bills. Estimated savings from the reduced demand are \$900,000 per year.

**Required:**

Estimate the nonvalue-added cost for each situation.

**OBJECTIVE** > **4** **Exercise 18-45 DRIVER ANALYSIS**

Refer to the six situations in **Exercise 18-44**.

**Required:**

For each situation, identify the possible root cause(s) of the activity cost (such as plant layout, process design, and product design).

**OBJECTIVE** > **4** **Exercise 18-46 TYPE OF ACTIVITY MANAGEMENT**

Refer to the six situations in **Exercise 18-44**.

**Required:**

For each situation, identify the cost reduction measure: activity elimination, activity reduction, activity sharing, or activity selection.

**OBJECTIVE** > **4** **Exercise 18-47 CYCLE TIME AND VELOCITY**

A manufacturing cell produces 90,000 stereo speakers per quarter. A total of 15,000 production hours are used within the cell per quarter.

**Required:**

1. Compute the velocity (per hour).
2. Compute the cycle time (minutes per unit produced).

**OBJECTIVE** > **1** **2** **Exercise 18-48 PRODUCT-COSTING ACCURACY, CONSUMPTION RATIOS**

Plata Company produces two products: a mostly handcrafted soft leather briefcase sold under the label Maletin Elegant and a leather briefcase produced largely through automation and sold under the label Maletin Fina. The two products use two overhead activities, with the following costs:

Setting up equipment	\$ 3,000
Machining	18,000

The controller has collected the expected annual prime costs for each briefcase, the machine hours, the setup hours, and the expected production.

	Elegant	Fina
Direct labor	\$9,000	\$3,000
Direct materials	\$3,000	\$3,000
Units	3,000	3,000
Machine hours	500	4,500
Setup hours	100	100

**Required:**

1. Do you think that the direct labor costs and direct materials costs are accurately traced to each briefcase? Explain.
2. Calculate the consumption ratios for each activity.
3. Calculate the overhead cost per unit for each briefcase by using a plantwide rate based on direct labor costs. Comment on this approach to assigning overhead.
4. Calculate the overhead cost per unit for each briefcase by using overhead rates based on machine hours and setup hours. Explain why these assignments are more accurate than using the direct labor costs.

**OBJECTIVE** > **1** **2** **Exercise 18-49 PRODUCT-COSTING ACCURACY, CONSUMPTION RATIOS, ACTIVITY RATES, ACTIVITY COSTING**

Tristar Manufacturing produces two types of battery-operated toy soldiers: infantry and special forces. The soldiers are produced by using one continuous process. Four activities have been identified: machining, setups, receiving, and packing. Resource drivers have

been used to assign costs to each activity. The overhead activities, their costs, and the other related data are as follows:

Product	Machine Hours	Setups	Receiving Orders	Packing Orders
Infantry	20,000	300	900	1,600
Special forces	20,000	100	100	800
Costs	\$80,000	\$24,000	\$18,000	\$30,000

**Required:**

1. Calculate the total overhead assigned to each product by using only machine hours to calculate a plantwide rate.
2. Calculate consumption ratios for each activity.
3. Calculate a rate for each activity by using the associated driver.
4. Assign the overhead costs to each product by using the activity rates computed in Requirement 3.
5. Comment on the difference between the assignment in Requirement 1 and the activity-based assignment.

**Exercise 18-50 FORMATION OF AN ACTIVITY DICTIONARY**

**OBJECTIVE** 2

A hospital is in the process of implementing an ABC system. A pilot study is being done to assess the effects of the costing changes on specific products. Of particular interest is the cost of caring for patients who receive in-patient recovery treatment for illness, surgery (noncardiac), and injury. These patients are housed on the third and fourth floors of the hospital (the floors are dedicated to patient care and have only nursing stations and patient rooms). A partial transcript of an interview with the hospital's nursing supervisor is as follows:

1. How many nurses are in the hospital?  
*There are 101 nurses, including me.*
2. Of these 100 nurses, how many are assigned to the third and fourth floors?  
*Fifty nurses are assigned to these two floors.*
3. What do these nurses do (please describe)?  
*Provide nursing care for patients, which, as you know, means answering questions, changing bandages, administering medicine, changing clothes, etc.*
4. And what do you do?  
*I supervise and coordinate all the nursing activity in the hospital. This includes surgery, maternity, the emergency room, and the two floors you mentioned.*
5. What other lodging and care activities are done for the third and fourth floors by persons other than the nurses?  
*The patients must be fed. The hospital cafeteria delivers meals. The laundry department picks up dirty clothing and bedding once each shift. The floors also have a physical therapist assigned to provide care on a physician-directed basis.*
6. Do patients use any equipment?  
*Yes. Mostly monitoring equipment.*
7. Who or what uses the activity output?  
*Patients. But there are different kinds of patients. On these two floors, we classify patients into three categories according to severity: intensive care, intermediate care, and normal care. The more severe the illness, the more activity is used. Nurses spend much more time with intermediate care patients than with normal care. The more severe patients tend to use more of the laundry service as well. Their clothing and bedding need to be changed more frequently. On the other hand, severe patients use less food. They eat fewer meals. Typically, we measure each patient type by the number of days of*

*hospital stay. And you have to realize that the same patient contributes to each type of product.*

**Required:**

Prepare an activity dictionary with three categories: activity name, activity description, and activity driver.

**OBJECTIVE** > **2** **Exercise 18-51 ACTIVITY RATES AND ACTIVITY-BASED PRODUCT COSTING**

Hammer Company produces a variety of electronic equipment. One of its plants produces two laser printers: the deluxe and the regular. At the beginning of the year, the following data were prepared for this plant:

	Deluxe	Regular
Quantity	100,000	800,000
Selling price	\$900	\$750
Unit prime cost	\$529	\$483

In addition, the following information was provided so that overhead costs could be assigned to each product:

Activity Name	Activity Driver	Activity Cost (\$)	Deluxe	Regular
Setups	Number of setups	2,000,000	300	200
Machining	Machine hours	80,000,000	100,000	300,000
Engineering	Engineering hours	6,000,000	50,000	100,000
Packing	Packing orders	1,000,000	100,000	400,000

**Required:**

1. Calculate the overhead rates for each activity.
2. Calculate the per-unit product cost for each product.

**OBJECTIVE** > **4** **Exercise 18-52 VALUE- AND NONVALUE-ADDED COSTS**

Waterfun Technology produces engines for recreational boats. Because of competitive pressures, the company was making an effort to reduce costs. As part of this effort, management implemented an activity-based management system and began focusing its attention on processes and activities. Purchasing was among the processes (activities) that were carefully studied. The study revealed that the number of purchase orders was a good driver for purchasing costs. During the last year, the company incurred fixed receiving costs of \$630,000 (salaries of 15 employees). These fixed costs provide a capacity of processing 72,000 receiving orders (7,200 per employee at practical capacity). Management decided that the efficient level for purchasing should use 36,000 receiving orders.

**Required:**

1. Explain why receiving would be viewed as a value-added activity. List all possible reasons. Also, list some possible reasons that explain why the demand for purchasing is more than the efficient level of 36,000 orders.
2. Break the cost of receiving into its value-added and nonvalue-added components.

## Problems

**OBJECTIVE** > **1** **2** **Problem 18-53 FUNCTIONAL-BASED VERSUS ACTIVITY-BASED COSTING**

For years, Tamarindo Company produced only one product: backpacks. Recently, the company decided to add a line of duffel bags. With this addition, the company began assigning overhead costs by using departmental rates. (Prior to this, the company used a predetermined plantwide rate based on units produced.) Departmental rates meant that

overhead costs had to be assigned to each producing department in order to create overhead pools so that predetermined departmental rates could be calculated. Surprisingly, after the addition of the duffel-bag line and the switch to departmental rates, the costs to produce the backpacks increased, and their profitability dropped.

The marketing manager and the production manager both complained about the increase in the production cost of backpacks. The marketing manager was concerned because the increase in unit costs led to pressure to increase the unit price of backpacks. She was resisting this pressure because she was certain that the increase would harm the company's market share. The production manager was receiving pressure to cut costs also, yet he was convinced that nothing different was being done in the way the backpacks were produced. He was also convinced that further efficiency in the manufacture of the backpacks was unlikely. After some discussion, the two managers decided that the problem had to be connected to the addition of the duffel-bag line.

Upon investigation, they were informed that the only real change in product costing procedures was in the way overhead costs are assigned. A two-stage procedure was now in use. First, overhead costs are assigned to the two producing departments, Patterns and Finishing. Some overhead costs are assigned to the producing departments by using direct tracing, and some are assigned by using driver tracing. For example, the salaries of the producing department's supervisors are assigned by using direct tracing, whereas the costs of the factory's accounting department are assigned by using driver tracing (the driver being the number of transactions processed for each department). Second, the costs accumulated in the producing departments are assigned to the two products by using direct labor hours as a driver (the rate in each department is based on direct labor hours). The managers were assured that great care was taken to associate overhead costs with individual products. So that they could construct their own example of overhead cost assignment, the controller provided them with the information necessary to show how accounting costs are assigned to products:

	Department		Total
	Patterns	Finishing	
Accounting cost	\$48,000	\$72,000	\$120,000
Transactions processed	32,000	48,000	80,000
Total direct labor hours	10,000	20,000	30,000
Direct labor hours per backpack*	0.10	0.20	0.30
Direct labor hours per duffel bag*	0.40	0.80	1.20

\* Hours required to produce one unit of each product.

The controller remarked that the cost of operating the accounting department had doubled with the addition of the new product line. The increase came because of the need to process additional transactions, which had also doubled in number.

During the first year of producing duffel bags, the company produced and sold 100,000 backpacks and 25,000 duffel bags. The 100,000 backpacks matched the prior year's output for that product.

#### Required:

1. Compute the amount of accounting cost assigned to a backpack before the duffel-bag line was added by using a plantwide rate approach based on units produced. Is this assignment accurate? Explain.
2. Suppose that the company decided to assign the accounting costs directly to the product lines by using the number of transactions as the activity driver. What is the accounting cost per unit of backpacks? Per unit of duffel bags?
3. Compute the amount of accounting cost assigned to each backpack and duffel bag by using departmental rates based on direct labor hours.
4. Which way of assigning overhead does the best job—the functional-based approach by using departmental rates or the activity-based approach by using transactions processed for each product? Explain. Discuss the value of ABC before the duffel-bag line was added.

## OBJECTIVE &gt; 1 2

**Problem 18-54 PLANTWIDE VERSUS DEPARTMENTAL RATES, PRODUCT-COSTING ACCURACY: ACTIVITY-BASED COSTING**

Ramsey Company produces speakers (Model A and Model B). Both products pass through two producing departments. Model A's production is much more labor-intensive than that of Model B. Model B is also the more popular of the two speakers. The following data have been gathered for the two products:

	Product Data	
	Model A	Model B
Units produced per year	30,000	300,000
Prime costs	\$100,000	\$1,000,000
Direct labor hours	140,000	300,000
Machine hours	20,000	200,000
Production runs	40	60
Inspection hours	800	1,200
Maintenance hours	10,000	90,000
Overhead costs:		
Setup costs	\$180,000	
Inspection costs	140,000	
Machining	160,000	
Maintenance	180,000	
Total	<u>\$660,000</u>	

**Required:**

1. Compute the overhead cost per unit for each product by using a plantwide rate based on direct labor hours. Round to two decimal places.
2. Compute the overhead cost per unit for each product by using ABC. Round to two decimal places.
3. Suppose that Ramsey decides to use departmental overhead rates. There are two departments: Department 1 (machine intensive) with a rate of \$2.33 per machine hour and Department 2 (labor intensive) with a rate of \$0.60 per direct labor hour. The consumption of these two drivers is as follows:

	Department 1 Machine Hours	Department 2 Direct Labor Hours
Model A	10,000	30,000
Model B	170,000	270,000

Compute the overhead cost per unit for each product by using departmental rates. Round to two decimal places.

4. Using the activity-based product costs as the standard, comment on the ability of departmental rates to improve the accuracy of product costing. (Did the departmental rates do better than the plantwide rate?)

## OBJECTIVE &gt; 1 2

**Problem 18-55 PRODUCTION-BASED COSTING VERSUS ACTIVITY-BASED COSTING, ASSIGNING COSTS TO ACTIVITIES, RESOURCE DRIVERS**

Willow Company produces lawn mowers. One of its plants produces two versions of mowers: a basic model and a deluxe model. The deluxe model has a sturdier frame, a higher horsepower engine, a wider blade, and mulching capability. At the beginning of the year, the following data were prepared for this plant:

	Basic Model	Deluxe Model
Expected quantity	40,000	20,000
Selling price	\$180	\$360
Prime costs	\$80	\$160
Machine hours	5,000	5,000
Direct labor hours	10,000	10,000

	Basic Model	Deluxe Model
Engineering support (hours)	1,500	4,500
Receiving (orders processed)	250	500
Materials handling (number of moves)	1,200	4,800
Purchasing (number of requisitions)	100	200
Maintenance (hours used)	1,000	3,000
Paying suppliers (invoices processed)	250	500
Setting up equipment (number of setups)	16	64

Additionally, the following overhead activity costs are reported:

Maintaining equipment	\$114,000
Engineering support	120,000
Materials handling	?
Setting up equipment	96,000
Purchasing materials	60,000
Receiving goods	40,000
Paying suppliers	30,000
Providing space	20,000
Total	<u>\$ ?</u>

Facility-level costs are allocated in proportion to machine hours (provides a measure of time the facility is used by each product). Materials handling uses three inputs: two forklifts, gasoline to operate the forklift, and three operators. The three operators are paid a salary of \$40,000 each. The operators spend 25 percent of their time on the receiving activity and 75 percent on moving goods (materials handling). Gasoline costs \$3 per move. Depreciation amounts to \$6,000 per forklift per year.

#### Required:

Round answers to two decimal places.

1. Calculate the cost of the materials handling activity. Label the cost assignments as driver tracing or direct tracing. Identify the resource drivers.
2. Calculate the cost per unit for each product by using direct labor hours to assign all overhead costs.
3. Calculate activity rates, and assign costs to each product. Calculate a unit cost for each product, and compare these costs with those calculated in Requirement 2.
4. Calculate consumption ratios for each activity.
5. Explain how the consumption ratios calculated in Requirement 4 can be used to reduce the number of rates. Calculate the rates that would apply under this approach.

#### Problem 18-56 ACTIVITY COSTING, ASSIGNING RESOURCE COSTS, PRIMARY AND SECONDARY ACTIVITIES

#### OBJECTIVE > 1 2

Trinity Clinic has identified three activities for daily maternity care: occupancy and feeding, nursing, and nursing supervision. The nursing supervisor oversees 150 nurses, 25 of whom are maternity nurses (the other nurses are located in other care areas such as the emergency room and intensive care). The nursing supervisor has three assistants, a secretary, several offices, computers, phones, and furniture. The three assistants spend 75 percent of their time on the supervising activity and 25 percent of their time as surgical nurses. They each receive a salary of \$48,000. The nursing supervisor has a salary of \$70,000. She spends 100 percent of her time supervising. The secretary receives a salary of \$22,000 per year. Other costs directly traceable to the supervisory activity (depreciation, utilities, phone, etc.) average \$100,000 per year.

Daily care output is measured as “patient days.” The clinic has traditionally assigned the cost of daily care by using a daily rate (a rate per patient day). Different kinds of daily care are provided, and rates are structured to reflect these differences. For example, a higher daily rate is charged for an intensive care unit than for a maternity care unit.

Within units, however, the daily rates are the same for all patients. Under the traditional, functional approach, the daily rate is computed by dividing the annual costs of occupancy and feeding, nursing, and a share of supervision by the unit's capacity expressed in patient days. The cost of supervision is assigned to each care area based on the number of nurses. A single driver (patient days) is used to assign the costs of daily care to each patient.

A pilot study has revealed that the demands for nursing care vary within the maternity unit, depending on the severity of a patient's case. Specifically, demand for nursing services per day increases with severity. Assume that the maternity unit has three levels of increasing severity: normal patients, cesarean patients, and patients with complications. The pilot study provided the following activity and cost information:

Activity	Annual Cost (\$)	Activity Driver	Annual Quantity
Occupancy and feeding	1,000,000	Patient days	10,000
Nursing care (maternity)	950,000	Hours of nursing care	50,000
Nursing supervision	?	Number of nurses	150

The pilot study also revealed the following information concerning the three types of patients and their annual demands:

Patient Type	Patient Days Demanded	Nursing Hours Demanded
Normal	7,000	17,500
Cesarean	2,000	12,500
Complications	1,000	20,000
Total	<u>10,000</u>	<u>50,000</u>

#### Required:

1. Calculate the cost per patient day by using a functional-based approach.
2. Calculate the cost per patient day by using an activity-based approach.
3. The hospital processes 1,000,000 pounds of laundry per year. The cost for the laundering activity is \$500,000 per year. In a functional-based cost system, the cost of the laundry department is assigned to each user department in proportion to the pounds of laundry produced. Typically, maternity produces 200,000 pounds per year. How much would this change the cost per patient day calculated in Requirement 1? Now, describe what information you would need to modify the calculation made in Requirement 2. Under what conditions would this activity calculation provide a more accurate cost assignment?

#### OBJECTIVE > 1 2 3

#### Problem 18-57 CUSTOMERS AS A COST OBJECT

Oaklawn National Bank has requested an analysis of checking account profitability by customer type. Customers are categorized according to the size of their account: low balances, medium balances, and high balances. The activities associated with the three different customer categories and their associated annual costs are as follows:

Opening and closing accounts	\$ 200,000
Issuing monthly statements	300,000
Processing transactions	2,050,000
Customer inquiries	400,000
Providing automatic teller machine (ATM) services	<u>1,120,000</u>
Total cost	<u>\$4,070,000</u>

Additional data concerning the usage of the activities by the various customers are also provided:

	Account Balance		
	Low	Medium	High
Number of accounts opened/closed	15,000	3,000	2,000
Number of statements issued	450,000	100,000	50,000
Processing transactions	18,000,000	2,000,000	500,000
Number of telephone minutes	1,000,000	600,000	400,000
Number of ATM transactions	1,350,000	200,000	50,000
Number of checking accounts	38,000	8,000	4,000

**Required:**

Round answers to two decimal places.

1. Calculate a cost per account per year by dividing the total cost of processing and maintaining checking accounts by the total number of accounts. What is the average fee per month that the bank should charge to cover the costs incurred because of checking accounts?
2. Calculate a cost per account by customer category by using activity rates.
3. Currently, the bank offers free checking to all of its customers. The interest revenues average \$90 per account; however, the interest revenues earned per account by category are \$80, \$100, and \$165 for the low-, medium-, and high-balance accounts, respectively. Calculate the average profit per account (average revenue less average cost from Requirement 1). Then calculate the profit per account by using the revenue per customer type and the unit cost per customer type calculated in Requirement 2.
4. After the analysis in Requirement 3, a vice president recommended eliminating the free checking feature for low-balance customers. The bank president expressed reluctance to do so, arguing that the low-balance customers more than made up for the loss through cross-sales. He presented a survey that showed that 50 percent of the customers would switch banks if a checking fee were imposed. Explain how you could verify the president's argument by using ABC.

**Problem 18-58 ACTIVITY-BASED COSTING AND CUSTOMER-DRIVEN COSTS****OBJECTIVE** > **2** **3**

Sorensen Manufacturing produces several types of bolts used in aircrafts. The bolts are produced in batches according to customer orders. Although there are a variety of bolts, they can be grouped into three product families. Because the product families are used in different kinds of aircraft, customers also can be grouped into three categories, corresponding to the product family that they purchase. The number of units sold to each customer class is the same. The selling prices for the three product families range from \$0.50 to \$0.80 per unit. Historically, the costs of order entry, processing, and handling were expensed and not traced to individual customer groups. These costs are not trivial and totaled \$4,500,000 for the most recent year. Furthermore, these costs had been increasing over time. Recently, the company started emphasizing a cost reduction strategy; however, any cost reduction decisions had to contribute to the creation of a competitive advantage.

Because of the magnitude and growth of order-filling costs, management decided to explore the causes of these costs. They discovered that order-filling costs were driven by the number of customer orders processed. Further investigation revealed the following cost behavior for the order-filling activity:

Step-fixed cost component: \$50,000 per step (2,000 orders define a step)\*

Variable cost component: \$20 per order

\* Sorensen currently has sufficient steps to process 100,000 orders.

The expected customer orders for the year total 100,000. The expected usage of the order-filling activity and the average size of an order by customer category follow:

	Category I	Category II	Category III
Number of orders	50,000	30,000	20,000
Average order size	600	1,000	1,500

As a result of cost behavior analysis, the marketing manager recommended the imposition of a charge per customer order. The president of the company concurred. The charge was implemented by adding the cost per order to the price of each order (computed by using the projected ordering costs and expected orders). This ordering cost was then reduced as the size of the order increased and was eliminated as the order size reached 2,000 units (the marketing manager indicated that any penalties imposed for orders greater than this size would lose sales from some of the smaller customers). Within a short period of communicating this new price information to customers, the average order size for all three product families increased to 2,000 units.

**Required:**

1. Sorensen traditionally has expensed order-filling costs. What is the most likely reason for this practice?
2. Calculate the cost per order for each customer category. Round to two decimal places.
3. Calculate the reduction in order-filling costs produced by the change in pricing strategy (assume that resource spending is reduced as much as possible and that the total units sold remain unchanged). Explain how exploiting customer activity information produced this cost reduction. Would any other internal activities benefit from this pricing strategy?

**OBJECTIVE** 2 3

**Problem 18-59 ACTIVITY-BASED SUPPLIER COSTING**

Levy Inc. manufactures tractors for agricultural usage. Levy purchases the engines needed for its tractors from two sources: Johnson Engines and Watson Company. The Johnson engine is the more expensive of the two sources and has a price of \$1,000. The Watson engine is \$900 per unit. Levy produces and sells 22,000 tractors. Of the 22,000 engines needed for the tractors, 4,000 are purchased from Johnson Engines, and 18,000 are purchased from Watson Company. The production manager, Jamie Murray, prefers the Johnson engine. However, Jan Booth, purchasing manager, maintains that the price difference is too great to buy more than the 4,000 units currently purchased. Booth also wants to maintain a significant connection with the Johnson source just in case the less expensive source cannot supply the needed quantities. Even though Jamie understands the price argument, he is convinced that the quality of the Johnson engine is worth the price difference.

Frank Wallace, the controller, has decided to use activity costing to resolve the issue. The following activity cost and supplier data have been collected:

Activity	Cost (\$)
Replacing engines <sup>a</sup>	800,000
Expediting orders <sup>b</sup>	1,000,000
Repairing engines <sup>c</sup>	1,800,000

<sup>a</sup> All units are tested after assembly, and some are rejected because of engine failure. The failed engines are removed and replaced, with the supplier replacing any failed engine. The replaced engine is retested before being sold. Engine failure often causes collateral damage, and other parts often need to be replaced.

<sup>b</sup> Due to late or failed delivery of engines.

<sup>c</sup> Repair work is for units under warranty and almost invariably is due to engine failure. Repair usually means replacing the engine. This cost plus labor, transportation, and other costs make warranty work very expensive.

	Watson	Johnson
Engines replaced by source	1,980	20
Late or failed shipments	198	2
Warranty repairs (by source)	2,440	60

**Required:**

1. Calculate the activity-based supplier cost per engine (acquisition cost plus supplier-related activity costs). Which of the two suppliers is the low-cost supplier? Explain why this is a better measure of engine cost than the usual purchase costs assigned to the engines.
2. Consider the supplier cost information obtained in Requirement 1. Suppose further that Johnson can only supply a total of 20,000 units. What actions would you advise Levy to undertake with its suppliers?

**Problem 18-60 ACTIVITY-BASED MANAGEMENT, NONVALUE-ADDED COSTS****OBJECTIVE** 4

Danna Martin, president of Mays Electronics, was concerned about the end-of-the-year marketing report that she had just received. According to Larry Savage, marketing manager, a price decrease for the coming year was again needed to maintain the company's annual sales volume of integrated circuit boards (CBs). This would make a bad situation worse. The current selling price of \$18 per unit was producing a \$2-per-unit profit—half the customary \$4-per-unit profit. Foreign competitors kept reducing their prices. To match the latest reduction would reduce the price from \$18 to \$14. This would put the price below the cost to produce and sell it. How could these firms sell for such a low price? Determined to find out if there were problems with the company's operations, Danna decided to hire a consultant to evaluate the way in which the CBs were produced and sold. After two weeks, the consultant had identified the following activities and costs:

Setting up equipment	\$ 125,000
Materials handling	180,000
Inspecting products	122,000
Engineering support	120,000
Handling customer complaints	100,000
Filling warranties	170,000
Storing goods	80,000
Expediting goods	75,000
Using materials	500,000
Using power	48,000
Manual insertion labor <sup>a</sup>	250,000
Other direct labor	150,000
Total costs	<u>\$1,920,000<sup>b</sup></u>

<sup>a</sup> Diodes, resistors, and integrated circuits are inserted manually into the circuit board.

<sup>b</sup> This total cost produces a unit cost of \$16 for last year's sales volume.

The consultant indicated that some preliminary activity analysis shows that per-unit costs can be reduced by at least \$7. Since the marketing manager had indicated that the market share (sales volume) for the boards could be increased by 50 percent if the price could be reduced to \$12, Danna became quite excited.

**Required:**

1. What is activity-based management? What phases of activity analysis did the consultant provide? What else remains to be done?
2. Identify as many nonvalue-added costs as possible. Compute the cost savings per unit that would be realized if these costs were eliminated. Was the consultant correct in his preliminary cost reduction assessment? Discuss actions that the company can take to reduce or eliminate the nonvalue-added activities.
3. Compute the unit cost required to maintain current market share, while earning a profit of \$4 per unit. Now compute the unit cost required to expand sales by 50 percent. How much cost reduction would be required to achieve each unit cost?
4. Assume that further activity analysis revealed the following: switching to automated insertion would save \$60,000 of engineering support and \$90,000 of direct labor.

Now, what is the total potential cost reduction per unit available from activity analysis? With these additional reductions, can Mays achieve the unit cost to maintain current sales? To increase it by 50 percent? What form of activity analysis is this: reduction, sharing, elimination, or selection?

- Calculate income based on current sales, prices, and costs. Then calculate the income by using a \$14 price and a \$12 price, assuming that the maximum cost reduction possible is achieved (including Requirement 4's reduction). What price should be selected?

**OBJECTIVE** 3 4

**Problem 18-61 NONVALUE-ADDED COSTS, ACTIVITY COSTS, ACTIVITY COST REDUCTION**

John Thomas, vice president of Mallett Company (a producer of a variety of plastic products), has been supervising the implementation of an ABC management system. One of John's objectives is to improve process efficiency by improving the activities that define the processes. To illustrate the potential of the new system to the president, John has decided to focus on two processes: production and customer service.

Within each process, one activity will be selected for improvement: materials usage for production and sustaining engineering for customer service (sustaining engineers are responsible for redesigning products based on customer needs and feedback). Value-added standards are identified for each activity (the level of efficiency so that no waste exists). For materials usage, the value-added standard calls for six pounds per unit of output (although the plastic products differ in shape and function, their size—as measured by weight—is uniform). The value-added standard is based on the elimination of all waste due to defective molds. The standard price of materials is \$5 per pound. For sustaining engineering, the standard is 58 percent of current practical activity capacity. This standard is based on the fact that about 42 percent of the complaints have to do with design features that could have been avoided or anticipated by the company.

Current practical capacity (at the end of 2007) is defined by the following requirements: 6,000 engineering hours for each product group that has been on the market or in development for five years or less and 2,400 hours per product group of more than five years. Four product groups have less than five years' experience, and 10 product groups have more. Each of the 24 engineers is paid a salary of \$60,000. Each engineer can provide 2,000 hours of service per year. No other significant costs are incurred for the engineering activity.

Actual materials usage for 2008 was 25 percent above the level called for by the value-added standard; engineering usage was 46,000 hours. A total of 80,000 units of output were produced. John and the operational managers have selected some improvement measures that promise to reduce nonvalue-added activity usage by 40 percent in 2009. Selected actual results achieved for 2007 are as follows:

Units produced	80,000
Materials used	584,800
Engineering hours	35,400

The actual prices paid for materials and engineering hours are identical to the standard or budgeted prices.

**Required:**

- For 2008, calculate the nonvalue-added usage and costs for materials usage and sustaining engineering.
- Using the budgeted improvements, calculate the expected activity usage levels for 2009. Now, compute the 2009 usage variances (the difference between the expected and actual values), expressed in both physical and financial measures, for materials and engineering. Comment on the company's ability to achieve its targeted reductions. In particular, discuss what measures the company must take to capture any realized reductions in resource usage.

**Problem 18-62 CYCLE TIME, VELOCITY, PRODUCT COSTING****OBJECTIVE** > 4

Goldman Company has a JIT system in place. Each manufacturing cell is dedicated to the production of a single product or major subassembly. One cell, dedicated to the production of telescopes, has four operations: machining, finishing, assembly, and qualifying (testing).

For the coming year, the telescope cell has the following budgeted costs and cell time (both at theoretical capacity):

Budgeted conversion costs	\$7,500,000
Budgeted raw materials	\$9,000,000
Cell time	12,000 hours
Theoretical output	90,000 telescopes

During the year, the following actual results were obtained:

Actual conversion costs	\$7,500,000
Actual materials	\$7,800,000
Actual cell time	12,000 hours
Actual output	75,000 telescopes

**Required (Round answers to two decimal places):**

1. Compute the velocity (number of telescopes per hour) that the cell can theoretically achieve. Now, compute the theoretical cycle time (number of hours or minutes per telescope) that it takes to produce one telescope.
2. Compute the actual velocity and the actual cycle time.
3. Compute the budgeted conversion costs per minute. Using this rate, compute the conversion costs per telescope if theoretical output is achieved. Using this measure, compute the conversion costs per telescope for actual output. Does this product costing approach provide an incentive for the cell manager to reduce cycle time? Explain.

**Problem 18-63 CLASSIFICATION OF ENVIRONMENTAL COSTS****OBJECTIVE** > 4

Consider the following independent environmental activities:

- a. A company takes actions to reduce the amount of material in its packages.
- b. After its useful life, a soft-drink producer returns the activated carbon used for purifying water for its beverages to the supplier. The supplier reactivates the carbon for a second use in nonfood applications. As a consequence, many tons of material are prevented from entering landfills.
- c. An evaporator system is installed to treat wastewater and to collect usable solids for other uses.
- d. The inks used to print snack packages (for chips) contain heavy metals.
- e. Processes are inspected to ensure compliance with environmental standards.
- f. Delivery boxes are used five times and then recycled. This prevents 112 million pounds of cardboard from entering landfills and saves two million trees per year.
- g. Scrubber equipment is installed to ensure that air emissions are less than the level permitted by law.
- h. Local residents are incurring medical costs from illnesses caused by air pollution from automobile exhaust pollution.
- i. As part of implementing an environmental perspective for a balanced performance measurement system, environmental performance measures are developed.
- j. Because of liquid and solid residues being discharged into a local lake, it is no longer fit for swimming, fishing, and other recreational activities.
- k. To reduce energy consumption, magnetic ballasts are replaced with electronic ballasts, and more efficient light bulbs and lighting sensors are installed. As a result, 2.3 million kilowatt-hours of electricity are saved per year.
- l. Because of a legal settlement, a chemical company must spend \$20,000,000 to clean up contaminated soil.

- m. A soft-drink company uses the following practice: In all bottling plants, packages damaged during filling are collected and recycled (glass, plastic, and aluminum).
- n. Products are inspected to ensure that the gaseous emissions produced during operation follow legal and company guidelines.
- o. Costs are incurred to operate pollution-control equipment.
- p. An internal audit is conducted to verify that environmental policies are being followed.

**Required:**

Classify these environmental activities as prevention, detection, internal failure, or external failure costs. For external failure costs, classify the costs as societal or private. Also, label those activities that are compatible with sustainable development with “SD.”

## Cases

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**OBJECTIVE** > 2 3 4
**Case 18-64 ACTIVITY-BASED COSTING, DISTORTED PRODUCT COSTS**

Sharp Paper Inc. has three paper mills, one of which is located in Memphis, Tennessee. The Memphis mill produces 300 different types of coated and uncoated specialty printing papers. This large variety of products was the result of a full-line marketing strategy adopted by Sharp’s management. Management was convinced that the value of variety more than offset the extra costs of the increased complexity.

During 2008, the Memphis mill produced 120,000 tons of coated paper and 80,000 tons of uncoated paper. Of the 200,000 tons produced, 180,000 were sold. Sixty products account for 80 percent of the tons sold. Thus, 240 products are classified as low-volume products.

Lightweight lime hopsack in cartons (LLHC) is one of the low-volume products. LLHC is produced in rolls, converted into sheets of paper, and then sold in cartons. In 2006, the cost to produce and sell one ton of LLHC was as follows:

Direct materials:		
Furnish (3 different pulps)	2,225 pounds	\$ 450
Additives (11 different items)	200 pounds	500
Tub size	75 pounds	10
Recycled scrap paper	(296 pounds)	(20)
Total direct materials		<u>\$ 940</u>
Direct labor		<u>\$ 450</u>
Overhead:		
Paper machine (\$100 per ton × 2,500 pounds)		\$ 125
Finishing machine (\$120 per ton × 2,500 pounds)		150
Total overhead		<u>\$ 275</u>
Shipping and warehousing		<u>\$ 30</u>
Total manufacturing and selling cost		<u><u>\$1,695</u></u>

Overhead is applied by using a two-stage process. First, overhead is allocated to the paper and finishing machines by using the direct method of allocation with carefully selected cost drivers. Second, the overhead assigned to each machine is divided by the budgeted tons of output. These rates are then multiplied by the number of pounds required to produce one good ton.

In 2008, LLHC sold for \$2,400 per ton, making it one of the most profitable products. A similar examination of some of the other low-volume products revealed that they also had very respectable profit margins. Unfortunately, the performance of the high volume products was less impressive, with many showing losses or very low profit margins. This situation led Ryan Chesser to call a meeting with his marketing vice president, Jennifer Woodruff, and his controller, Kaylin Penn.

**Ryan:** The above-average profitability of our low-volume specialty products and the poor profit performance of our high-volume products make me believe that we should switch our marketing emphasis to the low-volume line. Perhaps we should drop some of our high-volume products, particularly those showing a loss.

**Jennifer:** I'm not convinced that the solution you are proposing is the right one. I know our high-volume products are of high quality, and I am convinced that we are as efficient in our production as other firms. I think that somehow our costs are not being assigned correctly. For example, the shipping and warehousing costs are assigned by dividing these costs by the total tons of paper sold. Yet . . .

**Kaylin:** Jennifer, I hate to disagree, but the \$30-per-ton charge for shipping and warehousing seems reasonable. I know that our method to assign these costs is identical to a number of other paper companies.

**Jennifer:** Well, that may be true, but do these other companies have the variety of products that we have? Our low-volume products require special handling and processing, but when we assign shipping and warehousing costs, we average these special costs across our entire product line. Every ton produced in our mill passes through our mill shipping department and is either sent directly to the customer or to our distribution center and then eventually to customers. My records indicate quite clearly that virtually all of the high-volume products are sent directly to customers, whereas most of the low-volume products are sent to the distribution center. Now, all of the products passing through the mill shipping department should receive a share of the \$2,000,000 annual shipping costs. I am not convinced, however, that all products should receive a share of the receiving and shipping costs of the distribution center as currently practiced.

**Ryan:** Kaylin, is this true? Does our system allocate our shipping and warehousing costs in this way?

**Kaylin:** Yes, I'm afraid it does. Jennifer may have a point. Perhaps we need to reevaluate our method to assign these costs to the product lines.

**Ryan:** Jennifer, do you have any suggestions concerning how the shipping and warehousing costs should be assigned?

**Jennifer:** It seems reasonable to make a distinction between products that spend time in the distribution center and those that do not. We should also distinguish between the receiving and shipping activities at the distribution center. All incoming shipments are packed on pallets and weigh one ton each (there are 14 cartons of paper per pallet). In 2008, the receiving department processed 56,000 tons of paper. Receiving employs 15 people at an annual cost of \$600,000. Other receiving costs total about \$500,000. I would recommend that these costs be assigned by using tons processed.

Shipping, however, is different. There are two activities associated with shipping: picking the order from inventory and loading the paper. We employ 30 people for picking and 10 for loading, at an annual cost of \$1,200,000. Other shipping costs total \$1,100,000. Picking and loading are more concerned with the number of shipping items than with tonnage. That is, a shipping item may consist of two or three cartons instead of pallets. Accordingly, the shipping costs of the distribution center should be assigned by using the number of items shipped. In 2008, for example, we handled 190,000 shipping items.

**Ryan:** These suggestions have merit. Kaylin, I would like to see what effect Jennifer's suggestions have on the per-unit assignment of shipping and warehousing for LLHC. If the effect is significant, then we will expand the analysis to include all products.

**Kaylin:** I'm willing to compute the effect, but I'd like to suggest one additional feature. Currently, we have a policy to carry about 25 tons of LLHC in inventory. Our current costing system totally ignores the cost of carrying this inventory. Since it

costs us \$1,665 to produce each ton of this product, we are tying up a lot of money in inventory—money that could be invested in other productive opportunities. In fact, the return lost is about 16 percent per year. This cost should also be assigned to the units sold.

**Ryan:** Kaylin, this also sounds good to me. Go ahead and include the carrying cost in your computation.

To help in the analysis, Kaylin gathered the following data for LLHC for 2008:

Tons sold	10
Average cartons per shipment	2
Average shipments per ton	7

**Required:**

1. Identify the flaws associated with the current method of assigning shipping and warehousing costs to Sharp's products.
2. Compute the shipping and warehousing cost per ton of LLHC sold by using the new method suggested by Jennifer and Kaylin.
3. Using the new costs computed in Requirement 2, compute the profit per ton of LLHC. Compare this with the profit per ton computed by using the old method. Do you think that this same effect would be realized for other low-volume products? Explain.
4. Comment on Ryan's proposal to drop some high-volume products and place more emphasis on low-volume products. Discuss the role of the accounting system in supporting this type of decision making.
5. After receiving the analysis of LLHC, Ryan decided to expand the analysis to all products. He also had Kaylin reevaluate the way in which mill overhead was assigned to products. After the restructuring was completed, Ryan took the following actions: (a) the prices of most low-volume products were increased, (b) the prices of several high-volume products were decreased, and (c) some low-volume products were dropped. Explain why his strategy changed so dramatically.

**OBJECTIVE** > 2 3 4

**Case 18-65 ACTIVITY-BASED PRODUCT COSTING AND ETHICAL BEHAVIOR**

Consider the following conversation between Leonard Bryner, president and manager of a firm engaged in job manufacturing, and Chuck Davis, certified management accountant, the firm's controller.

**Leonard:** Chuck, as you know, our firm has been losing market share over the past three years. We have been losing more and more bids, and I don't understand why. At first, I thought that other firms were undercutting simply to gain business, but after examining some of the public financial reports, I believe that they are making a reasonable rate of return. I am beginning to believe that our costs and costing methods are at fault.

**Chuck:** I can't agree with that. We have good control over our costs. Like most firms in our industry, we use a normal job-costing system. I really don't see any significant waste in the plant.

**Leonard:** After talking with some other managers at a recent industrial convention, I'm not so sure that waste by itself is the issue. They talked about activity-based management, activity-based costing, and continuous improvement. They mentioned the use of something called "activity drivers" to assign overhead. They claimed that these new procedures can help to produce more efficiency in manufacturing, better control of overhead, and more accurate product costing. A big deal was made of eliminating activities that added no value. Maybe our bids are too high because these other firms have found ways to decrease their overhead costs and to increase the accuracy of their product costing.

**Chuck:** I doubt it. For one thing, I don't see how we can increase product costing accuracy. So many of our costs are indirect costs. Furthermore, everyone uses some measure of production activity to assign overhead costs. I imagine that what they are calling "activity drivers" is just some new buzzword for measures of production volume. Fads in costing come and go. I wouldn't worry about it. I'll bet that our problems with decreasing sales are temporary. You might recall that we experienced a similar problem about 12 years ago—it was 2 years before it straightened out.

**Required:**

1. Do you agree or disagree with Chuck Davis and the advice that he gave Leonard Bryner? Explain.
2. Was there anything wrong or unethical in the behavior that Chuck Davis displayed? Explain your reasoning.
3. Do you think that Chuck was well informed—that he was aware of the accounting implications of ABC and that he knew what was meant by cost drivers? Should he have been well informed? Review the Institute of Management Accountants "Statement of Ethical Professional Practice" found at [https://www.imanet.org/about\\_ethics\\_statement.asp](https://www.imanet.org/about_ethics_statement.asp). Do any of the standards of ethical conduct for management accountants apply?

# 19

## Profit Planning

After studying Chapter 19, you should be able to:

- **1** Define budgeting and discuss its role in planning, control, and decision making.
- **2** Define and prepare the operating budget, identify its major components, and explain the interrelationships of its various components.
- **3** Define and prepare the financial budget, identify its major components, and explain the interrelationships of its various components.
- **4** Describe the behavioral dimension of budgeting.





# **E**xperience Managerial Decisions with High Sierra

Have you ever wondered where that huge backpack you use to lug 50 pounds of books and education “gear” all over campus originated? If so, you might be surprised by the history behind the company. Right after World War II, an abundance of Army and Navy Surplus stores supplied consumers with tents, canteens, and canvas bags. One of these stores was Seaway Importing, a company founded in 1978 by Harry Bernbaum. Harry and his son Hank recognized the need to develop more durable products and founded the **High Sierra Sport Company**. Budgeting plays an important role in High Sierra’s decision making process. Throughout the 1980s, High Sierra developed its brand reputation as a manufacturer and supplier of numerous types of quality outdoor and foul weather gear, including backpacks, duffel bags, book bags, and hydration gear. During the mid-1990s budgeting played a key role in helping High Sierra realize it needed to streamline its brand identity in order to keep its competitive edge in

quality and price. High Sierra’s management used its budgeting process to eliminate poor performing products and to analyze new products, such as a winter sports product line that focused more directly on the company’s brand and target market (e.g., alliances with the U.S. Ski and Snowboard Association). During the early 2000s, High Sierra’s budgeting process showed management that it needed to expand operations by outsourcing some of its production overseas in order to remain cost competitive. To ensure that its budgeting process continues to provide useful insights, High Sierra frequently adopts new and evolving techniques, such as participative budgeting and continuous budgeting. In summary, High Sierra uses budgeting as an effective planning and control tool to promote successful new product development that creates value for the company and keeps students buying those huge backpacks every year!

**OBJECTIVE** > 1

Define budgeting and discuss its role in planning, control, and decision making.

## Description of Budgeting

All businesses should prepare budgets; all large businesses do. Business entities come in a variety of forms: sole proprietorships (single-owner businesses), partnerships, and corporations. Even small, professional corporations like sole-practitioner lawyers, dentists, and doctors can benefit from the planning and control provided by budgets.

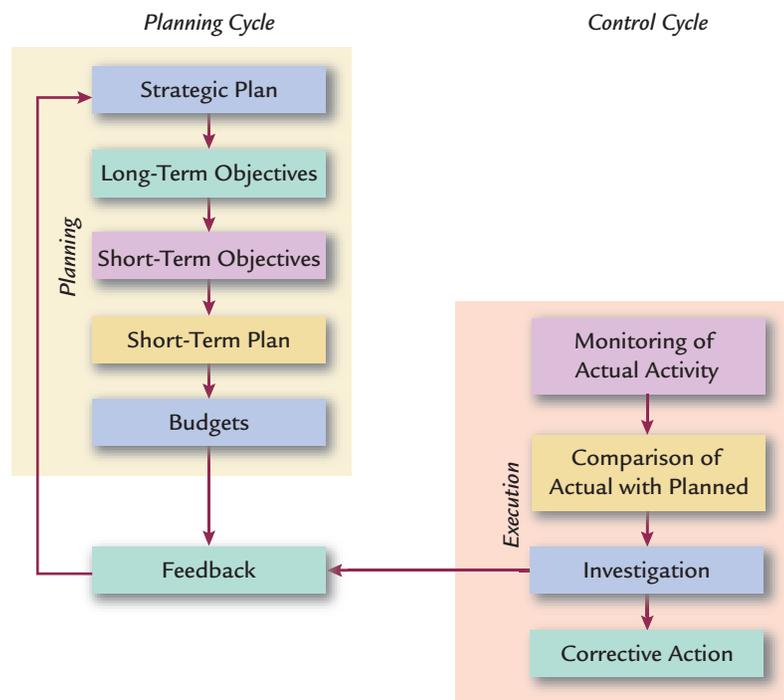
### Budgeting and Planning and Control

Planning and control are tied together in an important and vital way. *Planning* is looking ahead to see what actions should be taken to realize particular goals. *Control* is looking backward, determining what actually happened and comparing it with the previously planned outcomes. This comparison can then be used to adjust the budget, looking forward once more. Exhibit 19-1 illustrates the cycle of planning, control, and budgets.

**Budgets** are financial plans for the future and are a key component of planning. They identify objectives and the actions needed to achieve them. Before a budget is prepared, an organization should develop a strategic plan. The **strategic plan** identifies strategies for future activities and operations, generally covering at least five years. The organization can translate the overall strategy into long- and short-term objectives. These objectives form the basis of the budget. The budget and the strategic plan should be tightly linked. Since budgets, especially one-year plans, are short run in nature, this linkage is important because it helps management to ensure that not all attention is focused on the short run. For example, on May 14, 2007, private-equity firm **Cerberus Capital Management** announced it would buy an 80.1 percent stake in **Chrysler** from its German parent **DaimlerChrysler** for \$7.41 billion.<sup>1</sup> Managers at Cerberus undoubtedly performed detailed budgetary analyses of Chrysler's expected future cash inflows and outflows, as well as earnings. Short-run analyses were especially important to Cerberus as auto analysts speculated that Cerberus would attempt to make Chrysler leaner through cost cutting before turning around and selling it to another company for a profit shortly thereafter. However, Cerberus' analyses also needed to demonstrate

Exhibit 19-1

#### Planning, Control, and Budgets



<sup>1</sup> Gail Edmondson, "Why Daimler Gave Chrysler to Cerberus," *Business Week* (May 15, 2007): <http://www.msnbc.msn.com/id/18680299/>, accessed on March 17, 2008.

sufficient cash flows and earnings for Chrysler over the long term as well, in case its anticipated plan to unload the company in the near term did not materialize.

## Advantages of Budgeting

A budgetary system gives an organization several advantages.

1. It forces managers to plan.
2. It provides information that can be used to improve decision making.
3. It provides a standard for performance evaluation.
4. It improves communication and coordination.

Budgeting forces management to plan for the future. It encourages managers to develop an overall direction for the organization, foresee problems, and develop future policies.

Budgets improve decision making. For example, a restaurant owner who knows the expected revenues and the costs of meat, vegetables, cheeses, and so on might make menu changes that play up the less expensive items and reduce the use of more expensive ingredients. These better decisions, in turn, may keep customers happy while still providing a profitable living for the chefs, waiters, and others who work at the restaurant.

Budgets set standards that can control the use of a company's resources and motivate employees. A vital part of the budgetary system, **control** is achieved by comparing actual results with budgeted results on a periodic basis (e.g., monthly). A large difference between actual and planned results is feedback revealing that the system is out of control. Steps should be taken to find out why and then to correct the situation. For example, if a pizza restaurant knows how much cheese should be used on a pizza and what the cost should be, the owner can evaluate the amount of cheese actually used. If more cheese is being used than expected, the owner may discover that the workers are careless when preparing the pizzas such that some pizzas get less than their share of cheese and others get much more. The extra care in preparing the pizzas will produce savings and will convince customers that a consistent product will result each time. The same principle applies to other resources used by the corporation. In total, the savings could be significant.

Budgets also serve to communicate and coordinate. Budgets formally communicate the plans of the organization to each employee. Accordingly, all employees can be aware of their particular role in achieving those objectives. Since budgets for the various areas and activities of the organization must all work together to achieve organizational objectives, coordination is promoted. Managers can see the needs of other areas and are encouraged to subordinate their individual interests to those of the organization. The role of communication and coordination becomes more significant as an organization increases in size.

## The Master Budget

The **master budget** is the comprehensive financial plan for the organization as a whole. Typically, the master budget is for a one-year period, corresponding to the fiscal year of the company. Yearly budgets are broken down into quarterly and monthly budgets. The use of smaller time periods allows managers to compare actual data with budgeted data more frequently, so problems may be noticed and resolved sooner.

Some organizations have developed a continuous budgeting philosophy. A **continuous budget** is a moving 12-month budget. As a month expires in the budget, an additional month in the future is added so that the company always has a 12-month plan on hand. Proponents of continuous budgeting maintain that it forces managers to plan ahead constantly.

**Directing and Coordinating** Most organizations prepare the master budget for the coming year during the last four or five months of the current year. The **budget committee** reviews the budget, provides policy guidelines and budgetary goals, resolves differences that arise as the budget is prepared, approves the final budget, and monitors

### CONCEPT Q&A

How can a budget help in planning and control?

*A budget requires a plan. It also sets benchmarks that can be used to evaluate performance.*

**Possible Answer:**

the actual performance of the organization as the year unfolds. The president of the organization appoints the members of the committee, who are usually the president, vice president for marketing, vice president for manufacturing, other vice presidents, and the controller. The controller usually serves as the **budget director**, the person responsible for directing and coordinating the organization’s overall budgeting process.

**Major Components of the Master Budget** A master budget can be divided into operating and financial budgets. **Operating budgets** describe the income-generating activities of a firm: sales, production, and finished goods inventories. The ultimate outcome of the operating budgets is a pro forma or budgeted income statement. **Financial budgets** detail the inflows and outflows of cash and the overall financial position. Planned cash inflows and outflows appear in the cash budget. The expected financial position at the end of the budget period is shown in a budgeted, or pro forma, balance sheet. Since many of the financing activities are not known until the operating budgets are known, the operating budget is prepared first. Describing and illustrating the individual budgets that make up the master budget will make apparent the interdependencies of the component budgets. A diagram displaying these interrelationships is shown in Exhibit 19-2. Details of the capital budget are covered in Chapter 24.

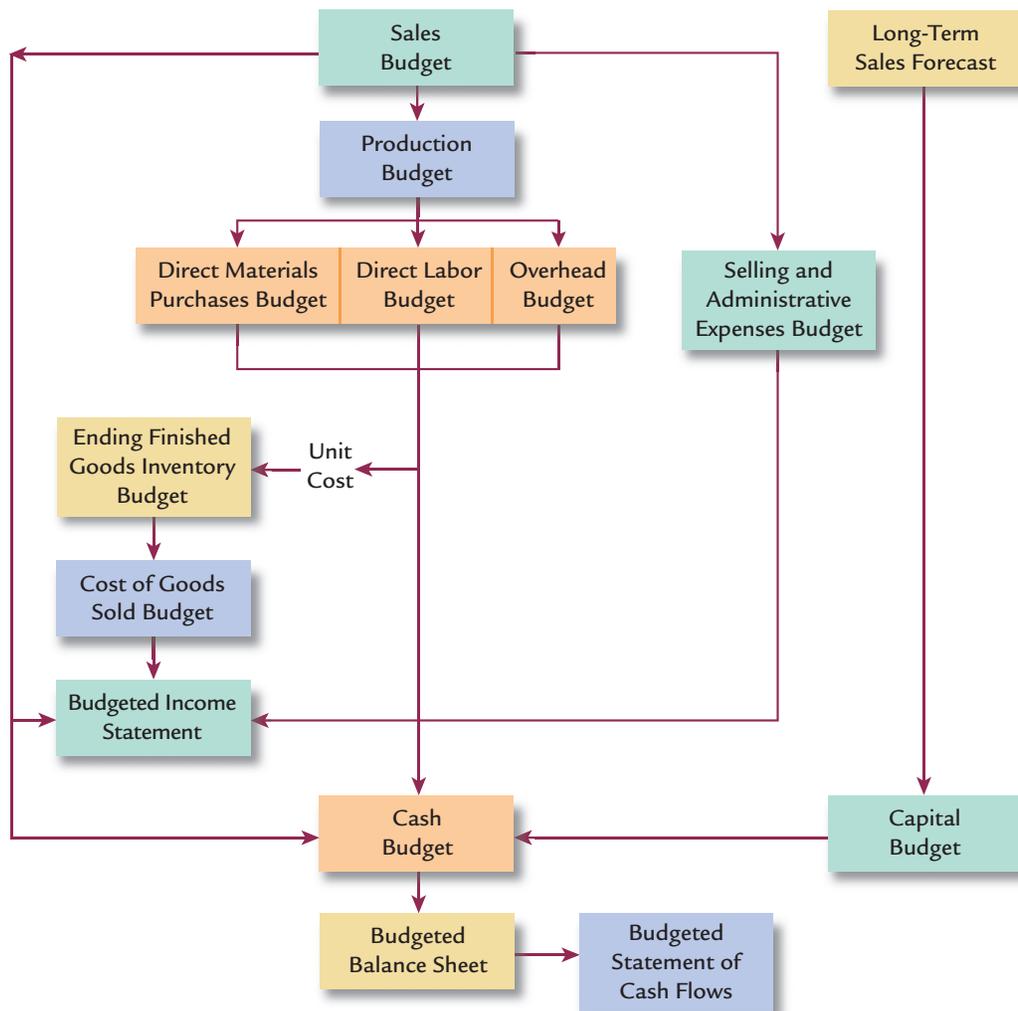
**CONCEPT Q&A**

What is the main objective of continuous budgeting?

*Possible Answer: It forces managers to plan ahead constantly—something especially needed when firms operate in rapidly changing environments.*

**Exhibit 19-2**

**The Master Budget and Its Interrelationships**



## Preparing the Operating Budget

The operating budget consists of a budgeted income statement accompanied by the following supporting schedules:

1. Sales budget
2. Production budget
3. Direct materials purchases budget
4. Direct labor budget
5. Overhead budget
6. Selling and administrative expenses budget
7. Ending finished goods inventory budget
8. Cost of goods sold budget

We illustrate the master budgeting process with an example based on the activities of Texas Rex Inc., a trendy restaurant in the Southwest that sells t-shirts with the Texas Rex logo (a dinosaur that engages in a variety of adventures while eating the Mexican food for which the restaurant is known). The example focuses on the Texas Rex clothing manufacturing plant.

### Sales Budget

The **sales budget** is approved by the budget committee and describes expected sales in units and dollars. Because the sales budget is the basis for all of the other operating budgets and most of the financial budgets, it is important that it be as accurate as possible.

The first step in creating a sales budget is to develop the sales forecast. This is usually the responsibility of the marketing department. One approach to forecasting sales is the *bottom-up approach*, which requires individual salespeople to submit sales predictions. These are aggregated to form a total sales forecast. The accuracy of this sales forecast may be improved by considering other factors such as the general economic climate, competition, advertising, pricing policies, and so on. Some companies use more formal approaches, such as time-series analysis, correlation analysis, and econometric modeling. For example, the regression technique studied in the Appendix of Chapter 14 can be applied to forecasting sales, in addition to costs.

The sales forecast is just the initial estimate, and it is often adjusted by the budget committee. The budget committee may decide that the forecast is too pessimistic or too optimistic and revise it appropriately. For example, **Nintendo**, according to a videogame analyst, set very conservative sales estimates for 2008. However, the company had to increase its sales forecast. Wii hardware sales alone were so robust that sales were expected to increase by one million units more than the company's original forecast.<sup>2</sup>

**Cornerstone 19-1** shows how to prepare the sales budget for Texas Rex's standard t-shirt line. For simplicity, we assume that Texas Rex has only one product: a standard short-sleeved t-shirt with the Texas Rex logo screen printed on the back. (For a multiple-product firm, the sales budget reflects sales for each product in units and sales dollars.)

### OBJECTIVE > 2

Define and prepare the operating budget, identify its major components, and explain the interrelationships of its various components.

#### HOW TO Prepare a Sales Budget

##### Information:

Budgeted units to be sold for each quarter: 1,000, 1,200, 1,500, and 2,000.  
Selling price is \$10 per t-shirt.

##### Required:

Prepare a sales budget for each quarter and for the year.



#### CORNERSTONE 19-1



<sup>2</sup>“Pachter finds Nintendo’s Sales Forecast Too Humble.” Posted January 31, 2008 at 02:57 pm by Pulkit Chandna: <http://www.gamertell.com/gaming/comment/analyst-nintendos-forecasts-remain-too-low/>, accessed March 16, 2008.

**CORNERSTONE**  
**19-1**  
*(continued)*

**Solution:**

**Texas Rex Inc.**  
**Sales Budget**  
**For the Year Ended December 31, 2010**

	Quarter				Year
	1	2	3	4	
Units	1,000	1,200	1,500	2,000	5,700
Unit selling price	× \$10	× \$10	× \$10	× \$10	× \$10
Budgeted sales	<u>\$10,000</u>	<u>\$12,000</u>	<u>\$15,000</u>	<u>\$20,000</u>	<u>\$57,000</u>

## CONCEPT Q&A

Why is the sales budget not necessarily the same as the sales forecast?

*The sales forecast is a starting point and an important input to the budgetary process; however, it is usually adjusted up or down, depending on the strategic objectives and plans of management.*

**Possible Answer:**

Notice that the sales budget in Cornerstone 19-1 reveals that Texas Rex's sales fluctuate seasonally. Most sales take place in the summer and fall quarters. This is due to the popularity of the t-shirts in the summer and the sales promotions that Texas Rex puts on for "back to school" and Christmas.

## Production Budget

The **production budget** tells how many units must be produced to meet sales needs and to satisfy ending inventory requirements. The Texas Rex production budget would show how many t-shirts are needed to satisfy sales demand for each quarter and for the year. If there were no beginning or ending inventories, the t-shirts to be produced would exactly equal the units to be sold. This would be the case in a just-in-time (JIT) firm. However, many

## Here's The



## Real Kicker

Stillwater Designs has 14 departments. Each department is given a budget for the coming fiscal year. The budgeting process begins with a sales forecast prepared by the president and vice presidents. The fiscal year for the company is October 1 through September 30. The budget is prepared during August and September, the last two months of the fiscal year. The fiscal year is driven by the seasonal nature of the business. In January of each year, there is a consumer electronics show in Las Vegas, Nevada. New products are introduced, and initial orders from distributors are taken. The sales season starts earnestly in March, reaches its peak in June or July, and drops to its lowest level in the fall. The sales season is driven by the anticipation of warm weather. The young men buying the Kicker speakers and amplifiers want to drive with windows down—with the apparent hope of impressing the girls!

Each department is given a percentage of sales as its budget. The amount ultimately decided upon is not simply a top-down decision. Department managers submit a

request for their desired budget. Negotiation takes place between the department managers and their associated vice presidents (each departmental manager is answerable to a specific vice president). Whether or not the desired levels are provided depends on how well the departmental manager can justify the expenditures. An important criterion is the notion that resources are expended to make profits.

The budget is reviewed monthly. Any large deviations from the budget are investigated (usually more than a 10 percent deviation is required for an investigation). However, no formal incentive system is tied to budgetary performance. The budget is viewed as a guideline. If more resources are needed, then they can be obtained provided the request is backed up with a good idea and a promising payout.



firms use inventories as a buffer against uncertainties in demand or production. Thus, they need to plan for inventory levels as well as sales.

To compute the units to be produced, both unit sales and units of beginning and ending finished goods inventory are needed:

$$\text{Units to Be Produced} = \text{Expected Unit Sales} + \text{Units in Desired Ending Inventory (EI)} - \text{Units in Beginning Inventory (BI)}$$

**Cornerstone 19-2** shows how to prepare a production budget using this formula. Consider the first column (quarter 1) of the budget in Cornerstone 19-2. Texas Rex anticipates sales of 1,000 t-shirts. In addition, the company wants 240 t-shirts in ending inventory at the end of the first quarter ( $0.20 \times 1,200$ ). Thus, 1,240 t-shirts are needed during the first quarter. Where will these 1,240 t-shirts come from? Beginning inventory can provide 180 of them, leaving 1,060 to be produced during the quarter. Notice that the production budget is expressed in terms of units.

## HOW TO Prepare a Production Budget

### Information:

Budgeted units to be sold for each quarter: 1,000, 1,200, 1,500, and 2,000. Assume that company policy requires 20 percent of the next quarter's sales in ending inventory and that beginning inventory of t-shirts for the first quarter of the year was 180. Assume also that sales for the first quarter of 2011 are estimated at 1,000 units.

### Required:

1. Calculate the desired ending inventory in units for the each quarter of the year. What is the ending inventory in units for the year?
2. Prepare a production budget for each quarter and for the year.

### Solution:

1. Ending inventory, quarter 1 =  $0.20 \times 1,200$  units = 240  
Ending inventory, quarter 2 =  $0.20 \times 1,500$  units = 300  
Ending inventory, quarter 3 =  $0.20 \times 2,000$  units = 400  
Ending inventory, quarter 4 =  $0.20 \times 1,000$  units = 200  
Ending inventory for the year = Ending inventory for quarter 4 = 200 units

2. \_\_\_\_\_

**Texas Rex Inc.**  
**Production Budget**  
**For the Year Ended December 31, 2010**

	Quarter				
	1	2	3	4	Year
Sales in units	1,000	1,200	1,500	2,000	5,700
Desired ending inventory	240	300	400	200	200
Total needs	1,240	1,500	1,900	2,200	5,900
Less: Beginning inventory*	(180)	(240)	(300)	(400)	(180)
Units to be produced	1,060	1,260	1,600	1,800	5,720

\* Beginning inventory for quarter 1 is given in information. Recall that the ending inventory for one quarter is equal to the beginning inventory of the next quarter.



## CORNERSTONE 19-2



## ANALYTICAL Q&A

Assume that the expected sales for January and February are 2,000 units and 2,500 units, respectively. The desired ending inventory is 20 percent of the next month's expected sales. If the inventory on hand at the beginning of January is 150 units, how many units should be budgeted for production?

*Budgeted units = Sales + EI - BI - (0.20 × 2,500) + 2,000 = 2,350.*  
**Answer:**

Two important points should be emphasized. First, the beginning inventory for one quarter is always equal to the ending inventory of the previous quarter. For quarter 2, the beginning inventory is 240 t-shirts, which is identical to the desired ending inventory for quarter 1. Second, the column for the year is not simply the addition of the amounts for the four quarters. Notice that the desired ending inventory for the year is 200 t-shirts, which is, of course, equal to the desired ending inventory for the fourth quarter.

## Direct Materials Purchases Budget

After the production budget is completed, the budgets for direct materials, direct labor, and overhead can be prepared.

The **direct materials purchases budget** tells the amount and cost of raw materials to be purchased in each time period; it depends on the expected use of materials in production and the raw materials inventory needs of the firm. The company needs to prepare a separate direct materials purchases budget for every type of raw material used. The formula used for calculating purchases is as follows:

$$\begin{aligned} \text{Purchases} = & \text{Direct Materials Needed for Production} \\ & + \text{Direct Materials in Desired Ending Inventory} \\ & - \text{Direct Materials in Beginning Inventory} \end{aligned}$$

The quantity of direct materials in inventory is determined by the firm's inventory policy.

Texas Rex uses two types of raw materials: plain t-shirts and ink. The direct materials purchases budgets for these two materials are presented in **Cornerstone 19-3**. Notice how similar the direct materials purchases budget is to the production budget. Consider the first quarter, starting with the plain t-shirts. It takes one plain t-shirt for every logo t-shirt, so the 1,060 logo t-shirts to be produced are multiplied by one to obtain the number of plain t-shirts needed for production. Next, the desired ending inventory of 126 (10 percent of the next quarter's production needs) is added. Thus, 1,186 plain t-shirts are needed during the first quarter. Of this total, 58 are already in beginning inventory, meaning that the remaining 1,128 must be purchased. Multiplying the 1,128 plain t-shirts by the cost of \$3 each gives Texas Rex the \$3,384 expected cost of plain t-shirt purchases for the first quarter of the year.

The second section of the direct materials purchases budget is for ink. Again using the first quarter, every logo t-shirt uses five ounces of ink; so the 1,060 logo t-shirts to be produced are multiplied by five to obtain the 5,300 ounces of ink needed for production. Next, the desired ending inventory of 630 ounces (10 percent of the next quarter's production needs) is added, yielding a requirement of 5,930 ounces of ink for the first quarter. Of this total, 390 ounces are already in beginning inventory, meaning that the remaining 5,540 ounces must be purchased. Multiplying the 5,540 ounces of ink by the cost of \$0.20 per ounce gives Texas Rex the \$1,108 expected cost of ink purchases for the first quarter of the year.

The total direct materials purchases of \$4,492 for the first quarter are the sum of the \$3,384 plain t-shirt purchases and the \$1,108 ink purchases. As you can see, there is a separate direct materials purchases budget for each type of raw material in a firm.

## Direct Labor Budget

The **direct labor budget** shows the total direct labor hours and the direct labor cost needed for the number of units in the production budget. As with direct materials, the budgeted hours of direct labor are determined by the relationship between labor and output.

## HOW TO Prepare a Direct Materials Purchases Budget

### Information:

Budgeted units to be produced for each quarter: 1,060, 1,260, 1,600, and 1,800. Plain t-shirts cost \$3 each, and ink (for the screen printing) costs \$0.20 per ounce. On a per-unit basis, the factory needs one plain t-shirt and five ounces of ink for each logo t-shirt that it produces. Texas Rex's policy is to have 10 percent of the following quarter's production needs in ending inventory. The factory has 58 plain t-shirts and 390 ounces of ink on hand on January 1. At the end of the year, the desired ending inventory is 106 plain t-shirts and 530 ounces of ink.

### Required:

- Calculate the ending inventory of plain t-shirts and of ink for quarters 2 and 3.
- Prepare a direct materials purchases budget for plain t-shirts and one for ink.

### Solution:

- Ending inventory plain t-shirts, quarter 2 =  $0.10 \times (1,600 \text{ units} \times 1 \text{ t-shirt}) = 160$   
 Ending inventory plain t-shirts, quarter 3 =  $0.10 \times (1,800 \text{ units} \times 1 \text{ t-shirt}) = 180$   
 Ending inventory ink, quarter 2 =  $0.10 \times (1,600 \text{ units} \times 5 \text{ ounces}) = 800$   
 Ending inventory ink, quarter 3 =  $0.10 \times (1,800 \text{ units} \times 5 \text{ ounces}) = 900$
- 

**Texas Rex Inc.**  
**Direct Materials Purchases Budget**  
**For the Year Ended December 31, 2010**

Plain t-shirts	Quarter				Year
	1	2	3	4	
Units to be produced	1,060	1,260	1,600	1,800	5,720
Direct materials per unit	$\times 1$				
Production needs	1,060	1,260	1,600	1,800	5,720
Desired ending inventory	126	160	180	106	106
Total needs	1,186	1,420	1,780	1,906	5,826
Less: Beginning inventory	(58)	(126)	(160)	(180)	(58)
Direct materials to be purchased	1,128	1,294	1,620	1,726	5,768
Cost per t-shirt	$\times \$3$				
Total purchase cost plain t-shirts	<u>\$3,384</u>	<u>\$3,882</u>	<u>\$4,860</u>	<u>\$5,178</u>	<u>\$17,304</u>

Ink	Quarter				Year
	1	2	3	4	
Units to be produced	1,060	1,260	1,600	1,800	5,720
Direct materials per unit	$\times 5$				
Production needs	5,300	6,300	8,000	9,000	28,600
Desired ending inventory	630	800	900	530	530
Total needs	5,930	7,100	8,900	9,530	29,130
Less: Beginning inventory	(390)	(630)	(800)	(900)	(390)
Direct materials to be purchased	5,540	6,470	8,100	8,630	28,740
Cost per ounce	$\times \$0.20$				
Total purchase cost of ink	<u>\$1,108</u>	<u>\$1,294</u>	<u>\$1,620</u>	<u>\$1,726</u>	<u>\$ 5,748</u>
Total direct materials purchase cost	<u>\$4,492</u>	<u>\$5,176</u>	<u>\$6,480</u>	<u>\$6,904</u>	<u>\$23,052</u>



## CORNERSTONE

### 19-3



Suppose that it takes 0.12 direct labor hours to produce a single t-shirt, and that the average wage rate is \$10 per direct labor hour. The direct labor budget for Texas Rex is shown in [Cornerstone 19-4](#).



## CORNERSTONE 19-4



### HOW TO Prepare a Direct Labor Budget

#### Information:

Recall from Cornerstone 19-2 that budgeted units to be produced for each quarter are: 1,060, 1,260, 1,600, and 1,800. It takes 0.12 hour to produce one t-shirt. The average wage cost per hour is \$10.

#### Required:

Prepare a direct labor budget.

#### Solution:

**Texas Rex Inc.**  
**Direct Labor Budget**  
**For the Year Ended December 31, 2010**

	Quarter				Year
	1	2	3	4	
Units to be produced	1,060	1,260	1,600	1,800	5,720
Direct labor time per unit in hours	× 0.12	× 0.12	× 0.12	× 0.12	× 0.12
Total hours needed	127.2	151.2	192.0	216.0	686.4
Average wage per hour	× \$10	× \$10	× \$10	× \$10	× \$10
Total direct labor cost	<u>\$ 1,272</u>	<u>\$ 1,512</u>	<u>\$ 1,920</u>	<u>\$ 2,160</u>	<u>\$ 6,864</u>

## ANALYTICAL Q&A

Assume that a product uses two hours of direct labor per unit. Expected production for the year is 1,250 units. The average wage cost per hour is \$8. What is the budget for direct labor cost?

$$\text{Answer: Budget} = (2 \times 1,250) \times \$8 = \$20,000.$$

## ANALYTICAL Q&A

Assume that the budget formula for overhead costs (OH) is  $OH = \$2,000 + \$3X$ , where  $X$  = total direct labor hours. If the company expects to work 5,000 direct labor hours, what is the budgeted variable overhead? Budgeted fixed overhead? Budgeted total overhead?

$$\text{Answer: Variable overhead} = \$3 \times 5,000 = \$15,000; \text{Fixed overhead} = \$2,000. \text{Total budgeted overhead} = \$15,000 + \$2,000 = \$17,000.$$

## Overhead Budget

The **overhead budget** shows the expected cost of all production costs other than direct materials and direct labor. Many companies use direct labor hours as the driver for overhead. Then costs that vary with direct labor hours are pooled and called variable overhead. The remaining overhead items are pooled into fixed overhead. For the Texas Rex example, the variable overhead rate is \$5 per direct labor hour. Fixed overhead is \$1,645 per quarter (this amount includes \$540 per quarter for depreciation). The method for preparing an overhead budget using this approach to cost behavior is shown in [Cornerstone 19-5](#).

## Ending Finished Goods Inventory Budget

The **ending finished goods inventory budget** supplies information needed for the balance sheet and also serves as an important input for the preparation of the cost of goods sold budget. To prepare this budget, the unit cost of producing each t-shirt must be calculated by using information from the direct materials, direct labor, and overhead budgets. The way to calculate the unit cost of a t-shirt and the cost of the planned ending inventory is shown in [Cornerstone 19-6](#).

## HOW TO Prepare an Overhead Budget

### Information:

Refer to Cornerstone 19-4 for the direct labor budget. The variable overhead rate is \$5 per direct labor hour; fixed overhead is budgeted at \$1,645 per quarter.

### Required:

Prepare an overhead budget.

### Solution:

**Texas Rex Inc.**  
**Overhead Budget**  
**For the Year Ended December 31, 2010**

	Quarter				Year
	1	2	3	4	
Budgeted direct labor hours	127.2	151.2	192.0	216.0	686.4
Variable overhead rate	× \$5	× \$5	× \$5	× \$5	× \$5
Budgeted variable overhead	\$ 636	\$ 756	\$ 960	\$1,080	\$ 3,432
Budgeted fixed overhead*	1,645	1,645	1,645	1,645	6,580
Total overhead	<u>\$2,281</u>	<u>\$2,401</u>	<u>\$2,605</u>	<u>\$2,725</u>	<u>\$10,012</u>

\* Includes \$540 of depreciation in each quarter.



## CORNERSTONE 19-5



## HOW TO Prepare an Ending Finished Goods Inventory Budget

### Information:

Refer to Cornerstones 19-3, 19-4, and 19-5 for the direct materials, direct labor, and overhead budgets.

### Required:

- Calculate the unit product cost.
- Prepare an ending finished goods inventory budget.

### Solution:

- Unit cost computation:

Direct materials:		
Plain t-shirt	\$3.00	
Ink	<u>1.00</u>	\$4.00
Direct labor (0.12 hr. @ \$10)		1.20
Overhead:		
Variable (0.12 hr. @ \$5)		0.60
Fixed (0.12 hr. @ \$9.59*)		<u>1.15</u>
Total unit cost		<u>\$6.95</u>

\* Budgeted fixed overhead/Budgeted direct labor hours = \$6,580/686.4 = \$9.59.

- 

**Texas Rex Inc.**  
**Ending Finished Goods Inventory Budget**  
**For the Year Ended December 31, 2010**

Logo t-shirts	200
Unit cost	<u>× \$6.95</u>
Total ending inventory	<u>\$1,390</u>



## CORNERSTONE 19-6



## CONCEPT Q&A

What operating budgets are needed to calculate a budgeted unit cost?

*Materials, labor, and overhead budgets. It could be argued that sales and production budgets are needed also because the three budgets listed cannot be developed until the sales and production budgets are known.*

Possible Answer:

## ANALYTICAL Q&A

Assume that the budgeted cost of goods sold is \$700. There is no beginning finished goods inventory. Budgeted manufacturing costs are \$1,000. What is the budgeted finished goods inventory?

*Ending finished goods = Goods available for sale – Cost of goods sold = \$1,000 – \$700 = \$300.*

Answer:

## ANALYTICAL Q&A

Assume that sales agents are paid a commission of 2 percent of sales revenue. Further, the only fixed selling expense is advertising, which is expected to be \$10,000. If sales revenue is budgeted at \$500,000, what is the budgeted selling expense?

*Budgeted selling expense = \$10,000 + (0.02 × \$500,000) = \$20,000.*

Answer:

## Cost of Goods Sold Budget

Assuming that the beginning finished goods inventory is valued at \$1,251, the budgeted cost of goods sold schedule can be prepared using information from Cornerstones 19-3 to 19-6. The **cost of goods sold budget** reveals the expected cost of the goods to be sold and is shown in **Cornerstone 19-7**.

## Selling and Administrative Expenses Budget

The next budget to be prepared, the **selling and administrative expenses budget**, outlines planned expenditures for nonmanufacturing activities. As with overhead, selling and administrative expenses can be broken down into fixed and variable components. Such items as sales commissions, freight, and supplies vary with sales activity. The selling and administrative expenses budget is illustrated in **Cornerstone 19-8**.

## Budgeted Income Statement

With the completion of the budgeted cost of goods sold schedule and the budgeted selling and administrative expenses budget, Texas Rex has all the operating budgets needed to prepare an estimate of *operating* income. The way to prepare this budgeted income statement is shown in **Cornerstone 19-9**. The eight budgets already prepared, along with the budgeted operating income statement, define the operating budget for Texas Rex.

Operating income is *not* equivalent to the net income of a firm. To yield net income, interest expense and taxes must be subtracted from operating income. The interest expense deduction is taken from the cash budget for Texas Rex (Cornerstone 19-12), a budget discussed in the section on financial budgets. The taxes owed depend on the current federal and state tax laws. For simplicity, a combined rate of 40 percent is assumed.



### CORNERSTONE 19-7



## HOW TO Prepare a Cost of Goods Sold Budget

### Information:

Refer to Cornerstones 19-3 through 19-6 for the direct materials, direct labor, overhead, and ending finished goods budgets.

### Required:

Prepare a cost of goods sold budget.

### Solution:

<b>Texas Rex Inc.</b>	
<b>Cost of Goods Sold Budget</b>	
<b>For the Year Ended December 31, 2010</b>	
Direct materials used (Cornerstone 19-3)*	\$22,880
Direct labor used (Cornerstone 19-4)	6,864
Overhead (Cornerstone 19-5)	10,012
Budgeted manufacturing costs	\$39,756
Beginning finished goods	1,251
Goods available for sale	\$41,007
Less: Ending finished goods (Cornerstone 19-6)	(1,390)
Budgeted cost of goods sold	\$39,617

\* Production needs = (5,720 plain t-shirts × \$3) + (28,600 oz. ink × \$0.20).

## HOW TO Prepare a Selling and Administrative Expenses Budget

### Information:

Refer to Cornerstone 19-1 for the sales budget. Variable expenses are \$0.10 per unit sold. Salaries average \$1,420 per quarter; utilities, \$50 per quarter; and depreciation, \$150 per quarter. Advertising for quarters 1 through 4 is \$100, \$200, \$800, and \$500, respectively.

### Required:

Prepare a selling and administrative expenses budget.

### Solution:



## CORNERSTONE 19-8



### Texas Rex Inc. Selling and Administrative Expenses Budget For the Year Ended December 31, 2010

	Quarter				Year
	1	2	3	4	
Planned sales in units (Cornerstone 19-1)	1,000	1,200	1,500	2,000	5,700
Variable selling and administrative expenses per unit	×\$0.10	×\$0.10	×\$0.10	×\$0.10	×\$0.10
Total variable expenses	<u>\$100</u>	<u>\$120</u>	<u>\$150</u>	<u>\$200</u>	<u>\$570</u>
Fixed selling and administrative expenses:					
Salaries	\$1,420	\$1,420	\$1,420	\$1,420	\$5,680
Utilities	50	50	50	50	200
Advertising	100	200	800	500	1,600
Depreciation	150	150	150	150	600
Total fixed expenses	<u>\$1,720</u>	<u>\$1,820</u>	<u>\$2,420</u>	<u>\$2,120</u>	<u>\$8,080</u>
Total selling and administrative expenses	<u>\$1,820</u>	<u>\$1,940</u>	<u>\$2,570</u>	<u>\$2,320</u>	<u>\$8,650</u>

## HOW TO Prepare a Budgeted Income Statement

### Information:

Refer to Cornerstones 19-1, 19-7, 19-8, and 19-12 for the sales budget, the cost of goods sold budget, the selling and administrative expenses budget, and the cash budget. Assume that the tax rate is 40 percent.

### Required:

Prepare a budgeted income statement.

### Solution:



## CORNERSTONE 19-9



### Texas Rex Inc. Budgeted Income Statement For the Year Ended December 31, 2010

Sales (Cornerstone 19-1)	\$ 57,000
Less: Cost of goods sold (Cornerstone 19-7)	<u>(39,617)</u>
Gross margin	\$ 17,383
Less: Selling and administrative expenses (Cornerstone 19-8)	<u>(8,650)</u>
Operating income	\$ 8,733
Less: Interest expense (Cornerstone 19-12)	<u>(60)</u>
Income before taxes	\$ 8,673
Less: Income taxes (0.40 × \$8,673)	<u>(3,469)</u>
Net income	<u>\$ 5,204</u>

**OBJECTIVE** > **3**

Define and prepare the financial budget, identify its major components, and explain the interrelationships of its various components.

**CONCEPT Q&A**

Why is it not possible to prepare a budgeted income statement by using only operating budgets?

*Interest expense comes from the financial budgets. Only operating income can be computed by using operating budgets.*

**Possible Answer:**

**Preparing the Financial Budget**

The remaining budgets found in the master budget are the financial budgets. The usual financial budgets prepared are:

1. The cash budget
2. The budgeted balance sheet
3. The budget for capital expenditures

The master budget also contains a plan for acquiring long-term assets—assets that have a time horizon that extends beyond the one-year operating period. Some of these assets may be purchased during the coming year; plans to purchase others may be detailed for future periods. This part of the master budget is typically referred to as the *capital budget*. Decision making for capital expenditures is considered in Chapter 24. Accordingly, only the cash budget and the budgeted balance sheet will be illustrated here.

**Cash Budget**

Understanding cash flows is critical in managing a business. Often, a business successfully produces and sells products but fails because of timing problems associated with cash inflows and outflows. Examples include the smallest entrepreneurs, who are required by suppliers to pay cash up front but must sell to their customers on credit, as well large corporations like **Sears**. In early 2008, Sears acknowledged that available cash had dropped by nearly 60 percent over 2007. A cash crunch was leading Sears to consider selling assets.<sup>3</sup>

By knowing when cash inflows and outflows are likely to occur, a manager can plan to borrow cash when needed and to repay the loans during periods of excess cash. Because cash flow is the lifeblood of an organization, the cash budget is one of the most important budgets in the master budget. The basic structure of a **cash budget** includes cash receipts, disbursements, any excess or deficiency of cash, and financing. At its simplest, a cash budget is cash inflows minus cash outflows. Suppose, for example, that a company expects \$3,000 in the cash account on June 1. During June, cash sales of \$45,000 are predicted, as are cash disbursements of \$39,000. The resulting cash budget for June is illustrated in Exhibit 19-3.

Cash available consists of the beginning cash balance and the expected cash receipts. Expected cash receipts include all sources of cash for the period being considered. The principal source of cash is from sales. Since a large proportion of sales is usually on account, a major task of an organization is to determine the pattern of collection for its accounts receivable. If a company has been in business for a while, it can use past experience in creating an accounts receivable aging schedule. In other words, the company can determine, on average, what percentages of its accounts receivable are paid in the months following sales.

**Cornerstone 19-10** shows how to create an accounts receivable aging schedule for Texas Rex. From past experience, Texas Rex expects 25 percent of all sales to be for cash, and the remaining 75 percent to be on credit. Of the credit sales, 90 percent

**Exhibit 19-3****The Cash Budget**

Expected beginning balance	\$ 3,000
Add cash receipts	45,000
Cash available	\$48,000
Less disbursements	39,000
Expected ending balance	<u>\$ 9,000</u>

<sup>3</sup>Gary McWilliams, "Profit Down, Sears May Hold Yard Sale," *The Wall Street Journal* (February 29, 2008): A13.

## HOW TO Prepare an Accounts Receivable Aging Schedule

### Information:

Texas Rex expects that, on average, 25 percent of total sales are cash and 75 percent of total sales are on credit. Of the credit sales, Texas Rex expects that 90 percent will be paid in cash during the quarter of sale, and the remaining 10 percent will be paid in the following quarter. Recall from Cornerstone 19-1 that Texas Rex expects the following total sales:

Quarter 1	\$10,000
Quarter 2	\$12,000
Quarter 3	\$15,000
Quarter 4	\$20,000

The balance in accounts receivable as of the last quarter of 2009 was \$1,350. This will be collected in cash during the first quarter of 2010.

### Required:

- Calculate cash sales expected in each quarter of 2010.
- Prepare a schedule showing cash receipts from sales expected in each quarter of 2010.

### Solution:

- Cash sales expected in Quarter 1 =  $\$10,000 \times 0.25 = \$2,500$   
 Cash sales expected in Quarter 2 =  $\$12,000 \times 0.25 = \$3,000$   
 Cash sales expected in Quarter 3 =  $\$15,000 \times 0.25 = \$3,750$   
 Cash sales expected in Quarter 4 =  $\$20,000 \times 0.25 = \$5,000$
- Cash from credit sales:

Source	Quarter			
	1	2	3	4
Cash sales	\$ 2,500	\$ 3,000	\$ 3,750	\$ 5,000
Received on account from:				
Quarter 4, 2009	1,350			
Quarter 1, 2010	6,750 <sup>a</sup>	750 <sup>b</sup>		
Quarter 2, 2010		8,100 <sup>c</sup>	900 <sup>d</sup>	
Quarter 3, 2010			10,125 <sup>e</sup>	1,125 <sup>f</sup>
Quarter 4, 2010				13,500 <sup>g</sup>
Total cash receipts	<u>\$10,600</u>	<u>\$11,850</u>	<u>\$14,775</u>	<u>\$19,625</u>

<sup>a</sup>  $(\$10,000 \times 0.75)(0.9)$

<sup>b</sup>  $(\$10,000 \times 0.75)(0.1)$

<sup>c</sup>  $(\$12,000 \times 0.75)(0.9)$

<sup>d</sup>  $(\$12,000 \times 0.75)(0.1)$

<sup>e</sup>  $(\$15,000 \times 0.75)(0.9)$

<sup>f</sup>  $(\$15,000 \times 0.75)(0.1)$

<sup>g</sup>  $(\$20,000 \times 0.75)(0.9)$



## CORNERSTONE 19-10



are paid in the same quarter as the sale. The remaining 10 percent are paid in the following quarter. While Texas Rex expects no bad debts expense, that may not be the case for all firms. If a firm expects less than 100 percent of the credit sales to be received in cash, then it expects some bad debts. For example, if a firm expected to be repaid 98 percent of credit sales, then it expects 2 percent bad debts. In other words, not everyone pays for their credit sales. This 2 percent is ignored for purposes of cash budgeting since it will not be received in cash. Different firms have different accounts receivable repayment experiences.

The cash disbursements section lists all planned cash outlays for the period. All expenses that do not require a cash outlay are *excluded* from the list (e.g., depreciation is never included in the disbursements section). Just as sources of cash may require an accounts receivable aging schedule to calculate cash expected from credit sales, the disbursements section may require care in handling payments on account. **Cornerstone 19-11** shows how to handle timing differences arising from paying for items on account.



## CORNERSTONE 19-11



### HOW TO Determine Cash Payments on Accounts Payable

#### Information:

Texas Rex purchases all raw materials on account; 80 percent of purchases are paid for in the quarter of purchase. The remaining 20 percent are paid for in the following quarter. The purchases for the fourth quarter of 2009 were \$5,000. Cornerstone 19-3 shows total expected purchases of raw materials for each quarter of 2010. These are shown here.

Quarter 1	\$4,492
Quarter 2	5,176
Quarter 3	6,480
Quarter 4	6,904

#### Required:

Prepare a schedule showing anticipated payments for accounts payable for materials.

#### Solution:

Cash needed for payments on account:

Source	Quarter			
	1	2	3	4
Quarter 4, 2009	\$1,000 <sup>a</sup>			
Quarter 1, 2010	3,594 <sup>b</sup>	\$ 898 <sup>c</sup>		
Quarter 2, 2010		4,141 <sup>d</sup>	\$1,035 <sup>e</sup>	
Quarter 3, 2010			5,184 <sup>f</sup>	\$1,296 <sup>g</sup>
Quarter 4, 2010				5,523 <sup>h</sup>
Total cash needed	<u>\$4,594</u>	<u>\$5,039</u>	<u>\$6,219</u>	<u>\$6,819</u>

<sup>a</sup> (\$5,000 × 0.20)

<sup>b</sup> (\$4,492 × 0.80)

<sup>c</sup> (\$4,492 × 0.20)

<sup>d</sup> (\$5,176 × 0.80)

<sup>e</sup> (\$5,176 × 0.20)

<sup>f</sup> (\$6,480 × 0.80)

<sup>g</sup> (\$6,480 × 0.20)

<sup>h</sup> (\$6,904 × 0.80)

A disbursement that is typically not included in the disbursements section is interest on short-term borrowing. This interest expenditure is reserved for the section on loan repayments.

The cash excess or deficiency line compares the cash available with the cash needed. Cash needed is the total cash disbursements plus the minimum cash balance required by company policy. The minimum cash balance is simply the lowest amount of cash on hand that the firm finds acceptable. Consider your own checking account. You probably try to keep at least some cash in the account, perhaps because by having a minimum balance you avoid service charges, or because a minimum balance allows you to make an unplanned purchase. Similarly, companies also require minimum cash balances. The amount varies from firm to firm and is determined by each

company's particular needs and policies. If the total cash available is less than the cash needed, a deficiency exists. In such a case, a short-term loan will be needed. On the other hand, with a cash excess (cash available is greater than the firm's cash needs), the firm has the ability to repay loans and perhaps to make some temporary investments.

The final section of the cash budget consists of borrowings and repayments. If there is a deficiency, this section shows the necessary amount to be borrowed. When excess cash is available, this section shows planned repayments, including interest expense.

The last line of the cash budget is the planned ending cash balance. Remember that the minimum cash balance was subtracted to find the cash excess or deficiency. However, the minimum cash balance is not a disbursement, so it must be added back to yield the planned ending balance. The way to prepare a cash budget is illustrated in **Cornerstone 19-12**.

## CONCEPT Q&A

Why would a company want a minimum cash balance? Suppose that the minimum cash balance is \$1,000 and that the projected cash surplus is \$500. What would a company have to do to achieve the desired minimum?

*A minimum cash balance is needed to reduce the risk of insufficient funds and satisfy account agreements with the banks. In the event of a shortage, it is necessary to borrow the difference.*

**Possible Answer:**

## HOW TO Prepare a Cash Budget

### Information:

Refer to Cornerstones 19-1, 19-3, 19-4, 19-5, 19-8, 19-9, 19-10 and 19-11 as well as the following details:

- A \$1,000 minimum cash balance is required for the end of each quarter. Money can be borrowed and repaid in multiples of \$1,000. Interest is 12 percent per year. Interest payments are made only for the amount of the principal being repaid. All borrowing takes place at the beginning of a quarter, and all repayment takes place at the end of a quarter.
- Budgeted depreciation is \$540 per quarter for overhead and \$150 per quarter for selling and administrative expenses (Cornerstones 19-5 and 19-8).
- The capital budget for 2010 revealed plans to purchase additional screen printing equipment. The cash outlay for the equipment, \$6,500, will take place in the first quarter. The company plans to finance the acquisition of the equipment with operating cash, supplementing it with short-term loans as necessary.
- Corporate income taxes are approximately \$3,469 and will be paid at the end of the fourth quarter (Cornerstone 19-9).
- Beginning cash balance equals \$5,200.
- All amounts in the budget are rounded to the nearest dollar.

### Required:

Prepare a cash budget for Texas Rex.

### Solution:

Texas Rex Inc. Cash Budget For the Year Ended December 31, 2010						
	Quarter				Year	Source*
	1	2	3	4		
Beginning cash balance	\$ 5,200	\$ 1,023	\$ 1,611	\$ 3,762	\$ 5,200	e
Cash sales and collections on account	<u>10,600</u>	<u>11,850</u>	<u>14,775</u>	<u>19,625</u>	<u>56,850</u>	10
Total cash available	<u>\$ 15,800</u>	<u>\$ 12,873</u>	<u>\$ 16,386</u>	<u>\$ 23,387</u>	<u>\$ 62,050</u>	



## CORNERSTONE 19-12



**CORNERSTONE**  
**19-12**  
*(continued)*

	Quarter				Year	Source*
	1	2	3	4		
Less						
disbursements:						
Payments for:						
Raw materials	\$ (4,594)	\$ (5,039)	\$ (6,219)	\$ (6,819)	\$(22,671)	11
Direct labor	(1,272)	(1,512)	(1,920)	(2,160)	(6,864)	4
Overhead	(1,741)	(1,861)	(2,065)	(2,185)	(7,852)	b,5
Selling and administrative	(1,670)	(1,790)	(2,420)	(2,170)	(8,050)	b,8
Income taxes	—	—	—	(3,469)	(3,469)	d,9
Equipment	(6,500)	—	—	—	(6,500)	c
Total						
disbursements	<u>\$(15,777)</u>	<u>\$(10,202)</u>	<u>\$(12,624)</u>	<u>\$(16,803)</u>	<u>\$(55,406)</u>	
Excess (deficiency) of cash available over needs	\$ 23	\$ 2,671	\$ 3,762	\$ 6,584	\$ 6,644	
Financing:						
Borrowings	1,000	—	—	—	1,000	
Repayments	—	(1,000)	—	—	(1,000)	a
Interest**	—	(60)	—	—	(60)	a
Total financing	<u>\$ 1,000</u>	<u>\$ (1,060)</u>	<u>—</u>	<u>—</u>	<u>\$ (60)</u>	
Ending cash balance***	<u>\$ 1,023</u>	<u>\$ 1,611</u>	<u>\$ 3,762</u>	<u>\$ 6,584</u>	<u>\$ 6,584</u>	

\* Letters refer to the detailed information above. Numbers refer to Cornerstone schedules.

\*\*Interest payment is  $6/12 \times 0.12 \times \$1,000$ . Since borrowings occur at the beginning of the quarter and repayments at the end of the quarter, the principal repayment takes place after six months.

\*\*\* Total cash available minus total disbursements plus (or minus) total financing.

## CONCEPT Q&A

Sales for a month totaled \$10,000. Cash receipts for the same month were \$15,000. How is it possible for cash receipts to be more than sales?

*Money can be collected from credit sales of prior month(s).*

**Possible Answer:**

Cornerstone 19-12 reveals that much of the information needed to prepare the cash budget comes from the operating budgets and from the schedules for cash receipts on accounts receivable and cash payments on accounts payable.

The cash budget underscores the importance of breaking down the annual budget into smaller time periods. The cash budget for the year gives the impression that sufficient operating cash will be available to finance the acquisition of the new equipment. Quarterly information, however, shows the need for short-term borrowing (\$1,000) because of both the acquisition of the new equipment and the timing of the firm's cash flows. Most firms prepare monthly cash budgets, and some even prepare weekly and daily budgets.

Another significant piece of information emerges from Texas Rex's cash budget. By the end of the third quarter, the firm has more cash (\$3,762) than necessary to meet operating needs. Texas Rex management should consider investing the excess cash in an interest-bearing account. Once plans are finalized for use of the excess cash, the cash budget should be revised to reflect those plans. Budgeting is a dynamic process. As the budget is developed, new information becomes available, and better plans can be formulated.

## Budgeted Balance Sheet

The budgeted balance sheet depends on information contained in the current balance sheet and in the other budgets in the master budget. Exhibit 19-4 shows the budgeted balance sheets as of December 31, 2009 and December 31, 2010. Explanations for the budgeted figures are provided in the footnotes.

**Exhibit 19-4**

### Budgeted Balance Sheet

Texas Rex Inc. Balance Sheet December 31, 2009		
<b>ASSETS</b>		
Current assets:		
Cash	\$ 5,200	
Accounts receivable	1,350	
Raw materials inventory	252	
Finished goods inventory	<u>1,251</u>	
Total current assets		\$ 8,053
Property, plant, and equipment (PP&E):		
Land	\$ 1,100	
Building and equipment	30,000	
Accumulated depreciation	<u>(5,000)</u>	
Total PP&E		<u>26,100</u>
Total assets		<u><u>\$34,153</u></u>
<b>LIABILITIES AND OWNER'S EQUITY</b>		
Current liabilities:		
Accounts payable		\$ 1,000
Owner's equity:		
Retained earnings		<u>33,153</u>
Total liabilities and owner's equity		<u><u>\$34,153</u></u>
Texas Rex Inc. Budgeted Balance Sheet December 31, 2010		
<b>ASSETS</b>		
Current assets:		
Cash	\$ 6,584 <sup>a</sup>	
Accounts receivable	1,500 <sup>b</sup>	
Raw materials inventory	424 <sup>c</sup>	
Finished goods inventory	<u>1,390<sup>d</sup></u>	
Total current assets		\$ 9,898
Property, plant, and equipment (PP&E):		
Land	\$ 1,100 <sup>e</sup>	
Building and equipment	36,500 <sup>f</sup>	
Accumulated depreciation	<u>(7,760)<sup>g</sup></u>	
Total PP&E		<u>29,840</u>
Total assets		<u><u>\$39,738</u></u>

LIABILITIES AND OWNER'S EQUITY	
Current liabilities:	
Accounts payable	\$ 1,381 <sup>h</sup>
Owner's equity:	
Retained earnings	<u>38,357<sup>i</sup></u>
Total liabilities and owner's equity	<u>\$39,738</u>

<sup>a</sup> Ending balance from Cornerstone 19-12.

<sup>b</sup> Ten percent of fourth-quarter credit sales ( $0.75 \times \$20,000$ )—see Cornerstones 19-1 and 19-12.

<sup>c</sup> From Cornerstone 19-3 [ $(106 \times \$3) + (530 \times \$0.20)$ ].

<sup>d</sup> From Cornerstone 19-6.

<sup>e</sup> From the December 31, 2009, balance sheet.

<sup>f</sup> December 31, 2009, balance (\$30,000) plus new equipment acquisition of \$6,500 (see the 2009 ending balance sheet and Cornerstone 19-12).

<sup>g</sup> From the December 31, 2009, balance sheet, Cornerstone 19-5, and Cornerstone 19-8 ( $\$5,000 + \$2,160 + \$600$ ).

<sup>h</sup> Twenty percent of fourth-quarter purchases ( $0.20 \times \$6,904$ )—see Cornerstones 19-3 and 19-12.

<sup>i</sup>  $\$33,153 + \$5,204$  (December 31, 2009, balance plus net income from Cornerstone 19-9).

## OBJECTIVE > 4

Describe the behavioral dimension of budgeting.

## Using Budgets for Performance Evaluation

Budgets are often used to judge the performance of managers. Bonuses, salary increases, and promotions are all affected by a manager's ability to achieve or beat budgeted goals. Since a manager's financial status and career can be affected, budgets can have a significant behavioral effect. Whether that effect is positive or negative depends in large part on how budgets are used.

Positive behavior occurs when the goals of each manager are aligned with the goals of the organization and each manager has the drive to achieve them. The alignment of managerial and organizational goals is often referred to as **goal congruence**. If the budget is improperly administered, subordinate managers may subvert the organization's goals. **Dysfunctional behavior** is individual behavior that is in basic conflict with the goals of the organization.

An ideal budgetary system is one that achieves complete goal congruence and, simultaneously, creates a drive in managers to achieve the organization's goals in an ethical manner. While an ideal budgetary system probably does not exist, research and practice have identified some key features that promote a reasonable degree of positive behavior. These features include frequent feedback on performance, monetary

and nonmonetary incentives, participative budgeting, realistic standards, controllability of costs, and multiple measures of performance.

### Frequent Feedback on Performance

Managers need to know how they are doing as the year unfolds. Providing them with frequent, timely performance reports allows them to know how successful their efforts have been, to take corrective actions, and to change plans as necessary.

### Monetary and Nonmonetary Incentives

A sound budgetary system encourages goal-congruent behavior. The means an organization uses to influence a manager to exert effort to achieve an organization's goal are called **incentives**. Traditional organizational theory assumes that employees are primarily motivated by monetary rewards, they resist work, and they are inefficient and wasteful. Thus, **monetary incentives** are used to control a manager's tendency to shirk and waste resources by relating budgetary performance to salary increases, bonuses, and promotions. The threat of dismissal is the ultimate economic sanction

## CONCEPT Q&A

In the last quarter of the fiscal year, a divisional manager chose to delay budgeted preventive maintenance expenditures so that the budgeted income goals could be achieved. Is this an example of goal congruent behavior or dysfunctional behavior?

*Assuming that the budgeted maintenance expenditures were well specified, the manager is sacrificing the long-run well-being of the division to achieve a short-run benefit (dysfunctional behavior).*

**Possible Answer:**

for poor performance. In reality, employees are motivated by more than economic factors. Employees are also motivated by intrinsic psychological and social factors, such as the satisfaction of a job well done, recognition, responsibility, self-esteem, and the nature of the work itself. Thus **nonmonetary incentives**, including job enrichment, increased responsibility and autonomy, recognition programs, and so on, can be used to enhance a budgetary control system.

## Participative Budgeting

Rather than imposing budgets on subordinate managers, **participative budgeting** allows subordinate managers considerable say in how the budgets are established. Typically, overall objectives are communicated to the manager, who helps develop a budget that will accomplish these objectives. Participative budgeting communicates a sense of responsibility to subordinate managers and fosters creativity. Since the subordinate manager creates the budget, the budget's goals will more likely become the manager's personal goals, resulting in greater goal congruence. The increased responsibility and challenge inherent in the process provide nonmonetary incentives that lead to a higher level of performance.

Participative budgeting has three potential problems:

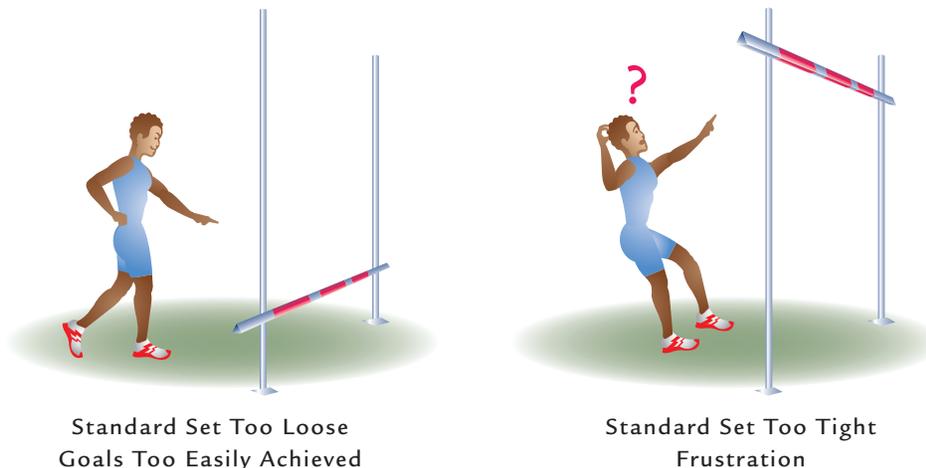
1. Setting standards that are either too high or too low
2. Building slack into the budget (often referred to as padding the budget)
3. Pseudoparticipation

Some managers may tend to set the budget either too loose or too tight. Since budgeted goals tend to become the manager's goals when participation is allowed, making this mistake in setting the budget can result in decreased performance levels. If goals are too easily achieved, a manager may lose interest, and performance may actually drop. Feeling challenged is important to aggressive and creative individuals. Similarly, setting the budget too tight ensures failure to achieve the standards and frustrates the manager. This frustration, too, can lead to poorer performance. The trick is to get managers in a participative setting to set high but achievable goals.

The second problem with participative budgeting is the opportunity for managers to build slack into the budget. **Budgetary slack** (or *padding the budget*) exists when a manager deliberately underestimates revenues or overestimates costs in an effort to make the future period appear less attractive in the budget than they think it will be in reality. Either approach increases the likelihood that the manager will achieve the budget and consequently reduces the risk that the manager faces. Top management should carefully review budgets proposed by subordinate managers and provide input, where needed, in order to decrease the effects of building slack into the budget (Exhibit 19-5).

### Exhibit 19-5

#### The Art of Standard Setting



## CONCEPT Q&A

Assume that a company evaluates and rewards its managers based on their ability to achieve budgeted goals. Why would the same company ask its managers to participate in setting their budgeted standards?

*Participation encourages managers to internalize the goals and make them their own, leading to improved performance.*

**Possible Answer:**

Furthermore, the act of padding the budget is questionable when considering what is viewed as ethical professional practice. Padding the budget is certainly not communicating information fairly and objectively and constitutes a violation of the credibility standard. The motive for such behavior is also not consistent with the professional responsibility to exhibit integrity.

The third problem with participation occurs when top management assumes total control of the budgeting process, seeking only superficial participation from lower-level managers. This practice is termed **pseudoparticipation**. Top management is simply obtaining formal acceptance of the budget from subordinate managers, not seeking real input. Accordingly, none of the behavioral benefits of participation will be realized.

## Realistic Standards

Budgeted objectives are used to gauge performance; accordingly, they should be based on realistic conditions and expectations. Budgets should reflect operating realities such as actual levels of activity, seasonal variations, efficiencies, and general economic trends. Flexible budgets are used to ensure that budgeted costs can be realistically compared with costs for actual levels of activity. Interim budgets should reflect seasonal effects. **Toys “R” Us**, for example, would expect much higher sales in the quarter that includes Christmas than in other quarters. Budgetary cuts should be based on *planned* increases in efficiency and not simply arbitrary across-the-board reductions. Across-the-board cuts without any formal evaluation may impair the ability of some units to carry out their missions. General economic conditions also need to be considered. Budgeting for a significant increase in sales when a recession is projected is not only foolish but also potentially dangerous.

## Controllability of Costs

Ideally, managers are held accountable only for costs that they can control. **Controllable costs** are costs whose level a manager can influence. For example, divisional managers have no power to authorize such corporate-level costs as research and development and salaries of top managers. Therefore, they should not be held accountable for the incurrence of those costs. If noncontrollable costs are put in the budgets of subordinate managers to help them understand that these costs also need to be covered, then they should be separated from controllable costs and labeled as *noncontrollable*.

## Multiple Measures of Performance

Often, organizations make the mistake of using budgets as their only measure of managerial performance. While financial measures of performance are important, overemphasis can lead to a form of dysfunctional behavior called *milking the firm* or *myopia*. **Myopic behavior** occurs when a manager takes actions that improve budgetary performance in the short run but bring long-run harm to the firm. For example, to meet budgeted cost objectives or profits, managers can delay promoting deserving employees or reducing expenditures for preventive maintenance, advertising, and new product development. Using measures that are both financial and nonfinancial and that are long term and short term can alleviate this problem. For example, **Starwood Hotels** incurs considerable costs every year to research consumer trends and to train its hotel staff members to help ensure sustainable growth in room revenue for its luxury St. Regis brand. Budgetary measures alone cannot prevent myopic behavior.

## Summary of Learning Objectives

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- LO1. Define budgeting and discuss its role in planning, control, and decision making.**
- Budgeting is the creation of a plan of action expressed in financial terms.
  - Budgeting plays a key role in planning, control, and decision making.
  - Budgets also serve to improve communication and coordination, a role that becomes increasingly important as organizations grow in size.
  - The master budget, which is the comprehensive financial plan of an organization, is made up of the operating and financial budgets.
- LO2. Define and prepare the operating budget, identify its major components, and explain the interrelationships of its various components.**
- The operating budget is the budgeted income statement and all supporting budgets.
  - The sales budget consists of the anticipated quantity and price of all products to be sold. It is done first, and the results feed directly into the production budget.
  - The production budget gives the expected production in units to meet forecasted sales and desired ending inventory goals; expected production is supplemented by beginning inventory. The results of the production budget are needed for the direct materials purchases budget and the direct labor budget.
  - The direct materials purchases budget gives the necessary purchases during the year for every type of raw material to meet production and desired ending inventory goals.
  - The direct labor budget shows the number of direct labor hours, and the direct labor cost needed to support production. The resulting direct labor hours are needed to prepare the overhead budget.
  - The overhead budget may be broken down into fixed and variable components to facilitate preparation of the budget.
  - The selling and administrative expenses budget gives the forecasted costs for these functions.
  - The finished goods inventory budget and the cost of goods sold budget detail production costs for the expected ending inventory and the units sold, respectively.
  - The budgeted income statement outlines the net income to be realized if budgeted plans come to fruition.
- LO3. Define and prepare the financial budget, identify its major components, and explain the interrelationships of its various components.**
- The financial budget includes the cash budget, the capital expenditures budget, and the budgeted balance sheet.
  - The cash budget is the beginning balance in the cash account, plus anticipated receipts, minus anticipated disbursements, plus or minus any necessary borrowing.
  - The budgeted (or pro forma) balance sheet gives the anticipated ending balances of the asset, liability, and equity accounts if budgeted plans hold.
- LO4. Describe the behavioral dimension of budgeting.**
- The success of a budgetary system depends on how seriously human factors are considered.
  - To discourage dysfunctional behavior, organizations should avoid overemphasizing budgets as a control mechanism.
  - Budgets can be improved as performance measures by using participative budgeting and other nonmonetary incentives, providing frequent feedback on performance, using flexible budgeting, ensuring that the budgetary objectives reflect reality, and holding managers accountable for only controllable costs.

## Summary of Important Equations

1. Units to Be Produced = Expected Unit Sales + Units in Desired Ending Inventory (EI) – Units in Beginning Inventory (BI)
2. Purchases = Direct Materials Needed for Production  
+ Direct Materials in Desired Ending Inventory  
– Direct Materials in Beginning Inventory



### CORNERSTONES FOR CHAPTER 19

- CORNERSTONE 19-1** How to prepare a sales budget, page 1023
- CORNERSTONE 19-2** How to prepare a production budget, page 1025
- CORNERSTONE 19-3** How to prepare a direct materials purchases budget, page 1027
- CORNERSTONE 19-4** How to prepare a direct labor budget, page 1028
- CORNERSTONE 19-5** How to prepare an overhead budget, page 1029
- CORNERSTONE 19-6** How to prepare an ending finished goods inventory budget, page 1029
- CORNERSTONE 19-7** How to prepare a cost of goods sold budget, page 1030
- CORNERSTONE 19-8** How to prepare a selling and administrative expenses budget, page 1031
- CORNERSTONE 19-9** How to prepare a budgeted income statement, page 1031
- CORNERSTONE 19-10** How to prepare an accounts receivable aging schedule, page 1033
- CORNERSTONE 19-11** How to determine cash payments on accounts payable, page 1034
- CORNERSTONE 19-12** How to prepare a cash budget, page 1035

## Key Terms

- |  |  |
|--|--|
| Budget committee, 1021                       | Goal congruence, 1038                            |
| Budget director, 1022                        | Incentives, 1038                                 |
| Budgetary slack, 1039                        | Master budget, 1021                              |
| Budgets, 1020                                | Monetary incentives, 1038                        |
| Cash budget, 1032                            | Myopic behavior, 1040                            |
| Continuous budget, 1021                      | Nonmonetary incentives, 1039                     |
| Control, 1021                                | Operating budgets, 1022                          |
| Controllable costs, 1040                     | Overhead budget, 1028                            |
| Cost of goods sold budget, 1030              | Participative budgeting, 1039                    |
| Direct labor budget, 1026                    | Production budget, 1024                          |
| Direct materials purchases budget, 1026      | Pseudoparticipation, 1040                        |
| Dysfunctional behavior, 1038                 | Sales budget, 1023                               |
| Ending finished goods inventory budget, 1028 | Selling and administrative expenses budget, 1030 |
| Financial budgets, 1022                      | Strategic plan, 1020                             |

## Review Problems

### I. Select Operational Budgets

Joven Products produces coat racks. The projected sales for the first quarter of the coming year and the beginning and ending inventory data are as follows:

Unit sales	100,000
Unit price	\$15
Units in beginning inventory	8,000
Units in targeted ending inventory	12,000

The coat racks are molded and then painted. Each rack requires four pounds of metal, which costs \$2.50 per pound. The beginning inventory of materials is 4,000 pounds. Joven Products wants to have 6,000 pounds of metal in inventory at the end of the quarter. Each rack produced requires 30 minutes of direct labor time, which is billed at \$9 per hour.

#### Required:

1. Prepare a sales budget for the first quarter.
2. Prepare a production budget for the first quarter.
3. Prepare a direct materials purchases budget for the first quarter.
4. Prepare a direct labor budget for the first quarter.

#### Solution:

1.

**Joven Products  
Sales Budget  
For the First Quarter**

Units	100,000
Unit price	× \$15
Sales	<u>\$1,500,000</u>

2.

**Joven Products  
Production Budget  
For the First Quarter**

Sales (in units)	100,000
Desired ending inventory	<u>12,000</u>
Total needs	112,000
Less: Beginning inventory	<u>8,000</u>
Units to be produced	<u>104,000</u>

3.

**Joven Products  
Direct Materials Purchases Budget  
For the First Quarter**

Units to be produced	104,000
Direct materials per unit (lb.)	× 4
Production needs (lb.)	<u>416,000</u>
Desired ending inventory (lb.)	<u>6,000</u>
Total needs (lb.)	422,000
Less: Beginning inventory (lb.)	<u>4,000</u>
Materials to be purchased (lb.)	418,000
Cost per pound	× \$2.50
Total purchase cost	<u>\$1,045,000</u>

4.

**Joven Products**  
**Direct Labor Budget**  
**For the First Quarter**

Units to be produced	104,000
Labor: Hours per unit	× 0.5
Total hours needed	52,000
Cost per hour	× \$9
Total direct labor cost	\$468,000

## II. Cash Budgeting

Kylles Inc. expects to receive cash from sales of \$45,000 in March. In addition, Kylles expects to sell property worth \$3,500. Payments for materials and supplies are expected to total \$10,000, direct labor payroll will be \$12,500, and other expenditures are budgeted at \$14,900. On March 1, the cash account balance is \$1,230.

### Required:

1. Prepare a cash budget for Kylles Inc. for the month of March.
2. Assume that Kylles Inc. wanted a minimum cash balance of \$15,000 and that it could borrow from the bank in multiples of \$1,000 at an interest rate of 12 percent per year. What would the adjusted ending balance for March be for Kylles? How much interest would Kylles owe in April, assuming that the entire amount borrowed in March would be paid back?

### Solution:

1.

**Kylles Inc.**  
**Cash Budget for the Month of March**

Beginning cash balance	\$ 1,230
Cash sales	45,000
Sale of property	3,500
Total cash available	\$49,730
Less disbursements:	
Materials and supplies	\$10,000
Direct labor payroll	12,500
Other expenditures	14,900
Total disbursements	\$37,400
Ending cash balance	\$12,330

2.

Unadjusted ending balance	\$12,330
Plus borrowing	3,000
Adjusted ending balance	\$15,330

In April, interest owed would be  $(1/12 \times 0.12 \times \$3,000) = \$30$ .

## Discussion Questions

1. Define the term *budget*. How are budgets used in planning?
2. Define *control*. How are budgets used to control?
3. Explain how both small and large organizations can benefit from budgeting.
4. Discuss some reasons for budgeting.

5. What is a master budget? An operating budget? A financial budget?
6. Explain the role of a sales forecast in budgeting. What is the difference between a sales forecast and a sales budget?
7. All budgets depend on the sales budget. Is this true? Explain.
8. Why is goal congruence important?
9. Why is it important for a manager to receive frequent feedback on his or her performance?
10. Discuss the roles of monetary and nonmonetary incentives. Do you believe that nonmonetary incentives are needed? Why?
11. What is participative budgeting? Discuss some of its advantages.
12. A budget too easily achieved will lead to diminished performance. Do you agree? Explain.
13. What is the role of top management in participative budgeting?
14. Explain why a manager has an incentive to build slack into the budget.
15. Explain how a manager can milk the firm to improve budgetary performance.

## Multiple-Choice Exercises

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### 19-1 A budget:

- a. is a long-term plan.
- b. covers at least two years.
- c. is only a control tool.
- d. is necessary only for large firms.
- e. is a short-term financial plan.

### 19-2 Which of the following is *not* part of the control process?

- a. Monitoring of actual activity
- b. Comparison of actual with planned activity
- c. Investigating
- d. Developing a strategic plan
- e. Taking corrective action

### 19-3 Which of the following is *not* an advantage of budgeting?

- a. It forces managers to plan.
- b. It provides information for decision making.
- c. It guarantees an improvement in organizational efficiency.
- d. It provides a standard for performance evaluation.
- e. It improves communication and coordination.

### 19-4 The budget committee:

- a. reviews the budget.
- b. resolves differences that arise as the budget is prepared.
- c. approves the final budget.
- d. is directed (typically) by the controller.
- e. does all of the above.

### 19-5 A moving, 12-month budget that is updated monthly is:

- a. a waste of time and effort.
- b. a continuous budget.
- c. a master budget.
- d. not used by industrial firms.
- e. always used by firms that prepare a master budget.

**19-6 Which of the following is not part of the operating budget?**

- a. The capital budget
- b. The cost of goods sold budget
- c. The production budget
- d. The direct labor budget
- e. The selling and administrative expenses budget

**19-7 Before a direct materials purchases budget can be prepared, you should first:**

- a. prepare a sales budget.
- b. prepare a production budget.
- c. decide on the desired ending inventory of materials.
- d. obtain the expected price of each type of material.
- e. do all of the above.

**19-8 The first step in preparing the sales budget is to:**

- a. talk with past customers.
- b. review the production budget carefully.
- c. assess the desired ending inventory of finished goods.
- d. prepare a sales forecast.
- e. increase sales beyond the forecast level.

**19-9 Which of the following is needed to prepare the production budget?**

- a. Direct materials needed for production
- b. Expected unit sales
- c. Direct labor needed for production
- d. Units of materials in ending inventory
- e. None of the above

**19-10 A company requires 100 pounds of plastic to meet the production needs of a small toy. It currently has 10 pounds of plastic inventory. The desired ending inventory of plastic is 30 pounds. How many pounds of plastic should be budgeted for purchasing during the coming period?**

- a. 100 pounds
- b. 120 pounds
- c. 130 pounds
- d. 140 pounds
- e. None of the above

**19-11 A company plans on selling 200 units. The selling price per unit is \$12. There are 20 units in beginning inventory, and the company would like to have 50 units in ending inventory. How many units should be produced for the coming period?**

- a. 250
- b. 200
- c. 230
- d. 220
- e. None of the above

**19-12 Which of the following is needed to prepare a budgeted income statement?**

- a. The production budget
- b. The budgeted balance sheet
- c. Budgeted selling and administrative expenses
- d. The capital expenditures budget
- e. None of the above

**19-13** Select the one budget below that is not a financial budget.

- a. The cost of goods sold budget
- b. The cash budget
- c. The budgeted balance sheet
- d. The capital expenditures budget
- e. None of the above

**19-14** The cash budget serves which of the following purposes?

- a. Documents the need for liberal inventory policies
- b. Provides information about the ability to repay loans
- c. Reveals the amount lost due to uncollectible accounts
- d. Reveals the amount of depreciation expense
- e. None of the above

**19-15** Assume that a company has the following accounts receivable collection pattern:

Month of sale	40%
Month following sale	60%

All sales are on credit. If credit sales for January and February are \$100,000 and \$200,000, respectively, the cash collections for February are:

- a. \$140,000.
- b. \$300,000.
- c. \$120,000.
- d. \$160,000.
- e. \$80,000.

**19-16** The percentage of accounts receivable uncollectible can be ignored for cash budgeting because:

- a. for most companies, it is not a material amount.
- b. it is included in cash sales.
- c. it appears on the budgeted income statement.
- d. no cash is received from an account that defaults.
- e. none of the above.

**19-17** An ideal budgetary system is one that:

- a. encourages dysfunctional behavior.
- b. encourages myopic behavior.
- c. encourages goal-congruent behavior.
- d. encourages subversion of an organization's goals.
- e. does none of the above.

**19-18** Some key budgetary features that tend to promote positive managerial behavior are:

- a. frequent feedback on performance.
- b. participative budgeting.
- c. realistic standards.
- d. well-designed monetary and nonmonetary incentives.
- e. all of the above.

**19-19** Which of the following is not an advantage of participative budgeting?

- a. It fosters a sense of creativity in managers.
- b. It encourages budgetary slack.
- c. It fosters a sense of responsibility.
- d. It encourages greater goal congruence.
- e. It tends to lead to a higher level of performance.

**19-20** Which of the following items is *not* a possible example of myopic behavior?

- Promotion of deserving employees
- Reducing expenditures on preventive maintenance
- Cutting back on new product development
- Laying off top sales personnel so that budgeted income can be achieved
- Buying cheaper, lower-quality materials so that the company does not exceed the materials purchases budget

## Cornerstone Exercises

### OBJECTIVE > 2

#### CORNERSTONE 19-1

### Cornerstone Exercise 19-21 PREPARING A SALES BUDGET

Sherwood, Inc. sells crates for pets. Sherwood expects the following units to be sold in the first three months of the coming year:

January	30,000
February	29,000
March	31,000

The average price for a crate is \$40.

#### Required:

Prepare a sales budget for the first three months of the coming year, showing units and sales revenue by month and in total for the quarter.

### OBJECTIVE > 2

#### CORNERSTONE 19-2

### Cornerstone Exercise 19-22 PREPARING A PRODUCTION BUDGET

Sherwood, Inc. makes pet crates. In the first four months of the coming year, Sherwood expects the following unit sales:

January	30,000
February	29,000
March	31,000
April	34,000

Sherwood's policy is to have 15 percent of next month's sales in ending inventory. On January 1, it is expected that there will be 4,200 crates on hand.

#### Required:

Prepare a production budget for the first quarter of the year. Show the number of crates that should be produced each month as well as for the quarter in total.

### OBJECTIVE > 2

#### CORNERSTONE 19-3

### Cornerstone Exercise 19-23 PREPARING A DIRECT MATERIALS PURCHASES BUDGET

Sherwood, Inc. makes pet crates. Planned production in units for the first three months of the coming year is:

January	30,150
February	29,300
March	31,450

Each crate uses two plastic shells and one hardware kit. Company policy requires that ending inventories of raw materials for each month be 20 percent of the next month's production needs. That policy was met for the ending inventory of December in the prior year. The cost of one plastic shell is \$4. The cost of one hardware kit is \$1.20.

**Required:**

1. Calculate the ending inventory of plastic shells for December of the prior year, and for January and February. What is the beginning inventory of plastic shells for January?
2. Prepare a direct materials purchases budgets for plastic shells for the months of January and February.
3. Calculate the ending inventory of hardware kits for December of the prior year, and for January and February. What is the beginning inventory of hardware kits for January?
4. Prepare a direct materials purchases budgets for hardware kits for the months of January and February.

**Cornerstone Exercise 19-24 PREPARING A DIRECT LABOR BUDGET****OBJECTIVE** > **2**

Sherwood, Inc. makes pet crates. Planned production in units for the first three months of the coming year is:

**CORNERSTONE 19-4**

January	30,150
February	29,300
March	31,450

Each crate takes 0.4 direct labor hours. The average wage is \$18 per hour.

**Required:**

Prepare a direct labor budget for the months of January, February, and March, as well as the total for the first quarter.

**Cornerstone Exercise 19-25 PREPARING AN OVERHEAD BUDGET****OBJECTIVE** > **2**

Sherwood, Inc. makes pet crates. Budgeted direct labor hours for the first three months of the coming year is:

**CORNERSTONE 19-5**

January	12,060
February	11,720
March	12,580

The variable overhead rate is \$2 per direct labor hour; fixed overhead is budgeted at \$1,800 per month.

**Required:**

Prepare an overhead budget for the months of January, February, and March, as well as the total for the first quarter.

**Cornerstone Exercise 19-26 PREPARING AN ENDING FINISHED GOODS INVENTORY BUDGET****OBJECTIVE** > **2****CORNERSTONE 19-6**

Toler Company manufactures a line of office chairs. Each chair takes \$18 of direct materials and uses 1.3 direct labor hours at \$15 per direct labor hour. The variable overhead rate is \$1.40 per direct labor hour and the fixed overhead rate is \$3.60 per direct labor hour. Toler expects to have 500 chairs in ending inventory.

**Required:**

1. Calculate the unit product cost.
2. Calculate the cost of budgeted ending inventory.

**Cornerstone Exercise 19-27 PREPARING A COST OF GOODS SOLD BUDGET****OBJECTIVE** > **2****CORNERSTONE 19-7**

Toler Company manufactures a line of office chairs. Each chair takes \$18 of direct materials and uses 1.3 direct labor hours at \$15 per direct labor hour. The variable overhead rate is \$1.40 per direct labor hour and the fixed overhead rate is \$3.60 per direct labor hour. Toler expects to produce 15,000 chairs next year and expects to have 500 chairs in ending inventory costing \$44 each. There is no beginning inventory of office chairs.

**Required:**

Prepare a cost of goods sold budget for Toler Company.

**OBJECTIVE** > **2**  
**CORNERSTONE 19-8**

**Cornerstone Exercise 19-28 PREPARING A SELLING AND ADMINISTRATIVE EXPENSES BUDGET**

Andrews Company makes and sells industrial solvents. In the coming year, Andrews expects to sell \$34,500,000 of solvents. There is a 2 percent commission on sales. In addition, fixed expenses of the sales and administrative offices include the following:

Salaries	\$1,860,000
Utilities	456,000
Office space	230,000
Advertising	3,200,000

**Required:**

Prepare a selling and administrative expenses budget for Andrews Company for the coming year.

**OBJECTIVE** > **2**  
**CORNERSTONE 19-9**

**Cornerstone Exercise 19-29 PREPARING A BUDGETED INCOME STATEMENT**

Lester Company provided the following information for the coming year:

Units produced and sold	60,000
Cost of goods sold per unit	\$18
Selling price	\$27
Variable selling and administrative expense per unit	\$2.70
Fixed selling and administrative expense	\$243,000
Tax rate	35%

**Required:**

Prepare a budgeted income statement for Lester Company for the coming year. (Round all income statement amounts to the nearest dollar.)

**OBJECTIVE** > **3**  
**CORNERSTONE 19-10**

**Cornerstone Exercise 19-30 PREPARING AN ACCOUNTS RECEIVABLE AGING SCHEDULE**

Don Gaspar and Company is a legal services firm. All sales of legal services are billed to the client (there are no cash sales). Don Gaspar expects that, on average, 50 percent will be paid in the month of billing, 30 percent will be paid in the month following billing, and 15 percent will be paid in the second month following billing. For the next five months, the following sales billings are expected:

May	\$60,000
June	72,000
July	55,000
August	62,000
September	65,000

**Required:**

Prepare a schedule showing the cash expected in payments on accounts receivable in August and in September.

**OBJECTIVE** > **3**  
**CORNERSTONE 19-11**

**Cornerstone Exercise 19-31 PREPARING AN ACCOUNTS PAYABLE SCHEDULE**

Shetland, Inc. purchases raw materials on account for use in production. The direct materials purchases budget shows the following expected purchases on account:

April	\$468,000
May	514,000
June	520,000

Shetland typically pays 30 percent on account in the month of billing and 70 percent the next month.

**Required:**

1. How much cash is required for payments on account in May?
2. How much cash is expected for payments on account in June?

**Cornerstone Exercise 19-32 PREPARING A CASH BUDGET****OBJECTIVE** > **3****CORNERSTONE 19-12**

TNT Pizzeria provided the following information for the month of October:

- a. Sales are budgeted to be \$120,000. About 15 percent of sales are cash; the remainder are on account.
- b. TNT expects that, on average, 70 percent of credit sales will be paid in the month of sale, and 26 percent will be paid in the following month.
- c. Food purchases, all on account, are expected to be \$83,000. TNT pays 25 percent in the month of purchase and 75 percent in the month following purchase.
- d. Most of the work is done by the owners, who typically withdraw \$6,000 a month from the business as their salary. (The \$6,000 is a payment in total to the two owners, not per person.) Various part-time workers cost \$4,400 per month. They are paid for their work weekly, so on average 90 percent of their wages are paid in the month incurred and the remaining 10 percent in the next month.
- e. Utilities average \$5,200 per month. Rent on the building is \$3,600 per month.
- f. Insurance is paid quarterly; the next payment of \$900 is due in October.
- g. September sales were \$130,000 and purchases of food in September equaled \$98,000.
- h. The cash balance on October 1 is \$7,680.

**Required:**

1. Calculate the cash receipts expected in October. (Hint: Remember to include both cash sales and payments from credit sales.)
2. Calculate the cash needed in October to pay for food purchases.
3. Prepare a cash budget for the month of October.

**Exercises****Exercise 19-33 PLANNING AND CONTROL****OBJECTIVE** > **1**

- a. Dr. Jones, a dentist, wants to increase the size and profitability of his business by building a reputation for quality and timely service.
- b. To achieve this, he plans on adding a dental laboratory to his building so that crowns, bridges, and dentures can be made in-house.
- c. To add the laboratory, he needs additional money, which he decides must be obtained by increasing revenues. After some careful calculation, Dr. Jones concludes that annual revenues must be increased by 10 percent.
- d. Dr. Jones finds that his fees for fillings and crowns are below the average in his community and decides that the 10 percent increase can be achieved by increasing these fees.
- e. He then identifies the quantity of fillings and crowns expected for the coming year, the new per-unit fee, and the total fees expected.
- f. As the year unfolds (on a month-by-month basis), Dr. Jones compares the actual revenues received with the budgeted revenues. For the first three months, actual revenues were less than planned.
- g. Upon investigating, he discovered that he had some reduction in the number of patients because he had also changed his available hours of operation.
- h. He returned to his old schedule and found out that the number of patients was restored to the original expected levels.
- i. However, to make up the shortfall, he also increased the price of some of his other services.

**Required:**

Match each statement with the following planning and control elements (a letter may be matched to more than one item):

1. Corrective action
2. Budgets
3. Feedback
4. Investigation
5. Short-term plan
6. Comparison of actual with planned
7. Monitoring of actual activity
8. Strategic plan
9. Short-term objectives
10. Long-term objectives

**OBJECTIVE** > **1** **2****Exercise 19-34 SALES BUDGET**

Assume that Stillwater Designs produces two automotive subwoofers: S12L7 and S12L5. The S12L7 sells for \$475, and the S12L5 sells for \$300. Projected sales (number of speakers) for the coming five quarters are as follows:

	S12L7	S12L5
First quarter, 2010	1,600	500
Second quarter, 2010	2,100	1,000
Third quarter, 2010	8,350	4,200
Fourth quarter, 2010	4,300	2,400
First quarter, 2011	1,650	750

The vice president of sales believes that the projected sales are realistic and can be achieved by the company.

**Required:**

1. Prepare a sales budget for each quarter of 2010 and for the year in total. Show sales by product and in total for each time period.
2. How will Stillwater Designs use this sales budget?

**OBJECTIVE** > **2****Exercise 19-35 PRODUCTION BUDGET**

Stillwater Designs produces two automotive subwoofers: S12L7 and S12L5. Projected sales (number of speakers) for the coming five quarters are as follows:



	S12L7	S12L5
First quarter, 2010	1,600	500
Second quarter, 2010	2,100	1,000
Third quarter, 2010	8,350	4,200
Fourth quarter, 2010	4,300	2,400
First quarter, 2011	1,650	750

The vice president of sales believes that the projected sales are realistic and can be achieved by the company.

Stillwater Designs needs a production budget for each product (representing the amount that must be outsourced to manufacturers located in Asia). Beginning inventory of S12L7 for the first quarter of 2010 was 500 boxes. The company's policy is to have 30 percent of the next quarter's sales of S12L7 in ending inventory. Beginning inventory of S12L5 was 200 boxes. The company's policy is to have 40 percent of the next quarter's sales of S12L5 in ending inventory.

**Required:**

Prepare a production budget for each quarter for 2010 and for the year in total.

### Exercise 19-36 PRODUCTION BUDGET AND DIRECT MATERIALS PURCHASES BUDGETS

OBJECTIVE &gt; 2

Seafood Inc. produces shrimp in cans. The sales budget for the first four months of the year is as follows:



	Unit Sales	Dollar Sales (\$)
January	200,000	150,000
February	240,000	180,000
March	220,000	165,000
April	200,000	150,000

Company policy requires that ending inventories for each month be 35 percent of next month's sales. At the beginning of January, the inventory of shrimp is 36,000 cans.

Each can of shrimp needs two raw materials: four ounces of shrimp and one can. Company policy requires that ending inventories of raw materials for each month be 20 percent of the next month's production needs. That policy was met on January 1.

#### Required:

1. Prepare a production budget for the first quarter of the year. Show the number of cans that should be produced each month as well as for the quarter in total.
2. Prepare separate direct materials purchases budgets for cans and for shrimp for the months of January and February.

### Exercise 19-37 PRODUCTION BUDGET

OBJECTIVE &gt; 2

Jimison Inc. produces spiral-bound notebooks. The unit sales for the first four months of the year for this product is as follows:

	Unit Sales
January	150,000
February	200,000
March	220,000
April	200,000

Company policy requires that ending inventories for each month be 15 percent of next month's sales. However, at the beginning of January, due to greater sales in December than anticipated, the beginning inventory of notebooks is only 12,000.

#### Required:

Prepare a production budget for the first quarter of the year. Show the number of units that should be produced each month as well as for the quarter in total.

### Exercise 19-38 DIRECT MATERIALS PURCHASES BUDGET

OBJECTIVE &gt; 2

Lester Company produces a variety of labels, including iron-on name labels, which are sold to parents of camp-bound children. (The camps require campers to have their name on each article of clothing.) The labels are sold in a roll of 1,000, which requires about 25 yards of paper strip. Each yard of paper strip costs \$0.17. Lester has budgeted production of the label rolls for the next four months as follows:



	Units
March	5,000
April	25,000
May	35,000
June	6,000

Inventory policy requires that sufficient paper strip be in ending monthly inventory to satisfy 20 percent of the following month's production needs. The inventory of paper

strip at the beginning of March equals exactly the amount needed to satisfy the inventory policy.

**Required:**

Prepare a direct materials purchases budget for March, April, and May, showing purchases in units and in dollars for each month and in total.

**OBJECTIVE** > **2** **Exercise 19-39 DIRECT LABOR BUDGET**

Pendel Company produces a variety of garden tools. The production budget for rakes is shown for the following months:

	<u>Units</u>
March	50,000
April	60,000
May	30,000
June	28,000

Each rake produced requires (on average) 0.15 direct labor hour. The average cost of direct labor is \$18 per hour.

**Required:**

Prepare a direct labor budget for March, April, and May, showing the hours needed and the direct labor cost for each month and in total.

**OBJECTIVE** > **2** **Exercise 19-40 SALES BUDGET**

Norton Inc. manufactures six models of leaf blowers and weed eaters. Norton's budgeting team is finalizing the sales budget for the coming year. Sales in units and dollars for last year follow:

<u>Product</u>	<u>Number Sold</u>	<u>Price (\$)</u>	<u>Revenue</u>
LB-1	16,800	29	\$ 487,200
LB-2	18,000	15	270,000
WE-6	25,200	13	327,600
WE-7	16,200	10	162,000
WE-8	2,400	22	52,800
WE-9	1,000	26	26,000
Total			<u>\$1,325,600</u>

In looking over the previous year's sales figures, Norton's sales budgeting team recalled the following:

- Model LB-1 is a newer version of the leaf blower with a gasoline engine. The LB-1 is mounted on wheels instead of being carried. This model is designed for the commercial market and did better than expected in its first year. As a result, the number of units of Model LB-1 to be sold was forecast at 300 percent of the previous year's units.
- Models WE-8 and WE-9 were introduced on October 1 of last year. They are lighter versions of the traditional weed eater and are designed for smaller households or condo units. Norton estimates that demand for both models will continue at the previous year's rate.
- A competitor has announced plans to introduce an improved version of model WE-6, Norton's traditional weed eater. Norton believes that the model WE-6 price must be cut 20 percent to maintain unit sales at the previous year's level.
- It was assumed that unit sales of all other models would increase by 10 percent, prices remaining constant.

**Required:**

Prepare a sales budget by product and in total for Norton Inc. for the coming year.

### Exercise 19-41 PRODUCTION BUDGET AND DIRECT MATERIALS PURCHASES BUDGET

**OBJECTIVE** > 2

Raylene Webber, owner of Raylene's Flowers and Gifts, produces gift baskets for various special occasions. Each gift basket includes fruit or assorted small gifts (e.g., a coffee mug, deck of cards, novelty cocoa mixes, scented soap) in a basket that is wrapped in colorful cellophane. Raylene has estimated the following unit sales of the standard gift basket for the rest of the year and for January of next year.

September	200
October	150
November	180
December	250
January	100

Raylene likes to have 10 percent of the next month's sales needs on hand at the end of each month. This requirement was met on August 31.

Two materials are needed for each fruit basket:

Fruit	1 pound
Small gifts	5 items

The materials inventory policy is to have 5 percent of the next month's fruit needs on hand and 50 percent of the next month's production needs of small gifts. (The relatively low inventory amount for fruit is designed to prevent spoilage.) Materials inventory on September 1 met this company policy.

#### Required:

1. Prepare a production budget for September, October, November, and December for gift baskets.
2. Prepare a direct materials purchases budget for the two types of materials used in the production of gift baskets for the months of September, October, and November. (Round answers to the nearest whole unit.)

### Exercise 19-42 ACCOUNTS RECEIVABLE AGING SCHEDULE AND CASH BUDGET

**OBJECTIVE** > 3

Kotari Inc. found that about 15 percent of its sales during the month were for cash. Kotari has the following accounts receivable payment experience:

Percent paid in the month of sale	20
Percent paid in the month after the sale	70
Percent paid in the second month after the sale	8

Kotari's anticipated sales for the next few months are as follows:

April	\$200,000
May	240,000
June	230,000
July	246,000
August	250,000

#### Required:

1. Calculate credit sales for May, June, July, and August.
2. Prepare a schedule of cash receipts for July and August.

### Exercise 19-43 ACCOUNTS RECEIVABLE AGING SCHEDULE AND CASH BUDGET

**OBJECTIVE** > 3

Janzen Inc. sells all of its product on account. Janzen has the following accounts receivable payment experience:

Percent paid in the month of sale	20
Percent paid in the month after the sale	60
Percent paid in the second month after the sale	15

To encourage payment in the month of sale, Janzen gives a 2 percent cash discount. Janzen's anticipated sales for the next few months are as follows:

April	\$200,000
May	220,000
June	230,000
July	210,000
August	250,000

**Required:**

1. Prepare a schedule of cash receipts for July.
2. Prepare a schedule of cash receipts for August.

**OBJECTIVE** > **3**

**Exercise 19-44 CASH PAYMENTS SCHEDULE**

Boger Company provided the following information relating to cash payments:

- a. Boger purchased direct materials on account in the following amounts:

June	40,000
July	45,000
August	50,000

- b. Boger pays 30 percent of accounts payable in the month of purchase and the remaining 70 percent in the following month.
- c. In July, direct labor cost is \$39,000. August direct labor cost was \$48,000. The company finds that typically 90 percent of direct labor cost is paid in cash during the month, with the remainder paid in the following month.
- d. August overhead amounted to \$73,700, including \$6,100 of depreciation.
- e. Boger had taken out a loan of \$112,000 on May 1. Interest, due with payment of principal, accrued at the rate of 12 percent per year. The loan and all interest were repaid on August 31.

**Required:**

Prepare a schedule of cash payments for Boger Company for the month of August.

**OBJECTIVE** > **3**

**Exercise 19-45 CASH BUDGET**

The owner of a small mining supply company has requested a cash budget for June. After examining the records of the company, you find the following:

- a. Cash balance on June 1 is \$830.
- b. Actual sales for April and May are as follows:

	April	May
Cash sales	\$10,000	\$15,000
Credit sales	<u>25,000</u>	<u>35,000</u>
Total sales	<u>\$35,000</u>	<u>\$50,000</u>

- c. Credit sales are collected over a three-month period: 50 percent in the month of sale, 30 percent in the second month, and 15 percent in the third month. The sales collected in the third month are subject to a 1 percent late fee, which is paid by those customers in addition to what they owe. The remaining sales are uncollectible.
- d. Inventory purchases average 75 percent of a month's total sales. Of those purchases, 20 percent are paid for in the month of purchase. The remaining 80 percent are paid for in the following month.
- e. Salaries and wages total \$8,700 per month, including a \$4,500 salary paid to the owner.
- f. Rent is \$1,340 per month.
- g. Taxes to be paid in June are \$5,500.

The owner also tells you that he expects cash sales of \$15,000 and credit sales of \$50,000 for June. No minimum cash balance is required. The owner of the company doesn't have access to short-term loans.

**Required:**

1. Prepare a cash budget for June. Include supporting schedules for cash collections and cash payments.
2. Did the business show a negative cash balance for June? Assuming that the owner has no hope of establishing a line of credit for the business, what recommendations would you give the owner for dealing with a negative cash balance?

## Problems

### Problem 19-46 CASH BUDGET

OBJECTIVE > 3

Morrissey Law Firm has found from past experience that 20 percent of its services are for cash. The remaining 80 percent are on credit. An aging schedule for accounts receivable reveals the following pattern:

- a. Ten percent of fees on credit are paid in the month that service is rendered.
- b. Seventy percent of fees on credit are paid in the month following legal service.
- c. Seventeen percent of fees on credit are paid in the second month following the legal service.
- d. Three percent of fees on credit are never collected.

Fees (on credit) that have not been paid until the second month following performance of the legal service are considered overdue and are subject to a 3 percent late charge.

Morrissey has developed the following forecast of fees:

May	\$230,000
June	250,000
July	240,000
August	240,000
September	290,000

**Required:**

Prepare a schedule of cash receipts for August and September.

### Problem 19-47 OPERATING BUDGET, COMPREHENSIVE ANALYSIS

OBJECTIVE > 1 2 3 4

Woodruff Manufacturing produces a subassembly used in the production of jet aircraft engines. The assembly is sold to engine manufacturers and aircraft maintenance facilities. Projected sales for the coming four months follow:

January	40,000
February	50,000
March	60,000
April	60,000



The following data pertain to production policies and manufacturing specifications followed by Woodruff Manufacturing:

- a. Finished goods inventory on January 1 is 32,000 units, each costing \$148.71. The desired ending inventory for each month is 80 percent of the next month's sales.
- b. The data on materials used are as follows:

Direct Material	Per-Unit Usage	Unit Cost (\$)
Metal	10 lbs.	8
Components	6	2

Inventory policy dictates that sufficient materials be on hand at the beginning of the month to produce 50 percent of that month's estimated sales. This is exactly the amount of material on hand on January 1.

- c. The direct labor used per unit of output is four hours. The average direct labor cost per hour is \$9.25.
- d. Overhead each month is estimated using a flexible budget formula. (Activity is measured in direct labor hours.)

	Fixed-Cost Component (\$)	Variable-Cost Component (\$)
Supplies	—	1.00
Power	—	0.50
Maintenance	30,000	0.40
Supervision	16,000	—
Depreciation	200,000	—
Taxes	12,000	—
Other	80,000	1.50

- e. Monthly selling and administrative expenses are also estimated using a flexible budgeting formula. (Activity is measured in units sold.)

	Fixed Costs (\$)	Variable Costs (\$)
Salaries	50,000	—
Commissions	—	2.00
Depreciation	40,000	—
Shipping	—	1.00
Other	20,000	0.60

- f. The unit selling price of the subassembly is \$180.
- g. All sales and purchases are for cash. The cash balance on January 1 equals \$400,000. If the firm develops a cash shortage by the end of the month, sufficient cash is borrowed to cover the shortage. Any cash borrowed is repaid at the end of the quarter, as is the interest due (cash borrowed at the end of the quarter is repaid at the end of the following quarter). The interest rate is 12 percent per annum. No money is owed at the beginning of January.

**Required:**

1. Prepare a monthly operating budget for the first quarter with the following schedules. (Assume that there is no change in work-in-process inventories.)
  - a. Sales budget
  - b. Production budget
  - c. Direct materials purchases budget
  - d. Direct labor budget
  - e. Overhead budget
  - f. Selling and administrative expenses budget
  - g. Ending finished goods inventory budget
  - h. Cost of goods sold budget
  - i. Budgeted income statement
  - j. Cash budget
2. Form a group with two or three other students. Locate a manufacturing plant in your community that has headquarters elsewhere. Interview the controller for the plant regarding the master budgeting process. Ask when the process starts each year, what schedules and budgets are prepared at the plant level, how the controller forecasts the amounts, and how those schedules and budgets fit in with the overall corporate budget. Is the budgetary process participative? Also, find out how budgets are used for performance analysis. Write a summary of the interview.

**Problem 19-48 CASH BUDGET, PRO FORMA BALANCE SHEET****OBJECTIVE 3**

Ryan Richards, controller for Grange Retailers, has assembled the following data to assist in the preparation of a cash budget for the third quarter of 2010:

a. Sales:

May (actual)	\$100,000
June (actual)	120,000
July (estimated)	90,000
August (estimated)	100,000
September (estimated)	135,000
October (estimated)	110,000

- b. Each month, 30 percent of sales are for cash and 70 percent are on credit. The collection pattern for credit sales is 20 percent in the month of sale, 50 percent in the following month, and 30 percent in the second month following the sale.
- c. Each month, the ending inventory exactly equals 50 percent of the cost of next month's sales. The markup on goods is 25 percent of cost.
- d. Inventory purchases are paid for in the month following the purchase.
- e. Recurring monthly expenses are as follows:

Salaries and wages	\$10,000
Depreciation on plant and equipment	4,000
Utilities	1,000
Other	1,700

- f. Property taxes of \$15,000 are due and payable on July 15, 2010.
- g. Advertising fees of \$6,000 must be paid on August 20, 2010.
- h. A lease on a new storage facility is scheduled to begin on September 2, 2010. Monthly payments are \$5,000.
- i. The company has a policy to maintain a minimum cash balance of \$10,000. If necessary, it will borrow to meet its short-term needs. All borrowing is done at the beginning of the month. All payments on principal and interest are made at the end of a month. The annual interest rate is 9 percent. The company must borrow in multiples of \$1,000.
- j. A partially completed balance sheet as of June 30, 2010, follows. (Accounts payable is for inventory purchases only.)

Cash	\$ ?	
Accounts receivable	?	
Inventory	?	
Plant and equipment	425,000	
Accounts payable		\$ ?
Common stock		210,000
Retained earnings		268,750
Total	<u>\$ ?</u>	<u>\$ ?</u>

**Required:**

- Complete the balance sheet given in item j.
- Prepare a cash budget for each month in the third quarter and for the quarter in total (the third quarter begins on July 1). Provide a supporting schedule of cash collections.
- Prepare a pro forma balance sheet as of September 30, 2010.
- Form a group with two or three other students. Discuss why a bank might require a cash budget for businesses that are seeking short-term loans. Determine what other financial reports might be useful for a loan decision. Also, discuss how the reliability of cash budgets and other financial information can be determined.

**OBJECTIVE** > **1** **4** **Problem 19-49 PARTICIPATIVE BUDGETING, NOT-FOR-PROFIT SETTING**

Dwight D. Eisenhower was the 34th president of the United States and the Supreme Commander of the Allied Forces during World War II. Much of his army career was spent in planning. He once said that “planning is everything; the plan is nothing.” What do you think he meant by this? Consider his comment with respect to the master budget. Do you agree or disagree? Be sure to include the impact of the master budget on planning and control.

**OBJECTIVE** > **3** **Problem 19-50 CASH BUDGET**

The controller of Pratesh Company is gathering data to prepare the cash budget for July. He plans to develop the budget from the following information:

- Of all sales, 35 percent are cash sales.
- Of credit sales, 60 percent are collected within the month of sale. Half of the credit sales collected within the month receive a 2 percent cash discount (for accounts paid within 10 days). Twenty percent of credit sales are collected in the following month; remaining credit sales are collected the month thereafter. There are virtually no bad debts.
- Sales for the second two quarters of the year follow. (The first three months are actual sales, and the last three months are estimated sales.)

	<u>Sales (\$)</u>
April	450,000
May	580,000
June	900,000
July	1,140,000
August	1,200,000
September	1,134,000

- The company sells all that it produces each month. The cost of raw materials equals 22 percent of each sales dollar. The company requires a monthly ending inventory equal to the coming month’s production requirements. Of raw materials purchases, 50 percent are paid for in the month of purchase. The remaining 50 percent is paid for in the following month.
- Wages total \$105,000 each month and are paid in the month incurred.
- Budgeted monthly operating expenses total \$336,000, of which \$45,000 is depreciation and \$6,000 is expiration of prepaid insurance (the annual premium of \$72,000 is paid on January 1).
- Dividends of \$130,000, declared on June 30, will be paid on July 15.
- Old equipment will be sold for \$25,200 on July 4.
- On July 13, new equipment will be purchased for \$173,000.
- The company maintains a minimum cash balance of \$20,000.
- The cash balance on July 1 is \$27,000.

**Required:**

Prepare a cash budget for July. Give a supporting schedule that details the cash collections from sales.

**OBJECTIVE** > **1** **2** **3** **Problem 19-51 MASTER BUDGET, COMPREHENSIVE REVIEW**

Optima Company is a high-technology organization that produces a mass-storage system. The design of Optima’s system is unique and represents a breakthrough in the industry. The units Optima produces combine positive features of both compact and hard disks. The company is completing its fifth year of operations and is preparing to build its master budget for the coming year (2010). The budget will detail each quarter’s activity and the activity for the year in total. The master budget will be based on the following information:

- Fourth-quarter sales for 2009 are 55,000 units.
- Unit sales by quarter (for 2010) are projected as follows:

First quarter	65,000
Second quarter	70,000
Third quarter	75,000
Fourth quarter	90,000

The selling price is \$400 per unit. All sales are credit sales. Optima collects 85 percent of all sales within the quarter in which they are realized; the other 15 percent is collected in the following quarter. There are no bad debts.

- c. There is no beginning inventory of finished goods. Optima is planning the following ending finished goods inventories for each quarter:

First quarter	13,000 units
Second quarter	15,000 units
Third quarter	20,000 units
Fourth quarter	10,000 units

- d. Each mass-storage unit uses five hours of direct labor and three units of direct materials. Laborers are paid \$10 per hour, and one unit of direct materials costs \$80.
- e. There are 65,700 units of direct materials in beginning inventory as of January 1, 2010. At the end of each quarter, Optima plans to have 30 percent of the direct materials needed for next quarter's unit sales. Optima will end the year with the same level of direct materials found in this year's beginning inventory.
- f. Optima buys direct materials on account. Half of the purchases are paid for in the quarter of acquisition, and the remaining half are paid for in the following quarter. Wages and salaries are paid on the 15th and 30th of each month.
- g. Fixed overhead totals \$1 million each quarter. Of this total, \$350,000 represents depreciation. All other fixed expenses are paid for in cash in the quarter incurred. The fixed overhead rate is computed by dividing the year's total fixed overhead by the year's expected actual units produced.
- h. Variable overhead is budgeted at \$6 per direct labor hour. All variable overhead expenses are paid for in the quarter incurred.
- i. Fixed selling and administrative expenses total \$250,000 per quarter, including \$50,000 depreciation.
- j. Variable selling and administrative expenses are budgeted at \$10 per unit sold. All selling and administrative expenses are paid for in the quarter incurred.
- k. The balance sheet as of December 31, 2009, is as follows:

<b>Assets</b>	
Cash	\$ 250,000
Direct materials inventory	5,256,000
Accounts receivable	3,300,000
Plant and equipment	<u>33,500,000</u>
Total assets	<u>\$42,306,000</u>
<b>Liabilities and Stockholders' Equity</b>	
Accounts payable	\$ 7,248,000*
Capital stock	27,000,000
Retained earnings	<u>8,058,000</u>
Total liabilities and stockholders' equity	<u>\$42,306,000</u>

\*For purchase of direct materials only.

- l. Optima will pay quarterly dividends of \$300,000. At the end of the fourth quarter, \$2 million of equipment will be purchased.

#### Required:

Prepare a master budget for Optima Company for each quarter of 2010 and for the year in total. The following component budgets must be included:

1. Sales budget
2. Production budget
3. Direct materials purchases budget
4. Direct labor budget
5. Overhead budget
6. Selling and administrative expenses budget
7. Ending finished goods inventory budget
8. Cost of goods sold budget (Assume that there is no change in work-in-process inventories.)
9. Cash budget
10. Pro forma income statement (using absorption costing)
11. Pro forma balance sheet

**OBJECTIVE** > **2** **Problem 19-52 DIRECT MATERIALS AND DIRECT LABOR BUDGETS**

Chistosa Company produces stuffed toy animals; one of these is Betty Rabbit. Each rabbit takes 0.10 yards of fabric and three ounces of polyfiberfill. Fabric costs \$3.50 per yard, and polyfiberfill is \$0.05 per ounce. Chistosa has budgeted production of stuffed rabbits for the next four months as follows:

	Units
October	40,000
November	80,000
December	50,000
January	60,000

Inventory policy requires that sufficient material be in ending monthly inventory to satisfy 15 percent of the following month's production needs and sufficient polyfiberfill be in inventory to satisfy 30 percent of the following month's production needs. Inventory of material and polyfiberfill at the beginning of October equals exactly the amount needed to satisfy the inventory policy.

Each rabbit produced requires (on average) 0.2 direct labor per hour. The average cost of direct labor is \$10.50 per hour.

**Required:**

1. Prepare a direct materials purchases budget of fabric for the last quarter of the year, showing purchases in units and in dollars for each month and for the quarter in total.
2. Prepare a direct materials purchases budget of polyfiberfill for the last quarter of the year, showing purchases in units and in dollars for each month and for the quarter in total.
3. Prepare a direct labor budget for the last quarter of the year, showing the hours needed and the direct labor cost for each month and for the quarter in total.

**OBJECTIVE** > **3** **Problem 19-53 CASH BUDGETING**

Bill Anderson owns The Eatery in Miami, Florida. The Eatery is an affordable restaurant located near tourist attractions. Bill accepts cash and checks. Checks are deposited immediately. The bank charges \$0.50 per check; the amount per check averages \$75. Bad checks that Bill cannot collect make up 2 percent of check revenue.

During a typical month, The Eatery has sales of \$75,000. About 75 percent are cash sales. Estimated sales for the next three months are as follows:

July	\$60,000
August	75,000
September	80,000

Bill thinks that it may be time to refuse to accept checks and to start accepting credit cards. He is negotiating with VISA/MasterCard and American Express, and he would start the new policy on April 1. Bill estimates that with the drop in sales from the

no-checks policy and the increase in sales from the acceptance of credit cards, the net increase in sales will be 20 percent. The credit cards involve added costs as follows:

VISA/MasterCard: Bill will accumulate these credit card receipts throughout the month and will submit them in one bundle for payment on the last day of the month. The money will be credited to his account by the fifth day of the following month. A fee of 3.5 percent is charged by the credit card company.

American Express: Bill will accumulate these receipts throughout the month and mail them to American Express for payment on the last day of the month. American Express will credit his account by the sixth day of the following month. A fee of 5.5 percent is charged by American Express.

Bill estimates the following breakdown of revenues among the various payment methods:

Cash	5%
VISA/Mastercard	75%
American Express	20%

#### Required:

1. Prepare a schedule of cash receipts for August and September under the current policy of accepting checks.
2. Prepare a schedule of cash receipts for August and September that incorporates the changes in policy.

#### Problem 19-54 BUDGETING IN THE GOVERNMENT SECTOR, INTERNET RESEARCH

OBJECTIVE > 1 2

In a similar sense as companies, the U.S. government must prepare a budget each year. However, unlike private, for-profit companies, the budget and its details are available to the public. The entire budgetary process is established by law. The government makes available a considerable amount of information concerning the federal budget. Most of this information can be found on the Internet. Using Internet resources (e.g., consider accessing the Office of Management and Budget at <http://www.whitehouse.gov/omb>), answer the following questions:

#### Required:

1. When is the federal budget prepared?
2. Who is responsible for preparing the federal budget?
3. How is the final federal budget determined? Explain in detail how the government creates its budget.
4. What percentage of the gross domestic product (GDP) is represented by the federal budget?
5. What are the revenue sources for the federal budget? Indicate the percentage contribution of each of the major sources.
6. How does U.S. spending as a percentage of GDP compare with spending of other countries?
7. How are deficits financed?

## Cases

#### Case 19-55 CASH BUDGET

OBJECTIVE > 1 3 4

Dr. Roger Jones is a successful dentist but he is experiencing recurring financial difficulties. For example, Dr. Jones owns his office building, which he leased to the professional corporation that housed his dental practice (he owns all shares in the corporation). However, Dr. Jones recently received a registered letter from the Internal Revenue Service threatening to impound his business and sell its assets for the

corporation's failure to pay payroll taxes for the past six months. Also, the corporation has had difficulty paying its suppliers, owing one of them over \$200,000 plus interest. In the past, Dr. Jones had solved similar problems by borrowing money on the equity in either his personal residence or his office building. Not surprisingly, Dr. Jones has grown weary of these recurring problems and has hired a local consultant for advice on how to fix his financial problems.

According to the analysis of the consultant, the financial difficulties facing Dr. Jones have been caused by the absence of proper planning and control. Budgetary control is sorely needed. To assist you in preparing a plan of action that will help his dental practice regain financial stability, Dr. Jones has made available the financial information describing a typical month in the following table.

<b>Revenues</b>		
	<b>Average Fee (\$)</b>	<b>Quantity</b>
Fillings	\$ 50	90
Crowns	300	19
Root canals	170	8
Bridges	500	7
Extractions	45	30
Cleaning	25	108
X-rays	15	150
<b>Costs</b>		
Salaries:		
Two dental assistants	\$1,900	
Receptionist/bookkeeper	1,500	
Hygienist	1,800	
Public relations (Mrs. Jones)	1,000	
Personal salary	<u>6,500</u>	
Total salaries		\$12,700
Benefits		1,344
Building lease		1,500
Dental supplies		1,200
Janitorial		300
Utilities		400
Phone		150
Office supplies		100
Lab fees		5,000
Loan payments		570
Interest payments		500
Miscellaneous		500
Depreciation		<u>700</u>
Total costs		<u>\$24,964</u>

Benefits include Dr. Jones's share of social security and a health insurance premium for all employees. Although all revenues billed in a month are not collected, the cash flowing into the business is approximately equal to the month's billings because of collections from prior months. The dental office is open Monday through Thursday from 8:30 a.m. to 4:00 p.m. and on Friday from 8:30 a.m. to 12:30 p.m. A total of 32 hours are worked each week. Additional hours could be worked, but Dr. Jones is reluctant to do so because of other personal endeavors that he enjoys.

Dr. Jones has noted that the two dental assistants and receptionist are not fully utilized. He estimates that they are busy about 65 to 70 percent of the time. Dr. Jones's wife spends about five hours each week on a monthly newsletter that is sent to all patients; she also maintains a birthday list and sends cards to patients on their birthdays.

Dr. Jones spends about \$2,400 yearly on informational seminars. These seminars, targeted especially for dentists, teach them how to increase their revenues. It is from one of these seminars that Dr. Jones decided to invest in promotion and public relations (the newsletter and the birthday list).

**Required:**

1. Prepare a monthly cash budget for Dr. Jones. Does Dr. Jones have a significant cash flow problem? How would you use the budget to show Dr. Jones why he is having financial difficulties?
2. Using the cash budget prepared in Requirement 1 and the information given in the case, recommend actions to solve Dr. Jones's financial problems. Prepare a cash budget that reflects these recommendations and demonstrates to Dr. Jones that the problems can be corrected. Do you think that Dr. Jones will accept your recommendations? Do any of the behavioral principles discussed in the chapter have a role in this type of setting? Explain.

**Case 19-56 BUDGETARY PERFORMANCE, REWARDS, ETHICAL BEHAVIOR**

**OBJECTIVE** > **1** **4**

Linda Ellis, division manager, is evaluated and rewarded on the basis of budgetary performance. Linda, her assistants, and the plant managers are all eligible to receive a bonus if actual divisional profits are between budgeted profits and 120 percent of budgeted profits. The bonuses are based on a fixed percentage of actual profits. Profits above 120 percent of budgeted profits earn a bonus at the 120 percent level (in other words, there is an upper limit on possible bonus payments). If the actual profits are less than budgeted profits, no bonuses are awarded. Consider the following actions taken by Linda:

- a. Linda tends to overestimate expenses and underestimate revenues. This approach facilitates the ability of the division to attain budgeted profits. Linda believes that the action is justified because it increases the likelihood of receiving bonuses and helps to keep the morale of the managers high.
- b. Suppose that toward the end of the fiscal year, Linda saw that the division would not achieve budgeted profits. Accordingly, she instructed the sales department to defer the closing of a number of sales agreements to the following fiscal year. She also decided to write off some inventory that was nearly worthless. Deferring revenues to next year and writing off the inventory in a no-bonus year increased the chances of a bonus for next year.
- c. Assume that toward the end of the year, Linda saw that actual profits would likely exceed the 120 percent limit and that she took actions similar to those described in item b.

**Required:**

1. Comment on the ethics of Linda's behavior. Are her actions right or wrong? What role does the company play in encouraging her actions?
2. Suppose that you are the marketing manager for the division, and you receive instructions to defer the closing of sales until the next fiscal year. What would you do?
3. Suppose that you are a plant manager, and you know that your budget has been padded by the division manager. Further, suppose that the padding is common knowledge among the plant managers, who support it because it increases the ability to achieve the budget and receive a bonus. What would you do?
4. Suppose that you are the division controller, and you receive instructions from the division manager to accelerate the recognition of some expenses that legitimately belong to a future period. What would you do?

# 20

## Standard Costing: A Managerial Control Tool

After studying Chapter 20, you should be able to:

- **1** Explain how unit standards are set and why standard cost systems are adopted.
- **2** Explain the purpose of a standard cost sheet.
- **3** Describe the basic concepts underlying variance analysis, and explain when variances should be investigated.
- **4** Compute the materials variances, and explain how they are used for control.
- **5** Compute the labor variances, and explain how they are used for control.
- **6** (Appendix) Prepare journal entries for materials and labor variances.





# **E**xperience Managerial Decisions with Navistar

Understanding an income statement is a relatively easy task. However, understanding the causes underlying net income represents a far more challenging task, especially for Fortune 300 companies like **Navistar International Truck and Engine Corporation**, whose annual net income typically falls in the neighborhood of several hundred million dollars. Navistar uses variance analysis as an important tool for understanding the many causes of its net income. This type of analysis helps managers at Navistar to learn which parts of the company are contributing to net income as expected and which parts are not contributing to net income as expected and, as such, will require careful attention to improve in the future. For example, Navistar recently reported that its monthly production cost was \$48 million to manufacture 1,228 actual units—considerably higher than its budgeted production cost of only \$41 million to produce 883 expected units. If you were the manager in charge of Navistar’s production, what would you do after receiving the news that actual costs were \$7 million greater (or approximately 17 percent more than the budgeted total production cost) than expected?

Before Navistar’s management took any rash actions, it performed an in-depth variance analysis on all of its key production factors to try and understand what had

caused the unfavorable static budget variance between its actual costs at month-end and its budgeted costs at the beginning of the month. These key production factors included direct and indirect materials, direct and indirect labor, benefits, utilities, depreciation, and information technology expense. As you might expect, variance analysis revealed that the \$7 million unfavorable static budget variance was comprised of numerous smaller variances, some favorable and others unfavorable, involving many of Navistar’s key production factors. Most importantly, Navistar’s managers were happy to learn that when adjusting the total budgeted costs for the higher production volume, total production costs should have increased by over \$11 million, much more than the actual cost increase of \$7 million. In fact, effective management of labor and materials purchasing—both of which had large favorable flexible budget variances—actually helped Navistar to save \$4 million. Without variance analysis, Navistar would have a much harder time understanding the causes of its net income and taking the appropriate action when components of income are different than expected.



**OBJECTIVE** > **1**

Explain how unit standards are set and why standard cost systems are adopted.

## Unit Standards

Most operating managers recognize the need to control costs. Cost control often means the difference between success and failure or between above-average profits and lesser profits. For example, as healthcare costs skyrocket due to the large and aging baby boomer generation, the growing complexity of medical treatments, the growing number of uninsured patients, etc., most healthcare facilities are desperately trying to budget and control costs more effectively. Usually, cost control means that managers must be cost conscious and assume responsibility for this important objective.

In Chapter 19, we learned that budgets set standards that are used to control and evaluate managerial performance. However, budgets are aggregate measures of performance; they identify the revenues and costs in total that an organization should experience if plans are executed as expected. By comparing the actual costs and actual revenues with the corresponding budgeted amounts at the same level of activity, a measure of managerial efficiency emerges.

Although the process just described provides significant information for control, developing standards for unit amounts, as well as for total amounts, can enhance control. To determine the unit standard cost for a particular input, two decisions must be made: (1) the amount of input that *should* be *used* per unit of output (the quantity decision) and (2) the amount that *should* be *paid* for the quantity of the input to be used (the pricing decision). The quantity decision produces **quantity standards**, and the pricing decision produces **price standards**. The unit standard cost can be computed by multiplying these two standards: Quantity standard  $\times$  Price standard.

For example, a soft-drink bottling company may decide that five ounces of fructose should be used for every 16-ounce bottle of cola (the quantity standard), and the price of the fructose should be \$0.05 per ounce (the price standard). The standard cost of the fructose per bottle of cola is then \$0.25 ( $5 \times \$0.05$ ). The standard cost per unit of fructose can be used to predict what the total cost of fructose should be as the activity level varies; thus, it becomes a flexible budget formula. If 10,000 bottles of cola are produced, then the total expected cost of fructose is \$2,500 ( $\$0.25 \times 10,000$ ); if 15,000 bottles are produced, then the total expected cost of fructose is \$3,750 ( $\$0.25 \times 15,000$ ).

### ANALYTICAL Q&A

If the unit quantity standard for a raw material is 10 pounds per unit, and the cost per pound of this material is \$8, what is the standard cost per unit of product for the material?

**Answer:**  
Standard cost =  $10 \times \$8 = \$80$ .

## How Standards Are Developed

Historical experience, engineering studies, and input from operating personnel are three potential sources of quantitative standards. Although historical experience may provide an initial guideline for setting standards, it should be used with caution. Often, processes are operating inefficiently; adopting input-output relationships from the past thus perpetuates these inefficiencies. Engineering studies can determine the most efficient way to operate and can provide rigorous guidelines; however, engineered standards often are too rigorous. They may not be achievable by operating personnel. Since operating personnel are accountable for meeting standards, they should have significant input in setting standards. The same principles governing participative budgeting pertain to setting unit standards.

Price standards are the joint responsibility of operations, purchasing, personnel, and accounting. Operating personnel determine the quality of the inputs required; personnel and purchasing have the responsibility of acquiring the labor and materials quality requested at the lowest price. Market forces, trade unions, and other external forces limit the range of choices for price standards. In setting price standards, purchasing must consider discounts, freight, and quality; personnel, on the other hand, must consider payroll taxes, fringe benefits, and qualifications. Accounting is responsible for recording the price standards as well as for preparing reports that compare actual performance with the standard.

## Types of Standards

Standards are generally classified as either *ideal* or *currently attainable*. **Ideal standards** demand maximum efficiency and can be achieved only if everything operates perfectly. No machine breakdowns, slack, or lack of skill (even momentarily) are allowed. **Currently attainable standards** can be achieved under efficient operating conditions. Allowance is made for normal breakdowns, interruptions, less than perfect skill, and so on. These standards are demanding but achievable. Exhibit 20-1 provides a visual and conceptual portrayal of the two standards.

Of the two types, currently attainable standards offer the most behavioral benefits. If standards are too tight and never achievable, workers become frustrated and performance levels decline. However, challenging but achievable standards tend to extract higher performance levels—particularly when the individuals subject to the standards have participated in their creation.

## Why Standard Cost Systems Are Adopted

Two reasons for adopting a standard cost system are frequently mentioned: to improve planning and control and to facilitate product costing.

**Planning and Control** Standard costing systems enhance planning and control and improve performance measurement. Unit standards are a fundamental requirement for a flexible budgeting system, which is a key feature of a meaningful planning and control system. Budgetary control systems compare actual costs with budgeted costs by computing *variances*, the difference between the actual and planned costs for the actual level of activity. By developing unit price and quantity standards, an overall variance can be decomposed into a price variance and a usage or efficiency variance.

Performing this decomposition provides a manager with additional information beyond that of the overall variance. For example, if the variance is unfavorable, this decomposition can inform a manager whether it is attributable to discrepancies between planned prices and actual prices, to discrepancies between planned usage and actual usage, or to both. Since managers have more control over the usage of inputs

### CONCEPT Q&A

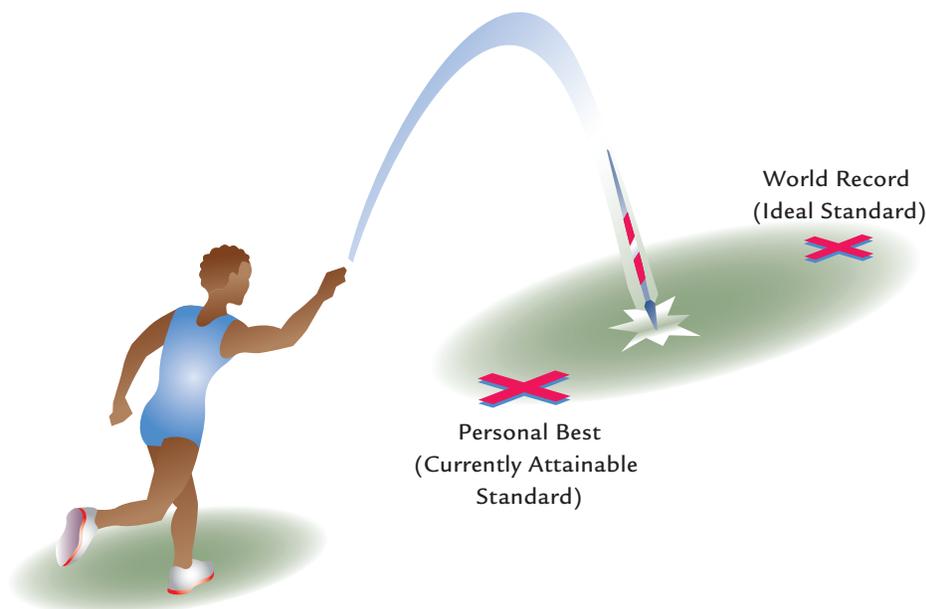
What is the difference between an ideal standard and a currently attainable standard?

*Possible Answer: An ideal standard is a standard of perfection—absolute efficiency is required. A currently attainable standard is rigorous but achievable and reflects a reasonable level of efficiency.*

Possible Answer:

Exhibit 20-1

### Types of Standards



than over their prices, efficiency variances provide specific signals regarding the need for corrective action and where that action should be focused. Thus, in principle, the use of efficiency variances enhances operational control. Additionally, by breaking out the price variance, over which managers potentially have less control, the system provides an improved measure of managerial efficiency.

The benefits of operational control, however, may not extend to the manufacturing environments that are emphasizing continuous improvement and just-in-time (JIT) purchasing and manufacturing. The use of a standard cost system for operational control in these settings can produce dysfunctional behavior. For example, materials price variance reporting may encourage the purchasing department to buy in large quantities in order to take advantage of discounts. Yet this practice might lead to holding significant inventories, something not desired by JIT firms. Therefore, the detailed computation of variances—at least at the operational level—is discouraged in this new environment. Nonetheless, standards in this newer manufacturing environment are still useful for planning, such as in the creation of bids. Also, variances may still be computed and presented in reports to higher-level managers so that the financial dimension can be monitored. In addition, other incentives, such as a fee charged to managers for holding excessive inventories, can be created to discourage managers from allowing inventories to grow beyond the level desired by JIT systems.

Finally, it should be mentioned that many firms operate with conventional manufacturing systems. Standard cost systems are widely used. According to one survey, 87 percent of the firms responding used a standard cost system.<sup>1</sup> Furthermore, the survey revealed that significant numbers of respondents were calculating variances at the operational level. For example, about 40 percent of the firms using a standard costing system reported labor variances for small work crews or individual workers.

**Product Costing** In a *standard* costing system, costs are assigned to products using quantity and price standards for all three manufacturing costs: direct materials, direct labor, and overhead. At the other end of the cost assignment spectrum, an *actual* costing system assigns the actual costs of all three manufacturing inputs to products. In the middle of this spectrum is a *normal* costing system, which predetermines overhead costs for the purpose of product costing but assigns direct materials and direct labor to products by using actual costs. Thus, a normal costing system assigns actual direct costs to products but allocates budgeted indirect costs to products using a budgeted rate and actual activity. Exhibit 20-2 summarizes these three cost assignment approaches. Standard product costing has several advantages over normal costing and actual costing. One, of course, is the greater capacity for control. Standard costing systems also provide readily available unit cost information that can be used for pricing decisions at any time throughout the period because actual costs (either direct or indirect) do not need to be known. This ability is particularly helpful

### Exhibit 20-2

#### Cost Assignment Approaches

	Manufacturing Costs		
	Direct Materials	Direct Labor	Overhead
Actual costing system	Actual	Actual	Actual
Normal costing system	Actual	Actual	Budgeted
Standard costing system	Standard	Standard	Standard

<sup>1</sup> Bruce R. Gaumnitz and Felix P. Kollaritsch, "Manufacturing Variances: Current Practice and Trends," *Journal of Cost Management* (Spring 1991): 59–64. Similar widespread usage is also reported by Carole B. Cheatham and Leo R. Cheatham, "Redesigning Cost Systems: Is Standard Costing Obsolete?" *Accounting Horizons* (December 1996): 23–31. Furthermore, a survey of UK firms revealed that 76 percent of them use a standard cost system; see Colin Drury, "Standard Costing: A Technique at Variance with Modern Management," *Management Accounting* (London, November 1999): 56–58.

for companies that do a significant amount of bidding and that are paid on a cost-plus basis.

Other simplifications also are possible. For example, if a process-costing system uses standard costing to assign product costs, there is no need to compute a unit cost for each equivalent unit cost category. A standard unit cost would exist for each category. Additionally, there is no need to distinguish between the first-in, first-out (FIFO) and weighted average methods of accounting for beginning inventory costs. Usually, a standard process-costing system will follow the equivalent unit calculation of the FIFO approach. That is, current equivalent units of work are calculated. By calculating current equivalent work, current actual production costs can be compared with standard costs for control purposes.

## CONCEPT Q&A

Why would a firm adopt a standard costing system?

*Standard costing enhances planning and control and improves performance evaluation. It also simplifies product costing. Having a readily available product cost facilitates pricing decisions.*

**Possible Answer:**

## Standard Product Costs

In manufacturing firms, standard costs are developed for direct materials, direct labor, and overhead. Using these costs, the **standard cost per unit** is computed. The **standard cost sheet** provides the production data needed to calculate the standard unit cost. To illustrate, a standard cost sheet will be developed for a 16-ounce bag of corn chips produced by Crunchy Chips Inc. The production of corn chips begins by steaming and soaking corn kernels overnight in a lime solution. This process softens the kernels so that they can be shaped into a sheet of dough. The dough is then cut into small triangular chips. Next, the chips are toasted in an oven and are dropped into a deep fryer. After cooking, the chips pass under a salting device and are inspected for quality. Sub-standard chips are sorted and discarded; the chips that pass inspection are bagged by a packaging machine. The bagged chips are manually packed into boxes for shipping.

Four materials are used to process corn chips: yellow corn, cooking oil, salt, and lime. The package in which the chips are placed is also classified as a direct material. Crunchy Chips has two types of direct laborers: machine operators and inspectors (or sorters). Variable overhead is made up of three costs: gas, electricity, and water. Both variable and fixed overhead are applied by using direct labor hours. The standard cost sheet is given in Exhibit 20-3. Note that it should cost \$0.88 to produce a

## OBJECTIVE 2

Explain the purpose of a standard cost sheet.

### Exhibit 20-3

#### Standard Cost Sheet for Corn Chips

Description	Standard Price	Standard Usage	Standard Cost*	Subtotal
Direct materials:				
Yellow corn	\$ 0.01	18 oz.	\$0.18	
Cooking oil	0.03	2 oz.	0.06	
Salt	0.01	1 oz.	0.01	
Lime	0.50	0.04 oz.	0.02	
Bags	0.05	1 bag	<u>0.05</u>	
Total direct materials				\$0.32
Direct labor:				
Inspection	8.00	0.01 hr.	\$0.08	
Machine operators	10.00	0.01 hr.	<u>0.10</u>	
Total direct labor				0.18
Overhead:				
Variable overhead	4.00	0.02 hr.	\$0.08	
Fixed overhead	15.00	0.02 hr.	<u>0.30</u>	
Total overhead				<u>0.38</u>
Total standard unit cost				<u>\$0.88</u>

\* Calculated by multiplying price times usage.

16-ounce package of corn chips. Also notice that the company should use 18 ounces of corn to produce a 16-ounce package of chips. There are two reasons for this two-ounce difference. First, some chips are discarded during the inspection process. The company plans on a normal amount of waste. Second, the company wants to have more than 16 ounces in each package to increase customer satisfaction with its product and to avoid any problems with fair packaging laws.

Exhibit 20-3 also reveals other important insights. The standard usage for variable and fixed overhead is tied to the direct labor standards. For variable overhead, the rate is \$4.00 per direct labor hour. Since one package of corn chips should use 0.02 hours of direct labor per unit, the variable overhead cost assigned to a package of corn chips is \$0.08 ( $\$4.00 \times 0.02$ ). For fixed overhead, the rate is \$15.00 per direct labor hour, making the fixed overhead cost per package of corn chips \$0.30 ( $\$15.00 \times 0.02$ ). About one-third of the cost of production is fixed, indicating a capital-intensive production effort. Indeed, much of the operation is mechanized.

The standard cost sheet also reveals the quantity of each input that should be used to produce one unit of output. The unit quantity standards can be used to compute the total amount of inputs allowed for the actual output. This computation is an essential component in computing efficiency variances. A manager should be able to compute the **standard quantity of materials allowed (SQ)** and the **standard hours allowed (SH)** for the actual output. This computation must be done for every class of direct material and every class of direct labor. **Cornerstone 20-1** shows how to compute these quantities by using one type of material and one class of labor.

## ANALYTICAL Q&A

A product is allowed three ounces of silver per unit and 0.5 hour of labor. If 3,000 units are produced, what is the standard quantity of silver allowed? Standard quantity of labor?

**Answer:**  
 $SQ = 3 \times 3,000 = 9,000$  ounces;  
 $SH = 0.5 \times 3,000 = 1,500$  direct labor hours



### CORNERSTONE 20-1



## HOW TO Compute Standard Quantities Allowed (SQ and SH)

### Information:

Assume that 100,000 packages of corn chips are produced during the first week of March. The unit quantity standard is 18 ounces of yellow corn per package (Exhibit 20-3). The unit quantity standard for machine operators is 0.01 hour per package produced (Exhibit 20-3).

### Required:

How much yellow corn and how many operator hours should be used for the actual output of 100,000 packages?

### Solution:

*Corn allowed:*

$$\begin{aligned} SQ &= \text{Unit Quantity Standard} \times \text{Actual Output} \\ &= 18 \times 100,000 \\ &= 1,800,000 \text{ ounces} \end{aligned}$$

*Operator hours allowed:*

$$\begin{aligned} SH &= \text{Unit Labor Standard} \times \text{Actual Output} \\ &= 0.01 \times 100,000 \\ &= 1,000 \text{ direct labor hours} \end{aligned}$$

## Here's The



## Real Kicker

About 15 percent of the defective Kicker speakers returned to Stillwater Designs can be rebuilt. The other 85 percent are sold as metal scrap. Speakers are candidates for rebuilding if the cost of direct materials and labor is less than the sum of the speaker's purchase cost, shipping cost, and duty (the production of Kicker speakers is outsourced to mostly Asian producers). This is true, for example, of the square S12L7 speakers.

To rebuild a square S12L7, the returned speaker is torn down to its basic structures, chemical and glue residues are removed, and the speaker is demagnetized so that it is possible to get rid of metal shavings and pieces. After this preparatory work, recone kits are used to replace the stripped-out components. The rebuilt woofer is then

placed in a cabinet and sealed. The completed unit undergoes two tests—one to ensure that the power is hooked up correctly and a second that checks for air leaks.

Every two years, standard costs for materials and labor are set. Time studies are used to determine the time required for rebuilding, and, thus, the labor content. The cost of the recone kit is the major material cost. These standard costs are used for two purposes: (1) to determine if rebuilding is feasible for a given model and (2) to assign costs to the rebuilt product on an ongoing basis if rebuilding is the decision.



## Variance Analysis: General Description

It is possible to calculate the costs that should have been incurred for the actual level of activity. This figure is obtained by multiplying the amount of input allowed (either materials or labor) for the actual output by the standard price of the input. Letting  $SP$  be the standard unit price of an input and  $SQ$  the standard quantity of input allowed for the actual output, the planned or budgeted input cost is  $SP \times SQ$ . The actual input cost is  $AP \times AQ$ , where  $AP$  is the actual price per unit of the input and  $AQ$  is the actual quantity of input used. The **total budget variance** is the difference between the actual cost of the input and its planned cost. As will be explained in Chapter 21, this budget is formally called the static budget variance. However, for now, the total budget variance will simply be called the *total variance*:

$$\begin{aligned} \text{Total Variance} &= \text{Actual Cost} - \text{Planned Cost} \\ &= (AP \times AQ) - (SP \times SQ) \end{aligned}$$

Because responsibility for deviations from planned prices tends to be located in the purchasing or personnel department and responsibility for deviations from planned usage of inputs tends to be located in the production department, it is important to separate the total variance into price and usage (quantity) variances.

## Price and Usage Variances

Exhibit 20-4 provides a general model for calculating price and quantity variances for materials and labor.<sup>2</sup> For labor, the price variance is usually called a *rate variance*, and the usage (quantity) variance is called an *efficiency variance*. **Price (rate) variance** is the difference between the actual and standard unit price of an input multiplied by the number of inputs used:  $(AP - SP)AQ$ . **Usage (efficiency) variance** is the difference between the actual and standard quantity of inputs multiplied by the standard unit price of the input:  $(AQ - SQ)SP$ .

**Unfavorable (U) variances** occur whenever actual prices or actual usage of inputs are greater than standard prices or standard usage. When the opposite occurs, **favorable (F) variances** are obtained. Favorable and unfavorable variances are not equivalent to good and bad variances. The terms merely indicate the relationship of the actual prices (or quantities) to the standard prices (or quantities). Whether or not

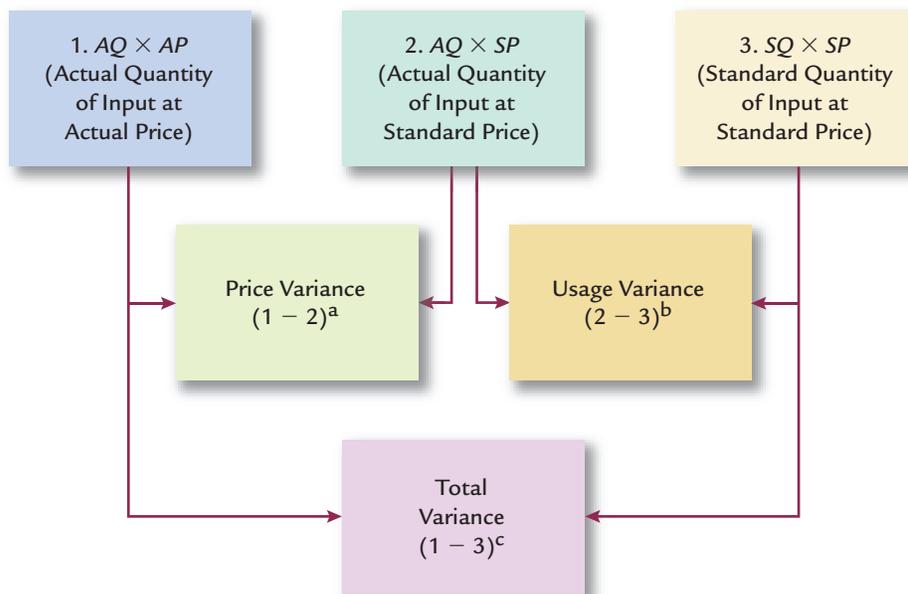
## OBJECTIVE > 3

Describe the basic concepts underlying variance analysis, and explain when variances should be investigated.

<sup>2</sup> Overhead variance analysis is discussed in Chapter 21.

## Exhibit 20-4

## Variance Analysis: General Description



$$^a\text{Price variance} = (AQ \times AP) - (AQ \times SP) = (AP - SP)AQ$$

$$^b\text{Usage variance} = (AQ \times SP) - (SQ \times SP) = (AQ - SQ)SP$$

$$^c\text{Total variance} = (AQ \times AP) - (SQ \times SP)$$

the variances are good or bad depends on why they occurred. Determining the cause of a variance requires managers to do some investigation.

### The Decision to Investigate

Rarely will actual performance exactly meet the established standards, and management does not expect it to do so. Random variations around the standard are expected. As a result, management should have in mind an acceptable range of performance. When variances are within this range, they are assumed to be caused by random factors. When a variance falls outside of this range, the deviation is likely to be caused by nonrandom factors, either factors that managers can control or factors they cannot control. In the noncontrollable case, managers need to revise the standard. In addition, it is possible that a variance that is too small to warrant investigation might be the result of two much larger but offsetting variances, each of which work in the opposite direction. For example, a \$5,000 unfavorable total variance for materials might be comprised of a \$100,000 unfavorable price variance and a \$95,000 favorable usage variance, both of which likely warrant investigation on their own. Effective managers do their best to recognize such offsetting variance situations.

An example from the pharmaceutical industry may drive home the importance of variance investigation.<sup>3</sup> Drugs must contain a certain amount of the active ingredient, plus or minus a small percent (e.g., aspirin claiming to have five grains per tablet must really have somewhere between 90 and 110 percent of the specified amount). The Food and Drug Administration (FDA) is responsible for ensuring the safety and efficacy of drugs manufactured in the United States and abroad. An anonymous letter alerted the FDA to manufacturing problems with an antibiotic produced by a Canadian firm, **Novopharm Ltd.** Basically, the drug was too strong and could potentially destroy beneficial bacteria along with the harmful bacteria. Upon investigation, the FDA found the blending process to be “out of control.” The result was that the firm stopped shipping that drug until the process could be corrected. Another FDA

<sup>3</sup>The examples given here are taken from an article by Christopher Drew, “Medicines from Afar Raise Safety Concerns,” *The New York Times* (October 29, 1995): A1 and A16.

investigation centered on **Haimen Pharmaceutical Factory** in China. In this case, the FDA found the samples of an antileukemia drug to be too weak. Again, large variances from the standard triggered an investigation. Interestingly, the question of what to do about the company and the drug was not clear-cut. In this case, the FDA did not withdraw its approval because the drug was in short supply.

**ETHICS** The earlier two examples also illustrate the strong ethical content of variance analysis. Significant deviations from standard in these examples can cause physical harm to the users of the product, by being either too potent or not potent enough. It is critical that a strong control system be in place and function as intended. Competence is the guiding ethical standard. Clearly, the consumers of these products are interested in those individuals responsible to perform their professional duties in accordance with the relevant laws, regulations, and technical standards. ♦

Now that we understand why variance investigation is important, we need to understand when to investigate. Investigating the cause of variances and taking corrective action, like all activities, have a cost associated with them. As a general principle, an investigation should be undertaken only if the expected benefits are greater than the expected costs. Assessing the costs and benefits of a variance investigation is not an easy task, however. A manager must consider whether a variance will recur. If so, the process may be permanently out of control, meaning that periodic savings may be achieved if corrective action is taken. But how is it possible to know if the variance is going to recur unless an investigation is conducted? And how is it possible to know the cost of corrective action unless the cause of the variance is known?

Because it is difficult to assess the costs and benefits of variance analysis on a case-by-case basis, many firms adopt the general guideline of investigating variances only if they fall outside of an acceptable range. They are not investigated unless they are large enough to be of concern. They must be large enough to be caused by something other than random factors and large enough (on average) to justify the costs of investigating and taking corrective action.

How do managers determine whether variances are significant? How is the acceptable range established? The acceptable range is the standard, plus or minus an allowable deviation. The top and bottom measures of the allowable range are called the **control limits**. The upper control limit is the standard plus the allowable deviation, and the lower control limit is the standard minus the allowable deviation. Current practice sets the control limits subjectively: Based on past experience, intuition, and judgment, management determines the allowable deviation from standard.<sup>4</sup> The actual deviations from standard often are plotted over time against the upper and lower limits to allow managers to see the significance of the variance. **Cornerstone 20-2** shows how control

## CONCEPT Q&A

Suppose that the actual labor rate paid is \$12 per hour, while the standard labor rate is \$11.50. Will the labor rate variance be favorable or unfavorable?

**Possible Answer:** It will be unfavorable because the rate actually paid is more than the rate allowed.

### HOW TO Use Control Limits to Trigger a Variance Investigation

#### Information:

Standard cost: \$100,000; allowable deviation:  $\pm$ \$10,000; actual costs for six months:

June	\$ 97,500	September	\$102,500
July	105,000	October	107,500
August	95,000	November	112,500



### CORNERSTONE 20-2



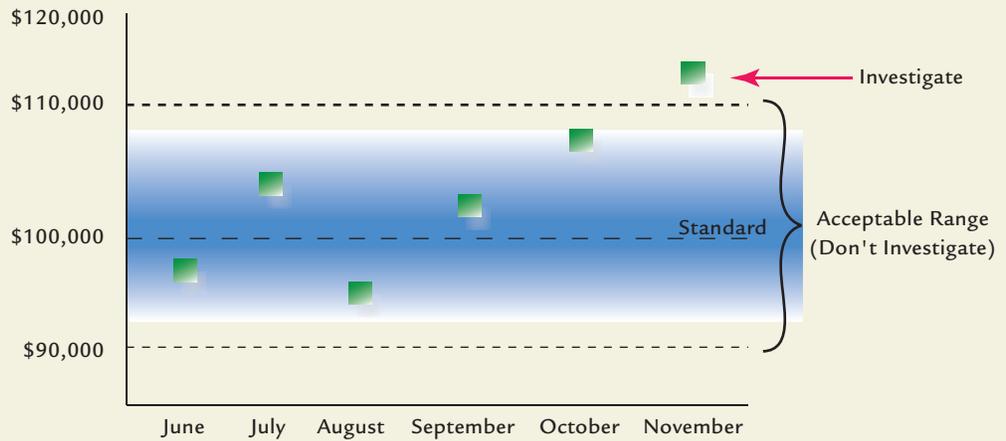
<sup>4</sup> Gaumnitz and Kollaritsch, "Manufacturing Variances: Current Practices and Trends," reports that about 45 to 47 percent of the firms use dollar or percentage control limits. Most of the remaining firms use judgment rather than any formal identification of limits.

**CORNERSTONE**  
**20-2**  
*(continued)*

**Required:**

Plot the actual costs over time against the upper and lower control limits. Determine when a variance should be investigated.

**Solution:**



The control chart reveals that the last variance should be investigated. The chart also reveals a short-term increasing trend that suggests the process is moving out of control. A nongraphical approach is to calculate the difference between the actual cost and the upper or lower limit and see if it exceeds \$10,000.

limits are used to trigger an investigation. The control chart graphically illustrates the concept of control limits. The assumed standard is \$100,000, and the allowable deviation is plus or minus \$10,000. The upper limit is \$110,000, and the lower limit is \$90,000. Investigation occurs whenever an observation falls outside of these limits (as would be the case for the sixth observation). Trends can also be important.

The control limits often are expressed both as a percentage of the standard and as an absolute dollar amount. For example, the allowable deviation may be expressed as the lesser of 10 percent of the standard amount, or \$10,000.

In other words, management will not accept a deviation of more than \$10,000 even if that deviation is less than 10 percent of the standard. Alternatively, even if the dollar amount is less than \$10,000, an investigation is required if the deviation is more than 10 percent of the standard amount.

**CONCEPT Q&A**

Refer to the control chart in Cornerstone 20-2. What action would you take for an actual value of \$89,750?

*This would produce a value below the lower control limit, so there should be an investigation to find the cause or causes of the deviation. Corrective action could then be taken.*

**Possible Answer:**

**OBJECTIVE** > **4**

Compute the materials variances, and explain how they are used for control.

**Variance Analysis: Materials**

The total variance for materials measures the difference between the actual costs of materials and their budgeted costs for the actual level of activity. **Cornerstone 20-3** illustrates how to calculate the total variance for materials by using selected data from Crunchy Chips for the first week of March. To keep the example simple, only one material (corn) is illustrated.

## HOW TO Calculate the Total Variance for Materials

### Information:

Unit standards from Exhibit 20-3; the actual results for the first week in March:

Actual production	48,500 bags of corn chips
Actual cost of corn	780,000 ounces at \$0.015 = \$11,700
Actual cost of inspection labor	360 hours at \$8.35 = \$3,006

### Required:

Calculate the total variance for corn for the first week in March.

### Solution:

	Actual Costs	Budgeted Costs*	Total Variance
	$AQ \times AP$	$SQ \times SP$	$(AQ \times AP) - (SQ \times SP)$
Corn	\$11,700	\$8,730	\$2,970 U

\* The standard quantities for materials and labor are computed as unit quantity standards from Exhibit 20-3:

Corn:  $SQ = 18 \times 48,500 = 873,000$  ounces

Multiplying these standard quantities by the unit standard prices given in Exhibit 20-3 produces the budgeted amounts appearing in this column:

Corn:  $\$0.01 \times 873,000 = \$8,730$



## CORNERSTONE 20-3



## Direct Materials Variances

To help control the cost of materials, price and usage variances are calculated. However, the sum of the price and usage variances will add up to the total materials variance calculated in Cornerstone 20-3 *only if the materials purchased equal the materials used*. The materials price variance is computed by using the actual quantity of materials purchased, and the materials usage variance is computed by using the actual quantity of materials used.

Since it is better to have information on variances earlier rather than later, the materials price variance uses the actual quantity of materials purchased rather than the actual quantity of materials used. The more timely the information, the more likely that proper managerial action can be taken. Old information often is useless information. Materials may sit in inventory for weeks or months before they are needed in production. By the time the materials price variance is computed, signaling a problem, it may be too late to take corrective action. Or, even if corrective action is still possible, the delay may cost the company thousands of dollars. For example, suppose a new purchasing agent is unaware of the availability of a quantity discount on a raw material. If the materials price variance that ignores the discount is computed when a new purchase is made, the resulting unfavorable signal would lead to quick corrective action. (In this case, the action would be to use the discount for future purchases.) If the materials price variance is not computed until the material is issued to production, it may be several weeks or even months before the problem is discovered.

Materials price and usage variances normally should be calculated using variance formulas. However, the three-pronged (columnar) approach is used when the materials purchased equal the materials used. **Cornerstone 20-4** shows how to use the materials variance formulas, which we now specifically state and define.

## CONCEPT Q&A

When is the total materials variance the sum of the price variance and the usage variance?

*When the materials purchased equal the materials used.*

**Possible Answer:**



## CORNERSTONE 20-4



### HOW TO Calculate Materials Variances: Formula and Columnar Approaches

#### Information:

Unit standards from Exhibit 20-3; the actual results for the first week in March:

Actual production	48,500 bags of corn chips
Actual cost of corn	780,000 ounces @ \$0.015

#### Required:

Calculate the materials price and usage variances by using the three-pronged (columnar) and formula approaches.

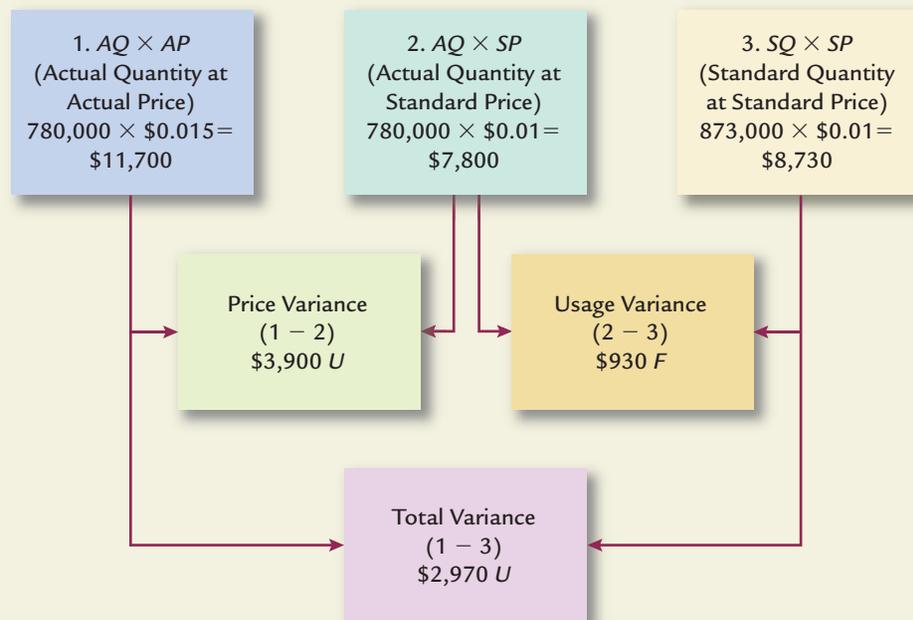
#### Solution:

- Formulas (recommended approach for materials variances because materials purchased may differ from materials used):

$$\begin{aligned} MPV &= (AP - SP)AQ \\ &= (\$0.015 - \$0.01)780,000 \\ &= \$3,900 \text{ U} \end{aligned}$$

$$\begin{aligned} MUV &= (AQ - SQ)SP \\ &= (780,000 - 873,000)(\$0.01) \\ &= \$930 \text{ F} \end{aligned}$$

- Columnar (this approach is possible only if the materials purchased equal materials used):



The **materials price variance (MPV)** measures the difference between what should have been paid for raw materials and what was actually paid. The formula for computing this variance is:

$$MPV = (AP \times AQ) - (SP \times AQ)$$

or, factoring, we have:

$$MPV = (AP - SP)AQ$$

where

$AP$  = The actual price per unit

$SP$  = The standard price per unit

$AQ$  = The actual quantity of material purchased

It should be noted that the  $MPV$  formula uses the *actual* quantity purchased, rather than the standard amount that should have been purchased, because purchasing managers typically influence the amount of materials actually purchased. Likewise, the  $MPV$  uses material *purchased*, rather than used, because purchasing managers typically do not control the amount of material actually used in production. Thus, the  $MPV$  contains items over which purchasing managers likely have control, which is helpful given that their bonuses often are affected by the  $MPV$ .

The **materials usage variance** ( $MUV$ ) measures the difference between the direct materials actually used and the direct materials that should have been used for the actual output. The formula for computing this variance is:

$$MUV = (SP \times AQ) - (SP \times SQ)$$

or, factoring:

$$MUV = (AQ - SQ)SP$$

where

$AQ$  = The actual quantity of materials used

$SQ$  = The standard quantity of materials allowed for the actual output

$SP$  = The standard price per unit

It should be noted that the  $MUV$  formula uses the *standard* price that should have been paid, rather than the actual price that was paid, because production managers typically do not influence the actual price paid for materials. Using the standard price in the  $MUV$ —a variance for which production managers typically are held accountable—prevents them from unfairly being affected by the actual price. Cornerstone 20-4 shows how to calculate the materials price and usage variances using either a columnar approach or a formula approach for the Crunchy Chips example (for corn only).

## ANALYTICAL Q&A

Assume that  $SP = \$3$  and  $AP = \$2$ . If 100 units are purchased, what is the materials price variance?

$$MPV = (\$2.00 - \$3.00)100 = \$100 F$$

Answer:

## Using Materials Variance Information

Calculating materials variances is only the first step. Using the variance information to exercise control is fundamental to a standard cost system. Responsibility must be assigned, variance significance must be assessed, and the variances must be accounted for and disposed of at the end of the year.

**Responsibility for the Materials Price Variance** The responsibility for controlling the materials price variance usually belongs to the purchasing agent. Admittedly, the price of materials is largely beyond his or her control; however, the price variance can be influenced by such factors as quality, quantity discounts, distance of the source from the plant, and so on. These factors often are under the control of the agent.

Using the price variance to evaluate the performance of purchasing has some limitations. Emphasis on meeting or beating the standard can produce some undesirable outcomes. For example, if the purchasing agent feels pressured to produce favorable variances, materials of lower quality than desired may be purchased or too much inventory may be acquired to take advantage of quantity discounts.

**Analysis of the Materials Price Variance** The first step in variance analysis is deciding whether or not the variance is significant. If it is judged insignificant, no further steps are needed. The materials price variance is \$3,900 unfavorable, which is about 45 percent of standard cost ( $\$3,900/\$8,730$ ). Most managers would judge this variance to be significant. The next step is to find out why it occurred.

For the Crunchy Chips example, the investigation revealed that a higher-quality corn was purchased because of a shortage of the usual grade in the market. Once the reason is known, corrective action can be taken if necessary—and if possible. In this case, no corrective action is needed. The firm has no control over the supply shortage; it will simply have to wait until market conditions improve.

**Responsibility for the Materials Usage Variance** The production manager is generally responsible for materials usage. Minimizing scrap, waste, and rework are all ways in which the manager can ensure that the standard is met. However, at times, the cause of the variance is attributable to others outside of the production area, as the next section shows.

As with the price variance, using the usage variance to evaluate performance can lead to undesirable behavior. For example, a production manager feeling pressure to produce a favorable variance might allow a defective unit to be transferred to finished goods. While this transfer avoids the problem of wasted materials, it may create customer relation problems.

**Analysis of the Materials Usage Variance** The materials usage variance is approximately 11 percent of standard cost ( $\$930/\$8,730$ ). A deviation greater than 10 percent likely is to be judged significant. Thus, investigation is needed. Investigation revealed that the favorable materials usage variance was the result of the higher-quality corn acquired by the purchasing department. In this case, the favorable variance is essentially assignable to purchasing. Since the materials usage variance is favorable—but smaller than the unfavorable price variance—the overall result of the change in purchasing is unfavorable. In the future, management should try to resume purchasing of the normal-quality corn.

If the overall variance had been favorable, a different response would be expected. If the favorable variance were expected to persist, the higher-quality corn should be purchased regularly and the price and quantity standards revised to reflect it. As this possibility reveals, standards are not static. As improvements in production take place and conditions change, standards may need to be revised to reflect the new operating environment. The importance of evaluating current business conditions and updating standards to reflect any changes in these conditions cannot be overemphasized.

**Accounting and Disposition of Materials Variances** Recognizing the price variance for materials at the point of purchase also means that the raw materials inventory is carried at standard cost. In general, materials variances are not inventoried. Typically, materials variances are added to cost of goods sold if unfavorable and are subtracted from cost of goods sold if favorable. The journal entries associated with the purchase and usage of raw materials for a standard cost system are illustrated in the Appendix.

## OBJECTIVE > 5

Compute the labor variances, and explain how they are used for control.

## Variance Analysis: Direct Labor

The total labor variance measures the difference between the actual costs of labor and their budgeted costs for the actual level of activity. **Cornerstone 20-5** illustrates how to calculate the total variance for labor by using selected data from Crunchy Chips for the first week of March. To keep the example simple, only inspection labor is illustrated.

## HOW TO Calculate the Total Variance for Labor

### Information:

Unit standards from Exhibit 20-3; the actual results for the first week in March:

Actual production	48,500 bags of corn chips
Actual cost of inspection labor	360 hours @ \$8.35 = \$ 3,006

### Required:

Calculate the total variance for inspection labor for the first week in March.

### Solution:

	Actual Costs	Budgeted Costs*	Total Variance
	$AQ \times AP$	$SQ \times SP$	$(AQ \times AP) - (SQ \times SP)$
Inspection labor	\$3,006	\$3,880	\$874 F

\* The standard quantities for inspection labor are computed as unit quantity standards from Exhibit 20-3:

Labor:  $SH = 0.01 \times 48,500 = 485$  hours

Multiplying these standard quantities by the unit standard prices given in Exhibit 20-3 produces the budgeted amounts appearing in this column:

Labor:  $\$8.00 \times 485 = \$3,880$



## CORNERSTONE 20-5



## Direct Labor Variances

Labor hours cannot be purchased and stored for future use as can be done with materials (i.e., there can be no difference between the amount of labor purchased and the amount of labor used). Therefore, unlike the total materials variance, the labor rate and labor efficiency variances always will add up to the total labor variance, as calculated in Cornerstone 20-5. Thus, the rate (price) and efficiency (usage) variances for labor can be calculated by using either the columnar approach or the associated formulas. Which technique to use is a matter of preference. The formulas are adapted to reflect the specific terms used for labor prices (rates) and usage (efficiency).

The **labor rate variance (LRV)** computes the difference between what was paid to direct laborers and what should have been paid:

$$LRV = (AR \times AH) - (SR \times AH)$$

or, factoring:

$$LRV = (AR - SR) AH$$

where

$AR$  = The actual hourly wage rate  
 $SR$  = The standard hourly wage rate  
 $AH$  = The actual direct labor hours used

The **labor efficiency variance (LEV)** measures the difference between the labor hours that were actually used and the labor hours that should have been used:

$$LEV = (AH \times SR) - (SH \times SR)$$

or, factoring:

$$LEV = (AH - SH)SR$$

where

$$AH = \text{The actual direct labor hours used}$$

$$SH = \text{The standard direct labor hours that should have been used}$$

$$SR = \text{The standard hourly wage rate}$$

**Cornerstone 20-6** shows how to calculate the labor rate and efficiency variances for the Crunchy Chips example (for inspection labor only) using either a columnar approach or a formula approach.



## CORNERSTONE 20-6



### HOW TO Calculate Labor Variances: Formula and Columnar Approaches

#### Information:

Unit standards from Exhibit 20-3; the actual results for the first week in March:

Actual production	48,500 bags of corn chips
Actual cost of inspection labor	360 hours @ \$8.35

#### Required:

Calculate the labor rate and efficiency variances by using the three-pronged (columnar) and formula approaches.

#### Solution:

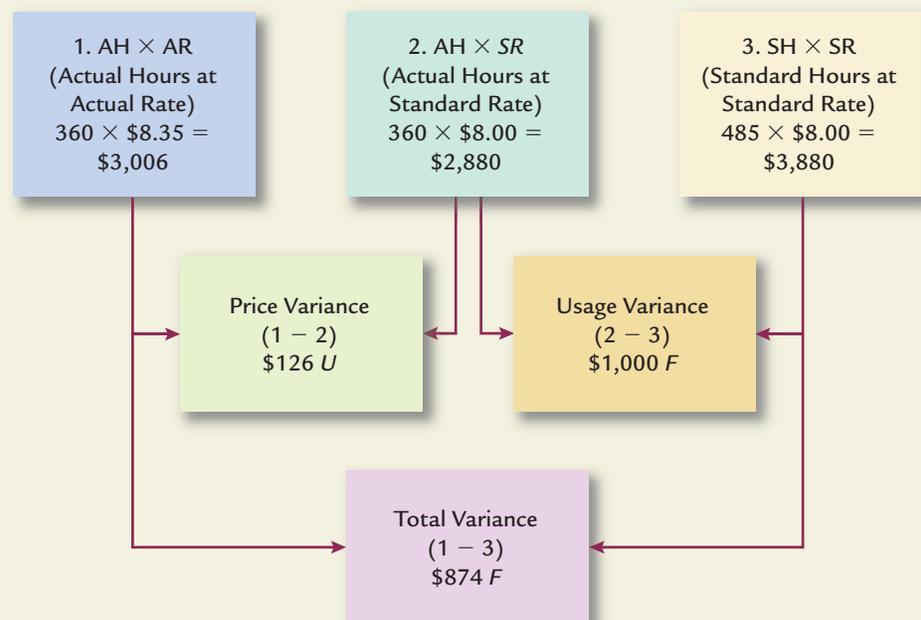
Formulas:

$$LRV = (AR - SR)AH \qquad LEV = (AH - SH)SR$$

$$= (\$8.35 - \$8.00)360 \qquad = (360 - 485)(\$8.00)$$

$$= \$126U \qquad = \$1,000F$$

Columnar:



## Using Labor Variance Information

As with materials variances, calculating labor variances initiates the feedback process. Using the labor variance information to exercise control is fundamental. Responsibility must be assigned, variance significance must be assessed, and the variances must be accounted for and disposed of at the end of the year.

**Responsibility for the Labor Rate Variance** Labor rates are largely determined by such external forces as labor markets and union contracts. The actual wage rate rarely departs from the standard rate. When labor rate variances do occur, they usually do so because an average wage rate is used for the rate standard and because more skilled and more highly paid laborers are used for less skilled tasks. Unexpected overtime also can be the cause of a labor rate variance.

Wage rates for a particular labor activity often differ among workers because of differing levels of seniority. Rather than selecting labor rate standards reflecting those different levels, an average wage rate often is chosen. As the seniority mix of workers changes, the average rate changes. This rate change will give rise to a labor rate variance; it also calls for a new standard to reflect the new seniority mix. Controllability is not assignable for this cause of a labor rate variance.

However, the use of labor is controllable by the production manager. The use of more skilled workers to perform less skilled tasks (or vice versa) is a decision that a production manager consciously makes. For this reason, responsibility for the labor rate variance generally is assigned to the individuals who decide how labor will be used.

**Analysis of the Labor Rate Variance** The labor rate variance is only 3 percent of the standard cost (\$126/\$3,880). Although a 3 percent variance is not likely to be judged significant, for illustrative purposes, assume that an investigation is conducted. The cause of the variance is found to be the use of more highly paid and skilled machine operators as inspectors, which occurred because two inspectors quit without formal notice. The corrective action is to hire and train two new inspectors.

**Responsibility for the Labor Efficiency Variance** Generally speaking, production managers are responsible for the productive use of direct labor. However, as is true of all variances, once the cause is discovered, responsibility may be assigned elsewhere. For example, frequent breakdowns of machinery may cause interruptions and nonproductive use of labor. But the responsibility for these breakdowns may be faulty maintenance. If so, the maintenance manager should be charged with the unfavorable labor efficiency variance.

Production managers may be tempted to engage in dysfunctional behavior if too much emphasis is placed on the labor efficiency variance. For example, to avoid losing hours or using additional hours because of possible rework, a production manager could deliberately transfer defective units to finished goods.

**Analysis of the Labor Efficiency Variance** The labor efficiency variance is 26 percent of standard cost (\$1,000/\$3,880). This favorable variance is judged to be significant, and an investigation is undertaken. Investigation revealed that inspections flowed more smoothly because of the higher quality of materials. This additional benefit of the higher-quality materials should be factored into whether Crunchy should return to purchasing the normal-quality corn when it becomes available or whether the higher-quality material should again be purchased. In this case, even with this additional benefit, the materials price variance is so large that the correct action is to acquire the normal-quality material when it again becomes available.

### ANALYTICAL Q&A

Assume that  $AH = 100$  hours and  $SH = 80$  hours, with  $SR = \$10$ . What is the labor efficiency variance?

$$\text{LEV} = (AH - SH)SR = (100 - 80)\$10 = \$200 \text{ U.}$$

**Answer:**

## Additional Cost Management Practices: Kaizen Costing and Target Costing

In addition to standard costing, some companies choose to employ other cost management practices, such as kaizen costing and target costing. Kaizen costing focuses on the continuous reduction of the *manufacturing* costs of existing products and processes. Kaizen is a Japanese word meaning continuous improvement. The philosophy in a standard costing system is that the budgeted expectation, or standard, should be met each period. However, as the phrase “continuous improvement” suggests, the philosophy in a kaizen costing system is that the budgeted expectation, or kaizen standard, of the current period should exceed the improvement accomplished the previous period. Using this philosophy, each period’s kaizen standard is set based on prior periods’ improvements, thereby locking in these improvements to push for even greater improvements in the future. Typically, continuous cost improvements are achieved by identifying a large number of relatively small cost-reducing opportunities (e.g., repositioning factory work space, placing or transporting work-in-process inventory in such a way that the next worker can immediately access the inventory and begin working on it, etc.). For example, **Honda** uses kaizen costing practices to help its engineers implement the product design improvements identified by its shop floor workers.

Target costing focuses on the reduction of the *design* costs of existing and future products and processes. Increasingly, companies such as **Toyota**, **Boeing**, and **Olympus** are emphasizing cost management in the design stage as they begin to recognize that an astonishingly large percentage (somewhere between 75 to 90 percent) of a product’s total costs are “locked in” or “committed to” by the time it finishes the design stage and moves into the manufacturing stage.<sup>5</sup> A **target cost** is the difference between the sales price needed to capture a predetermined market share and the desired per-unit profit (i.e., target cost per unit = expected sales price per unit – desired profit per unit). The sales price reflects the product specifications or functions valued by the customer. If the target cost is *less* than the current actual cost, then management must find cost reductions that decrease the actual cost to the target cost. Some managers refer to this process as closing the cost gap, which is the difference between current actual cost and the necessary target cost. Closing this cost gap is the principal challenge of target costing and usually requires the participation of suppliers and other business partners outside of the company over a period of several years. If this cost gap is not closed to zero (i.e., the actual cost is not reduced to the target cost) by the date the new product is planned to launch, then most target costing proponents will follow the cardinal rule of target costing and delay the product launch date until the gap is closed. The reason for the delay is that many managers feel that once the product launches, the incentive to reduce the actual cost falls significantly and, thus, the likelihood of the actual cost eventually decreasing to the target cost level necessary to generate the desired profit margin becomes unacceptably small. **Caterpillar** is famous for adhering to this rule even though the launch delay means that the company must forego significant sales revenues during the delay period.

As you might have noticed, target costing is more than just cost control, because it includes expected sales revenues and desired profit margins in the calculation of the target cost. For this reason, target costing often is referred to as a profit planning technique. In addition, target costing is more of a long-term approach to cost reduction, whereas kaizen costing is more of a continuous, short-term approach to cost reduction. Finally, given that target and kaizen costing practices focus on different segments of the value chain, they can serve as effective complements as an organization strives to reduce its costs along the entire value chain.

<sup>5</sup> See Julie H Hertenstein and Marjorie B Platt. *Management Accounting*. Apr 1998. Vol. 79, Iss. 10; p. 50 (6 pages).

## Summary of Learning Objectives

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**LO1. Explain how unit standards are set and why standard cost systems are adopted.**

- A standard cost system budgets quantities and costs on a unit basis. These unit budgets are for labor, materials, and overhead. Standard costs, therefore, are the amount that should be expended to produce a product or service.
- Standards are set by using historical experience, engineering studies, and input from operating personnel, marketing, and accounting.
- Currently attainable standards are those that can be achieved under efficient operating conditions.
- Ideal standards are those achievable under maximum efficiency, or ideal operating conditions.
- Standard cost systems are adopted to improve planning and control and to facilitate product costing. By comparing actual outcomes with standards and breaking the variance into price and quantity components, detailed feedback is provided to managers. This information allows managers to exercise a greater degree of cost control than that found in a normal or actual cost system.

**LO2. Explain the purpose of a standard cost sheet.**

- The standard cost sheet provides the details for computing the standard cost per unit. It shows the standard costs for materials, labor, and variable and fixed overhead.
- The standard cost sheet also reveals the quantity of each input that should be used to produce one unit of output. By using these unit quantity standards, the standard quantity of materials allowed and the standard hours allowed can be computed for the actual output.

**LO3. Describe the basic concepts underlying variance analysis, and explain when variances should be investigated.**

- The total variance is the difference between actual costs and planned costs.
- In a standard costing system, the total variance is broken down into price and usage variances. By breaking the total variances into price and usage variances, managers are better able to analyze and control the total variance.
- Variances should be investigated if they are material (i.e., significant) and if the benefits of corrective action are greater than the costs of investigation. Because of the difficulty of assessing cost and benefits on a case-by-case basis, many firms set up formal control limits—either a dollar amount, a percentage, or both. Other firms use judgment to assess the need to investigate.

**LO4. Compute the materials variances, and explain how they are used for control.**

- The materials price and usage variances are computed by using either a three-pronged (columnar) approach or formulas.
- The materials price variance is the difference between what was actually paid for materials (generally associated with the purchasing activity) and what should have been paid.
- The materials usage variance is the difference between the actual amount of materials used (generally associated with the production activity) and the amount of materials that should have been used.
- When a significant variance is signaled, an investigation is undertaken to find the cause. Corrective action is taken, if possible, to put the system back in control.

**LO5. Compute the labor variances, and explain how they are used for control.**

- The labor variances are computed by using either a three-pronged approach or formulas.

- The labor rate variance is caused by the actual wage rate differing from the standard wage rate. It is the difference between the wages that were paid and those that should have been paid.
- The labor efficiency variance is the difference between the actual amount of labor that was used and the amount of labor that should have been used.
- When a significant variance is signaled, investigation is called for, and corrective action should be taken, if possible, to put the system back in control.
- Kaizen costing focuses on continuous short-term improvements in manufacturing costs, while target costing focuses on long-term improvements in design costs. Target cost is the difference between the targeted revenue and the targeted profit.

## Summary of Important Equations

1.  $MPV = (AP - SP)AQ$
2.  $MUV = (AQ - SQ)SP$
3.  $LRV = (AR - SR)AH$
4.  $LEV = (AH - SH)SR$



### CORNERSTONES FOR CHAPTER 20

- CORNERSTONE 20-1** How to compute standard quantities allowed ( $SQ$  and  $SH$ ), page 1072
- CORNERSTONE 20-2** How to use control limits to trigger a variance investigation, page 1075
- CORNERSTONE 20-3** How to calculate the total variance for materials, page 1077
- CORNERSTONE 20-4** How to calculate materials variances: formula and columnar approaches, page 1078
- CORNERSTONE 20-5** How to calculate the total variance for labor, page 1081
- CORNERSTONE 20-6** How to calculate labor variances: formula and columnar approaches, page 1082

## Key Terms

- |   |   |
|---|---|
| Control limits, 1075                      | Quantity standards, 1068                              |
| Currently attainable standards, 1069      | Standard cost per unit, 1071                          |
| Favorable ( $F$ ) variances, 1073         | Standard cost sheet, 1071                             |
| Ideal standards, 1069                     | Standard hours allowed ( $SH$ ), 1072                 |
| Labor efficiency variance ( $LEV$ ), 1081 | Standard quantity of materials allowed ( $SQ$ ), 1072 |
| Labor rate variance ( $LRV$ ), 1081       | Target cost, 1084                                     |
| Materials price variance ( $MPV$ ), 1078  | Total budget variance, 1073                           |
| Materials usage variance ( $MUV$ ), 1079  | Unfavorable ( $U$ ) variances, 1073                   |
| Price (rate) variance, 1073               | Usage (efficiency) variance, 1073                     |
| Price standards, 1068                     |   |

## Appendix: Accounting for Variances

### OBJECTIVE 6

Prepare journal entries for materials and labor variances.

To illustrate recording variances, we will assume that the materials price variance is computed at the time materials are purchased. With this assumption, we can state a general rule for a firm's inventory accounts: All inventories are carried at standard cost. As a result, actual costs are not entered into an inventory account. Instead, applied standard costs flow through inventory and eventually to cost of goods sold. As illustrated in this appendix, the accounts containing the variances between applied standard costs and actual costs are closed, which allows the amount of actual costs to ultimately impact the final cost of goods sold number that appears in the financial statements. In recording variances, unfavorable variances always are debits, and favorable variances always are credits.

### Entries for Direct Materials Variances

**Materials Price Variance** The entry to record the purchase of materials follows (assuming an unfavorable *MPV* and that *AQ* is materials purchased):

<b>Materials</b>	$SP \times AQ$	
<b>Materials Price Variance</b>	$(AP - SP)AQ$	
<b>Accounts Payable</b>		$AP \times AQ$

For example, if *AP* is \$0.0069 per ounce of corn, *SP* is \$0.0060 per ounce, and 780,000 ounces of corn are purchased, the entry would be:

Materials	4,680	
Materials Price Variance	702	
Accounts Payable		5,382

Notice that the raw materials are carried in the inventory account at standard cost.

**Materials Usage Variance** The general form for the entry to record the issuance and usage of materials, assuming a favorable *MUV*, is as follows:

<b>Work in Process</b>	$SQ \times SP$	
<b>Materials Usage Variance</b>		$(AQ - SQ)SP$
<b>Materials</b>		$AQ \times SP$

Here, *AQ* is the materials issued and used, not necessarily equal to the materials purchased. Notice that only standard quantities and standard prices are used to assign costs to Work in Process; no actual costs enter this account.

For example, if *AQ* is 780,000 ounces of corn, *SQ* is 873,000 ounces, and *SP* is \$0.006, then the entry would be:

Work in Process	5,238	
Materials Usage Variance		558
Materials		4,680

Notice that the favorable usage variance appears as a credit entry.

### Entries for Direct Labor Variances

Unlike the materials variances, the entry to record both types of labor variances is made simultaneously. The general form of this entry follows (assuming an unfavorable labor rate variance and an unfavorable labor efficiency variance).

<b>Work in Process</b>	$SH \times SR$	
<b>Labor Efficiency Variance</b>	$(AH - SH)SR$	
<b>Labor Rate Variance</b>	$(AR - SR)AH$	
<b>Accrued Payroll</b>		$AH \times AR$

Again, notice that only standard hours and standard rates are used to assign costs to Work in Process. Actual prices or quantities are not used.

To give a specific example, assume that  $AH$  is 360 hours of inspection,  $SH$  is 339.5 hours,  $AR$  is \$7.35 per hour, and  $SR$  is \$7.00 per hour. The following journal entry would be made:

Work in Process	2,376.50	
Labor Efficiency Variance	143.50	
Labor Rate Variance	126.00	
Accrued Payroll		2,646.00

## Disposition of Materials and Labor Variances

At the end of the year, the variances for materials and labor usually are closed to Cost of Goods Sold. (This practice is acceptable provided that variances are not material in amount.) Using the previous data, the entries would take the following form:

Cost of Goods Sold	971.50	
Materials Price Variance		702.00
Labor Efficiency Variance		143.50
Labor Rate Variance		126.00
Materials Usage Variance	558.00	
Cost of Goods Sold		558.00

If the variances are material, they must be prorated among various accounts. For the materials price variance, it is prorated among Materials Inventory, Materials Usage Variance, Work in Process, Finished Goods, and Cost of Goods Sold. The remaining materials and labor variances are prorated among Work in Process, Finished Goods, and Cost of Goods Sold. Typically, materials variances are prorated on the basis of the materials balances in each of these accounts and the labor variances on the basis of the labor balances in the accounts.

## Appendix: Summary of Learning Objectives

### LO6. Prepare journal entries for materials and labor variances.

- Assuming that the materials price variance is computed at the point of purchase, all inventories are carried at standard cost.
- Actual costs are not entered into an inventory account. Instead, standard costs are applied to inventory and eventually flow through to cost of goods sold.
- Accounts are created for materials price and usage variances and for labor rate and efficiency variances.
- Unfavorable variances are always debits; favorable variances are always credits.
- The closing of the variance accounts, which contain the difference between applied standard costs and actual costs, results in the amount of actual costs ultimately impacting cost of goods sold.

## Review Problems

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### I. Materials, Labor, and Overhead Variances

Willhelm Manufacturing has the following standards for one of its products:

Direct materials (2 ft. @ \$5)	\$10
Direct labor (0.5 hr. @ \$10)	5

During the most recent year, the following actual results were recorded:

Production	6,000 units
Direct materials (11,750 ft. purchased and used)	\$61,100
Direct labor (2,900 hrs.)	29,580

#### Required:

Compute the following variances:

1. Materials price and usage variances.
2. Labor rate and efficiency variances.

#### Solution:

1. Materials variances:

$$\begin{aligned} MPV &= (AP - SP)AQ \\ &= (\$5.20 - \$5.00)11,750 \\ &= \$2,350 \text{ U} \end{aligned}$$

$$\begin{aligned} MUV &= (AQ - SQ)SP \\ &= (11,750 - 12,000)\$5.00 \\ &= \$1,250 \text{ F} \end{aligned}$$

2. Labor variances:

$$\begin{aligned} LRV &= (AR - SR)AH \\ &= (\$10.20 - \$10.00)2,900 \\ &= \$580 \text{ U} \end{aligned}$$

$$\begin{aligned} LEV &= (AH - SH)SR \\ &= (2,900 - 3,000)\$10.00 \\ &= \$1,000 \text{ F} \end{aligned}$$

## Discussion Questions

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1. Discuss the difference between budgets and standard costs.
2. Describe the relationship that unit standards have with flexible budgeting.
3. Why is historical experience often a poor basis for establishing standards?
4. What are ideal standards? Currently attainable standards? Of the two, which is usually adopted? Why?
5. Explain why standard costing systems are adopted.
6. How does standard costing improve the control function?
7. Discuss the differences among actual costing, normal costing, and standard costing.

8. What is the purpose of a standard cost sheet?
9. The budget variance for variable production costs is broken down into quantity and price variances. Explain why the quantity variance is more useful for control purposes than the price variance.
10. When should a standard cost variance be investigated?
11. What are control limits, and how are they set?
12. Explain why the materials price variance is often computed at the point of purchase rather than at the point of issuance.
13. The materials usage variance is always the responsibility of the production supervisor. Do you agree or disagree? Why?
14. The labor rate variance is never controllable. Do you agree or disagree? Why?
15. Suggest some possible causes of an unfavorable labor efficiency variance.
16. What is kaizen costing? On which part of the value chain does kaizen costing focus?
17. What is target costing? Describe how costs are reduced so that the target cost can be met.

## Multiple-Choice Exercises

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**20-1 Historical experience should be used with caution in setting standards because:**

- a. most companies keep poor records.
- b. ideal standards are always better than historical standards.
- c. they may not be achievable by operating personnel.
- d. they may perpetuate operating inefficiencies.
- e. none of the above.

**20-2 Standards set by engineering studies:**

- a. can determine the most efficient way of operating.
- b. can provide rigorous guidelines.
- c. may not be achievable by operating personnel.
- d. often do not allow operating personnel to have much input.
- e. All of the above.

**20-3 The standard cost per unit of output for a particular input is calculated using the equation:**

- a. Actual input price per unit  $\times$  Actual input used per unit.
- b. Standard input price  $\times$  Inputs allowed for the actual output.
- c. Standard input price  $\times$  Actual inputs.
- d. Standard price per unit  $\times$  Standard units produced.
- e. Standard input price  $\times$  Standard input allowed per unit of output produced.

**20-4 A currently attainable standard is one that:**

- a. relies on maximum efficiency.
- b. uses only historical experience.
- c. can be achieved under efficient operating conditions.
- d. is based on ideal operating conditions.
- e. None of the above.

**20-5 An ideal standard is one that:**

- a. relies on maximum efficiency.
- b. uses only historical experience.
- c. can be achieved under efficient operating conditions.
- d. makes allowances for normal breakdowns, interruptions, less than perfect skill, and so on.
- e. None of the above.

**20-6 Reasons for adopting a standard cost system include:**

- to enhance operational control.
- to imitate most other firms.
- to encourage purchasing managers to purchase cheap materials.
- that the weighted average method can be used for process manufacturers.
- None of the above.

**20-7 Standard costs are developed for:**

- direct materials.
- direct labor.
- variable overhead.
- fixed overhead.
- All of the above.

**20-8 The underlying details for the standard cost per unit are provided in:**

- the balance sheet.
- the standard production budget.
- the standard cost sheet.
- the standard work-in-process account.
- None of the above.

**20-9 The standard quantity of materials allowed is computed by the equation:**

- Unit Quantity Standard  $\times$  Standard Output.
- Unit Quantity Standard  $\times$  Actual Output.
- Unit Quantity Standard  $\times$  Practical Output.
- Unit Quantity Standard  $\times$  Normal Output.
- None of the above.

**20-10 The standard direct labor hours allowed is given by the equation:**

- Unit Labor Standard  $\times$  Normal Output.
- Unit Labor Standard  $\times$  Practical Output.
- Unit Labor Standard  $\times$  Standard Output.
- Unit Labor Standard  $\times$  Actual Output.
- Unit Labor Standard  $\times$  Theoretical Output.

**20-11 The total (budget) variance is given by the equation:**

- $(AP \times AQ) - (SP \times SQ)P$ .
- $(SP \times AQ) - (AP \times SQ)P$ .
- $(SP \times AQ) - (SP \times SQ)P$ .
- $(AP \times SP) - (AQ \times SQ)P$ .
- None of the above.

**20-12 Investigating variances from standard is:**

- always done.
- done if the variance is outside of an acceptable range.
- not done if the variance is expected to recur.
- done if the variance is less than 10 percent of standard cost.
- none of the above.

**20-13 Responsibility for the materials price variance typically belongs to:**

- production.
- marketing.
- purchasing.
- personnel.
- the chief executive officer (CEO).

**20-14 The materials price variance is usually computed:**

- when materials are purchased.
- when materials are issued to production.
- when goods are finished.
- after suppliers are paid.
- None of the above.

**20-15 Responsibility for the materials usage variance is usually assigned to:**

- production.
- marketing.
- purchasing.
- personnel.
- the CEO.

**20-16 Responsibility for the labor rate variance typically is assigned to:**

- labor unions.
- labor markets.
- personnel.
- production.
- engineering.

**20-17 Responsibility for the labor efficiency variance typically is assigned to:**

- labor unions.
- personnel.
- production.
- engineering.
- outside trainers.

**20-18 Which of the following items describes practices surrounding the recording of variances?**

- All inventories are typically carried at standard.
- Unfavorable variances appear as debits.
- Favorable variances appear as credits.
- Immaterial variances are typically closed to Cost of Goods Sold.
- All of the above.

**20-19 (Appendix) Which of the following is true concerning significantly large labor variances?**

- They are prorated among Work in Process, Finished Goods, and Cost of Goods Sold.
- They are closed to Cost of Goods Sold.
- They are prorated among Materials, Work in Process, Finished Goods, and Cost of Goods Sold.
- They are reported on the balance sheet at the end of the year.
- All of the above.

## Cornerstone Exercises

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**CORNERSTONE 20-1 Cornerstone Exercise 20-20 STANDARD QUANTITIES ALLOWED OF LABOR AND MATERIALS**

Packstar Company produces ready-to-cook oatmeal. Each carton of oatmeal requires 24 ounces of rolled oats per carton (the unit quantity standard) and .05 labor hours (the unit labor standard). During the year, 350,000 cartons of oatmeal were produced.

**Required:**

1. Calculate the total amount of oats allowed for the actual output.
2. Calculate the total amount of labor hours allowed for the actual output.

**Cornerstone Exercise 20-21 CONTROL LIMITS****CORNERSTONE 20-2**

During the last six weeks, the actual costs of materials were as follows:

Week 1	\$47,500	Week 4	\$50,000
Week 2	\$52,500	Week 5	\$60,000
Week 3	\$60,000	Week 6	\$65,000

The standard materials cost for each week was \$50,000 with an allowable deviation of  $\pm 5,000$ .

**Required:**

Plot the actual costs over time against the upper and lower limits. Comment on whether or not there is a need to investigate any of the variances.

**Cornerstone Exercise 20-22 TOTAL MATERIALS VARIANCE****CORNERSTONE 20-3**

Lata Inc., produces aluminum cans. Production of 12-ounce cans has a standard unit quantity of 4 ounces of aluminum per can. During the month of April, 250,000 cans were produced using 1,100,000 ounces of aluminum. The actual cost of aluminum was \$0.09 per ounce and the standard price was \$0.08 per ounce. There are no beginning or ending inventories of aluminum.

**Required:**

Calculate the total variance for aluminum for the month of April.

**Cornerstone Exercise 20-23 MATERIALS VARIANCES****CORNERSTONE 20-4**

Refer to the data provided in **Cornerstone Exercise 20-22**.

**Required:**

Calculate the materials price and usage variances using the columnar and formula approaches.

**Cornerstone Exercise 20-24 TOTAL LABOR VARIANCE****CORNERSTONE 20-5**

Lata, Inc. produces aluminum cans. Each can has a standard labor requirement of .03 hours. During the month of April, 250,000 cans were produced using 7,000 labor hours @ \$9.00. The standard wage rate is \$8.50 per hour.

**Required:**

Calculate the total variance for production labor for the month of April.

**Cornerstone Exercise 20-25 LABOR RATE AND EFFICIENCY VARIANCES****CORNERSTONE 20-6**

Refer to the data provided in **Cornerstone Exercise 20-24**.

**Required:**

Calculate the labor rate and efficiency variances using the columnar and formula approaches.

## Exercises

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**Exercise 20-26 STANDARD QUANTITIES OF LABOR AND MATERIALS****OBJECTIVE** 2

Stillwater Designs rebuilds defective units of its S12L7 Kicker speaker model. During the year, Stillwater rebuilt 5,000 units. Materials and labor standards for performing the repairs are as follows:



Direct materials (1 recon kit @ \$150.00)	\$150.00
Direct materials (1 cabinet @ \$50)	50.00
Direct labor (6 hrs. @ \$12)	72.00

**Required:**

1. Compute the standard hours allowed for a volume of 5,000 rebuilt units.
2. Compute the standard number of kits and cabinets allowed for a volume of 5,000 rebuilt units.

**OBJECTIVE** > **3** **Exercise 20-27 INVESTIGATION OF VARIANCES**

Sommers Company uses the following rule to determine whether materials usage variances should be investigated: A materials usage variance will be investigated anytime the amount exceeds the lesser of \$12,000 or 10 percent of the standard cost. Reports for the past five weeks provided the following information:

Week	MUV (\$)	Standard Materials Cost (\$)
1	10,500 F	120,000
2	10,700 U	100,500
3	9,000 F	120,000
4	13,500 U	127,500
5	10,500 U	103,500

**Required:**

1. Using the rule provided, identify the cases that will be investigated.
2. Suppose investigation reveals that the cause of an unfavorable materials usage variance is the use of lower-quality materials than are normally used. Who is responsible? What corrective action would likely be taken?
3. Suppose investigation reveals that the cause of a significant unfavorable materials usage variance is attributable to a new approach to manufacturing that takes less labor time but causes more material waste. Examination of the labor efficiency variance reveals that it is favorable and larger than the unfavorable materials usage variance. Who is responsible? What action should be taken?

**OBJECTIVE** > **4** **5** **Exercise 20-28 BUDGET VARIANCES, MATERIALS AND LABOR**

Bolsa Corporation produces high-quality leather belts. The company uses a standard cost system and has set the following standards for materials and labor:

Leather (3 strips @ \$4)	\$12.00
Direct labor (0.75 hr. @ \$12)	9.00
Total prime cost	<u>\$21.00</u>

During the year, Bolsa produced 40,000 belts. Actual leather purchased was 122,000 strips at \$3.96 per strip. There were no beginning or ending inventories of leather. Actual direct labor was 31,200 hours at \$12.50 per hour.

**Required:**

1. Compute the costs of leather and direct labor that should be incurred for the production of 40,000 leather belts.
2. Compute the total budget variances for materials and labor.

**OBJECTIVE** > **4** **Exercise 20-29 MATERIALS VARIANCES**

Refer to the data provided in **Exercise 20-28**.

**Required:**

Break down the total variance for materials into a price variance and a usage variance using the columnar and formula approaches.

**Exercise 20-30 LABOR VARIANCES**

OBJECTIVE &gt; 5

Refer to the data provided in **Exercise 20-28**.

**Required:**

Break down the total variance for labor into a rate variance and an efficiency variance using the columnar and formula approaches.

**Exercise 20-31 MATERIALS VARIANCES**

OBJECTIVE &gt; 4

Legumbre Company produces vegetable juices, sold in gallons. Recently, the company adopted the following material standard for one gallon of its tomato juice:

$$\text{Direct materials (128 oz. @ \$0.06)} = \$7.68$$

During the first week of operation, the company experienced the following results:

- Gallon units produced: 20,000.
- Ounces of materials purchased and used: 2,600,000 ounces at \$0.07.
- No beginning or ending inventories of raw materials.

**Required:**

- Compute the materials price variance.
- Compute the materials usage variance.

**Exercise 20-32 LABOR VARIANCES**

OBJECTIVE &gt; 5

Verde Company produces wheels for bicycles. During the year, 330,000 wheels were produced. The actual labor used was 180,000 hours at \$9.25 per hour. Verde has the following labor standard: 0.5 hour at \$10.

CORNERSTONE 20-6

**Required:**

- Compute the labor rate variance.
- Compute the labor efficiency variance.

**Exercise 20-33 MATERIALS AND LABOR VARIANCES**

OBJECTIVE &gt; 4 5

At the beginning of the year, Shults Company had the following standard cost sheet for one of its plastic products:

Direct materials (5 lbs. @ \$4.00)	\$20.00
Direct labor (2 hrs. @ \$11.25)	22.50
Standard prime cost per unit	<u>\$42.50</u>

The actual results for the year are as follows:

- Units produced: 175,000.
- Materials purchased: 930,000 pounds @ \$4.10.
- Materials used: 925,000 pounds.
- Direct labor: 362,500 hours @ \$11.15.

**Required:**

- Compute price and usage variances for materials.
- Compute the labor rate and labor efficiency variances.

**Exercise 20-34 VARIANCES, EVALUATION, AND BEHAVIOR**

OBJECTIVE &gt; 1

Jackie Iverson was furious. She was about ready to fire Tom Rich, her purchasing agent. Just a month ago, she had given him a salary increase and a bonus for his performance. She had been especially pleased with his ability to meet or beat the price standards. But now, she found out that it was because of a huge purchase of raw materials. It would take months to use that inventory, and there was hardly space to store it. In the meantime, where could the other materials supplies be put that would be ordered and processed on a regular basis? Additionally, it was a lot of capital to tie up in inventory—money that

could have been used to help finance the cash needs of the new product just coming on line.

Her interview with Tom was frustrating. He was defensive, arguing that he thought she wanted those standards met and that the means were not that important. He also pointed out that quantity purchases were the only way to meet the price standards. Otherwise, an unfavorable variance would have been realized.

**Required:**

1. Why did Tom Rich purchase the large quantity of raw materials? Do you think that this behavior was the objective of the price standard? If not, what is the objective(s)?
2. Suppose that Tom is right and that the only way to meet the price standards is through the use of quantity discounts. Also, assume that using quantity discounts is not a desirable practice for this company. What would you do to solve this dilemma?
3. Should Tom be fired? Explain.

**OBJECTIVE** > **4** **5**

**Exercise 20-35 MATERIALS AND LABOR VARIANCES**

Camisa Company produces single-colored t-shirts. Materials for the shirts are dyed in large vats. After dyeing the materials for a given color, the vats must be cleaned and prepared for the next batch of materials to be colored. The following standards for changeover for a given batch have been established:

Direct materials (2.5 lbs. @ \$0.90)	\$2.25
Direct labor (0.75 hr. @ \$7.00)	<u>5.25</u>
Standard prime cost	<u>\$7.50</u>

During the year, 53,000 pounds of material were purchased and used for the changeover activity. There were 20,000 batches produced, with the following actual prime costs:

Direct materials	\$42,000
Direct labor	102,000 (for 14,900 hrs.)

**Required:**

Compute the materials and labor variances associated with the changeover activity, labeling each variance as favorable or unfavorable.

**OBJECTIVE** > **6**

**Exercise 20-36 (APPENDIX) JOURNAL ENTRIES**

Refer to the data provided in **Exercise 20-35**.

**Required:**

1. Prepare a journal entry for the purchase of raw materials.
2. Prepare a journal entry for the issuance of raw materials.
3. Prepare a journal entry for the addition of labor to Work in Process.
4. Prepare a journal entry for the closing of variances to Cost of Goods Sold.

**OBJECTIVE** > **4** **6**

**Exercise 20-37 (APPENDIX) MATERIALS VARIANCES, JOURNAL ENTRIES**

Esteban Products produces instructional aids. Among the company's products are white boards, which use colored markers instead of chalk. They are particularly popular for conference rooms in educational institutions and executive offices of large corporations. The standard cost of materials for this product is 12 pounds at \$8.25 per pound.

During the first month of the year, 3,200 boards were produced. Information concerning actual costs and usage of materials follows:

Materials purchased	38,000 lbs @ \$8.35
Materials used	37,500 lbs

**Required:**

1. Compute the materials price and usage variances.
2. Prepare journal entries for all activity relating to materials.

**Exercise 20-38 (APPENDIX) LABOR VARIANCES, JOURNAL ENTRIES**

OBJECTIVE &gt; 5 6

Escuchar Products, a producer of DVD players, has established a labor standard for its product—direct labor: 2 hrs at \$9.65 per hour. During January, Escuchar produced 12,800 boards. The actual direct labor used was 25,040 hours at a total cost of \$245,392.

**Required:**

1. Compute the labor rate and efficiency variances.
2. Prepare journal entries for all activities relating to labor.

**Problems****Problem 20-39 SETTING STANDARDS AND ASSIGNING RESPONSIBILITY**

OBJECTIVE &gt; 1

Cabanarama Inc. designs and manufactures easy-to-set-up beach cabanas. The cabanas come in a kit that includes canvas, lacing, and aluminum support poles. Families can easily transport the cabanas to the beach, set them up, and have a protected place to change clothing, store picnic hampers, and so on. Cabanarama has expanded rapidly from a two-person operation to one involving over a hundred employees. The founder and owner of Cabanarama, Frank Love, understands that a more formal approach to standard setting and control is needed to ensure that the consistent quality for which the company is known continues.

Frank and Annette Wilson, his financial vice president, divided the company into departments and designated each department as a cost center. Sales, Quality Control, and Design report directly to Frank. Production, Shipping, Finance, and Accounting report to Annette. In the production department, one of the supervisors was assigned the materials purchasing function; the job included purchasing all raw materials, overseeing inventory handling (receiving, storage, etc.), and tracking materials purchases and use.

Frank felt that control would be better achieved if there were a way for his employees to continue to perform in such a way that quality was maintained and cost reduction was achieved. Annette suggested that Cabanarama institute a standard costing system. Variances for materials and labor could then be calculated and reported directly to her, and she could alert Frank to any problems or opportunities for improvement.

**Required:**

1. a. When Annette designs the standard costing system for Cabanarama, who should be involved in setting the standards for each cost component?  
b. What factors should be considered in establishing the standards for each cost component?
2. Assume that Cabanarama develops the standards for materials use, materials price, labor use, and labor wages. Who will be assigned responsibility for each and for any resulting variances? Why?

**Problem 20-40 BASICS OF VARIANCE ANALYSIS, VARIABLE INPUTS**

OBJECTIVE &gt; 3 4 5

Guanamo Waste Disposal Company has a long-term contract with several large cities to collect garbage and trash from residential customers. To facilitate the collection, Guanamo places a large plastic container with each household. Because of wear and tear, growth, and other factors, Guanamo places about 200,000 new containers each year (about 20 percent of the total households). Several years ago, Guanamo decided to manufacture its own containers as a cost-saving measure. A strategically located plant involved in this type of manufacturing was acquired. To help ensure cost efficiency, a standard cost system was installed in the plant. The following standards have been established for the product's variable inputs:

	Standard Quantity	Standard Price (rate in \$)	Standard Cost (\$)
Direct materials	12 lbs.	\$ 3.00	\$36.00
Direct labor	1.60 hrs.	10.00	16.00
Variable overhead	1.60 hrs.	2.50	4.00
Total			<u>\$56.00</u>

During the first week, the company had the following actual results:

Units produced	4,000
Actual labor costs	\$70,000
Actual labor hours	6,600
Materials purchased and used	46,000 lbs. @ \$3.05
Actual variable overhead costs	\$26,500

The purchasing agent located a new source of slightly higher-quality plastic, and this material was used during the first week in January. Also, a new manufacturing process was implemented on a trial basis. The new process required a slightly higher level of skilled labor. The higher-quality material has no effect on labor utilization. However, the new manufacturing process was expected to reduce materials usage by 0.25 pound per can.

**Required:**

1. Compute the materials price and usage variances. Assume that the 0.25 pound per can reduction of materials occurred as expected and that the remaining effects are all attributable to the higher-quality material. Would you recommend that the purchasing agent continue to buy this quality, or should the usual quality be purchased? Assume that the quality of the end product is not affected significantly.
2. Compute the labor rate and efficiency variances. Assuming that the labor variances are attributable to the new manufacturing process, should it be continued or discontinued? In answering, consider the new process's materials reduction effect as well. Explain.
3. Refer to Requirement 2. Suppose that the industrial engineer argued that the new process should not be evaluated after only one week. His reasoning was that it would take at least a week for the workers to become efficient with the new approach. Suppose that the production is the same the second week and that the actual labor hours were 6,000 and the labor cost was \$62,000. Should the new process be adopted? Assume the variances are attributable to the new process. Assuming production of 4,000 units per week, what would be the projected annual savings? (Include the materials reduction effect.)

**OBJECTIVE** > **1** **4** **5**

**Problem 20-41 SETTING STANDARDS, MATERIALS AND LABOR VARIANCES**

Tom Belford and Tony Sorrentino own a small business devoted to kitchen and bath granite installations. Recently, building contractors have insisted on up-front bid prices for a house rather than the cost-plus system that Tom and Tony were used to. They worry because natural flaws in the granite make it impossible to tell in advance exactly how much granite will be used on a particular job. In addition, granite can be easily broken, meaning that Tom or Tony could ruin a slab and would need to start over with a new one. Sometimes the improperly cut pieces could be used for smaller installations, sometimes not. All their accounting is done by a local certified public accounting firm headed by Charlene Davenport. Charlene listened to their concerns and suggested that it might be time to implement tighter controls by setting up a standard costing system.

Charlene reviewed the invoices pertaining to a number of Tom and Tony's previous jobs to determine the average amount of granite and glue needed per square foot. She then updated prices on both materials to reflect current conditions. The standards she developed for one square foot of counter installed were as follows:

Granite, per square foot	\$50.00
Glue (10 oz. @ \$0.15)	1.50
Direct labor hours:	
Cutting labor (0.10 hr. @ \$15)	1.50
Installation labor (0.25 hr. @ \$25)	6.25

These standards assumed that one seamless counter requires one sink cut (the space into which the sink will fit) as well as cutting the counter to fit the space available.

Charlene tracked the actual costs incurred by Tom and Tony for granite installation for the next six months. She found that they completed 50 jobs with an average of 32 square feet of granite installed in each one. The following information on actual amounts used and cost was gathered:

Granite purchased and used (1,640 sq. ft.)	\$79,048
Glue purchased and used (16,000 oz.)	\$2,560
Actual hours cutting labor	180
Actual hours installation labor	390

The actual wage rate for cutting and installation labor remained unchanged from the standard rate.

**Required:**

1. Calculate the materials price variances and materials usage variances for granite and for glue for the past six months.
2. Calculate the labor rate variances and labor efficiency variances for cutting labor and for installation labor for the past six months.
3. Would it be worthwhile for Charlene to establish standards for atypical jobs (e.g., those with more than one sink cut or wider than normal)?

**Problem 20-42 SETTING A DIRECT LABOR STANDARD, LEARNING CURVE EFFECTS, SERVICE COMPANY**

OBJECTIVE > 1 2 5

Mantenga Company provides routine maintenance services for heavy moving and transportation vehicles. Although the vehicles vary, the maintenance services provided follow a fairly standard pattern. Recently, a potential customer has approached the company, requesting a new maintenance service for a radically different type of vehicle. New servicing equipment and some new labor skills will be needed to provide the maintenance service. The customer is placing an initial order to service 150 vehicles and has indicated that if the service is satisfactory, several additional orders of the same size will be placed every three months over the next three to five years.

Mantenga uses a standard costing system and wants to develop a set of standards for the new part. The usage standards for direct materials such as oil, lubricants, and transmission fluids were easily established. The usage standard is 25 quarts per servicing, with a standard cost of \$4 per quart. Management has also decided on standard rates for labor and overhead: The standard labor rate is \$15 per direct labor hour, the standard variable overhead rate is \$8 per direct labor hour, and the standard fixed overhead rate is \$12 per hour. The only remaining decision is the standard for labor usage. To assist in developing this standard, the engineering department has estimated the following relationship between units serviced and average direct labor hours used:

Units Serviced	Cumulative Average Time per Unit (hours)
40	2.500
80	2.000
160	1.600
320	1.280
640	1.024

As the workers learn more about servicing the new vehicles, they become more efficient, and the average time needed to service one unit declines. Engineering estimates that all of the learning effects will be achieved by the time that 320 units are produced. No further improvement will be realized past this level.

**Required:**

1. Assume that the average labor time is 0.768 hour per unit after the learning effects are achieved. Using this information, prepare a standard cost sheet that details the standard service cost per unit. Round costs to two decimal places.

2. Given the per-unit labor standard set, would you expect a favorable or an unfavorable labor efficiency? Explain. Calculate the labor efficiency variance for servicing the first 320 units.
3. Assuming no further improvement in labor time per unit is possible past 320 units, explain why the cumulative average time per unit at 640 is lower than the time at 320 units. Show that the standard labor time should be 0.768 hour per unit. Explain why this value is a good choice for the per-unit labor standard.

**OBJECTIVE** > 2 4 5

**Problem 20-43 UNIT COSTS, MULTIPLE PRODUCTS, VARIANCE ANALYSIS, SERVICE SETTING**

The maternity wing of the city hospital has two types of patients: normal and cesarean. The standard quantities of labor and materials per delivery for 2009 are:

	Normal	Cesarean
Direct materials (lbs.)	8	20
Nursing labor (hrs.)	2	4

The standard price paid per pound of direct materials is \$10. The standard rate for labor is \$16. Overhead is applied on the basis of direct labor hours. The variable overhead rate for maternity is \$30 per hour, and the fixed overhead rate is \$40 per hour.

Actual operating data for 2009 are as follows:

- a. Patient days produced: normal, 3,500; cesarean, 7,000.
- b. Direct materials purchased and used: 172,000 pounds at \$9.50—30,000 for normal maternity patients and 142,000 for the cesarean patients; no beginning or ending raw materials inventories.
- c. Nursing labor: 36,500 hours—7,200 hours for normal patients and 29,300 hours for the cesarean; total cost of labor, \$580,350.

**Required:**

1. Prepare a standard cost sheet showing the unit cost per patient day for each type of patient.
2. Compute the materials price and usage variances for each type of patient.
3. Compute the labor rate and efficiency variances.
4. Assume that you know only the total direct materials used for both products and the total direct labor hours used for both products. Can you compute the total materials usage and labor efficiency variances? Explain.
5. Standard costing concepts have been applied in the healthcare industry. For example, diagnostic-related groups (DRGs) are used for prospective payments for Medicare patients. Select a search engine (such as Yahoo! or Google), and conduct a search to see what information you can obtain about DRGs. You might try “Medicare DRGs” as a possible search topic. Write a memo that answers the following questions:
  - a. What is a DRG?
  - b. How are DRGs established?
  - c. How many DRGs are used?
  - d. How does the DRG concept relate to standard costing concepts discussed in the chapter? Can hospitals use DRGs to control their costs? Explain.

**OBJECTIVE** > 3 4 5
**Problem 20-44 CONTROL LIMITS, VARIANCE INVESTIGATION**

Goodsmell Company produces a well-known cologne. The standard manufacturing cost of the cologne is described by the following standard cost sheet:

Direct materials:	
Liquids (4.2 oz. @ \$0.25)	\$1.05
Bottles (1 @ \$0.05)	0.05
Direct labor (0.2 hr. @ \$12.50)	2.50

Variable overhead (0.2 hr. @ \$4.70)	0.94
Fixed overhead (0.2 hr. @ \$1.00)	<u>0.20</u>
Standard cost per unit	<u>\$4.74</u>

Management has decided to investigate only those variances that exceed the lesser of 10 percent of the standard cost for each category or \$20,000.

During the past quarter, 250,000 four-ounce bottles of cologne were produced. Descriptions of actual activity for the quarter follow:

- A total of 1.15 million ounces of liquids was purchased, mixed, and processed. Evaporation was higher than expected (no inventories of liquids are maintained). The price paid per ounce averaged \$0.27.
- Exactly 250,000 bottles were used. The price paid for each bottle was \$0.048.
- Direct labor hours totaled 48,250, with a total cost of \$622,425.

Normal production volume for Goodsmell is 250,000 bottles per quarter. The standard overhead rates are computed by using normal volume. All overhead costs are incurred uniformly throughout the year.

**Required:**

- Calculate the upper and lower control limits for each manufacturing cost category.
- Compute the total materials variance, and break it into price and usage variances. Would these variances be investigated?
- Compute the total labor variance, and break it into rate and efficiency variances. Would these variances be investigated?

**Problem 20-45 CONTROL LIMITS, VARIANCE INVESTIGATION**

**OBJECTIVE** > 3 4 5

The management of Golding Company has determined that the cost to investigate a variance produced by its standard cost system ranges from \$2,000 to \$3,000. If a problem is discovered, the average benefit from taking corrective action usually outweighs the cost of investigation. Past experience from the investigation of variances has revealed that corrective action is rarely needed for deviations within 8 percent of the standard cost. Golding produces a single product, which has the following standards for materials and labor:

Direct materials (8 lbs. @ \$0.25)	\$2
Direct labor (0.4 hr. @ \$7.50)	3

Actual production for the past three months with the associated actual usage and costs for materials and labor follow. There were no beginning or ending raw materials inventories.

	April	May	June
Production (units)	90,000	100,000	110,000
Direct materials:			
Cost	\$189,000	\$218,000	\$230,000
Usage (lbs.)	723,000	870,000	885,000
Direct labor:			
Cost	\$270,000	\$323,000	\$360,000
Usage (hrs.)	36,000	44,000	46,000

**Required:**

- What upper and lower control limits would you use for materials variances? For labor variances?
- Compute the materials and labor variances for April, May, and June. Identify those that would require investigation.
- Let the horizontal axis be time and the vertical axis be variances measured as a percentage deviation from standard. Draw horizontal lines that identify upper and lower control limits. Plot the labor and material variances for April, May, and June.

Prepare a separate graph for each type of variance. Explain how you would use these graphs (called *control charts*) to assist your analysis of variances.

**OBJECTIVE** > **2** **4** **5**

**Problem 20-46 STANDARD COSTING, PLANNED VARIANCES**

Ogundipe Company manufactures a plastic toy cell phone. The following standards have been established for the toy's materials and labor inputs:

	Standard Quantity	Standard Price (Rate in \$)	Standard Cost (\$)
Direct materials	0.5 lb.	1	0.50
Direct labor	0.1 hr.	10	1.00

During the first week of July, the company had the following results:

Units produced	40,000
Actual labor costs	\$42,000
Actual labor hours	4,100
Materials purchased and used	19,500 lbs. @ \$1.05 per lb

*Other information:* The purchasing agent located a new source of slightly higher-quality plastic, and this material was used during the first week in July. Also, a new manufacturing layout was implemented on a trial basis. The new layout required a slightly higher level of skilled labor. The higher-quality material has no effect on labor utilization. Similarly, the new manufacturing approach has no effect on material usage.

**Required:**

1. Compute the materials price and usage variances. Assuming that the materials variances are essentially attributable to the higher quality of materials, would you recommend that the purchasing agent continue to buy this quality, or should the usual quality be purchased? Assume that the quality of the end product is not affected significantly.
2. Compute the labor rate and efficiency variances. Assuming that the labor variances are attributable to the new manufacturing layout, should it be continued or discontinued? Explain.
3. Refer to Requirement 2. Suppose that the industrial engineer argued that the new layout should not be evaluated after only one week. His reasoning was that it would take at least a week for the workers to become efficient with the new approach. Suppose that the production is the same the second week and that the actual labor hours were 3,900 and the labor cost was \$39,000. Should the new layout be adopted? Assume the variances are attributable to the new layout. If so, what would be the projected annual savings?

**OBJECTIVE** > **1** **4** **5**

**Problem 20-47 STANDARD COSTING**

Whitecotton Company produces plastic bottles. The unit for costing purposes is a case of 18 bottles. The following standards for producing one case of bottles have been established:

Direct materials (5 lbs @ \$0.80)	\$ 4
Direct labor (1.5 hours @ \$16.00)	24
Standard prime cost	<u>\$28</u>

During December, 52,000 pounds of material were purchased and used in production. There were 10,000 cases produced, with the following actual prime costs:

Direct materials	\$40,000
Direct labor	236,910 (for 14,900 hrs.)

**Required:**

1. Compute the materials variances.
2. Compute the labor variances.
3. What are the advantages and disadvantages that can result from the use of a standard costing system?

**Problem 20-48 (APPENDIX) VARIANCE ANALYSIS, REVISION OF STANDARDS, JOURNAL ENTRIES**

OBJECTIVE &gt; 4 5 6

The Lubbock plant of Morril's Small Motor Division produces a major subassembly for a 6.0 horsepower motor for lawn mowers. The plant uses a standard costing system for production costing and control. The standard cost sheet for the subassembly follows:

Direct materials (6.0 lbs. @ \$5.00)	\$30.00
Direct labor (1.6 hrs. @ \$12.00)	19.20

During the year, the Lubbock plant had the following actual production activity:

- a. Production of motors totaled 50,000 units.
- b. A total of 260,000 pounds of raw materials was purchased at \$4.70 per pound.
- c. There were 60,000 pounds of raw materials in beginning inventory (carried at \$5 per lb.). There was no ending inventory.
- d. The company used 82,000 direct labor hours at a total cost of \$1,066,000.

The Lubbock plant's practical activity is 60,000 units per year. Standard overhead rates are computed based on practical activity measured in standard direct labor hours.

**Required:**

1. Complete the materials price and usage variances. Of the two materials variances, which is viewed as the most controllable? To whom would you assign responsibility for the usage variance in this case? Explain.
2. Compute the labor rate and efficiency variances. Who is usually responsible for the labor efficiency variance? What are some possible causes for this variance?
3. Assume that the purchasing agent for the small motors plant purchased a lower-quality raw material from a new supplier. Would you recommend that the plant continue to use this cheaper raw material? If so, what standards would likely need revision to reflect this decision? Assume that the end product's quality is not significantly affected.
4. Prepare all possible journal entries.

**Cases****Case 20-49 ESTABLISHMENT OF STANDARDS, VARIANCE ANALYSIS**

OBJECTIVE &gt; 1 2 4

Paul Golding and his wife, Nancy, established Crunchy Chips in 1938. (Nancy sold her piano to help raise capital to start the business.) Paul assumed responsibility for buying potatoes and selling chips to local grocers; Nancy assumed responsibility for production. Since Nancy was already known for her delicious thin potato chips, the business prospered.

Over the past 60 years, the company has established distribution channels in 11 western states, with production facilities in Utah, New Mexico, and Colorado. In 1980, Paul Golding died, and his son, Edward, took control of the business. By 2009, the company was facing stiff competition from national snack-food companies. Edward was advised that the company's plants needed to gain better control over production costs. To assist in achieving this objective, he hired a consultant to install a standard costing system. To help the consultant in establishing the necessary standards, Edward sent her the following memo:

**To:** Diana Craig, Certified Management Accountant  
**From:** Edward Golding, President, Crunchy Chips  
**Subject:** Description and Data Relating to the Production of Our Plain Potato Chips  
**Date:** September 28, 2009

The manufacturing process for potato chips begins when the potatoes are placed into a large vat in which they are automatically washed. After washing, the potatoes flow directly to an automatic peeler. The peeled potatoes then pass by inspectors, who manually cut out deep eyes or other blemishes. After inspection, the potatoes are automatically sliced and are dropped into the cooking oil. The frying process is closely monitored by an employee. After the chips are cooked, they pass under a salting device and then pass by more inspectors, who sort out the unacceptable finished chips (those that are discolored or too small). The chips then continue on the conveyor belt to a bagging machine that bags them in one-pound bags. After bagging, the bags are placed in a box and shipped. The box holds 15 bags.

The raw potato pieces (eyes and blemishes), peelings, and rejected finished chips are sold to animal feed producers for \$0.16 per pound. The company uses this revenue to reduce the cost of potatoes; we would like this reflected in the price standard relating to potatoes.

Crunchy Chips purchases high-quality potatoes at a cost of \$0.245 per pound. Each potato averages 4.25 ounces. Under efficient operating conditions, it takes four potatoes to produce one 16-ounce bag of plain chips. Although we label bags as containing 16 ounces, we actually place 16.3 ounces in each bag. We plan to continue this policy to ensure customer satisfaction. In addition to potatoes, other raw materials are the cooking oil, salt, bags, and boxes. Cooking oil costs \$0.04 per ounce, and we use 3.3 ounces of oil per bag of chips. The cost of salt is so small that we add it to overhead. Bags cost \$0.11 each and boxes \$0.52 each.

Our plant produces 8.8 million bags of chips per year. A recent engineering study revealed that we would need the following direct labor hours to produce this quantity if our plant operates at peak efficiency:

Raw potato inspection	3,200
Finished chip inspection	12,000
Frying monitor	6,300
Boxing	16,600
Machine operators	6,300

I'm not sure that we can achieve the level of efficiency advocated by the study. In my opinion, the plant is operating efficiently for the level of output indicated if the hours allowed are about 10 percent higher.

The hourly labor rates agreed upon with the union are:

Raw potato inspectors	\$15.20
Finished chip inspectors	10.30
Frying monitor	14.00
Boxing	11.00
Machine operators	13.00

Overhead is applied on the basis of direct labor dollars. We have found that variable overhead averages about 116 percent of our direct labor cost. Our fixed overhead is budgeted at \$1,135,216 for the coming year.

**Required:**

1. Discuss the benefits of a standard costing system for Crunchy Chips.
2. Discuss the president's concern about using the result of the engineering study to set the labor standards. What standard would you recommend?
3. Form a group with two or three other students. Develop a standard cost sheet for Crunchy Chips' plain potato chips.

4. Suppose that the level of production was 8.8 million bags of potato chips for the year as planned. If 9.5 million pounds of potatoes were used, compute the materials usage variance for potatoes.

### Case 20-50 STANDARD COSTING, ETHICAL BEHAVIOR, USEFULNESS OF STANDARD COSTING

OBJECTIVE > 1 3 4

Pat James, the purchasing agent for a local plant of the Oakden Electronics Division, was considering the possible purchase of a component from a new supplier. The component's purchase price, \$0.90, compared favorably with the standard price of \$1.10. Given the quantity that would be purchased, Pat knew that the favorable price variance would help to offset an unfavorable variance for another component. By offsetting the unfavorable variance, his overall performance report would be impressive and good enough to help him qualify for the annual bonus. More importantly, a good performance rating this year would help him to secure a position at division headquarters at a significant salary increase.

Purchase of the part, however, presented Pat with a dilemma. Consistent with his past behavior, Pat made inquiries regarding the reliability of the new supplier and the part's quality. Reports were basically negative. The supplier had a reputation for making the first two or three deliveries on schedule but being unreliable from then on. Worse, the part itself was of questionable quality. The number of defective units was only slightly higher than that for other suppliers, but the life of the component was 25 percent less than what normal sources provided.

If the part were purchased, no problems with deliveries would surface for several months. The problem of shorter life would cause eventual customer dissatisfaction and perhaps some loss of sales, but the part would last at least 18 months after the final product began to be used. If all went well, Pat expected to be at headquarters within six months. He saw little personal risk associated with a decision to purchase the part from the new supplier. By the time any problems surfaced, they would belong to his successor. With this rationalization, Pat decided to purchase the component from the new supplier.

#### Required:

1. Do you agree with Pat's decision? Why or why not? How important was Pat's assessment of his personal risk in the decision? Should it be a factor?
2. Do you think that the use of standards and the practice of holding individuals accountable for their achievement played major roles in Pat's decision?
3. Review the discussion on corporate ethical standards in Chapter 13 and read the Institute of Management Accountants "Statement of Ethical Professional Practice" found at [https://www.imanet.org/about\\_ethics\\_statement.asp](https://www.imanet.org/about_ethics_statement.asp). Identify the standards that might apply to Pat's situation. Should every company adopt a set of ethical standards that apply to its employees, regardless of their specialty?
4. The usefulness of standard costing has been challenged in recent years. Some claim that its use is an impediment to the objective of continuous improvement (an objective that many feel is vital in today's competitive environment). Write a short paper (individually or in a small group with two or three other students) that analyzes the role and value of standard costing in today's manufacturing environment. Address the following questions:
  - a. What are the major criticisms of standard costing?
  - b. Will standard costing disappear, or is there still a role for it in the new manufacturing environment? If so, what is the role?
  - c. Given the criticisms, can you explain why its use continues to be so prevalent? Will this use eventually change?

In preparing your paper, the following references may be useful; however, do not restrict your literature search to these references. They are simply to help you get started.

- Robin Cooper and Robert S. Kaplan, "Activity-Based Systems: Measuring the Costs of Resource Usage," *Accounting Horizons* (September 1992): 1-13.

- Forrest B. Green and Felix E. Amenkhienan, “Accounting Innovations: A Cross-Sectional Survey of Manufacturing Firms,” *Journal of Cost Management* (Spring 1992): 59–64.
- Bruce R. Gaumnitz and Felix P. Kollaritsch, “Manufacturing Variances: Current Practice and Trends,” *Journal of Cost Management* (Spring 1991): 59–64.
- Chris Guilding, Dane Lamminmaki, and Colin Drury, “Budgeting and Standard Costing Practices in New Zealand and the United Kingdom,” *Journal of International Accounting*, Vol. 33, No. 5 (1998): 569–588.

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# M

## Making the Connection: Integrative Multi-Chapter Exercise



### Cost System Choices, Budgeting, and Variance Analyses for Sacred Heart Hospital

Chapters	Objectives	Cornerstones
18	18-1	18-2
19	18-2	18-3
20	18-4	20-1
	19-1	20-3
	20-1	20-4
	20-3	20-5
	20-4	20-6
	20-5	

The purpose of this integrated exercise is to demonstrate how a change in the cost system's allocation base can result in significantly different reported costs for control purposes (e.g., the cost of various service lines), as well as significantly different budgeted costs for planning purposes (e.g., flexible budgets and variance analyses).

#### The Two Cost Systems

Sacred Heart Hospital (SHH) faces skyrocketing nursing costs, all of which relate to its two biggest nursing service lines—the Emergency Room (ER) and the Operating Room (OR). SHH's current cost system assigns total nursing costs to the ER and OR based on the number of patients serviced by each line. Total hospital annual nursing costs for these two lines are expected to equal \$300,000. The table below shows expected patient volume for both lines.

Measure	ER	OR	Total
Number of patients (ER visits or OR surgeries)	1,000	1,000	2,000
Number of vital signs checks	2,000	4,000	6,000
Number of nursing hours	10,000	5,000	15,000

#### Required:

1. Using the current cost system, calculate the hospital-wide rate based on number of patients.
2. Calculate the amount of nursing costs that the current cost system assigns to the ER and to the OR.
3. Using the results from question 2, calculate the cost per OR nursing hour under the current cost system.

After discussion with several experienced nurses, Jack Bauer (SHH's accountant) decided that assigning nursing costs to the two service lines based on the number of times that nurses must check patients' vital signs might more closely match the underlying use of costly hospital resources. Therefore, for comparative purposes, Jack decided to develop a second cost system on his computer that assigns total nursing costs to the ER and OR based on the number of times nurses check patients' vital signs. This system is referred to as the "vital-signs costing system." The earlier table also shows data for vital sign checks for lines.

4. Using the vital-signs costing system, calculate the hospital-wide rate based on the number of vital sign checks.

5. Calculate the amount of nursing costs that the vital-signs costing system assigns to the ER and to the OR.
6. Using the results from question 5, calculate the cost per OR nursing hour under the vital-signs costing system.

### Budgeting and Variance Analysis

In an effort to better plan for and control OR costs, SHH management asked Jack to calculate the flexible budget variance (i.e., flexible budget costs–actual costs) for OR nursing costs, including the price variance and efficiency variance that make up the flexible budget variance for OR nursing costs. Given that Jack is interested in comparing the reported costs of both systems, he decided to prepare the requested OR variance analysis for both the current cost system and the vital signs costing system. In addition, Jack chose to use each cost system's estimate of the cost per OR nursing hour as the standard cost per OR nursing hour. Jack collected the following additional information for use in preparing the flexible budget variance for both systems:

Actual number of surgeries performed = 950

Standard number of nursing hours allowed for each OR surgery = 5

Actual number of OR nursing hours used = 5,000

Actual OR nursing costs = 190,000

7. For the OR service line, use the information above and the cost per OR nursing hour under the current cost system to calculate the:
  - a. Flexible budget variance (Hint: Use your answer to question 3 as the standard cost per OR nursing hour for the current cost system.)
  - b. Price variance
  - c. Efficiency variance
8. For the OR service line, use the information above and the cost per OR nursing hour under the vital signs cost system to calculate the:
  - a. Flexible budget variance (Hint: Use your answer to question 6 as the standard cost per OR nursing hour for the vital signs cost system.)
  - b. Price variance
  - c. Efficiency variance

### Discussion of Reported Costs and Variances from the Two Systems

9. Consider SHH's need to control its skyrocketing costs, Jack's discussion with experienced nurses regarding their use of hospital resources, and the reported costs that you calculated from each cost system. Based on these considerations, which cost system (current or vital signs) would you choose to implement if you were Jack? Briefly explain the reasoning behind your choice.
10. What does each of the calculated variances suggest to Jack regarding actions that he should or should not take with respect to investigating and improving each variance? Also, briefly explain why the variances differ between the two cost systems.

# 21

## Flexible Budgets and Overhead Analysis

After studying Chapter 21, you should be able to:

- **1** Prepare a flexible budget, and use it for performance reporting.
- **2** Calculate the variable overhead variances, and explain their meaning.
- **3** Calculate the fixed overhead variances, and explain their meaning.
- **4** Prepare an activity-based flexible budget.





# **E**xperience Managerial Decisions with **Second City**

Ask Chicagoans about their most popular local businesses, and you likely will receive answers such as Billy Goat Tavern (founded in 1934 and made famous in the 1970s in Saturday Night Live skits featuring Bill Murray and John Belushi), Ed Debevic's (a series of 1950s-style diners), and Second City.

**Second City** has been North America's premiere live improvisational and sketch comedy theater company for the past 50 years. Many famous stars began their careers at Second City, including John Candy, Tina Fey, Mike Myers, Eugene Levy, and Bill Murray. More than just Second City Television (SCTV), Second City includes training centers, national touring companies, media and entertainment offshoots, and a corporate communication division. As you might imagine, Second City is an entrepreneurial organization, as evidenced most recently by its decision to provide comedy theater aboard Norwegian Cruise Line ships. Given the nature of its businesses, Second City is extremely dependent on overhead costs. These overhead costs must be allocated to each business to create accurate budgets, which is followed by variance analyses when actual overhead costs are very different from budgeted overhead costs. Its fixed overhead costs are associated with capacity and, as such, relate more to its home and resident stages in Chicago, Toronto, Las Vegas, Denver, and Detroit,

rather than to its traveling shows. Examples of Second City's fixed overhead costs include salaries, stage and other facilities rent, facilities maintenance, depreciation, taxes, and insurance. These overhead costs then are assigned to individual business budgets by using allocation bases such as square footage, number of employees, and percentage of earnings. Second City then uses overhead cost variances to "red flag" potential problems that might not be self-correcting and need managerial attention.

For example, Second City Theatricals might have a slow year because the producers are too busy with other ventures to mount a new production, while at the same time, the Second City Training Center might have a surge in enrollment. Such a scenario likely would lead Second City financial executives to shift some assigned overhead costs from the theatrical business to the training center business. Also, Second City uses flexible budgeting to adjust budgets for its businesses that experience sporadic volumes, such as the seasonality present in some of its traveling and cruise activities. While the managerial accountants likely do not intentionally provide too many jokes, they do provide the critical function of budgeting and examining variances for overhead costs, which allows the comic talent of Second City to continue to do what it does best—make us laugh!

**OBJECTIVE** > 1

Prepare a flexible budget, and use it for performance reporting.

## Using Budgets for Performance Evaluation

Budgets are useful for both planning and control. As well, they are often used as benchmarks for performance evaluation. Determining how budgeted amounts should be compared with actual results is a major consideration that must be addressed.

### Static Budgets versus Flexible Budgets

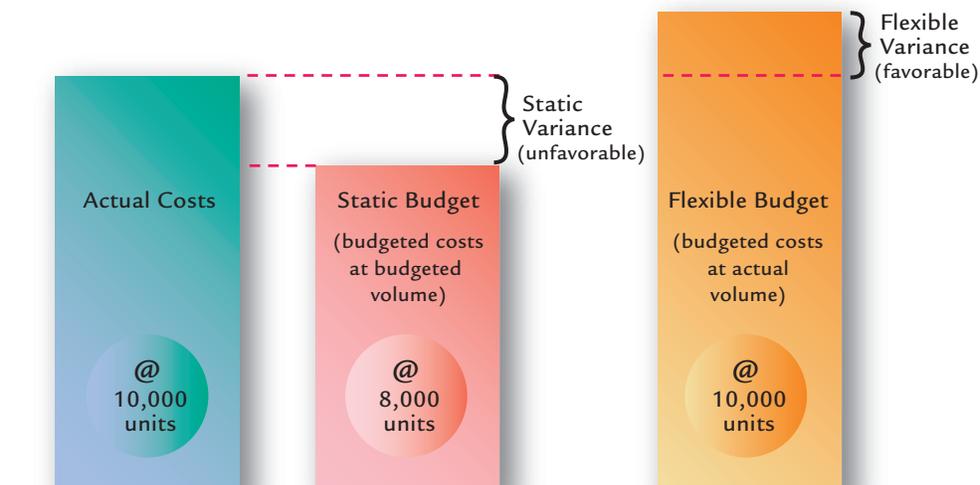
Companies prepare a master budget based on their best estimate of the level of sales and production activity for the coming period (the best estimate is the budgeted level for the period). A **performance report** compares actual costs with budgeted costs. Two possibilities exist for making this comparison: (1) comparison of actual costs with the budgeted costs for the budgeted level of activity and (2) comparison of actual costs with the actual level of activity. The first choice is a report based on *static budgets*, whereas the second choice is for a report based on *flexible budgets*. The two approaches for variance calculation are illustrated in Exhibit 21-1.

**Static Budgets and Performance Reports** A **static budget** is a budget for a particular level of activity. Master budgets are generally created for a particular level of activity. Thus, one way to prepare a performance report is to compare the actual costs with the budgeted costs from the master budget. As an example, the production of Cool-U screen-printed t-shirts will be considered. In setting up the master budget for the first quarter of the year, Cool-U expected to produce 1,060 t-shirts. When the quarter had ended, Cool-U found that it had actually produced 1,200 t-shirts. **Cornerstone 21-1** shows how to prepare a performance report based on a static budget for the Cool-U clothing manufacturing plant for its first quarter of operations. For simplicity, the report only considers production costs.

According to the report, there were unfavorable variances for direct materials, direct labor, maintenance, and power. However, there is something fundamentally wrong with the report. Actual costs for production of 1,200 t-shirts are being compared with planned costs for production of 1,060. Because direct materials, direct labor, and variable overhead are variable costs, they should be greater at a higher level

Exhibit 21-1

### Static and Flexible Budget Variances



## HOW TO Prepare a Performance Report Based on a Static Budget (Using Budgeted Production)

### Information:

Relationships from the Master Budget	Actual Data for Quarter 1
Budgeted production for Quarter 1: 1,060	Production: 1,200 units
Materials:	
1 plain t-shirt @ \$3.00	Materials cost: \$4,380
5 ounces of ink @ \$0.20	
Labor:	
0.12 hr. @ \$10.00	Labor cost: \$1,500
Variable overhead:	
Maintenance:	
0.12 hr. @ \$3.75	Maintenance cost: \$535
Power:	
0.12 hr. @ \$1.25	Power cost: \$170
Fixed overhead:	
Grounds keeping: \$1,200 per quarter	Grounds keeping: \$1,050
Depreciation: \$600 per quarter	Depreciation: \$600



### CORNERSTONE 21-1



### Required:

Prepare a performance report using a budget based on expected production.

### Solution:

	Actual	Budgeted	Variance
Units produced	1,200	1,060	140 F <sup>a</sup>
Direct materials cost	\$4,830	\$4,240 <sup>b</sup>	\$590 U <sup>c</sup>
Direct labor cost	1,500	1,272 <sup>d</sup>	228 U
Variable overhead:			
Maintenance	535	477 <sup>e</sup>	58 U
Power	170	159 <sup>f</sup>	11 U
Fixed overhead:			
Grounds keeping	1,050	1,200	(150) F
Depreciation	600	600	0
Total	<u>\$8,685</u>	<u>\$7,948</u>	<u>\$737 U</u>

<sup>a</sup> F means the variance is favorable.

<sup>b</sup> Budgeted units (t-shirt cost + ink cost) = 1,060[(\$3 + (5 oz. × \$0.20)].

<sup>c</sup> U means the variance is unfavorable.

<sup>d</sup> Budgeted units (number of direct labor hours × cost per hour) = 1,060(0.12 × \$10.00).

<sup>e</sup> Budgeted units (number of direct labor hours × variable maintenance rate) = 1,060(0.12 × \$3.75).

<sup>f</sup> Budgeted units (number of direct labor hours × variable power rate) = 1,060(0.12 × \$1.25).

of production. Thus, even if cost control were perfect for the production of 1,200 units, unfavorable variances would be produced for at least some of the variable costs. To create a meaningful performance report, actual costs and expected costs must be compared at the *same* level of activity. Since actual output often differs from planned output, a method is needed to compute what the costs should have been for the actual output level.

**ETHICS** If a company were to insist on using the budget for planned output as the benchmark for performance evaluation, it would invite potential abuse by managers

subject to this approach. Although unethical, a manager could manipulate the performance report by deliberately producing less than the planned output—producing, for example, 1,000 t-shirts instead of the planned 1,060. By producing less, the costs will be less than the budgeted amounts, creating a favorable performance outcome. Using flexible budgeting allows the benchmark to be adjusted to reflect the expected costs for the actual level of output. ♦

**Flexible Budgets** A **flexible budget** enables a firm to compute expected costs for a range of activity levels. The key to flexible budgeting is knowledge of fixed and variable costs. The two types of flexible budgets are:

1. *Before-the-fact.* This type of flexible budget helps managers deal with uncertainty by allowing them to see the expected outcomes for a range of activity levels. It can be used to generate financial results for a number of plausible scenarios.
2. *After-the-fact.* This flexible budget is the budget for the actual level of activity. This type of budget is used to compute what costs should have been for the actual level of activity. Those expected costs are then compared with the actual costs in order to assess performance.

Flexible budgeting is the key to providing the frequent feedback that managers need to exercise control and effectively carry out the plans of an organization.

To illustrate the before-the-fact capability of flexible budgeting, suppose that the management of Cool-U wants to know the cost of producing 1,000 t-shirts, 1,200 t-shirts, and 1,400 t-shirts. To compute the expected cost for these different levels of output, the cost behavior pattern of each item in the budget needs to be known. Knowing the variable cost per unit and the total fixed costs allows the calculation of the expected costs for various levels of activity. **Cornerstone 21-2** shows how budgets can be prepared for different levels of activity, using cost formulas for each item.

Notice in **Cornerstone 21-2** that total budgeted production costs increase as the production level increases. Budgeted costs change because total variable costs go up as output increases. Because of this, flexible budgets are sometimes referred to as

## CONCEPT Q&A

Why are static budgets usually not a good choice for benchmarks in preparing a performance report?

*The actual output may differ from the budgeted output, thus causing significant differences in cost. Comparing planned costs for one level of activity with the actual costs of a different level of activity does not provide good control information.*

Possible Answer:



### CORNERSTONE 21-2



## HOW TO Prepare a Flexible Production Budget

### Information:

Levels of output: 1,000, 1,200, and 1,400.

Materials:

1 plain t-shirt @ \$3.00

5 ounces of ink @ \$0.20

Labor:

0.12 hr. @ \$10.00

Variable overhead:

Maintenance: 0.12 hr. @ \$3.75

Power: 0.12 hr. @ \$1.25

Fixed overhead:

Grounds keeping: \$1,200 per quarter

Depreciation: \$600 per quarter

### Required:

Prepare a budget for three levels of output: 1,000, 1,200, and 1,400 units.

**Solution:****CORNERSTONE**  
**21-2**  
*(continued)*

Production Costs	Variable Cost per Unit	Range of Production (units)		
		1,000	1,200	1,400
Variable:				
Direct materials	\$4.00 <sup>a</sup>	\$4,000 <sup>b</sup>	\$4,800	\$5,600
Direct labor	1.20 <sup>c</sup>	1,200 <sup>d</sup>	1,440	1,680
Variable overhead:				
Maintenance	0.45 <sup>e</sup>	450 <sup>f</sup>	540	630
Power	0.15 <sup>g</sup>	150 <sup>h</sup>	180	210
Total variable costs	<u>\$5.80</u>	<u>\$5,800</u>	<u>\$6,960</u>	<u>\$8,120</u>
Fixed overhead:				
Grounds keeping		\$1,200	\$1,200	\$1,200
Depreciation		600	600	600
Total fixed costs		<u>\$1,800</u>	<u>\$1,800</u>	<u>\$1,800</u>
Total production costs		<u>\$7,600</u>	<u>\$8,760</u>	<u>\$9,920</u>

<sup>a</sup> t-shirt cost + ink cost = [(\$3.00 × 1 t-shirt) × (\$0.20 × 5 oz.)].

<sup>b</sup> (\$4 × 1,000 units)

<sup>c</sup> (\$10.00 per direct labor hour × 0.12 direct labor hours per unit).

<sup>d</sup> (\$1.20 × 1,000 units)

<sup>e</sup> (\$3.75 per direct labor hour × 0.12 direct labor hours per unit).

<sup>f</sup> (\$0.45 × 1,000 units)

<sup>g</sup> (\$1.25 per direct labor hour × 0.12 direct labor hours per unit).

<sup>h</sup> (\$0.15 × 1,000 units)

**variable budgets.** Since Cool-U has a mix of variable and fixed costs, the overall cost of producing one t-shirt goes *down* as production goes *up*. This makes sense. As production increases, there are more units over which to spread the fixed production costs.

It should also be pointed out that the flexible budget formulas often are based on direct labor hours instead of units. This is easy to do because direct labor hours are correlated with units produced. For example, the variable cost formulas for variable overhead are \$3.75 and \$1.25 per direct labor hour (\$5.00 per direct labor hour in total) for maintenance and power, respectively. When standard hours are used, we need to convert units into direct labor hours. For the Cool-U example, the production of 1,000 budgeted units means that 120 direct labor hours will be needed (0.12 direct labor hours per unit × 1,000 budgeted units).

**Here's The****Real Kicker**

Stillwater Designs has a Product Steering Committee whose charge is to decide on the timing for upgrades and redesigns for its various Kicker speaker models. About every four years, a complete redesign is done for a Kicker speaker. A complete redesign takes about 16 to 18 months. A specification workshop is held that identifies features, benefits, customers, and competitors. Additionally, the costs of the new model, including the design costs (research and development), acquisition costs, freight, and duties, are estimated for various sales volumes. During this phase, the company will work closely with the manufacturers to control the design so that manufacturing costs are carefully set. A financial analysis is run over the expected life cycle

of the new product (two to three years) to see what the profit potential is. Thus, both expected revenues and costs for various levels of activity are assessed. This before-the-fact flexible budgeting analysis is especially important for those products with which the company has less experience. At times, a new product may be produced even if at the most likely volume the product is not expected to be profitable. The reason? The new product may complete a line or may enhance the overall image of the Kicker speakers.



## ANALYTICAL Q&amp;A

What is the budgeted cost of maintenance if 2,000 t-shirts are produced?

$$\text{Answer: } \$900 = 2,000 \times \$0.45$$

Flexible budgets are powerful control tools because they allow management to compute what the costs should be for the level of *output that actually occurred*. Recall that Cool-U thought that 1,060 units would be produced, and budgeted for that amount. However, actual production was 1,200 units. It does not make sense to compare the actual costs for 1,200 t-shirts to the budgeted costs for 1,060 t-shirts. Management will need a useful performance report, one that compares actual and budgeted costs for the actual level of activity. This is the second type of flexible budget and preparation of this report is shown in **Cornerstone 21-3**. The revised performance report in Cornerstone 21-3 paints a much different picture than the one in Cornerstone 21-1. All of the variances are fairly small. Had they been larger, management would have searched for the cause and tried to correct the problems.



### CORNERSTONE 21-3



## HOW TO Prepare a Performance Report Using a Flexible Budget

### Information:

For convenience, the actual costs for 1,200 units (Cornerstone 21-1) and the budgeted costs for the actual level of activity (Cornerstone 21-2) are repeated here.

	Actual Costs	Budgeted Costs
Units produced	1,200	1,200
Direct materials cost	\$4,830	\$4,800
Direct labor cost	1,500	1,440
Variable overhead:		
Maintenance	535	540
Power	170	180
Fixed overhead:		
Grounds keeping	1,050	1,200
Depreciation	600	600

### Required:

Prepare a performance report using budgeted costs for the actual level of activity.

### Solution:

	Actual	Budget	Variance
Units produced	1,200	1,200	—
Production costs:			
Direct materials	\$4,830	\$4,800	\$ 30 U
Direct labor	1,500	1,440	60 U
Variable overhead:			
Maintenance	535	540	(5) F
Power	170	180	(10) F
Total variable costs	\$7,035	\$6,960	\$ 75 U
Fixed overhead:			
Grounds keeping	\$1,050	\$1,200	\$(150) F
Depreciation	600	600	(0)
Total fixed costs	\$1,650	\$1,800	\$(150) F
Total production costs	\$8,685	\$8,760	\$ (75) F

A difference between the actual amount and the flexible budget amount is the **flexible budget variance**. The flexible budget provides a measure of the efficiency of a manager. In other words, given the level of production achieved, how well did the manager control costs? To measure whether or not a manager accomplishes his or her goals, the static budget is used. The static budget represents certain goals that the firm wants to achieve. A manager is effective if the goals described by the static budget are achieved or exceeded. In the Cool-U example, production volume was 140 units greater than the original budgeted amount; the manager exceeded the original budgeted goal. Therefore, the effectiveness of the manager is not in question.

## Variable Overhead Analysis

In Chapter 20, total variances for direct materials and direct labor were broken down into price and efficiency variances. In a standard cost system, the total overhead variance, which is the difference between applied and actual overhead, is also broken down into component variances. The number of component variances computed depends on the method of variance analysis used. The four-variance method is described in this chapter. First, overhead is divided into fixed and variable categories. Next, two variances are calculated for each category. The total variable overhead variance is divided into the variable overhead spending variance and the variable overhead efficiency variance. Similarly, the total fixed overhead variance is divided into the fixed overhead spending variance and the fixed overhead volume variance.

### Total Variable Overhead Variance

To illustrate the variable overhead variances, the first quarter data for Cool-U will be used. The unit prices and quantities used for the flexible budget are assumed to be the standards associated with Cool-U's standard cost system. **Cornerstone 21-4** illustrates how to calculate the total variable overhead variance. The total variable overhead variance is simply the difference between the total *actual variable overhead* and *applied variable overhead*. Variable overhead is applied by using hours allowed in a standard cost system. The total variable overhead variance can be divided into spending and efficiency variances. Variable overhead spending and efficiency variances can be calculated by using either the three-pronged (columnar) approach or formulas. The best approach is a matter of preference. However, the formulas first need to be expressed specifically for variable overhead.

#### OBJECTIVE 2

Calculate the variable overhead variances, and explain their meaning.

### HOW TO Calculate the Total Variable Overhead Variance

#### Information:

Standard variable overhead rate (SVOR)	\$5.00 per direct labor hour
Actual variable overhead costs	\$705
Standard hours allowed per unit	0.12 hour
Actual direct labor hours worked	150 hours
Actual production	1,200 units

#### Required:

1. Calculate the actual variable overhead rate (AVOR).
2. Calculate the total variable overhead variance.

#### Solution:

1. Actual variable overhead rate = Actual overhead cost/Actual direct labor hours  

$$AVOR = \$705/150 \text{ hours}$$

$$AVOR = \$4.70$$



#### CORNERSTONE 21-4



**CORNERSTONE**  
**21-4**  
*(continued)*

2.	Actual variable overhead ( $AH \times AVOR$ )	\$705
	Applied variable overhead ( $SH \times SVOR$ )*	720
	Total variable overhead variance [ $(AH \times AVOR) - (SH \times SVOR)$ ]	<u>\$ (15)</u>

\*  $SH \times SVOR = 0.12 \times 1,200 \times \$5$ .

Because the equations for variable overhead variances can be long if expressed in words, abbreviations are often used. Here are some common abbreviations that you will find in the rest of this section:

$AH$  = actual direct labor hours

$SH$  = standard direct labor hours that *should have been worked* for actual units produced

$AVOR$  = actual variable overhead rate

$SVOR$  = standard variable overhead rate

**Variable Overhead Spending Variance** The **variable overhead spending variance** measures the aggregate effect of differences between the actual variable overhead rate ( $AVOR$ ) and the standard variable overhead rate ( $SVOR$ ). The actual variable overhead rate is computed as follows:

$$AVOR = \frac{\text{Actual Variable Overhead}}{\text{Actual Hours}}$$

As shown by Cornerstone 21-4, this rate is \$4.70 per hour, computed as actual variable overhead cost of \$705 divided by 150 actual direct labor hours. The formula for computing the variable overhead spending variance is:

$$\begin{aligned} \text{Variable Overhead Spending Variance} &= (AVOR \times AH) - (SVOR \times AH) \\ &= (AVOR - SVOR)AH \end{aligned}$$

**Variable Overhead Efficiency Variance** Variable overhead is assumed to vary as the production volume changes. Thus, variable overhead changes in proportion to changes in the direct labor hours used. The **variable overhead efficiency variance** measures the change in the actual variable overhead that occurs because of efficient (or inefficient) use of direct labor. The efficiency variance is computed by using the following formula:

$$\text{Variable Overhead Efficiency Variance} = (AH - SH)SVOR$$

## ANALYTICAL Q&A

If actual hours equal 100, standard hours equal 90, and the standard variable overhead rate is \$6, what is the variable overhead efficiency variance?

Variable overhead efficiency variance =  $(AH - SH)SVOR = (100 - 90)\$6 = \$60$ .

Answer:

How to calculate the variable overhead variances using either a columnar or formula approach is shown for the Cool-U example in **Cornerstone 21-5**.

## HOW TO Calculate Variable Overhead Spending and Efficiency Variances: Columnar and Formula Approaches

### Information:

Standard variable overhead rate (SVOR)	\$5.00 per direct labor hour
Actual variable overhead rate (AVOR)	\$4.70
Actual hours worked (AH)	150 hours
Number of t-shirts produced	1,200 units
Hours allowed for production (SH)	144 hours <sup>a</sup>

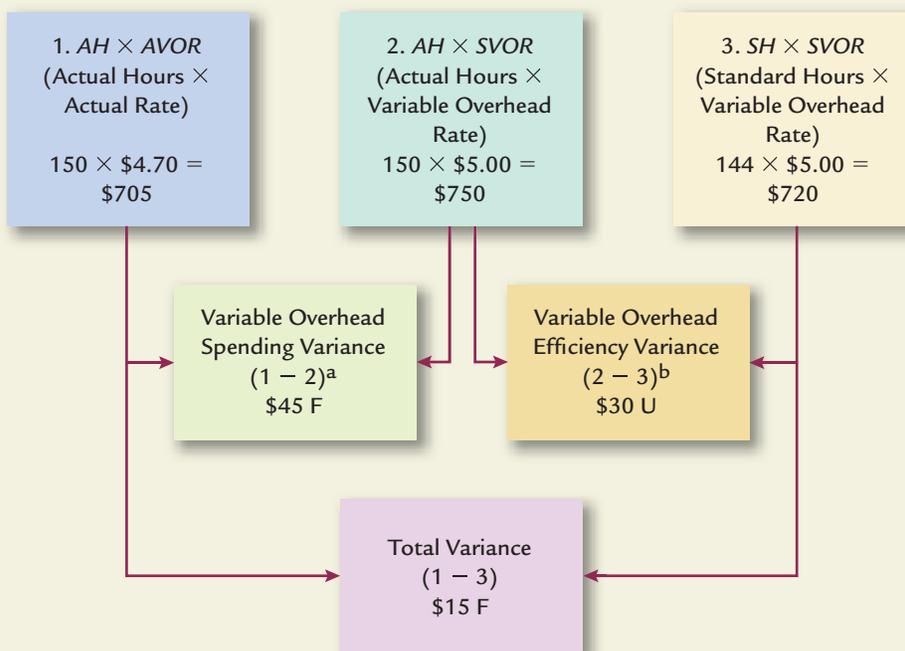
<sup>a</sup>  $0.12 \times 1,200$ .

### Required:

Calculate the variable overhead spending and efficiency variances.

### Solution:

#### Columnar:



### Formulas:

$$\begin{aligned}
 {}^a\text{VOH Spending Variance} &= (AVOR - SVOR)AH \\
 &= (\$4.70 - \$5.00)150 \\
 &= \$45 \text{ F}
 \end{aligned}$$

$$\begin{aligned}
 {}^b\text{VOH Efficiency Variance} &= (AH - SH)SVOR \\
 &= (150 - 144)(\$5.00) \\
 &= \$30 \text{ U}
 \end{aligned}$$



## CORNERSTONE 21-5



## Comparison of the Variable Overhead Spending Variance with the Price Variances of Materials and Labor

The variable overhead spending variance is similar but not identical to the price variances of materials and labor; there are some conceptual differences. Variable overhead is not a single input—it is made up of a large number of individual items,

such as indirect materials, indirect labor, electricity, maintenance, and so on. The standard variable overhead rate represents the weighted cost per direct labor hour that should be incurred for all variable overhead items. The difference between what should have been spent per hour and what actually was spent per hour is a type of price variance.

A variable overhead spending variance can arise because prices for individual variable overhead items have increased or decreased. Assume, for the moment, that the price changes of individual overhead items are the only cause of the spending variance. If the spending variance is unfavorable, price increases for individual variable overhead items are the cause; if the spending variance is favorable, price decreases are dominating.

## CONCEPT Q&A

How does the variable overhead spending variance differ from the materials and labor price variances?

*The variable overhead spending variance is affected by price changes of individual items as well as efficiency issues.*

**Possible Answer:**

If the only source of the variable overhead spending variance were price changes, then it would be just like the price variances of materials and labor. Unfortunately, the spending variance is also affected by how efficiently overhead is used. Waste or inefficiency in the use of variable overhead increases the actual variable overhead cost. This increased cost, in turn, is reflected in an increased actual variable overhead rate. Thus, even if the actual prices of the individual overhead items were equal to the budgeted or standard prices, an unfavorable variable overhead spending variance could still take place. For example, more kilowatt-hours of power may be used than should be, yet this is not captured by any change in direct labor hours. However, the effect is reflected by an increase in

the total cost of power and, thus, the total cost of variable overhead. Similarly, efficiency can decrease the actual variable overhead cost and decrease the actual variable overhead rate. Efficient use of variable overhead items contributes to a favorable spending variance. If the waste effect dominates, then the net contribution will be unfavorable; if efficiency dominates, then the net contribution is favorable. Therefore, the variable overhead spending variance is the result of both price and efficiency.

## Responsibility for the Variable Overhead Spending Variance

Many variable overhead items are affected by several responsibility centers. For example, utilities are a joint cost. To the extent that consumption of variable overhead can be traced to a responsibility center, responsibility can be assigned. Consumption of indirect materials is an example of a traceable variable overhead cost.

Controllability is a prerequisite for assigning responsibility. Price changes of variable overhead items are essentially beyond the control of supervisors. If price changes are small (as they often are), then the spending variance is primarily a matter of the efficient use of overhead in production. This is controllable by production supervisors. Accordingly, responsibility for the variable overhead spending variance is generally assigned to production departments.

## Responsibility for the Variable Overhead Efficiency Variance

The variable overhead efficiency variance is directly related to the direct labor efficiency or usage variance. If variable overhead is truly proportional to direct labor consumption, then like the labor usage variance, the variable overhead efficiency variance is caused by efficient or inefficient use of direct labor. If more (or fewer) direct labor hours are used than the standard calls for, then the total variable overhead cost will increase (or decrease). The validity of the measure depends on the validity of the relationship between variable overhead costs and direct labor hours. In other words, do variable overhead costs really change in proportion to changes in direct labor hours? If so, responsibility for the variable overhead efficiency variance should be assigned to the individual who has responsibility for the use of direct labor: the production manager.

## A Performance Report for the Variable Overhead Spending and Efficiency Variances

Cornerstone 21-5 showed a favorable \$45 variable overhead spending variance and an unfavorable \$30 variable overhead efficiency variance. The \$45 F spending variance means that overall Cool-U spent less than expected on variable overhead. The reasons for the \$30 unfavorable variable overhead efficiency variance are the same as those offered for an unfavorable labor usage variance. An unfavorable variance means that more hours were used than called for by the standard. Even if the total variable overhead spending and efficiency variances are insignificant, they reveal nothing about how well costs of *individual* variable overhead items were controlled. It is possible for two large variances of opposite sign to cancel each other out. Control of variable overhead requires line-by-line analysis for each item. **Cornerstone 21-6** shows how to prepare a performance report that supplies the line-by-line information essential for detailed analysis of the variable overhead variances.

### CONCEPT Q&A

Why are the labor efficiency and variable overhead efficiency variances similar in nature?

**Possible Answer:** Both depend on the difference between actual and standard direct labor hours.

### HOW TO Prepare a Performance Report for the Variable Overhead Variances

#### Information:

Standard variable overhead rate (SVOR)	\$5.00 per direct labor hour
Actual costs:	
Maintenance	\$535
Power	\$170
Actual hours worked (AH)	150 hours
Number of t-shirts produced	1,200 units
Hours allowed for production (SH)	144 hours <sup>a</sup>
Variable overhead:	
Maintenance	0.12 hr. @ \$3.75
Power	0.12 hr. @ \$1.25

<sup>a</sup>  $0.12 \times 1,200$ .

#### Required:

Prepare a performance report that shows the variances on an item-by-item basis.

#### Solution:

#### Performance Report For the Quarter Ended March 31, 2010

Cost	Cost Formula <sup>a</sup>	Actual Costs	Budget for		Budget for	
			Actual Hours <sup>b</sup>	Spending Variance <sup>c</sup>	Standard Hours <sup>d</sup>	Efficiency Variance <sup>e</sup>
Maintenance	\$3.75	\$535	\$562.50	\$27.50 F	\$540	\$22.50 U
Power	1.25	170	187.50	17.50 F	180	7.50 U
Total	<u>\$5.00</u>	<u>\$705</u>	<u>\$750.00</u>	<u>\$45.00 F</u>	<u>\$720</u>	<u>\$30.00 U</u>

<sup>a</sup> Per direct labor hour.

<sup>b</sup> Computed using the cost formula and 150 actual hours.

<sup>c</sup> Spending Variance = Actual Costs – Budget for Actual Hours.

<sup>d</sup> Computed using the cost formula and an activity level of 144 standard hours.

<sup>e</sup> Efficiency Variance = Budget for Actual Hours – Budget for Standard Hours.



### CORNERSTONE 21-6



The analysis on a line-by-line basis reveals no unusual problems such as two large individual item variances with opposite signs. No individual item variance is greater than 10 percent of its budgeted amount. Thus, no variance at the individual item level appears to be of a large enough magnitude to be of concern.

### OBJECTIVE > 3

Calculate the fixed overhead variances, and explain their meaning.

## Fixed Overhead Analysis

Fixed overhead costs are capacity costs that are acquired in advance of usage. Examples include the property, plant, and equipment needed to manufacture the product. Recall from Chapter 16 that the predetermined overhead rate is calculated at the beginning of the year by dividing budgeted overhead by the budgeted amount of the base (e.g., direct labor hours). Now, however, we need to divide that predetermined overhead rate into variable and fixed overhead rates. It was easy to find the variable overhead rate since that rate is unchanged even though the number of units produced, and thus direct labor hours, changes. However, the fixed overhead rate changes as the underlying activity changes. To keep a stable fixed overhead rate throughout the year, companies typically use practical capacity to determine the number of direct labor hours in the denominator of the fixed overhead rate.

Suppose that Cool-U can produce 1,500 t-shirts per quarter under efficient operating conditions, then practical capacity measured in standard hours ( $SH_p$ ) is calculated by the following formula:

$$\begin{aligned} SH_p &= \text{Unit Standard} \times \text{Units of Practical Capacity} \\ &= 0.12 \times 1,500 \\ &= 180 \text{ hours} \end{aligned}$$

Recall from Cornerstone 21-2 that Cool-U's total fixed costs per quarter equal \$1,800. The standard fixed overhead rate (SFOR) is calculated as follows:

$$\begin{aligned} SFOR &= \frac{\text{Budgeted Fixed Overhead Costs}}{\text{Practical Capacity}} \\ SFOR &= \frac{\$1,800}{180} \\ &= \$10 \text{ per direct labor hour} \end{aligned}$$

Some firms use average or expected capacity instead of practical capacity to calculate fixed overhead rates. In this case, the standard hours used to calculate the fixed overhead rate will typically be less than the standard direct labor hours at practical capacity.

## Total Fixed Overhead Variances

The total fixed overhead variance is the difference between actual fixed overhead and applied fixed overhead, when applied fixed overhead is obtained by multiplying the standard fixed overhead rate times the standard hours allowed for the actual output. Thus, the applied fixed overhead is:

$$\text{Applied Fixed Overhead} = SFOR \times SH$$

The total fixed overhead variance is the difference between the actual fixed overhead and the applied fixed overhead:

$$\text{Total Variance} = \text{Actual Fixed Overhead} - \text{Applied Fixed Overhead}$$

**Cornerstone 21-7** illustrates how to calculate the total fixed overhead variance, using the Cool-U example. The total fixed overhead variance can be divided into spending and volume variances. Spending and volume variances can be calculated by using

## ANALYTICAL Q&A

If the budgeted fixed overhead is \$10,000 and the standard fixed overhead rate is \$100 per direct labor hour (calculated using practical capacity), what is the practical capacity, measured in direct labor hours?

*Practical capacity = \$10,000/\$100 = 100 direct labor hours.*  
Answer:

either the three-pronged (columnar) approach or formulas. The best approach to use is a matter of preference. However, the formulas first need to be expressed specifically for fixed overhead.

## HOW TO Calculate the Total Fixed Overhead Variance

### Information:

Standard fixed overhead rate ( <i>SFOR</i> )	\$10.00 per direct labor hour
Actual fixed overhead costs	\$1,650
Standard hours allowed per unit	0.12 hour
Actual production	1,200 units

### Required:

1. Calculate the standard hours for actual units produced.
2. Calculate the total applied fixed overhead.
3. Calculate the total fixed overhead variance.

### Solution:

$$\begin{aligned}
 1. \quad SH &= \text{Actual Units} \times \text{Standard Hours Allowed per Unit} \\
 &= 1,200 \text{ units} \times 0.12 \text{ hour} \\
 &= 144 \text{ hours}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad \text{Applied Fixed Overhead} &= SH \times SFOR \\
 &= 144 \times \$10 \\
 &= \$1,440
 \end{aligned}$$

3.		
	Actual fixed overhead cost	\$1,650
	Applied fixed overhead	1,440
	Total variance	<u>\$ 210 U</u>



## CORNERSTONE 21-7



**Fixed Overhead Spending Variance** The **fixed overhead spending variance** is defined as the difference between the actual fixed overhead and the budgeted fixed overhead (*BFOH*):

$$FOH \text{ Spending Variance} = AFOH - BFOH$$

**Fixed Overhead Volume Variance** The **fixed overhead volume variance** is the difference between budgeted fixed overhead and applied fixed overhead:

$$\begin{aligned}
 \text{Volume Variance} &= \text{Budgeted Fixed Overhead} - \text{Applied Fixed Overhead} \\
 &= \text{Budgeted Fixed Overhead} - (SH \times SFOR)
 \end{aligned}$$

The volume variance measures the effect of the actual output differing from the output used at the beginning of the year to compute the predetermined standard fixed overhead rate. If you think of the output used to calculate the fixed overhead rate as the capacity acquired (practical capacity) and the actual output as the capacity used, then the volume variance is the cost of unused capacity. [Cornerstone 21-8](#) illustrates how to calculate the fixed overhead variances using either a columnar or a formula approach.



## CORNERSTONE 21-8



### HOW TO Calculate Fixed Overhead Variances: Columnar and Formula Approaches

#### Information:

Standard fixed overhead rate ( <i>SFOR</i> )	\$10.00 per direct labor hour
Budgeted fixed overhead ( <i>BFOH</i> )	\$1,800
Number of t-shirts produced	1,200 units
Hours allowed for production ( <i>SH</i> )	144 hours <sup>a</sup>

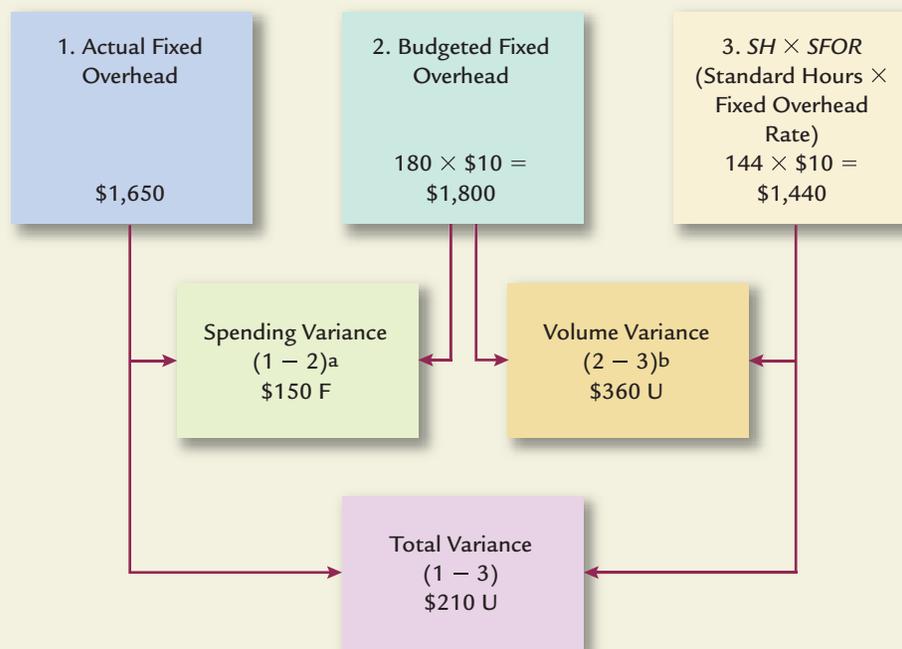
<sup>a</sup>  $0.12 \times 1,200$ .

#### Required:

Calculate the fixed overhead spending and volume variances.

#### Solution:

#### Columnar:



#### Formulas:

$$\begin{aligned} \text{FOH Spending Variance} &= \text{Actual Fixed Overhead} - \text{Budgeted Fixed Overhead} \\ &= \$1,650 - \$1,800 \\ &= \$150 \text{ F} \end{aligned}$$

$$\begin{aligned} \text{FOH Volume Variance} &= \text{Budgeted Fixed Overhead} - \text{Applied Fixed Overhead} \\ &= \text{Budgeted Fixed Overhead} - (SH \times SFOR) \\ &= \$1,800 - (144 \times \$10) \\ &= \$1,800 - \$1,440 \\ &= \$360 \text{ U} \end{aligned}$$

### Responsibility for the Fixed Overhead Spending Variance

Fixed overhead is made up of items such as salaries, depreciation, taxes, and insurance. Many fixed overhead items—long-run investments, for instance—are not subject to change in the short run; consequently, fixed overhead costs are often beyond the immediate control of management. Since many fixed overhead costs are affected primarily by long-run decisions, and not by changes in production levels, the budget variance is usually small. For example, actual depreciation, salaries, taxes, and insurance costs are not likely to be much different from planned costs.

## Analysis of the Fixed Overhead Spending Variance

Because fixed overhead is made up of many individual items, a line-by-line comparison of budgeted costs with actual costs provides more information concerning the causes of the spending variance. The fixed overhead section of Cornerstone 21-3 provides such a report. The report reveals that the fixed overhead spending variance is out of line with expectations. Less was spent on grounds keeping than expected. In fact, the entire spending variance is attributable to this one item. Since the amount is more than 10 percent of budget, it merits an investigation. An investigation, for example, might reveal that the weather was especially wet and thus reduced the cost of watering for the period involved. In this case, no action is needed, as a natural correction would be forthcoming.

## Responsibility for the Fixed Overhead Volume Variance

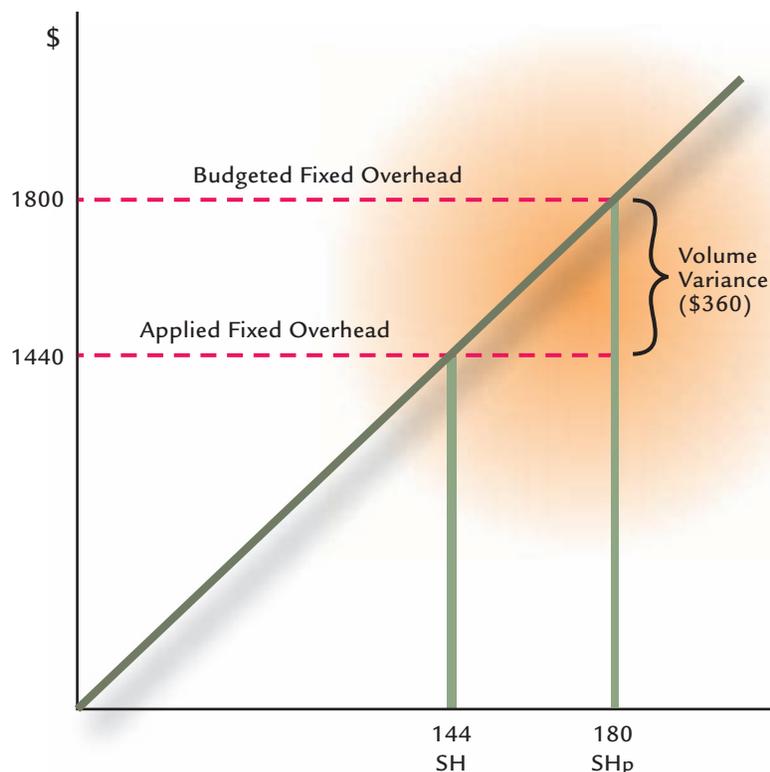
Assuming that volume variance measures capacity utilization implies that the general responsibility for this variance should be assigned to the production department. At times, however, investigation into the reasons for a significant volume variance may reveal the cause to be factors beyond the control of production. In this instance, specific responsibility may be assigned elsewhere. For example, if the purchasing department buys lower-quality raw materials than usual, significant rework time may result. This will cause lower production and an unfavorable volume variance. In this case, responsibility for the variance rests with purchasing, not production.

## Analysis of the Volume Variance

The \$360 U variance (Cornerstone 21-8) occurs because the production capacity is 180 hours and only 144 hours should have been used. Why the company failed to use all of its capacity is not known. Given that unused capacity is about 20 percent of the total, investigation seems merited. Exhibit 21-2 graphically illustrates the volume variance. Notice that the volume variance occurs because fixed overhead is treated as

Exhibit 21-2

### Graphical Analysis of the Volume Variance



if it were a variable cost. In reality, fixed costs do not change as activity changes, as a predetermined fixed overhead rate allows.

## OBJECTIVE 4

Prepare an activity-based flexible budget.

## Activity-Based Budgeting

The traditional approach to budgeting emphasizes:

1. the estimation of revenues and costs by organizational units (e.g., departments, plants), and
2. the use of a single unit-based driver such as direct labor hours.

Companies that have implemented an activity-based costing (ABC) system may also wish to install an *activity-based budgeting system*. An **activity-based budgeting system (ABB)** focuses on:

1. estimating the costs of activities rather than the costs of departments and plants,
2. the use of multiple drivers, both unit-based and nonunit-based.

The activity-based budgeting approach supports continuous improvement and process management. Because activities consume resources (which cause cost), activity-based budgeting can be used to reduce cost through the elimination of wasteful activities and improving the efficiency of necessary activities.

## Static Activity Budgets

Assuming that activity-based costing has been implemented, the major emphasis for ABB is estimating the workload (demand) for each activity and then determining the resources required for this workload. The workload for each activity must be set to support the sales and production activities expected for the coming period.

As with traditional budgeting, ABB begins with sales and production budgets. Direct materials and direct labor budgets are also compatible with an activity-based costing framework because these inputs can be directly traced to the individual products. The major differences between functional and activity-based budgeting are found in the overhead and selling and administration categories. In a functional-based approach, budgets within these categories are typically detailed by cost categories. These cost categories are classified as variable or fixed, using production or sales output measures as the basis for determining cost behavior. Furthermore, these budgets are usually constructed by budgeting for a cost item within a department (function) and then rolling these items up into the master overhead budget. For example, the cost of supervision in an overhead budget is the sum of all the supervision costs of the various departments. ABB, on the other hand, identifies the overhead, selling, and administrative *activities* and then builds a budget for each activity, based on the resources needed to provide the required activity output levels. Costs are classified as variable or fixed with respect to the *activity* output measure.

Consider, for example, purchasing materials. The demand for this activity is a function of the materials requirements for the various products and services produced. An activity driver, such as number of purchase orders, measures the activity output demand. **Cornerstone 21-9** illustrates how to prepare a budget at the activity level for the purchasing activity.

Of the resources consumed by the purchasing activity in Cornerstone 21-9, supplies is a variable cost, and the other resources are fixed costs (a step-fixed cost behavior in the case of salaries and depreciation). However, one important difference should be mentioned: Fixed and variable purchasing costs are defined with respect to the *number of purchase orders* and not direct labor hours or units produced or other measures of production output. In budgeting at the activity level, the cost behavior of each activity is defined with respect to *its* output measure (which is often different from the production-based drivers used in functional-based budgeting). Knowing the output measure provides significant insights for controlling activity costs. In an activity framework, controlling costs translates into managing activities. For example, by redesigning

## HOW TO Prepare a Static Budget for an Activity

### Information:

1. Demand for purchase orders based on materials requirements: 15,000 purchase orders.
2. Resources needed:
  - a. Five purchasing agents, each capable of processing 3,000 orders per year; salary, \$40,000 each.
  - b. Supplies (forms, paper, stamps, envelopes, etc.), projected to cost \$1.00 per purchase order.
  - c. Desks and computers: depreciation, \$5,000 per year.
  - d. Office space, rent, and utilities, \$6,000.

### Required:

Prepare a budget for the purchasing activity.

### Solution:

Purchasing budget:

Salaries	\$200,000
Depreciation	5,000
Supplies	15,000
Occupancy	6,000
Total	<u>\$226,000</u>



## CORNERSTONE 21-9



products so that they use more common components, the number of purchase orders can be decreased. By decreasing the number of purchase orders demanded, flexible resource demand is reduced; furthermore, decreasing the number of purchase orders demanded also reduces the activity capacity needed. Thus, activity costs will decrease.

## Activity Flexible Budgeting

Understanding the relationship between changes in activity costs and changes in activity drivers allows managers to more carefully plan and monitor activity improvements. **Activity flexible budgeting** is the prediction of what activity costs will be as related output changes. Variance analysis within an activity framework makes it possible to improve traditional budgetary performance reporting, and enhances the ability to manage activities.

In a functional-based approach, budgeted costs for the actual level of activity are obtained by assuming that a single unit-based driver (e.g., units of product or direct labor hours) drives all costs. A cost formula is developed for each cost item as a function of units produced or direct labor hours. Cornerstone 21-2 illustrated a traditional flexible budget for production based on direct labor hours. If, however, costs vary with respect to more than one driver, and the drivers are not highly correlated with direct labor hours, then the predicted costs can be misleading.

The solution is to build flexible budget formulas for more than one driver. Cost estimation procedures (high-low method, the method of least squares, and so on) can be used to estimate cost formulas for each activity. This multiple-formula approach allows managers to predict more accurately what costs should be for different levels of activity, as measured by the drivers. These costs can then be compared with the actual costs to help assess budgetary performance. **Cornerstone 21-10** illustrates how to prepare an activity flexible budget. Notice that flexible budgets are computed for *each driver*.

## CONCEPT Q&A

What are the main differences between ABB and traditional budgeting?

*ABB differs primarily with overhead and selling and administrative budgets. ABB builds a budget for each activity based on the demands of the activity for resources, whereas traditional budgeting focuses on cost items required by organizational units such as departments.*

**Possible Answer:**



## CORNERSTONE 21-10



### HOW TO Prepare an Activity Flexible Budget

#### Information:

Information on five overhead activities for a company is given below.

Activity	Driver	Fixed Cost	Variable Rate
Maintenance	Machine hours	\$ 20,000	\$ 5.50
Machining	Machine hours	15,000	2.00
Setting up	Setups	—	1,800
Inspection	Setups	80,000	2,100
Purchasing	Purchase Orders	211,000	1.00

#### Required:

Prepare an activity-based flexible budget for the following production levels:

Driver	32,000 units	64,000 units
Machine hours	8,000	16,000
Setups	25	30
Purchase orders	15,000	25,000

#### Solution:

Steps in forming the activity-based flexible budget include:

1. Set up a table showing the activities under their related driver.
2. Calculate total activity cost by multiplying the variable rate times the driver level and adding the fixed amount. For example, at 8,000 machine hours,

$$\text{Maintenance} = \$20,000 + (\$5.50 \times 8,000 \text{ machine hours}) = \$64,000$$

And at 16,000 machine hours,

$$\text{Maintenance} = \$20,000 + (\$5.50 \times 16,000 \text{ machine hours}) = \$108,000$$

	Required for			
			32,000 units	64,000 units
<i>Driver: Machine Hours</i>				
	<b>Fixed</b>	<b>Variable</b>	<b>8,000</b>	<b>16,000</b>
Maintenance	\$20,000	\$5.50	\$64,000	\$108,000
Machining	15,000	2.00	31,000	47,000
Subtotal	<u>\$35,000</u>	<u>\$7.50</u>	<u>\$95,000</u>	<u>\$155,000</u>
<i>Driver: Number of Setups</i>				
	<b>Fixed</b>	<b>Variable</b>	<b>25</b>	<b>30</b>
Setups	\$ —	\$1,800	\$ 45,000	\$ 54,000
Inspections	80,000	2,100	132,500	143,000
Subtotal	<u>\$80,000</u>	<u>\$3,900</u>	<u>\$177,500</u>	<u>\$197,000</u>
<i>Driver: Number of Orders</i>				
	<b>Fixed</b>	<b>Variable</b>	<b>15,000</b>	<b>25,000</b>
Purchasing	\$211,000	\$1.00	\$226,000	\$236,000
Total			<u>\$498,500</u>	<u>\$588,000</u>

Notice that the activity-based performance report shown in **Cornerstone 21-11** compares the budgeted costs for the actual activity usage levels with the actual costs. The five items are mixed. The net outcome is a favorable variance of \$22,500. The performance report in Cornerstone 21-11 compares total budgeted costs for the

## HOW TO Prepare an Activity-Based Performance Report

### Information:

Actual activity level is 32,000 units. See Cornerstone 21-10 for budgeted costs. For example, budgeted costs for maintenance would be based on 8,000 machine hours and would equal \$64,000.

Actual costs:

Maintenance	\$ 55,000
Machining	29,000
Inspections	125,500
Setups	46,500
Purchases	220,000

### Required:

Prepare an activity-based performance report.

### Solution:

Note, for this performance report, just input the actual costs as given above. Then input the budgeted costs for the activity levels required. The budget variance is the difference between the actual costs and the budgeted costs. If actual costs are greater than budgeted costs, the budget variance is unfavorable (U). If actual costs are less than budgeted costs, the budget variance is favorable (F).

	Actual Costs	Budgeted Costs	Budget Variance
Maintenance	\$ 55,000	\$ 64,000	\$ 9,000 F
Machining	29,000	31,000	2,000 F
Inspections	125,500	132,500	7,000 F
Setups	46,500	45,000	1,500 U
Purchases	220,000	226,000	6,000 F
Total	<u>\$476,000</u>	<u>\$498,500</u>	<u>\$22,500 F</u>



## CORNERSTONE 21-11



actual level of activity with the total actual costs for each activity. The preparation of the performance report follows the pattern and approach in Cornerstone 21-3. The difference is that the comparison is for *each* activity.

One can also compare the actual fixed activity costs with the budgeted fixed activity costs and the actual variable activity costs with the budgeted variable costs. For example, assume that the actual fixed inspection costs are \$82,000 (due to a midyear salary adjustment, reflecting a more favorable union agreement than anticipated) and that the actual variable inspection costs are \$43,500. The variable and fixed budget variances for the inspection activity are computed as follows:

Activity	Actual Cost	Budgeted Cost	Variance
Inspection			
Fixed	\$ 82,000	\$ 80,000	\$2,000 U
Variable	43,500	52,500	9,000 F
Total	<u>\$125,500</u>	<u>\$132,500</u>	<u>\$7,000 F</u>

Breaking each variance into fixed and variable components provides more insight into the source of the variation in planned and actual expenditures.

## CONCEPT Q&A

Why does activity-based flexible budgeting provide a more accurate prediction of costs?

Activity-based flexible budgeting is more accurate if costs vary with more than one driver and the drivers are not highly correlated with direct labor hours (which is often the case).

Possible Answer:

## Summary of Learning Objectives

---

### LO1. Prepare a flexible budget, and use it for performance reporting.

- Static budgets provide expected cost for a given level of activity. If the actual level of activity differs from the level associated with the static budget level, then comparing actual costs with budgeted costs does not make any sense. The solution is flexible budgeting.
- Flexible budgets divide costs into those that vary with units of production (or direct labor hours) and those that are fixed with respect to these unit-level drivers. These relationships allow the identification of a cost formula for each item in the budget.
- Cost formulas are the means for calculating expected costs for various levels of activity. There are two applications of flexible budgets: before-the-fact and after-the-fact.
  - Before-the-fact applications allow managers to see what costs will be for different levels of activity, thus helping in planning.
  - After-the-fact applications allow managers to see what the cost should have been for the actual level of activity. Knowing these after-the-fact expected or budgeted costs then provides the opportunity to evaluate efficiency by comparing actual costs with budgeted costs.

### LO2. Calculate the variable overhead variances, and explain their meaning.

- Overhead costs are often a significant proportion of costs in a budget.
- Comparing actual variable and fixed overhead costs with applied overhead costs yields a total overhead variance.
- In a standard cost system, it is possible to break down these overhead variances into component variances.
- For variable overhead, the two component variances are the spending variance and the efficiency variance.
- The spending variance is the result of comparing the actual costs with budgeted costs.
- The variable overhead efficiency variance is the result of efficient or inefficient use of labor because variable overhead is assumed to vary with direct labor hours.

### LO3. Calculate the fixed overhead variances, and explain their meaning.

- For fixed overhead, the two component variances are the spending variance and the volume variance.
- The spending variance is the result of comparing the actual costs with budgeted costs.
- The fixed overhead volume variance is the result of producing a level different than that used to calculate the predetermined fixed overhead rate. It can be interpreted as a measure of capacity utilization.

### LO4. Prepare an activity-based flexible budget.

- Activity-based budgeting (ABB) is done at the activity level.
- First, demand for products is assessed.
- Next, the level of activity output needed to support the expected production level is estimated.
- Finally, the resources needed to support the required activity output are estimated. This then becomes the activity budget.
- Activity flexible budgets differ from traditional flexible budgets because the cost formulas are based on the activity drivers for the respective activities rather than being based only on a single unit-based driver, such as direct labor hours.

## Summary of Important Equations

### Abbreviations:

$AH$  = actual direct labor hours

$SH$  = standard direct labor hours that *should have been worked* for actual units produced

$AVOR$  = actual variable overhead rate

$SVOR$  = standard variable overhead rate

$SFOR$  = standard fixed overhead rate

- Variable Overhead Spending Variance =  $(AVOR \times AH) - (SVOR \times AH)$   
=  $(AVOR - SVOR)AH$
- Variable Overhead Efficiency Variance =  $(AH - SH)SVOR$
- $SFOR = \frac{\text{Budgeted Fixed Overhead Costs}}{\text{Practical Capacity}}$
- Applied Fixed Overhead =  $SFOR \times SH$
- FOH Spending Variance = Actual Fixed Overhead – Budgeted Fixed Overhead
- Volume Variance = Budgeted Fixed Overhead – Applied Fixed Overhead  
= Budgeted Fixed Overhead –  $(SH \times SFOR)$

**CORNERSTONE 21-1** How to prepare a performance report based on a static budget (using budgeted production), page 1113

**CORNERSTONE 21-2** How to prepare a flexible production budget, page 1114

**CORNERSTONE 21-3** How to prepare a performance report using a flexible budget, page 1116

**CORNERSTONE 21-4** How to calculate the total variable overhead variance, page 1117

**CORNERSTONE 21-5** How to calculate variable overhead spending and efficiency variances: columnar and formula approaches, page 1119

**CORNERSTONE 21-6** How to prepare a performance report for the variable overhead variances, page 1121

**CORNERSTONE 21-7** How to calculate the total fixed overhead variance, page 1123

**CORNERSTONE 21-8** How to calculate fixed overhead variances: columnar and formula approaches, page 1124

**CORNERSTONE 21-9** How to prepare a static budget for an activity, page 1127

**CORNERSTONE 21-10** How to prepare an activity flexible budget, page 1128

**CORNERSTONE 21-11** How to prepare an activity-based performance report, page 1129



### CORNERSTONES FOR CHAPTER 21

## Key Terms

Activity flexible budgeting, 1127

Activity-based budgeting system (ABB), 1126

Fixed overhead spending variance, 1123

Fixed overhead volume variance, 1123

Flexible budget variance, 1117

Flexible budget, 1114

Performance report, 1112

Static budget, 1112

Variable budgets, 1115

Variable overhead efficiency variance, 1118

Variable overhead spending variance, 1118

## Review Problems

### I. Flexible Budgeting

Trina Hoyt, controller of Ferrel Company wants to prepare a quarterly budget for three different levels of output (measured in units): 2,000, 2,500, and 3,000.

The product uses the following inputs:

Materials:

Three pounds of plastic @ \$6.00

4 ounces of metal @ \$2.00

Labor:

0.5 hr. @ \$10.00

Variable overhead:

Inspection: 0.2 hr. @ \$10

Machining: 0.3 hr. @ \$5

Fixed overhead:

Rent: \$15,000 per quarter

Utilities: \$3,000 per quarter

**Required:**

Prepare a budget for three levels of output: 2,000, 2,500, and 3,000 units.

**Solution:**

Production Costs	Variable Cost per Unit	Range of Production (units)		
		2,000	2,500	3,000
Variable:				
Direct materials	\$26.00 <sup>a</sup>	\$52,000 <sup>b</sup>	\$ 65,000	\$ 78,000
Direct labor	5.00 <sup>c</sup>	10,000 <sup>d</sup>	12,500	15,000
Variable overhead:				
Inspection	2.00 <sup>e</sup>	4,000 <sup>f</sup>	5,000	6,000
Machining	1.50 <sup>g</sup>	3,000 <sup>h</sup>	3,750	4,500
Total variable costs	<u>\$34.50</u>	<u>\$69,000</u>	<u>\$ 86,250</u>	<u>\$103,500</u>
Fixed overhead:				
Rent		\$15,000	\$ 15,000	\$ 15,000
Utilities		3,000	3,000	3,000
Total fixed costs		<u>\$18,000</u>	<u>\$ 18,000</u>	<u>\$ 18,000</u>
Total production costs		<u>\$87,000</u>	<u>\$104,250</u>	<u>\$121,500</u>

<sup>a</sup>  $(3 \times \$6.00) + (4 \times \$2.00)$

<sup>b</sup>  $(\$26 \times 2,000)$

<sup>c</sup>  $(0.50 \times \$10.00)$

<sup>d</sup>  $(\$5 \times 2,000)$

<sup>e</sup>  $(0.20 \times \$10)$

<sup>f</sup>  $(\$2 \times 2,000)$

<sup>g</sup>  $(0.30 \times \$5.00)$

<sup>h</sup>  $(\$1.50 \times 2,000)$

### II. Overhead Variances

Klemmens Manufacturing has the following standard cost sheet for one of its products:

Direct materials (2 ft. @ \$5)	\$10
Direct labor (0.5 hr. @ \$10)	5
Fixed overhead (0.5 hr. @ \$2)*	1
Variable overhead (0.5 hr. @ \$4)	2
Standard unit cost	<u>\$18</u>

\* Rate based on budgeted fixed overhead of \$5,000 and expected activity of 2,500 direct labor hours.

During the most recent year, the following actual results were recorded:

Production	6,000 units
Direct materials (11,750 ft. purchased and used)	\$61,100
Direct labor (2,900 hrs.)	29,580
Fixed overhead	6,000
Variable overhead	10,500

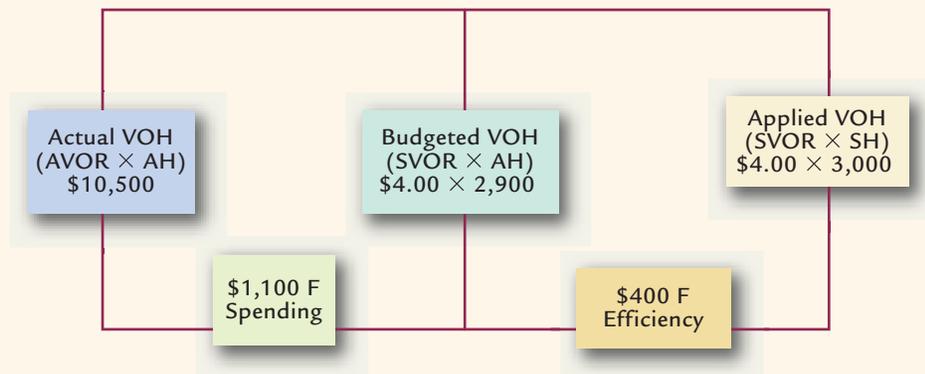
**Required:**

Compute the following variances for Klemmens Company:

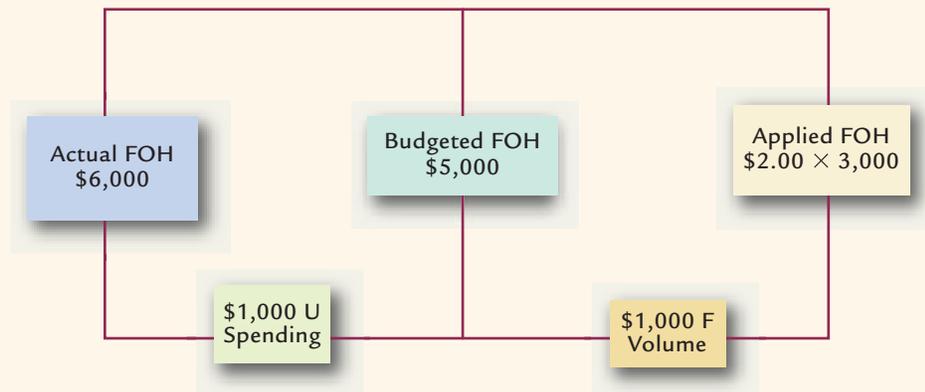
1. Variable overhead spending and efficiency variances.
2. Fixed overhead spending and volume variances.

**Solution:**

1. Variable overhead variances:



2. Fixed overhead variances:



## Discussion Questions

1. Discuss the differences between static and flexible budgets.
2. Why are flexible budgets superior to static budgets for performance reporting?
3. Explain why mixed costs must be broken down into their fixed and variable components before a flexible budget can be developed.
4. What is the purpose of a before-the-fact flexible budget?
5. What is the purpose of an after-the-fact flexible budget?
6. Explain how an activity-based budget is prepared.

7. What is the difference between an activity flexible budget and a functional-based (traditional) flexible budget?
8. Why would an activity-based performance report be more accurate than a report based on a traditional flexible budget?
9. Explain why the variable overhead spending variance is not a pure price variance.
10. The variable overhead efficiency variance has nothing to do with efficient use of variable overhead. Do you agree or disagree? Why?
11. Describe the difference between the variable overhead efficiency variance and the labor efficiency variance.
12. Explain why the fixed overhead spending variance is usually very small.
13. What is the cause of an unfavorable volume variance?
14. Does the volume variance convey any meaningful information to managers?
15. Which do you think is more important for control of fixed overhead costs: the spending variance or the volume variance? Explain.

## Multiple-Choice Exercises

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**21-1** For performance reporting, it is best to compare actual costs with budgeted costs using:

- a. flexible budgets.
- b. static budgets.
- c. master budgets.
- d. short-term budgets.
- e. none of the above.

**21-2** To create a meaningful performance report, actual costs and expected costs should be compared:

- a. at the budgeted level of activity.
- b. weekly.
- c. at the actual level of activity.
- d. at the average level of activity.
- e. hourly.

**21-3** To help deal with uncertainty, managers should use:

- a. a static budget.
- b. a master budget.
- c. an after-the-fact flexible budget.
- d. a before-the-fact flexible budget.
- e. none of the above.

**21-4** To help assess performance, managers should use:

- a. a static budget.
- b. a master budget.
- c. an after-the-fact flexible budget.
- d. a before-the-fact flexible budget.
- e. none of the above.

**21-5** A firm comparing the actual variable costs of producing 10,000 units with the total variable costs of a static budget based on 9,000 units would probably see:

- a. no variances.
- b. small favorable variances.
- c. small unfavorable variances.
- d. large favorable variances.
- e. large unfavorable variances.

**21-6 The total variable overhead variance is the difference between:**

- a. the budgeted variable overhead and the actual variable overhead.
- b. the actual variable overhead and the applied variable overhead.
- c. the budgeted variable overhead and the applied variable overhead.
- d. the applied variable overhead and the budgeted total overhead.
- e. none of the above.

**21-7 A variable overhead spending variance can occur because:**

- a. prices for individual overhead items have increased.
- b. prices for individual overhead items have decreased.
- c. more of an individual overhead item was used than expected.
- d. less of an individual overhead item was used than expected.
- e. all of the above.

**21-8 Because the calculation of both variances is based on direct labor hours, an unfavorable labor efficiency variance implies that:**

- a. the variable overhead efficiency variance will also be unfavorable.
- b. the variable overhead efficiency variance will be favorable.
- c. there will be no variable overhead efficiency variance.
- d. the variable overhead spending variance will be unfavorable.
- e. the variable overhead is overapplied.

**21-9 The total variable overhead variance can be expressed as the sum of:**

- a. the underapplied variable overhead and the spending variance.
- b. the efficiency variance and the overapplied variable overhead.
- c. the spending and efficiency variances.
- d. the spending, efficiency, and volume variances.
- e. none of the above.

**21-10 In a performance report that details the spending and efficiency variances, which of the following columns will be found?**

- a. A cost formula for each item
- b. A budget for actual hours for each item
- c. A budget of standard hours for each item
- d. All of the above.
- e. Only a and b.

**21-11 The total fixed overhead variance is:**

- a. the difference between actual and budgeted fixed overhead costs.
- b. the difference between budgeted and applied fixed overhead costs.
- c. the difference between budgeted fixed and variable overhead costs.
- d. the difference between actual and applied fixed overhead costs.
- e. none of the above.

**21-12 The total fixed overhead variance can be expressed as the sum of:**

- a. the spending and efficiency variances.
- b. the spending and volume variances.
- c. the efficiency and volume variances.
- d. the flexible budget and the volume variances.
- e. none of the above.

**21-13 Because of the nature of fixed overhead items, the difference between the actual fixed overhead cost and the budgeted fixed overhead is:**

- a. likely to be small.
- b. likely to be large.
- c. usually a major concern.
- d. often attributable to labor inefficiency.
- e. none of the above.

**21-14 An unfavorable volume variance can occur because:**

- too much finished goods inventory was held.
- the company overproduced.
- the actual output was less than expected or practical capacity.
- the actual output was greater than expected or practical capacity.
- all of the above.

**21-15 Responsibility for the volume variance usually is assigned to:**

- the purchasing department.
- the receiving department.
- the shipping department.
- the manufacturing department.
- none of the above.

**21-16 In activity-based budgeting, costs are classified as variable or fixed with respect to:**

- the activity driver.
- only the units produced.
- only the units sold.
- only the direct labor hours.
- none of the above.

**21-17 Activity flexible budgeting makes it possible to:**

- predict what activity costs will be as activity output changes.
- improve traditional budgetary performance reporting.
- enhance the ability to manage activities.
- all of the above.
- only a and c.

**21-18 In activity-based budgeting, flexible budget formulas are created:**

- using only unit-level drivers.
- using only nonunit-level drivers.
- using both unit-level and nonunit-level drivers.
- using only direct labor hours.
- all of the above.

## Cornerstone Exercises

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**OBJECTIVE** > **1**  
**CORNERSTONE 21-1**

**Cornerstone Exercise 21-19 PERFORMANCE REPORT**

Dagmar Company provided the following information for last year.

<u>Master Budget</u>	<u>Actual Data</u>
Budgeted production 3,000	2,900 units
Direct materials:	
3 pounds @ 0.80 per pound	\$6,900
Direct labor:	
0.5 hr. @ \$12.00 per hour	17,340
Variable overhead:	
0.5 hr. @ \$1.50	2,200
Fixed overhead:	
Materials handling, \$6,200	6,300
Depreciation, \$2,600	2,600

**Required:**

1. Calculate the budgeted amounts for each cost category listed above for the 3,000 budgeted units.
2. Prepare a performance report using a budget based on expected production.

**Cornerstone Exercise 21-20 FLEXIBLE BUDGET WITH DIFFERENT LEVELS OF PRODUCTION****OBJECTIVE** > **1**  
**CORNERSTONE 21-2**

Dagmar Company budgeted the following amounts:

Variable costs of production:	
Direct materials	3 pounds @ 0.80 per pound
Direct labor	0.5 hr. @ \$12.00 per hour
Variable overhead	0.5 hr. @ \$1.50
Fixed overhead:	
Materials handling	\$6,200
Depreciation	\$2,600

**Required:**

Prepare a flexible budget for 2,500 units, 3,000 units, and 3,500 units.

**Cornerstone Exercise 21-21 PERFORMANCE REPORT****OBJECTIVE** > **1**  
**CORNERSTONE 21-3**

Dagmar Company budgeted the following amounts:

Variable costs of production:	
Direct materials	3 pounds @ 0.80 per pound
Direct labor	0.5 hr. @ \$12.00 per hour
Variable overhead	0.5 hr. @ \$1.50
Fixed overhead:	
Materials handling	\$6,200
Depreciation	\$2,600

At the end of the year, Dagmar had the following actual costs for production of 2,900 units:

Direct materials	\$ 6,900
Direct labor	17,340
Variable overhead	2,200
Fixed overhead:	
Materials handling	6,300
Depreciation	2,600

**Required:**

Prepare a performance report using a budget based on the actual level of production.

**Cornerstone Exercise 21-22 TOTAL VARIABLE OVERHEAD VARIANCE****OBJECTIVE** > **2**  
**CORNERSTONE 21-4**

A company showed the following information for the year:

Standard variable overhead rate (SVOR) per direct labor hour	\$4.50
Standard hours (SH) allowed per unit	3
Actual production	12,000
Actual variable overhead costs	\$163,172
Actual direct labor hours	36,100

**Required:**

1. Calculate the actual variable overhead rate (AVOR).
2. Calculate the applied variable overhead.
3. Calculate the total variable overhead variance.

**OBJECTIVE** > **2**  
**CORNERSTONE 21-5**
**Cornerstone Exercise 21-23 VARIABLE OVERHEAD SPENDING AND EFFICIENCY VARIANCES, COLUMNAR AND FORMULA APPROACHES**

A company provided the following information:

Standard variable overhead rate ( <i>SVOR</i> ) per direct labor hour	\$4.50
Actual variable overhead rate ( <i>AVOR</i> ) per direct labor hour	\$4.52
Actual direct labor hours worked ( <i>AH</i> )	36,100
Actual production in units	12,000
Standard hours allowed for actual units produced ( <i>SH</i> )	36,000

**Required:**

- Using the columnar approach, calculate the variable overhead spending and efficiency variances.
- Using the formula approach, calculate the variable overhead spending variance.
- Using the formula approach, calculate the variable overhead efficiency variance.
- Calculate the total variable overhead variance.

**OBJECTIVE** > **2**  
**CORNERSTONE 21-6**
**Cornerstone Exercise 21-24 PERFORMANCE REPORT FOR VARIABLE VARIANCES**

A company provided the following information:

Standard variable overhead rate ( <i>SVOR</i> ) per direct labor hour	\$4.50
Actual variable overhead costs:	
Inspection	\$66,722
Power	\$96,450
Actual direct labor hours worked ( <i>AH</i> )	36,100
Actual production in units	12,000
Standard hours allowed for actual units produced ( <i>SH</i> )	36,000
Variable overhead:	
Inspection	3 hours @ \$1.80
Power	3 hours @ \$2.70

**Required:**

Prepare a performance report that shows the variances for each variable overhead item (inspection and power).

**OBJECTIVE** > **3**  
**CORNERSTONE 21-7**
**Cornerstone Exercise 21-25 TOTAL FIXED OVERHEAD VARIANCE**

A company provided the following data:

Standard fixed overhead rate ( <i>SFOR</i> )	\$7 per direct labor hour
Actual fixed overhead costs	\$250,895
Standard hours allowed per unit	3 hours
Actual production	12,000 units

**Required:**

- Calculate the standard hours allowed for actual production.
- Calculate the applied fixed overhead.
- Calculate the total fixed overhead variance.

**OBJECTIVE** > **3**  
**CORNERSTONE 21-8**
**Cornerstone Exercise 21-26 FIXED OVERHEAD SPENDING AND VOLUME VARIANCES, COLUMNAR AND FORMULA APPROACHES**

A company provided the following information:

Standard fixed overhead rate ( <i>SFOR</i> ) per direct labor hour	\$7.00
Actual fixed overhead rate ( <i>AFOR</i> ) per direct labor hour	\$6.95
Actual direct labor hours worked ( <i>AH</i> )	36,100
Actual production in units	12,000
Standard hours allowed for actual units produced ( <i>SH</i> )	36,000

**Required:**

- Using the columnar approach, calculate the fixed overhead spending and efficiency variances.
- Using the formula approach, calculate the fixed overhead spending variance.
- Using the formula approach, calculate the fixed overhead efficiency variance.
- Calculate the total fixed overhead variance.

**Cornerstone Exercise 21-27 STATIC BUDGET FOR AN ACTIVITY****OBJECTIVE** > 4

Jefferson Company decided to look more closely at the inspection activity in its factory. The following information for a year was collected:

**CORNERSTONE 21-9**

Demand for inspections: 130,000

Resources needed:

- 7 inspectors, capable of inspecting 20,000 units per year. Salary is \$35,000 each.
- Supplies (small tools, oil, rags) expected to cost \$0.60 per inspection.
- Workbenches, computers, etc., depreciation: \$16,700 per year.
- Factory space for the inspection station, utilities: \$13,400 per year.

**Required:**

Prepare a static budget for the inspection activity for the year.

**Cornerstone Exercise 21-28 ACTIVITY FLEXIBLE BUDGET****OBJECTIVE** > 4

Cohlma Company provided information on the following four overhead activities.

**CORNERSTONE 21-10**

Activity	Driver	Fixed Cost	Variable Rate
Maintenance	Machine hours	\$40,000	\$ 2.50
Machining	Machine hours	25,000	3.00
Setting up	Setups	—	2,250
Purchasing	Purchase Orders	75,000	6.00

Cohlma has found that the following driver levels are associated with two different levels of production.

Driver	40,000 units	60,000 units
Machine hours	60,000	90,000
Setups	50	70
Purchase orders	10,000	16,000

**Required:**

Prepare an activity-based flexible budget.

**Cornerstone Exercise 21-29 ACTIVITY-BASED PERFORMANCE REPORT****OBJECTIVE** > 4

Cohlma Company produced 32,000 units last year. The information on the actual costs and budgeted costs at actual production of four activities is provided below.

**CORNERSTONE 21-11**

Activity	Actual Cost	Budgeted Cost for Actual Production
Maintenance	\$187,300	\$190,000
Machining	204,000	205,000
Setting up	114,000	112,500
Purchasing	135,300	135,000

**Required:**

Prepare an activity-based performance report for the four activities for the past year.

## Exercises

### OBJECTIVE > 1 Exercise 21-30 PERFORMANCE REPORT

Master Budget	Actual Data
Budgeted production: 2,500	Actual production: 2,600 units
Materials:	
2 leather strips @ \$3.00	Materials cost: \$15,250
Labor:	
0.5 hr. @ \$12.00	Labor cost: \$16,000

#### Required:

1. Prepare a performance report using a budget based on expected production.
2. Comment on the limitations of this report.

### OBJECTIVE > 1 Exercise 21-31 FLEXIBLE BUDGET FOR VARIOUS LEVELS OF PRODUCTION



Budgeted amounts for the year:

Materials	2 leather strips @ \$3.00
Labor	0.5 hr. @ \$12.00
Variable overhead	0.5 hr. @ \$1.00
Fixed overhead	\$4,500

#### Required:

1. Prepare a flexible budget for 2,000, 3,000, and 4,000 units.
2. Calculate the unit cost at 2,000, 3,000, and 4,000 units. What happens to unit cost as the number of units produced increases?

### OBJECTIVE > 1 Exercise 21-32 FLEXIBLE BUDGET FOR VARIOUS LEVELS OF ACTIVITY

CHC, Inc., produces a variety of shampoos, conditioners, and hair care products. CHC's controller has developed standard costs for the following four overhead items:

Overhead Item	Total Fixed Cost	Variable Rate per Direct Labor Hour
Maintenance	\$165,000	\$0.30
Power		0.40
Indirect labor	126,500	1.80
Rent	28,000	

Next year, CHC expects production to require 150,000 direct labor hours.

#### Required:

1. Prepare an overhead budget for the expected level of direct labor hours for the coming year.
2. Prepare an overhead budget that reflects production that is 15 percent higher than expected, and for production that is 15 percent lower than expected.

### OBJECTIVE > 1 Exercise 21-33 PERFORMANCE REPORT BASED ON ACTUAL PRODUCTION

Refer to the information provided in Exercise 21-32. Assume that CHC's actual production required 156,000 direct labor hours at standard. The actual overhead costs incurred were as follows:

Maintenance	\$207,800
Power	63,000
Indirect labor	435,000
Rent	28,000

**Required:**

Prepare a performance report for the period based on actual production.

**Exercise 21-34 VARIABLE OVERHEAD VARIANCES, SERVICE COMPANY****OBJECTIVE** > 2

Joven Inc. operates a delivery service for over 70 restaurants. The corporation has a fleet of vehicles and has invested in a sophisticated, computerized communications system to coordinate its deliveries. Joven has gathered the following actual data on last year's delivery operations:

Deliveries made	42,000
Direct labor	30,000 direct labor hours @ \$7.00
Actual variable overhead	\$138,000

Joven employs a standard costing system. During the year, a variable overhead rate of \$4.05 per hour was used. The labor standard requires 0.75 hour per delivery.

**Required:**

1. Compute the standard hours allowed for actual deliveries made last year.
2. Compute the variable overhead spending and efficiency variances.

**Exercise 21-35 FIXED OVERHEAD VARIANCES****OBJECTIVE** > 3

Refer to **Exercise 21-34**. Assume that the actual fixed overhead was \$420,000. Budgeted fixed overhead was \$405,000, based on practical capacity of 33,750 direct labor hours.

**Required:**

1. Calculate the standard fixed overhead rate based on budgeted fixed overhead and practical capacity.
2. Compute the fixed overhead spending and volume variances.

**Exercise 21-36 OVERHEAD VARIANCES****OBJECTIVE** > 2 3

At the beginning of the year, Raydom Company had the following standard cost sheet for one of its chemical products:

Direct materials (5 lbs. @ \$6.40)	\$32.00
Direct labor (2 hrs. @ \$18.00)	36.00
Fixed overhead (2 hrs. @ \$4.00)	8.00
Variable overhead (2 hrs. @ \$1.50)	3.00
Standard cost per unit	<u>\$79.00</u>



Raydom computes its overhead rates using practical volume, which is 144,000 units. The actual results for the year are as follows:

- a. Units produced: 140,000
- b. Direct labor: 290,000 hours at \$9.05
- c. Fixed overhead: \$1,160,000
- d. Variable overhead: \$436,000

**Required:**

1. Compute the variable overhead spending and volume variances.
2. Compute the fixed overhead spending and efficiency variances.

**Exercise 21-37 OVERHEAD APPLICATION, FIXED AND VARIABLE OVERHEAD VARIANCES****OBJECTIVE** > 2 3

Tules Company is planning to produce 2,400,000 power drills for the coming year. The company uses direct labor hours to assign overhead to products. Each drill requires 0.5 standard hour of labor for completion. The total budgeted overhead was \$2,700,000. The total fixed overhead budgeted for the coming year is \$1,320,000. Predetermined

overhead rates are calculated using expected production, measured in direct labor hours. Actual results for the year are:

Actual production (units)	2,360,000
Actual direct labor hours	1,190,000
Actual variable overhead	\$1,410,000
Actual fixed overhead	\$1,260,000

**Required:**

1. Compute the applied fixed overhead.
2. Compute the fixed overhead spending and efficiency variances.
3. Compute the applied variable overhead.
4. Compute the variable overhead spending and volume variances.

**OBJECTIVE** > **2** **3**

**Exercise 21-38 OVERHEAD APPLICATION, FIXED AND VARIABLE VARIANCES**

Messner Company is planning to produce 280,000 units for the coming year. The company uses direct labor hours to assign overhead to products. Each unit requires 0.9 standard hour of labor for completion. The total variable overhead budgeted was \$801,360. The total fixed overhead budgeted for the coming year is \$1,386,000. Predetermined overhead rates are calculated using direct labor hours based on expected production. Actual results for the year are:

Actual production (units)	291,000
Actual direct labor hours	259,000
Actual fixed overhead	\$1,410,000
Actual variable overhead	\$829,000

**Required:**

1. Compute the fixed overhead rate.
2. Compute the applied fixed overhead.
3. Compute the fixed overhead spending and volume variances.
4. Compute the applied variable overhead.
5. Compute the variable overhead spending and efficiency variances.

**OBJECTIVE** > **1**

**Exercise 21-39 PERFORMANCE REPORT FOR VARIABLE OVERHEAD VARIANCES**

Minihan Company had the data below for its most recent year, ending December 31:

Actual costs:		Variable overhead standards:	
Indirect labor	\$29,800	Indirect labor	0.25 hr. @ \$15.00
Supplies	\$2,200	Supplies	0.25 hr. @ \$1.00
Actual hours worked	2,080 hours	Standard variable overhead rate	\$16.00 per direct labor hour
Units produced	8,000 units		
Hours allowed for production	2,000 hours		

**Required:**

Prepare a performance report that shows the variances on an item-by-item basis.

**OBJECTIVE** > **4**

**Exercise 21-40 ACTIVITY-BASED BUDGETING**

Usry Company decided to look more closely at the materials receiving activity in its factory. The driver for receiving is the number of receiving orders. The following information for a year was collected:

Demand for receiving orders: 130,000  
Resources needed:

- 4 workers, capable of completing 35,000 receiving orders per year. (The completion of a receiving order requires unloading the materials onto the receiving dock, checking the receiving order against the purchase order and invoice, and carrying the materials to the materials storeroom.) Salary is \$30,000 for each worker.
- Supplies (paper, grease markers, small tools, rags) expected to cost \$0.50 per receiving order.
- Workbenches, dollies, computers, etc., depreciation: \$5,800 per year.
- Space for the receiving dock, utilities, \$10,400 per year.

**Required:**

- Prepare a static budget for the receiving activity for the year.
- Calculate the cost per receiving order based on annual demand for receiving orders.

**Exercise 21-41 ACTIVITY FLEXIBLE BUDGET****OBJECTIVE** > **4**

Pulaski Company provided information on the following three overhead activities.

Activity	Driver	Fixed Cost	Variable Rate
Engineering	Engineering hours	\$50,000	\$5.50
Machining	Machine hours	25,000	2.00
Receiving	Receiving orders	43,000	5.60

Pulaski has found that the following driver levels are associated with two different levels of production.

Driver	40,000 units	50,000 units
Engineering hours	500	750
Machine hours	60,000	75,000
Receiving orders	12,000	16,000

**Required:**

Prepare an activity-based flexible budget for the two levels of activity.

**Exercise 21-42 ACTIVITY-BASED PERFORMANCE REPORT****OBJECTIVE** > **4**

Eggars produced 572,000 units last year. The information on the actual costs and budgeted costs at actual production of four activities follows.

Activity	Actual Cost	Budgeted Cost for Actual Production
Maintenance	\$365,300	\$360,000
Machining	290,500	289,800
Setting up	209,500	210,000
Purchasing	137,750	140,600

**Required:**

Prepare an activity-based performance report for the four activities for the past year.

## Problems

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**Problem 21-43 OVERHEAD BUDGET FOR A PARTICULAR LEVEL OF ACTIVITY****OBJECTIVE** > **1**

Regina Johnson, controller for Pet-Care Company, has been instructed to develop a flexible budget for overhead costs. The company produces two types of dog food. One, BasicDiet, is a standard mixture for healthy dogs. The second, SpecialDiet, is a reduced protein formulation for older dogs with health problems. The two dog foods use common raw materials in different proportions. The company expects to produce 100,000 bags of each product during the coming year. BasicDiet requires 0.25 direct labor hour



per bag, and SpecialDiet requires 0.30 direct labor hours per bag. Regina has developed the following fixed and variable costs for each of the four overhead items:

Overhead Item	Fixed Cost	Variable Rate per Direct Labor Hour
Maintenance	\$17,000	\$0.40
Power		0.50
Indirect labor	26,500	1.60
Rent	18,000	

**Required:**

1. Calculate the total direct labor hours required for the production of 100,000 bags of BasicDiet and 100,000 bags of SpecialDiet.
2. Prepare an overhead budget for the expected activity level (calculated in Requirement 1) for the coming year.

**OBJECTIVE** > **1** **Problem 21-44 FLEXIBLE BUDGET FOR VARIOUS PRODUCTION LEVELS**

Refer to the information provided in **Problem 21-43**.

**Required:**

1. Calculate the direct labor hours required for production that is 10 percent higher than expected. Calculate the direct labor hours required for production that is 20 percent lower than expected.
2. Prepare an overhead budget that reflects production that is 10 percent higher than expected, and for production that is 20 percent lower than expected. (Hint: Use total direct labor hours calculated in Requirement 1.)

**OBJECTIVE** > **1** **Problem 21-45 PERFORMANCE REPORT BASED ON ACTUAL PRODUCTION**

Refer to the information provided in **Problem 21-43**. Assume that Pet-Care actually produced 120,000 bags of BasicDiet and 100,000 bags of SpecialDiet. The actual overhead costs incurred were as follows:

Maintenance	\$ 40,500
Indirect labor	119,000
Power	31,700
Rent	18,000

**Required:**

1. Calculate the number of direct labor hours budgeted for actual production of the two products.
2. Prepare a performance report for the period based on actual production.
3. Based on the report, would you judge any of the variances to be significant? Can you think of some possible reasons for the variances?

**OBJECTIVE** > **1** **Problem 21-46 OVERHEAD BUDGET, FLEXIBLE BUDGET**

Blazer Company manufactures machine parts in its Prague plant. Blazer has developed the following flexible budget for overhead for the coming year. Activity level is measured in direct labor hours.

	Variable Cost Formula	Activity Level (hours)		
		14,000	21,000	28,000
Variable costs:				
Maintenance	\$3.70	\$ 51,800	\$ 77,700	\$103,600
Supplies	2.68	37,520	56,280	75,040
Power	0.06	840	1,260	1,680
Total variable costs	<u>\$6.44</u>	<u>\$ 90,160</u>	<u>\$135,240</u>	<u>\$180,320</u>

Variable Cost Formula	Activity Level (hours)		
	14,000	21,000	28,000
Fixed costs:			
Depreciation	\$ 14,700	\$ 14,700	\$ 14,700
Salaries	75,000	75,000	75,000
Total fixed costs	<u>\$ 89,700</u>	<u>\$ 89,700</u>	<u>\$ 89,700</u>
Total overhead costs	<u>\$179,860</u>	<u>\$224,940</u>	<u>\$270,020</u>

The Prague plant produces two different types of parts. The production budget for November is 50,000 units for Part Q19 and 20,000 units for Part R08. Part Q19 requires 6 minutes of direct labor time, and Part R08 requires 36 minutes. Fixed overhead costs are incurred uniformly throughout the year.

**Required:**

1. Calculate the number of direct labor hours needed in November to produce Part Q19 and the number of direct labor hours needed in November to produce Part R08. What are the total direct labor hours budgeted for November?
2. Prepare an overhead budget for November. (Hint: The budgeted fixed costs given are for the year.)

**Problem 21-47 KICKER SPEAKERS, BEFORE-THE-FACT FLEXIBLE BUDGETING, FLEXIBLE BUDGETING FOR THE NEW SOLO X18 MODEL**

**OBJECTIVE** > 1



Stillwater Designs is considering a new Kicker speaker model: Solo X18, which is a large and expensive subwoofer (projected price is \$760 to distributors). The company controls the design specifications of the model and contracts with manufacturers in mainland China to produce the model. Stillwater Designs pays the freight and custom duties. The product is shipped to Stillwater and then sold to distributors throughout the United States.

The market for this type of subwoofer is small and competitive. It is expected to have a 3-year life cycle. Market test reviews were encouraging. One potential customer noted that the speaker could make a deaf person hear again. Another remarked that the bass could be heard two miles away. Another customer was simply impressed by the size and watts of the subwoofer (a maximum of 10,000 watts capability). Encouraged by the results of market tests, the Product Steering Committee also wanted to review the financial analysis. The projected revenues and costs at three levels of sales volume are as follows (for the 3-year life cycle):

	Pessimistic	Most Likely	Optimistic
Sales volume (units)	<u>72,000</u>	<u>150,000</u>	<u>250,000</u>
Variable costs (total):			
Acquisition cost	\$43,200,000	\$ 90,000,000	\$150,000,000
Freight	4,320,000	9,000,000	15,000,000
Duties	1,800,000	3,750,000	6,250,000
Total	<u>\$49,320,000</u>	<u>\$102,750,000</u>	<u>\$171,250,000</u>
Fixed costs (total):			
Engineering (R&D)	\$10,000,000	\$ 10,000,000	\$ 10,000,000
Overhead	3,000,000	3,000,000	3,000,000
Total	<u>\$13,000,000</u>	<u>\$ 13,000,000</u>	<u>\$ 13,000,000</u>

**Required:**

1. Prepare flexible budget formulas for the cost items listed for the Solo X18 model. Also, provide a flexible budget formula for total costs.
2. Prepare an income statement for each of the three levels of sales volume. Discuss the value of before-the-fact flexible budgeting and relate this to the current example.
3. Form a group with two to four other students. Assume that the group is acting as a Product Steering Committee. Evaluate the feasibility of producing the Solo X18

model (using the given financial data and the results of Requirements 1 and 2.) If the financial performance of the model is questionable, discuss possible courses of action that the company might take to improve the financial performance of the product. Also, discuss some reasons why the company might wish to produce the model even if it does not promise a good financial return.

**OBJECTIVE** > **1** **Problem 21-48 FLEXIBLE BUDGETING**

Quarterly budgeted overhead costs for two different levels of activity follow. The 2,000 level was the expected level from the master budget.

	Cost Formula (\$)		Direct Labor Hours	
	Fixed	Variable	1,000 Hours	2,000 Hours
Maintenance	4,000	6.00	\$10,000	\$16,000
Depreciation	5,000	—	5,000	5,000
Supervision	15,000	—	15,000	15,000
Supplies	—	1.40	1,400	2,800
Power	—	0.75	750	1,500
Other	8,000	0.10	8,100	8,200

The actual activity level was 1,650 hours.

**Required:**

1. Prepare a flexible budget for an activity level of 1,650 direct labor hours.
2. Suppose that all of the formulas for each item are missing. You only have the budgeted costs for each level of activity. Show how you can obtain the formulas for each item by using the information given for the budgeted costs for the two levels.

**OBJECTIVE** > **1** **Problem 21-49 FLEXIBLE BUDGETING**



Fruta Inc. purchases fruit from numerous growers and packs fruit boxes and fruit baskets for sale. Fruta has developed the following flexible budget for overhead for the coming year. Activity level is measured in direct labor hours.

		Activity Level (hours)		
		2,000	2,500	3,000
Variable costs:				
Maintenance	\$0.80	\$ 1,600	\$ 2,000	\$ 2,400
Supplies	0.20	400	500	600
Power	0.40	800	1,000	1,200
Total variable costs	<u>\$1.40</u>	<u>\$ 2,800</u>	<u>\$ 3,500</u>	<u>\$ 4,200</u>
Fixed costs:				
Depreciation		\$ 4,800	\$ 4,800	\$ 4,800
Salaries		18,000	18,000	18,000
Total fixed costs		<u>\$22,800</u>	<u>\$22,800</u>	<u>\$22,800</u>
Total overhead costs		<u>\$25,600</u>	<u>\$26,300</u>	<u>\$27,000</u>

**Required:**

1. Prepare an overhead budget for May.
2. The Cushing High School Parent–Teacher Organization ordered 200 gift baskets from Fruta to be given to high school teachers and support staff as a thank you for a successful school year. These gift baskets must be ready by May 31 and were not included in the original production budget for May. Without preparing a new overhead budget, what is Fruta's new total budgeted overhead for May?

**OBJECTIVE** > **1** **Problem 21-50 PERFORMANCE REPORTING**

Fernando's is a hole-in-the-wall sandwich shop just off the State University campus. Customers enter off the street into a small counter area to order one of 10 varieties of

sandwiches and a soft drink. All orders must be taken out because there is no space for dining in.

The owner of Fernando's is Luis Azaria, son of Fernando Azaria who founded the shop. Luis is attempting to construct a series of budgets. He has accumulated the following information:

- The average sandwich (which sells for \$4.50) requires 1 roll, 4 ounces of meat, 2 ounces of cheese, 0.05 head of lettuce, 0.25 of a tomato, and a healthy squirt (1 ounce) of secret sauce. (We can't reveal the recipe here, but it includes Serrano pepper and hoisin sauce.)
- Each customer typically orders one soft drink (average price \$1.50) consisting of a cup and 12 ounces of soda. Refills on the soda are free, but this offer is seldom taken advantage of because the typical customer carries his/her sandwich and soda back to the office or common area.
- Use of paper supplies (napkins, bag, sandwich wrap, cups) varies somewhat from customer to customer but averages \$1,650 per month.
- Fernando's is open for two 4-hour shifts. The noon shift on Monday through Friday requires two workers earning \$10 per hour. The evening shift is only worked on Friday, Saturday, and Sunday nights. The two evening shift employees also earn \$10 per hour. There are 4.3 weeks in a month.
- Rent is \$575 per month. Other monthly cash expenses average \$1,800.
- Food costs are:

Meat	\$7.00/lb
Cheese	\$6.00/lb
Rolls	\$28.80/gross
Lettuce (a box contains 24 heads)	\$12.00/box
Tomatoes (a box contains about 20 tomatoes)	\$4/box
Secret sauce	\$6.40/gallon
Soda (syrup and carbonated water)	\$2.56/gallon

In a normal month when school is in session, Fernando's sells 5,000 sandwiches and 5,000 sodas. In October, State U holds its homecoming celebration. Therefore, Luis figured that if he added a noon shift on Saturday and Sunday of homecoming weekend, October sales would be 30 percent higher than normal. To advertise his noon shifts during homecoming weekend, Luis bought cups emblazoned with the State U Homecoming schedule. This added \$200 to paper costs for the month. Last year, he added two additional shifts, and his sales goal was realized.

#### Required:

- Prepare a flexible budget for a normal school month.
- Prepare a flexible budget for October.
- Do you think it was worthwhile for Luis to add the additional shifts for homecoming weekend last October?

#### Problem 21-51 FUNCTIONAL VERSUS ACTIVITY FLEXIBLE BUDGETING

#### OBJECTIVE > 1 4

Amy Bunker, production manager, was upset with the latest performance report, which indicated that she was \$100,000 over budget. Given the efforts that she and her workers had made, she was confident that they had met or beat the budget. Now she was not only upset but also genuinely puzzled over the results. Three items—direct labor, power, and setups—were over budget. The actual costs for these three items follow:

Direct labor	\$210,000
Power	135,000
Setups	140,000
Total	<u>\$485,000</u>

Amy knew that her operation had produced more units than originally had been budgeted so more power and labor had naturally been used. She also knew that the

uncertainty in scheduling had led to more setups than planned. When she pointed this out to Gary Grant, the controller, he assured her that the budgeted costs had been adjusted for the increase in productive activity. Curious, Amy questioned Gary about the methods used to make the adjustment.

**Gary:** If the actual level of activity differs from the original planned level, we adjust the budget by using budget formulas—formulas that allow us to predict the costs for different levels of activity.

**Amy:** The approach sounds reasonable. However, I'm sure something is wrong here. Tell me exactly how you adjusted the costs of direct labor, power, and setups.

**Gary:** First, we obtain formulas for the individual items in the budget by using the method of least squares. We assume that cost variations can be explained by variations in productive activity where activity is measured by direct labor hours. Here is a list of the cost formulas for the three items you mentioned. The variable X is the number of direct labor hours.

$$\begin{aligned}\text{Direct labor cost} &= \$10X \\ \text{Power cost} &= \$5,000 + \$4X \\ \text{Setup cost} &= \$100,000\end{aligned}$$

**Amy:** I think I see the problem. Power costs don't have a lot to do with direct labor hours. They have more to do with machine hours. As production increases, machine hours increase more rapidly than direct labor hours. Also, . . .

**Gary:** You know, you have a point. The coefficient of determination for power cost is only about 50 percent. That leaves a lot of unexplained cost variation. The coefficient for labor, however, is much better—it explains about 96 percent of the cost variation. Setup costs, of course, are fixed.

**Amy:** Well, as I was about to say, setup costs also have little to do with direct labor hours. And I might add that they certainly are not fixed—at least not all of them. We had to do more setups than our original plan called for because of the scheduling changes. And we have to pay our people when they work extra hours. It seems like we are always paying overtime. I wonder if we simply do not have enough people for the setup activity. Also, there are supplies that are used for each setup, and these are not cheap. Did you build these extra costs of increased setup activity into your budget?

**Gary:** No, we assumed that setup costs were fixed. I see now that some of them could vary as the number of setups increases. Amy, let me see if I can develop some cost formulas based on better explanatory variables. I'll get back to you in a few days.

Assume that after a few days' work, Gary developed the following cost formulas, all with a coefficient of determination greater than 90 percent:

$$\begin{aligned}\text{Direct labor cost} &= \$10X, \text{ where } X = \text{Direct labor hours} \\ \text{Power cost} &= \$68,000 + 0.9Y, \text{ where } Y = \text{Machine hours} \\ \text{Setup cost} &= \$98,000 + \$400Z, \text{ where } Z = \text{Number of setups}\end{aligned}$$

The actual measure of each activity driver is as follows:

Direct labor hours	20,000
Machine hours	90,000
Number of setups	110

**Required:**

1. Prepare a performance report for direct labor, power, and setups using the direct labor-based formulas.
2. Prepare a performance report for direct labor, power, and setups using the multiple cost driver formulas that Gary developed.
3. Of the two approaches, which provides the more accurate picture of Amy's performance? Why?

**Problem 21-52 ACTIVITY FLEXIBLE BUDGETING****OBJECTIVE** > **4**

Billy Adams, controller for Westcott, Inc., prepared the following budget for manufacturing costs at two different levels of activity for 2010:

**DIRECT LABOR HOURS**

	Level of Activity	
	50,000	100,000
Direct materials	\$300,000	\$ 600,000
Direct labor	200,000	400,000
Depreciation (plant)	100,000	100,000
Subtotal	<u>\$600,000</u>	<u>\$1,100,000</u>

**MACHINE HOURS**

	Level of Activity	
	200,000	300,000
Maintaining equipment	\$ 360,000	\$ 510,000
Machining	112,000	162,000
Subtotal	<u>\$ 472,000</u>	<u>\$ 672,000</u>

**MATERIAL MOVES**

	Level of Activity	
	20,000	40,000
Materials handling	<u>\$165,000</u>	<u>\$290,000</u>

**NUMBER OF BATCHES INSPECTED**

	Level of Activity	
	100	200
Inspecting products	\$ 125,000	\$ 225,000
Total	<u>\$1,362,000</u>	<u>\$2,287,000</u>

During 2009, Westcott employees worked a total of 80,000 direct labor hours, used 250,000 machine hours, made 32,000 moves, and performed 120 batch inspections. The following actual costs were incurred:

Direct materials	\$440,000
Direct labor	355,000
Depreciation	100,000
Maintenance	425,000
Machining	142,000
Materials handling	232,500
Inspecting products	160,000

Westcott applies overhead using rates based on direct labor hours, machine hours, number of moves, and number of batches. The second level of activity (the far right column in the preceding table) is the practical level of activity (the available activity for resources acquired in advance of usage) and is used to compute predetermined overhead pool rates.

**Required:**

1. Prepare a performance report for Westcott's manufacturing costs in 2010.
2. Assume that one of the products produced by Westcott is budgeted to use 10,000 direct labor hours, 15,000 machine hours, and 500 moves and will be produced in five batches. A total of 10,000 units will be produced during the year. Calculate the budgeted unit manufacturing cost.
3. One of Westcott's managers said the following: "Budgeting at the activity level makes a lot of sense. It really helps us manage costs better. But this budget really needs to provide more detailed information. For example, I know that the materials handling activity involves the usage of forklifts and operators, and this information is lost with simply reporting the total cost of the activity for various levels of output. We have four forklifts, each capable of providing 10,000 moves per year. We lease these forklifts for five years, at \$10,000 per year. Furthermore, for our two shifts, we need up to eight operators if we run all four forklifts. Each operator is paid a salary of \$30,000 per year. Also, I know that fuel costs us about \$0.25 per move."

Based on these comments, explain how this additional information may help Westcott to better manage its costs. Also, assuming that these are the only three items, expand the detail of the flexible budget for materials handling to reveal the cost of these three resource items for 20,000 moves and 40,000 moves, respectively. You may wish to review the concepts of flexible, committed, and discretionary resources found in Chapter 14.

**OBJECTIVE** > **1** **Problem 21-53 FLEXIBLE BUDGETING**

At the beginning of last year, Jean Bingham, controller for Thorpe Inc., prepared the following budget for conversion costs at two levels of activity for the coming year:

	<u>Direct Labor Hours</u>	
	<u>100,000</u>	<u>120,000</u>
Direct labor	\$1,000,000	\$1,200,000
Supervision	180,000	180,000
Utilities	18,000	21,000
Depreciation	225,000	225,000
Supplies	25,000	30,000
Maintenance	240,000	284,000
Rent	120,000	120,000
Other	60,000	70,000
Total manufacturing cost	<u>\$1,868,000</u>	<u>\$2,130,000</u>

During the year, the company worked a total of 112,000 direct labor hours and incurred the following actual costs:

Direct labor	\$963,200
Supervision	190,000
Utilities	20,500
Depreciation	225,000
Supplies	24,640
Maintenance	237,000
Rent	120,000
Other	60,500

Thorpe applied overhead on the basis of direct labor hours. Normal volume of 120,000 direct labor hours is the activity level to be used to compute the predetermined overhead rate.

**Required:**

1. Determine the cost formula for each of Thorpe's conversion costs. (Hint: Use the high-low method.)

2. Prepare a performance report for Thorpe's conversion costs for last year. Should any cost item be given special attention? Explain.

### Problem 21-54 OVERHEAD APPLICATION, OVERHEAD VARIANCES

OBJECTIVE > 2 3

Tavera Company uses a standard cost system. The direct labor standard indicates that six direct labor hours should be used for every unit produced. Tavera produces one product. The normal production volume is 120,000 units of this product. The budgeted overhead for the coming year is as follows:

Fixed overhead	\$2,160,000*
Variable overhead	1,440,000
* At normal volume.	

Tavera applies overhead on the basis of direct labor hours. During the year, Tavera produced 119,000 units, worked 731,850 direct labor hours, and incurred actual fixed overhead costs of \$2.25 million and actual variable overhead costs of \$1.425 million.

#### Required:

1. Calculate the standard fixed overhead rate and the standard variable overhead rate.
2. Compute the applied fixed overhead and the applied variable overhead. What is the total fixed overhead variance? Total variable overhead variance?
3. Break down the total fixed overhead variance into a spending variance and a volume variance. Discuss the significance of each.
4. Compute the variable overhead spending and efficiency variances. Discuss the significance of each.
5. Journal entries for overhead variances were not discussed in this chapter. Typically, the overhead variance entries happen at the end of the year. Assume that applied fixed (variable) overhead is accumulated on the credit side of the fixed (variable overhead) control account. Actual fixed (variable) overhead costs are accumulated on the debit side of the respective control accounts. At the end of the year, the balance in each control account is the total (fixed) variable variance. Create accounts for each of the four overhead variances and close out the total variances to each of these four variance accounts. These four variance accounts are then usually disposed of by closing them to Cost of Goods Sold.

Form a group with two to four other students, and prepare the journal entries that isolate the four variances. Finally, prepare the journal entries that close these variances to Cost of Goods Sold.

### Problem 21-55 OVERHEAD VARIANCE ANALYSIS

OBJECTIVE > 2 3

The Lubbock plant of Morrill's Small Motor Division produces a major subassembly for a 6.0 horsepower motor for lawn mowers. The plant uses a standard costing system for production costing and control. The standard cost sheet for the subassembly follows:



Direct materials (6.0 lbs. @ \$5.00)	\$30.00
Direct labor (1.6 hrs. @ \$12.00)	19.20
Variable overhead (1.6 hrs. @ \$10.00)	16.00
Fixed overhead (1.6 hrs. @ \$6.00)	9.60
Standard unit cost	<u>\$74.80</u>

During the year, the Lubbock plant had the following actual production activity:

- a. Production of motors totaled 50,000 units.
- b. The company used 82,000 direct labor hours at a total cost of \$1,066,000.
- c. Actual fixed overhead totaled \$556,000.
- d. Actual variable overhead totaled \$860,000.

The Lubbock plant's practical activity is 60,000 units per year. Standard overhead rates are computed based on practical activity measured in standard direct labor hours.

**Required:**

1. Compute the variable overhead spending and efficiency variances.
2. Compute the fixed overhead spending and volume variances. Interpret the volume variance. What can be done to reduce this variance?

**OBJECTIVE** > **2** **3**

**Problem 21-56 OVERHEAD VARIANCES**

Extrim Company produces monitors. Extrim's plant in San Antonio uses a standard costing system. The standard costing system relies on direct labor hours to assign overhead costs to production. The direct labor standard indicates that four direct labor hours should be used for every microwave unit produced. (The San Antonio plant produces only one model.) The normal production volume is 120,000 units. The budgeted overhead for the coming year is as follows:

Fixed overhead	\$1,286,400
Variable overhead	888,000*
* At normal volume.	

Extrim applies overhead on the basis of direct labor hours.

During the year, Extrim produced 119,000 units, worked 487,900 direct labor hours, and incurred actual fixed overhead costs of \$1.3 million and actual variable overhead costs of \$927,010.

**Required:**

1. Calculate the standard fixed overhead rate and the standard variable overhead rate.
2. Compute the applied fixed overhead and the applied variable overhead. What is the total fixed overhead variance? Total variable overhead variance?
3. Break down the total fixed overhead variance into a spending variance and a volume variance. Discuss the significance of each.
4. Compute the variable overhead spending and efficiency variances. Discuss the significance of each.

**OBJECTIVE** > **2** **3**

**Problem 21-57 INCOMPLETE DATA, OVERHEAD ANALYSIS**

Lynwood Company produces surge protectors. To help control costs, Lynwood employs a standard costing system and uses a flexible budget to predict overhead costs at various levels of activity. For the most recent year, Lynwood used a standard overhead rate of \$18 per direct labor hour. The rate was computed using practical activity. Budgeted overhead costs are \$396,000 for 18,000 direct labor hours and \$540,000 for 30,000 direct labor hours. During the past year, Lynwood generated the following data:

- a. Actual production: 100,000 units
- b. Fixed overhead volume variance: \$20,000 U
- c. Variable overhead efficiency variance: \$18,000 F
- d. Actual fixed overhead costs: \$200,000
- e. Actual variable overhead costs: \$310,000

**Required:**

1. Calculate the fixed overhead rate.
2. Determine the fixed overhead spending variance.
3. Determine the variable overhead spending variance.
4. Determine the standard hours allowed per unit of product.

**OBJECTIVE** > **1** **2** **3**

**Problem 21-58 FLEXIBLE BUDGET, OVERHEAD VARIANCES**

Shumaker Company manufactures a line of high-top basketball shoes. At the beginning of the year, the following plans for production and costs were revealed:

Pairs of shoes to be produced and sold	55,000
Standard cost per unit:	
Direct materials	\$15
Direct labor	12
Variable overhead	6
Fixed overhead	<u>3</u>
Total unit cost	<u><u>\$36</u></u>

During the year, a total of 50,000 units were produced and sold. The following actual costs were incurred:

Direct materials	\$775,000
Direct labor	590,000
Variable overhead	310,000
Fixed overhead	180,000

There were no beginning or ending inventories of raw materials. In producing the 50,000 units, 63,000 hours were worked, 5 percent more hours than the standard allowed for the actual output. Overhead costs are applied to production using direct labor hours.

#### Required:

- Using a flexible budget, prepare a performance report comparing expected costs for the actual production with actual costs.
- Determine the following:
  - Fixed overhead spending and volume variances.
  - Variable overhead spending and efficiency variances.

## Cases

### Case 21-59 FIXED OVERHEAD SPENDING AND VOLUME VARIANCES, CAPACITY MANAGEMENT

OBJECTIVE 3

Lorale Company, a producer of recreational vehicles, recently decided to begin producing a major subassembly for jet skis. The subassembly would be used by Lorele's jet ski plants and also would be sold to other producers. The decision was made to lease two large buildings in two different locations: Little Rock, Arkansas, and Athens, Georgia. The company agreed to a 11-year, renewable lease contract. The plants were of the same size, and each had 10 production lines. New equipment was purchased for each line and workers were hired to operate the equipment. The company also hired production line supervisors for each plant. A supervisor is capable of directing up to two production lines per shift. Two shifts are run for each plant. The practical production capacity of each plant is 300,000 subassemblies per year. Two standard direct labor hours are allowed for each subassembly. The costs for leasing, equipment depreciation, and supervision for a single plant are as follows (the costs are assumed to be the same for each plant):

Supervision (10 supervisors @ \$50,000)	\$ 500,000
Building lease (annual payment)	800,000
Equipment depreciation (annual)	<u>1,100,000</u>
Total fixed overhead costs*	<u><u>\$2,400,000</u></u>

\* For simplicity, assume these are the only fixed overhead costs.

After beginning operations, Lorele discovered that demand for the product in the region covered by the Little Rock plant was less than anticipated. At the end of the first year, only 240,000 units were sold. The Athens plant sold 300,000 units as

expected. The actual fixed overhead costs at the end of the first year were \$2,500,000 (for each plant).

**Required:**

1. Calculate a fixed overhead rate based on standard direct labor hours.
2. Calculate the fixed overhead spending and volume variances for the Little Rock and Athens plants. What is the most likely cause of the spending variance? Why are the volume variances different for the two plants?
3. Suppose that from now on the sales for the Little Rock plant are expected to be no more than 240,000 units. What actions would you take to manage the capacity costs (fixed overhead costs)?
4. Calculate the fixed overhead cost per subassembly for each plant. Do they differ? Should they differ? Explain. Do ABC concepts help in analyzing this issue?

**OBJECTIVE** > 1

**Case 21-60 ETHICAL CONSIDERATIONS; FLEXIBLE BUDGETING AND THE ENVIRONMENT**

Harry Johnson, the chief financial officer of Ur Thrift, Inc, a large retailer, had just finished a meeting with the Roger Swasey, the chief financial officer of the large retailer, and Connie Baker, its environmental officer. Over the years, Harry had overseen the development of a number of cost formulas that allowed Ur Thrift to budget the variable costs of a variety of items. For example, packaging for one of its private line of dolls had a cost formula of  $Y = \$2.20X$ , where  $X$  represented the number of dolls sold. The formula was used to calculate the expected packaging costs which were then compared with the actual packaging costs. Over the last several years, the actual costs and budgeted costs were virtually on target, prompting Harry to claim that packaging costs were well controlled.

Connie Baker, however, argued that the packaging costs were not well controlled. In fact, she was adamant in her view that the packaging was excessive and that by reducing the packaging, costs could be reduced and the environmental impacts reduced as well. She argued that the company had an ethical obligation to reduce environmental impacts and that cost savings would also be captured, improving the profitability of the company. As another example, Connie discussed the fleet of trucks used by Ur Thrift to move goods from its warehouses to retail outlets. The fuel cost formula was  $\$3X$ , where  $X$  represented gallons of fuel consumed. She pointed out that the performance data also revealed that fuel costs were in control. Yet her office had recently recommended the installation of an auxiliary power unit to heat and cool the cabs of the trucks during the mandatory ten-hour breaks required of its drivers, thus avoiding the need to have the engine idle during this rest period. She claimed that this would significantly reduce fuel costs and easily pay for the new auxiliary units in a short period of time.

Connie had also made some comments that caused Harry to pause and do some soul searching. She noted that the financial officers of the company should be more concerned about reducing costs than simply predicting what they should be. Thus (according to her view), cost formulas are useful only to tell us where we currently are so that they can be used to assess how to reduce costs. The so-called flexible budgets are simply a means of enforcing static standards. She also said that the company's managers had an ethical obligation to not overconsume the resources of the planet. She urged both Harry and Roger to help position the company so that it could reduce its environmental impacts.

**Required:**

1. Do financial officers have an ethical obligation to help in reducing negative environmental impacts? Identify and discuss which of the Institute of Management Accountant's ethical standards might be used to sustain this point of view. Also, describe the role that flexible budgeting may play in reducing environmental impacts.

2. Suppose that Harry and Connie embark on a cooperative effort to eliminate any excessive packaging. The projected results are impressive. The expected reductions will save \$3 million in shipping costs (\$0.50 per package), \$1.5 million in packaging materials (\$0.40 per package), 5,000 trees, and 1.25 million barrels of oil. Are there any ethical issues associated with these actions? What standards might apply?
3. Identify two potential ethical dilemmas that might surface in the use of flexible budgeting for performance evaluation (the dilemmas do not need to be connected with environmental activities).

# 22

## Performance Evaluation, Variable Costing, and Decentralization

After studying Chapter 22,  
you should be able to:

- **1** Explain how and why firms choose to decentralize.
- **2** Explain the difference between absorption and variable costing, and prepare segmented income statements.
- **3** Compute and explain return on investment.
- **4** Compute and explain residual income and economic value added.
- **5** Explain the uses of the Balanced Scorecard and the role of transfer pricing in a decentralized firm.





# **E**xperience Managerial Decisions with Herman Miller

The goal of performance evaluation is to provide information useful for assessing the effectiveness of past decisions so that future decisions can be improved. As you might guess, this goal is difficult to achieve because of the sheer quantity of information present in organizations and the complexity of the business environment in which most decisions are made. However, **Herman Miller Inc.**, a large furniture manufacturer headquartered in western Michigan with business activities in over 40 countries, uses an increasingly popular performance evaluation technique—economic value added (EVA)—to help it make better decisions. For example, the entire office furniture market experienced a devastating slump in the early 2000s as a result of the dot-com bust and the 9/11 disaster. EVA measures provided Herman Miller with information beyond traditional accounting performance metrics that was critical to its dramatic and quick recovery from the negative operating margins it experienced

during the slump to the near double-digit positive margins it enjoyed only a few years later. EVA identifies the return generated by the company's assets and then subtracts the cost of all capital, both debt (e.g., money raised from loans, leases, and bonds) and equity (e.g., money raised from investors), used by the company to finance those assets in order to determine whether value is being created or destroyed. More specifically, EVA helps Herman Miller to quantify the long-term financial benefits of carrying less inventory and employing fewer fixed assets in its business. As a result of such EVA analyses, Herman Miller makes fundamentally different strategic and operating decisions involving its furniture production processes than it would if it relied solely on traditional accounting metrics. The ability to impact decisions in such a positive fashion has catapulted EVA into a position of prominence in Herman Miller's successful performance evaluation system.

**OBJECTIVE** > 1

Explain how and why firms choose to decentralize.

## Decentralization and Responsibility Centers

In general, a company is organized along lines of responsibility. The traditional organizational chart, with its pyramid shape, illustrates the lines of responsibility flowing from the chief executive officer down through the vice presidents to middle- and lower-level managers. As organizations grow larger, these lines of responsibility become longer and more numerous. The structure becomes cumbersome. Contemporary practice is moving toward a flattened hierarchy. This structure—emphasizing teams—is consistent with decentralization. **GE Capital**, for example, is essentially a group of smaller businesses. A strong link exists between the structure of an organization and its responsibility accounting system. Ideally, the responsibility accounting system mirrors and supports the structure of an organization.

Firms with multiple responsibility centers usually choose one of two decision-making approaches to manage their diverse and complex activities: *centralized* or *decentralized*. In centralized decision making, decisions are made at the very top level, and lower-level managers are charged with implementing these decisions. On the other hand, decentralized decision making allows managers at lower levels to make and implement key decisions pertaining to their areas of responsibility. **Decentralization** is the practice of delegating decision-making authority to the lower levels of management in a company. Exhibit 22-1 illustrates the difference between centralized and decentralized companies.

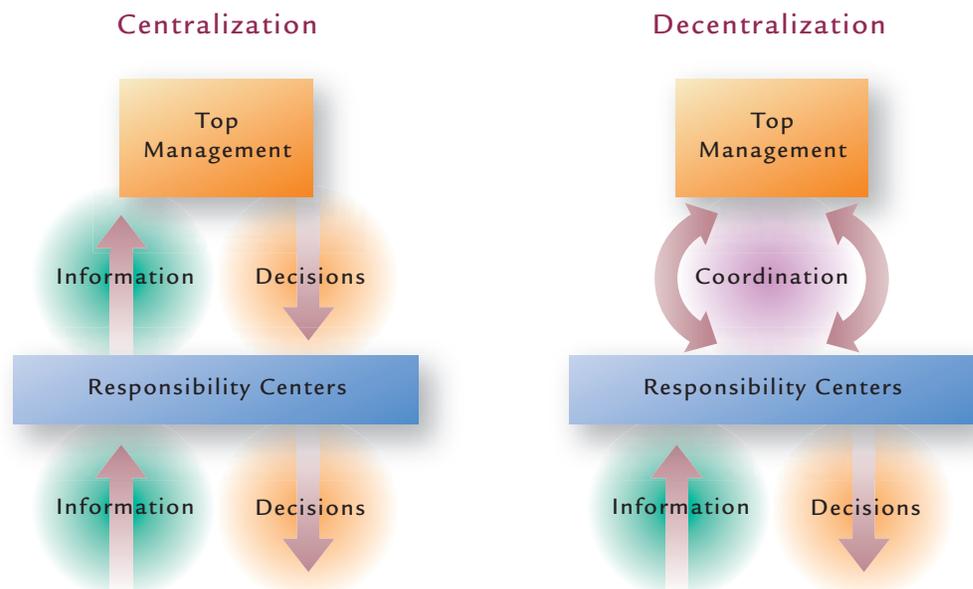
Organizations range from highly centralized to strongly decentralized. Most firms fall somewhere in between, with the majority tending toward decentralization. The reasons for the popularity of decentralization and the ways in which a company may choose to decentralize are discussed next.

### Reasons for Decentralization

Firms decide to decentralize for several reasons, including (1) ease of gathering and using local information; (2) focusing of central management; (3) training and motivating of segment managers; and (4) enhanced competition, exposing segments to market forces.

Exhibit 22-1

#### Centralization and Decentralization



**Gathering and Using Local Information** The quality of decisions is affected by the quality of information available. As a firm grows in size and operates in different markets and regions, central management may not understand local conditions. Lower-level managers, however, are in contact with immediate operating conditions (such as the strength and nature of local competition, the nature of the local labor force, and so on). As a result, they often are better positioned to make local decisions. For example, **McDonald's** has restaurants around the world. The tastes of people in China or France differ from those of people in the United States. So, McDonald's tailors its menu to different countries. The result is that the McDonald's in each country can differentiate to meet the needs of its local market.

**Focusing of Central Management** By decentralizing the operating decisions, central management is free to engage in strategic planning and decision making. The long-run survival of the organization should be of more importance to central management than day-to-day operations.

**Training and Motivating of Managers** Organizations always need well-trained managers to replace higher-level managers who leave to take advantage of other opportunities. What better way to prepare a future generation of higher-level managers than by providing them the opportunity to make significant decisions? These opportunities also enable top managers to evaluate local managers' capabilities. Those who make the best decisions are the ones who can be promoted.

**Enhanced Competition** In a highly centralized company, overall profit margins can mask inefficiencies within the various subdivisions. Large companies now find that they cannot afford to keep a noncompetitive division. One of the best ways to improve performance of a division or factory is to expose it more fully to market forces. At **Koch Industries Inc.**, each unit is expected to act as an autonomous business unit and to set prices both externally and internally. Units whose services are not required by other Koch units may face possible elimination.

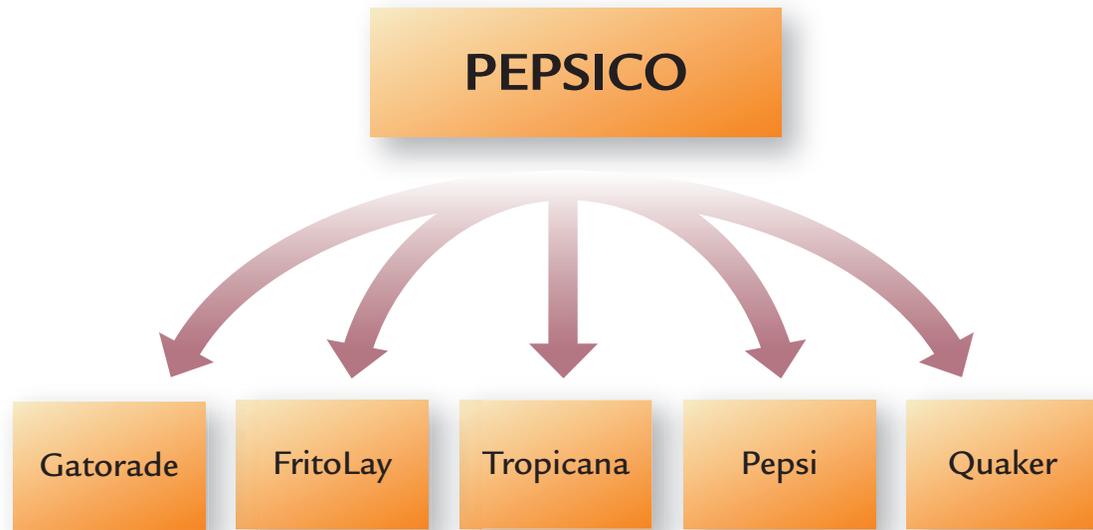
## Divisions in the Decentralized Firm

Decentralization involves a cost-benefit trade-off. As a firm becomes more decentralized, it passes more decision authority down the managerial hierarchy. As a result, managers in a decentralized firm make and implement more decisions than do managers in a centralized firm. The benefit of decentralization is that decisions are more likely to be made by managers who possess the specific local knowledge—not possessed by high-level managers—to use the firm's resources in the best way possible to maximize firm value. However, the cost of decentralization is that lower-level managers who have the knowledge to make the best decisions with the firm's resources are less likely to possess the same incentive as high-level managers to maximize firm value. Stated differently, as compared to high-level managers, lower-level managers are more likely to use the firm's resources for personal gain than for increasing the firm's stock value. Therefore, decentralization requires the use of particular incentives, such as profit-sharing and stock options, to try and motivate lower-level managers to make decisions that maximize firm value. **Starbucks**, for example, is famous for offering incentives, such as healthcare benefits and stock options, even to its part-time employees. Successful decentralized firms manage this trade-off in an effective fashion.

Decentralization usually is achieved by creating units called *divisions*. One way in which divisions are differentiated is by the types of goods or services produced. For example, divisions of **PepsiCo** include the Snack Ventures Europe Division (a joint venture with **General Mills**), **Frito-Lay Inc.**, and **Tropicana**, as well as its flagship soft-drink division. Exhibit 22-2 shows decentralized divisions of PepsiCo. These divisions are organized on the basis of product lines. Notice that some divisions depend on other divisions. For example, PepsiCo spun off its restaurant divisions to **YUM! Brands**. As a result, the cola you drink at **Pizza Hut**, **Taco Bell**, and **KFC**

## Exhibit 22-2

## Decentralized Divisions



## CONCEPT Q&amp;A

Think about summer jobs that you and your friends have held. To what extent did you or your friends work in a centralized or decentralized decision-making environment?

*If you worked at a Taco Bell or Pizza Hut, you were working for a decentralized company, YUM! Brands. This company owns many Taco Bells and Pizza Huts. Some decision making is pushed down to lower-level managers. On the other hand, suppose you worked for a small law or accounting firm that has only the local office. Then you were working for a centralized company, and the owner probably made all important operating and strategic decisions.*

**Possible Answer:**

will be Pepsi—not Coke. In a decentralized setting, some interdependencies usually exist; otherwise, a company would merely be a collection of totally separate entities.

Divisions may also be created along geographic lines. For example, **UAL Inc.** (parent of **United Airlines**) has a number of regional divisions: Asian/Pacific, Caribbean, European, Latin American, and North American. The presence of divisions spanning one or more regions creates the need for performance evaluation that can take into account differences in divisional environments.

A third way divisions differ is by the type of responsibility given to the divisional manager. As a firm grows, top management typically creates areas of responsibility, known as responsibility centers, and assigns subordinate managers to those areas. A **responsibility center** is a segment of the business whose manager is accountable for specified sets of activities.

The results of each responsibility center can be measured according to the information that managers need to operate their centers. The four major types of responsibility centers are as follows:

1. **Cost center:** A responsibility center in which a manager is responsible only for costs.
2. **Revenue center:** A responsibility center in which a manager is responsible only for sales, or revenues.
3. **Profit center:** A responsibility center in which a manager is responsible for both revenues and costs.
4. **Investment center:** A responsibility center in which a manager is responsible for revenues, costs, and investments.

The choice of responsibility center typically mirrors the actual situation and the type of information available to the manager. Information is the key to appropriately holding managers responsible for outcomes. For example, a production department manager is held responsible for departmental costs but not for sales. This responsibility choice occurs because the production department manager understands and

## Exhibit 22-3

### Types of Responsibility Centers and Accounting Information Used to Measure Performance

	Cost	Sales	Capital Investment	Other
Cost center	X			
Revenue center		X		
Profit center	X	X		
Investment center	X	X	X	X

directly controls some production costs, but does not set prices. Any difference between actual and expected costs can best be explained at this level.

The marketing department manager sets the price and projected sales. Therefore, the marketing department may be evaluated as a revenue center. Direct costs of the marketing department and overall sales are the responsibility of the sales manager.

In some companies, plant managers are given the responsibility for manufacturing and marketing their products. These plant managers control both costs and revenues, putting them in control of a profit center. Operating income is an important performance measure for profit center managers.

Finally, divisions sometimes are cited as examples of investment centers. In addition to having control over cost and pricing decisions, divisional managers have the power to make investment decisions such as plant closings and openings and decisions to keep or drop a product line. As a result, both operating income and some type of ROI are important performance measures for investment center managers. Exhibit 22-3 displays these centers along with the type of information that managers need to manage their operations. As the exhibit shows, investment centers represent the greatest degree of decentralization (followed by profit centers and finally by cost and revenue centers) because their managers have the freedom to make the greatest variety of decisions.

It is important to realize that while the responsibility center manager has responsibility only for the activities of that center, decisions made by that manager can affect other responsibility centers. For example, the sales force at a floor care products firm routinely offers customers price discounts at the end of the month. Sales increase dramatically, which is good for revenue and the sales force. However, the factory is forced to institute overtime shifts to keep up with demand. These overtime shifts increase the costs of the factory, as well as the cost per unit of product.

Organizing divisions as responsibility centers creates the opportunity to control the divisions through the use of responsibility accounting. Revenue center control is achieved by evaluating the efficiency and the effectiveness of divisional managers on the basis of sales revenue. Cost center control is based on control of costs and frequently employs variance analysis, as described in Chapters 20 and 21. This chapter will focus on the evaluation of profit centers and investment centers.

## Measuring the Performance of Profit Centers by Using Variable and Absorption Income Statements

### OBJECTIVE > 2

Explain the difference between absorption and variable costing, and prepare segmented income statements.

Profit centers are evaluated based on income statements. However, the overall income statement for the company would be of little use for this purpose. Instead, it is important to develop a segmented income statement for each profit center. Two common methods of computing income on a segmented basis include one based on variable costing and another based on full or absorption costing. These are costing methods because they refer to the way in which product costs are determined. Recall from Chapter 13 that *product costs* are inventoried; they include direct materials,

## Exhibit 22-4

### Classification of Costs as Product or Period Costs under Absorption and Variable Costing

	Absorption Costing	Variable Costing
Product costs	Direct materials Direct labor Variable overhead Fixed overhead	Direct materials Direct labor Variable overhead
Period costs	Selling expenses Administrative expenses	Fixed overhead Selling expenses Administrative expenses

direct labor, and overhead. As discussed in Chapter 13, product costs are included in Inventory (an asset on the balance sheet) until the product is sold, at which time these costs are expensed in the form of Cost of Goods Sold on the income statement. *Period costs*, such as Selling and Administrative Expense, are expensed in the period incurred. The difference between variable and absorption costing hinges on the treatment of one particular aspect of product cost: fixed factory (i.e., manufacturing or plant) overhead.

Variable costing stresses the difference between fixed and variable manufacturing costs. **Variable costing** assigns only variable manufacturing costs to the product; these costs include direct materials, direct labor, and variable overhead. Fixed overhead is treated as a period expense and is excluded from the product cost. The rationale for this treatment is that fixed overhead is a cost of capacity, or staying in business. Once the period is over, any benefits provided by capacity have expired and should not be inventoried. Under variable costing, fixed overhead of a period is seen as expiring that period and is charged in total against the revenues of the period.

**Absorption costing** assigns *all* manufacturing costs to the product. Direct materials, direct labor, variable overhead, and fixed overhead define the cost of a product. Thus, under absorption costing, fixed overhead is viewed as a product cost, not a period cost. Under this method, fixed overhead is assigned to the product through the use of a predetermined fixed overhead rate and is not expensed until the product is sold. In other words, fixed overhead is an inventoriable cost. Exhibit 22-4 illustrates the classification of costs as product or period costs under absorption and variable costing.

Generally accepted accounting principles (GAAP) require absorption costing for external reporting. The Financial Accounting Standards Board (FASB), the Internal Revenue Service (IRS), and other regulatory bodies do not accept variable costing as a product-costing method for external reporting. Yet variable costing can supply vital cost information for decision making and control that is not supplied by absorption costing, such as the performance of profit center managers in many situations. For *internal* application, variable costing is an invaluable managerial tool.

## Inventory Valuation

Inventory is valued at product (or manufacturing) cost. Under absorption costing, that product cost includes direct materials, direct labor, variable overhead, and fixed overhead. Under variable costing, the product cost includes only direct materials, direct labor, and variable overhead. **Cornerstone 22-1** shows how to compute inventory cost under both methods.

Notice that the only difference between the two approaches is the treatment of fixed factory overhead. Thus, the unit product cost under absorption costing is always greater than the unit product cost under variable costing.

## HOW TO Compute Inventory Cost under Absorption and Variable Costing

### Information:

During the most recent year, Fairchild Company had the following data associated with the product it makes:

Units in beginning inventory	—
Units produced	10,000
Units sold (\$300 per unit)	8,000
Variable costs per unit:	
Direct materials	\$50
Direct labor	\$100
Variable overhead	\$50
Fixed costs:	
Fixed overhead per unit produced	\$25
Fixed selling and administrative	\$100,000

### Required:

- How many units are in ending inventory?
- Using absorption costing, calculate the per-unit product cost. What is the value of ending inventory?
- Using variable costing, calculate the per-unit product cost. What is the value of ending inventory?

### Solution:

- Units in Ending Inventory = Units in Beginning Inventory + Units Produced  
     – Units Sold  
     = 0 + 10,000 – 8,000  
     = 2,000

- Absorption costing:

Direct materials	\$ 50
Direct labor	100
Variable overhead	50
Fixed overhead	25
Unit product cost	<u>\$225</u>

$$\text{Value of ending inventory} = 2,000 \times \$225 = \$450,000$$

- Variable costing:

Direct materials	\$ 50
Direct labor	100
Variable overhead	50
Unit product cost	<u>\$200</u>

$$\text{Value of ending inventory} = 2,000 \times \$200 = \$400,000$$



## CORNERSTONE 22-1



## Income Statements Using Variable and Absorption Costing

Because unit product costs are the basis for cost of goods sold, the variable- and absorption-costing methods can lead to different operating income figures. The difference arises because of the amount of fixed overhead recognized as an expense under the two methods. **Cornerstone 22-2** shows how to develop cost of goods sold and income statements for both variable and absorption costing.



### CORNERSTONE 22-2



### HOW TO Prepare Income Statements under Absorption and Variable Costing

#### Information:

During the most recent year, Fairchild Company had the following data associated with the product it makes:

Units in beginning inventory	—
Units produced	10,000
Units sold (\$300 per unit)	8,000
Variable costs per unit:	
Direct materials	\$50
Direct labor	\$100
Variable overhead	\$50
Fixed costs:	
Fixed overhead per unit produced	\$25
Fixed selling and administrative	\$100,000

#### Required:

1. Calculate the cost of goods sold under absorption costing.
2. Calculate the cost of goods sold under variable costing.
3. Prepare an income statement using absorption costing.
4. Prepare an income statement using variable costing.

#### Solution:

1.  $\text{Cost of Goods Sold} = \text{Absorption Unit Product Cost} \times \text{Units Sold}$   
 $= \$225 \times 8,000 = \$1,800,000$

Note: Cornerstone 22-1 shows the detailed calculation of the \$225 unit product cost under absorption costing.

2.  $\text{Cost of Goods Sold} = \text{Variable Unit Product Cost} \times \text{Units Sold}$   
 $= \$200 \times 8,000 = \$1,600,000$

Note: Cornerstone 22-1 shows the detailed calculation of the \$200 unit product cost under variable costing.

- 3.

#### Fairchild Company Absorption-Costing Income Statement

Sales (\$300 × 8,000)	\$2,400,000
Less: Cost of goods sold	<u>1,800,000</u>
Gross margin	\$ 600,000
Less: Selling and administrative expenses	<u>100,000</u>
Net income	<u><u>\$ 500,000</u></u>

4.

**Fairchild Company**  
**Variable-Costing Income Statement**

Sales (\$300 × 8,000)		\$2,400,000
Less variable expenses:		
Variable cost of goods sold		1,600,000
Contribution margin		\$ 800,000
Less fixed expenses:		
Fixed overhead	\$250,000*	
Fixed selling and administrative	100,000	350,000
Net income		\$ 450,000

\*\$25/unit × 10,000 units = \$250,000

**CORNERSTONE**  
**22-2**  
*(continued)*

Cornerstone 22-2 demonstrates that absorption-costing income is \$50,000 higher than variable-costing income. This difference is due to some of the period's fixed overhead flowing into inventory when absorption costing is used. As a result, less fixed overhead cost flowed into the absorption-costing cost of goods sold, thereby increasing net income by \$50,000 relative to variable costing net income. In fact, only \$200,000 ( $\$25 \times 8,000$ ) of fixed overhead was included in cost of goods sold for absorption costing; the remaining \$50,000 ( $\$25 \times 2,000$ ) was added to inventory. Under variable costing, however, all of the \$250,000 of fixed overhead cost for the period was added to expense on the income statement.

Notice that selling and administrative expenses are never included in product cost. They always are expensed on the income statement and never appear on the balance sheet.

## Production, Sales, and Income Relationships

The relationship between variable-costing income and absorption-costing income changes as the relationship between production and sales changes. If more units are sold than were produced, variable-costing income is greater than absorption-costing income. This situation is just the opposite of that for the Fairchild example. Selling more than was produced means that beginning inventory units and units produced in the current period are being sold. Under absorption costing, units coming out of beginning inventory have attached to them fixed overhead from a prior period. In addition, units produced and sold have all of the current period's fixed overhead attached. Thus, the amount of fixed overhead expensed by absorption costing is greater than the current period's fixed overhead by the amount of fixed overhead flowing out of beginning inventory. Therefore, when the number of units sold exceeds the number of units produced in the period, variable-costing income is greater than absorption-costing income by the amount of fixed overhead flowing out of beginning inventory and into cost of goods sold.

If production and sales are equal, of course, no difference exists between the two reported incomes. Since the units produced are all sold, absorption costing, like variable costing, will recognize the total fixed overhead of the period as an expense. No fixed overhead flows into or out of inventory.

The relationships between production, sales, and the two reported incomes are summarized in Exhibit 22-5. Note that if production is greater than sales, then inventory has increased. If production is less than sales, then inventory must have decreased. If production is equal to sales, then beginning inventory is equal to ending inventory.

The difference between absorption and variable costing centers on the recognition of expense associated with fixed factory overhead. Under absorption costing, fixed factory overhead must be assigned to units produced. This assignment presents

## Exhibit 22-5

**Production, Sales, and Income Relationships**

	If	Then
1.	Production > Sales	Absorption income > Variable income
2.	Production < Sales	Absorption income < Variable income
3.	Production = Sales	Absorption income = Variable income

two problems that we have not explicitly considered. First, how do we convert factory overhead applied on the basis of direct labor hours or machine hours into factory overhead applied to units produced? Second, what is done when actual factory overhead does not equal applied factory overhead? The solution to these problems is reserved for a more advanced accounting course.

### Evaluating Profit-Center Managers

While cost center managers are evaluated based on costs and revenue center managers are evaluated based on revenues, the evaluation of profit center managers often is tied to the profitability of the units that they control. How income changes from one period to the next and how actual income compares with planned income are frequently used as signals of managerial ability. To be meaningful signals, however, income should reflect managerial effort. For example, if a manager has worked hard and increased sales while holding costs in check, income should increase over the prior period, signaling success. In general terms, if income performance is expected to reflect managerial performance, then managers have the right to expect the following:

1. As sales revenue increases from one period to the next, all other things being equal, income should increase.
2. As sales revenue decreases from one period to the next, all other things being equal, income should decrease.
3. As sales revenue remains unchanged from one period to the next, all other things being equal, income should remain unchanged.

Variable costing does ensure that the above relationships hold, however, absorption costing may not.

### Segmented Income Statements Using Variable Costing

Variable costing is useful in preparing segmented income statements because it gives useful information on variable and fixed expenses. A **segment** is a subunit of a company of sufficient importance to warrant the production of performance reports. Segments can be divisions, departments, product lines, customer classes, and so on. In segmented income statements, however, fixed expenses are broken down into two categories: *direct fixed expenses* and *common fixed expenses*. This additional subdivision highlights controllable versus noncontrollable costs and enhances the manager's ability to evaluate each segment's contribution to overall firm performance.

**Direct fixed expenses** are fixed expenses that are directly traceable to a segment. These are sometimes referred to as *avoidable fixed expenses* or *traceable fixed expenses* because they vanish if the segment is eliminated. For example, if the segments were sales regions, a direct fixed expense for each region would be the rent for the sales office, salary of the sales manager of each region, and so on. If one region were to be eliminated, then those fixed expenses would disappear. For instance, if **United Airlines** were to vacate the \$515 million, 85-acre "Terminal for Tomorrow" at Chicago's O'Hare International Airport, it would avoid the substantial costs it incurs each year to operate and maintain that terminal.

**Common fixed expenses** are jointly caused by two or more segments. These expenses persist even if one of the segments to which they are common is eliminated. For example, depreciation on the corporate headquarters building, the salary of the

CEO, and the cost of printing and distributing the annual report to shareholders are common fixed expenses for **The Walt Disney Company**. If Disney were to sell a theme park or open a new one, then those common expenses would not be affected.

**Cornerstone 22-3** shows how to prepare a segmented income statement where the segments are product lines. In the example, Audiomatronics produces both MP3 players and DVD players.

## HOW TO Prepare a Segmented Income Statement

### Information:

Audiomatronics Inc. produces MP3 players and DVD players in a single factory. The following information was provided for the coming year.

	MP3 Players	DVD Players
Sales	\$400,000	\$290,000
Variable cost of goods sold	200,000	150,000
Direct fixed overhead	30,000	20,000

A sales commission of 5 percent of sales is paid for each of the two product lines. Direct fixed selling and administrative expense was estimated to be \$10,000 for the MP3 line and \$15,000 for the DVD line.

Common fixed overhead for the factory was estimated to be \$100,000; common selling and administrative expense was estimated to be \$20,000.

### Required:

Prepare a segmented income statement for Audiomatronics Inc. for the coming year, using variable costing.

### Solution:

#### Audiomatronics Inc. Segmented Income Statement For the Coming Year

	MP3 Players	DVD Players	Total
Sales	\$ 400,000	\$ 290,000	\$ 690,000
Variable cost of goods sold	(200,000)	(150,000)	(350,000)
Variable selling expense	(20,000)	(14,500)	(34,500)
Contribution margin	<u>\$ 180,000</u>	<u>\$ 125,500</u>	<u>\$ 305,500</u>
Less direct fixed expenses:			
Direct fixed overhead	(30,000)	(20,000)	(50,000)
Direct selling and administrative	(10,000)	(15,000)	(25,000)
Segment margin	<u>\$ 140,000</u>	<u>\$ 90,500</u>	<u>\$ 230,500</u>
Less common fixed expenses:			
Common fixed overhead			(100,000)
Common selling and administrative			(20,000)
Operating income			<u>\$ 110,500</u>



## CORNERSTONE 22-3



Notice that Cornerstone 22-3 shows that both MP3 players and DVD players have large positive contribution margins (\$180,000 for MP3 players and \$125,500 for DVD players). Both products are providing revenue above variable costs that can be used to help cover the firm's fixed costs. However, some of the firm's fixed costs are caused by the segments themselves. Thus, the real measure of the profit contribution of each segment is what is left over after these direct fixed costs are covered.

The profit contribution each segment makes toward covering a firm's common fixed costs is called the **segment margin**. A segment should at least be able to cover both its own variable costs and direct fixed costs. Ignoring any effect a segment may have on the sales of other segments, the segment margin measures the change in a firm's profits that would occur if the segment were eliminated. A negative segment margin drags down the firm's total profit, suggesting that it might be wise to consider dropping the product. In other words, a negative segment margin suggests that the firm would be more profitable as a whole without the segment than with the segment.

**OBJECTIVE** 3  
Compute and explain return on investment.

## Measuring the Performance of Investment Centers by Using Return on Investment

Typically, investment centers are evaluated on the basis of return on investment (ROI). Other measures, such as residual income and economic value added, are discussed in the following section.

### Return on Investment

Divisions that are investment centers will have an income statement and a balance sheet. So, could those divisions be ranked on the basis of income? Suppose, for example, that a company has two divisions—Alpha and Beta. Alpha's income is \$100,000, and Beta's income is \$200,000. Did Beta perform better than Alpha? What if Alpha used an investment of \$500,000 to produce the contribution of \$100,000, while Beta used an investment of \$2 million to produce the \$200,000 contribution? Does your response change? Clearly, relating the reported operating profits to the assets used to produce them is a more meaningful measure of performance.

One way to relate operating profits to assets employed is to compute the **return on investment (ROI)**, which is the profit earned per dollar of investment. ROI is the most common measure of performance for an investment center. It can be defined as follows:

$$\text{ROI} = \frac{\text{Operating Income}}{\text{Average Operating Assets}}$$

**Operating income** refers to earnings before interest and taxes. **Operating assets** are all assets acquired to generate operating income, including cash, receivables, inventories, land, buildings, and equipment. The figure for average operating assets is computed as follows:

$$\text{Average Operating Assets} = \frac{(\text{Beginning Assets} + \text{Ending Assets})}{2}$$

Opinions vary regarding how long-term assets (plant and equipment) should be valued (e.g., gross book value vs. net book value or historical cost vs. current cost). Most firms use historical cost and net book value.<sup>1</sup>

Going back to our example, Alpha's ROI is 0.20 (\$100,000/\$500,000), while Beta's ROI is only 0.10 (\$200,000/\$2,000,000). The formula for ROI is quick and

<sup>1</sup> There is no one correct way to calculate ROI. The important thing is to be sure that one method is applied consistently, which allows the company to compare the ROIs among divisions and over time.

easy to use. However, the decomposition of ROI into margin and turnover ratios gives additional information. **Cornerstone 22-4** shows how to calculate these ratios.

### HOW TO Calculate Average Operating Assets, Margin, Turnover, and Return on Investment

#### Information:

Celimar Company's Western Division earned operating income last year as shown in the following income statement:

Sales	\$480,000
Cost of goods sold	222,000
Gross margin	<u>\$258,000</u>
Selling and administrative expense	210,000
Operating income	<u><u>\$ 48,000</u></u>

At the beginning of the year, the value of operating assets was \$277,000. At the end of the year, the value of operating assets was \$323,000.

#### Required:

For the Western Division, calculate:

1. Average operating assets
2. Margin
3. Turnover
4. Return on investment

#### Solution:

1. Average Operating Assets = (Beginning Assets + Ending Assets)/2  
= (\$277,000 + \$323,000)/2  
= \$300,000
2. Margin = Operating Income/Sales = \$48,000/\$480,000 = 0.10, or 10 percent
3. Turnover = Sales/Average Operating Assets = \$480,000/\$300,000 = 1.6
4. ROI = Margin × Turnover = 0.10 × 1.6 = 0.16, or 16 percent

Alternatively,

$$\begin{aligned} \text{ROI} &= \text{Operating Income}/\text{Average Operating Assets} \\ &= \$48,000/\$300,000 \\ &= 0.16, \text{ or } 16 \text{ percent} \end{aligned}$$



### CORNERSTONE 22-4



## Margin and Turnover

A second way to calculate ROI is to separate the formula (Operating Income/Average Operating Assets) into margin and turnover.

$$\text{ROI} = \frac{\text{Margin}}{\text{Sales}} \times \frac{\text{Turnover}}{\text{Average Operating Assets}}$$

Notice that “Sales” in the above formula can be cancelled out to yield the original ROI formula of Operating Income/Average Operating Assets.

**Margin** is the ratio of operating income to sales. It tells how many cents of operating income result from each dollar of sales; it expresses the portion of sales that is available for interest, taxes, and profit. Some managers also refer to margin as return on sales. **Turnover** is a different measure; it is found by dividing sales by average operating assets.

## Exhibit 22-6

## Comparison of Divisional Performance

	Comparison of ROI			
	Electronics Division		Medical Supplies Division	
Year 1:				
Sales	\$30,000,000		\$117,000,000	
Operating income	1,800,000		3,510,000	
Average operating assets	10,000,000		19,510,000	
ROI <sup>a</sup>	18%		18%	
Year 2:				
Sales	\$40,000,000		\$117,000,000	
Operating income	2,000,000		2,925,000	
Average operating assets	10,000,000		19,500,000	
ROI <sup>b</sup>	20%		15%	

	Margin and Turnover Comparisons			
	Electronics Division		Medical Supplies Division	
	Year 1	Year 2	Year 1	Year 2
Margin <sup>c</sup>	6.0%	5.0%	3.0%	2.5%
Turnover <sup>d</sup>	$\times 3.0$	$\times 4.0$	$\times 6.0$	$\times 6.0$
ROI	<u>18.0%</u>	<u>20.0%</u>	<u>18.0%</u>	<u>15.0%</u>

<sup>a</sup> Operating income divided by average operating assets.

<sup>b</sup> Operating income divided by average operating assets.

<sup>c</sup> Operating income divided by sales.

<sup>d</sup> Sales divided by average operating assets.

Turnover tells how many dollars of sales result from every dollar invested in operating assets; it shows how productively assets are being used to generate sales.

Suppose, for example, that Alpha had sales of \$400,000. Then, margin would be 0.25 ( $\$100,000/\$400,000$ ), and turnover would be 0.80 ( $\$400,000/\$500,000$ ). Alpha's ROI would still be 0.20 ( $0.25 \times 0.80$ ).

While both approaches yield the same ROI, the calculation of margin and turnover gives a manager valuable information. To illustrate this additional information, consider

the data presented in Exhibit 22-6. The Electronics Division improved its ROI from 18 percent in year 1 to 20 percent in year 2. The Medical Supplies Division's ROI, however, dropped from 18 to 15 percent. Computing the margin and turnover ratios for each division gives a better picture of what caused the change in rates. As with variance analysis, understanding the causes of managerial accounting measures (i.e., variances, margins, turnover, etc.) helps managers take actions to improve the division. These ratios are presented in Exhibit 22-6.

Notice that the margins for both divisions dropped from year 1 to year 2. In fact, the divisions experienced the *same* percentage of decline (16.67 percent). A declining margin could be explained by increasing expenses, by competitive pressures (forcing a decrease in selling prices), or both.

Despite the declining margin, the Electronics Division was able to increase its rate of return. The reason is that the increase in turnover more than compensated for the decline in margin. One explanation for the increased turnover could be a deliberate policy to reduce inventories. (Notice that the

## CONCEPT Q&amp;A

Think about some stores in your town, such as a jewelry store, fast-food outlet, and grocery store. How do you suppose their margins and turnover ratios compare with each other? Explain your thinking.

Fast-food outlets and grocery stores probably have low margins and high turnover. These financial characteristics exist because they deal in perishables and must have continual turnover or the food will go bad. A jewelry store, on the other hand, has high margin and relatively low turnover. These financial characteristics exist because the goods are not perishable and there is relatively less competition in this market. (The existence of competition, of course, changes as more jewelry stores enter a market and as consumers become more confident about buying jewelry online.)

Possible Answer:

average assets employed remained the same for the Electronics Division even though sales increased by \$10 million.)

The experience of the Medical Supplies Division was less favorable. Because its turnover rate remained unchanged, its ROI dropped. This division, unlike the Electronics Division, could not overcome the decline in margin.

## Advantages of Return on Investment

At least three positive results stem from the use of ROI:

1. It encourages managers to focus on the relationship among sales, expenses, and investment, as should be the case for a manager of an investment center.
2. It encourages managers to focus on cost efficiency.
3. It encourages managers to focus on operating asset efficiency.

These advantages are illustrated by the following three scenarios.

**Focus on Return on Investment Relationships** Della Barnes, manager of the Plastics Division, is mulling over a suggestion from her marketing vice president to increase the advertising budget by \$100,000. The marketing vice president is confident that this increase will boost sales by \$200,000. Della realizes that the increased sales also will raise expenses. She finds that the increased variable cost will be \$80,000.

The division also will need to purchase additional machinery to handle the increased production. The equipment will cost \$50,000 and will add \$10,000 of depreciation expense. As a result, the proposal will add \$10,000 (\$200,000 – \$80,000 – \$10,000) to operating income. Currently, the division has sales of \$2 million, total expenses of \$1,850,000, and operating income of \$150,000. Operating assets equal \$1 million.

	Without Increased Advertising	With Increased Advertising
Sales	\$2,000,000	\$2,200,000
Less: Expenses	1,850,000	2,040,000
Operating income	<u>\$ 150,000</u>	<u>\$ 160,000</u>
Average operating assets	\$1,000,000	\$1,050,000
ROI:		
	$\$150,000/\$1,000,000 = 0.15$ , or 15 percent	$\$160,000/\$1,050,000 = 0.1524$ , or 15.24 percent

The ROI without the additional advertising is 15 percent; the ROI with the additional advertising and \$50,000 investment in assets is 15.24 percent. Since ROI is increased by the proposal, Della decides to authorize the increased advertising. In effect, the current ROI, without the proposal, is the *hurdle rate*. This term is frequently used to indicate the minimum ROI necessary to accept an investment.

**Focus on Cost Efficiency** Kyle Chugg, manager of Turner's Battery Division, groaned as he reviewed the projections for the last half of the current fiscal year. The recession was hurting his division's performance. Adding the projected operating income of \$200,000 to the actual operating income of the first half produced expected annual earnings of \$425,000. Kyle then divided the expected operating income by the division's average operating assets to obtain an expected ROI of 12.15 percent. "This is awful," muttered Kyle. "Last year our ROI was 16 percent. And I'm looking at a couple more bad years before business returns to normal. Something has to be done to improve our performance."

Kyle directed all operating managers to identify and eliminate nonvalue-added activities. As a result, lower-level managers found ways to reduce costs by \$150,000 for the remaining half of the year. This reduction increased the annual operating income from \$425,000 to \$575,000, increasing ROI from 12.15 percent to 16.43 percent as a result. Interestingly, Kyle found that some of the reductions could be maintained after business returned to normal.

**Focus on Operating Asset Efficiency** The Electronic Storage Division prospered during its early years. In the beginning, the division developed portable external disk drives for storing data; sales and ROI were extraordinarily high. However, during the past several years, competitors had developed competing technology, and the division's ROI had plunged from 30 to 15 percent. Cost cutting had helped initially, but all of the fat had been removed, making further improvements from cost reductions impossible. Moreover, any increase in sales was unlikely—competition was too stiff. The divisional manager searched for some way to increase the ROI by at least 3 to 5 percent. Only by raising the ROI so that it compared favorably with that of the other divisions could the division expect to receive additional capital for research and development (R&D).

The divisional manager initiated an intensive program to reduce operating assets. Most of the gains were made in the area of inventory reductions; however, one plant was closed because of a long-term reduction in market share. By installing a just-in-time purchasing and manufacturing system, the division was able to reduce its asset base without threatening its remaining market share. Finally, the reduction in operating assets meant that operating costs could be decreased still further. The end result was a 50 percent increase in the division's ROI, from 15 percent to more than 22 percent.

### Disadvantages of the Return on Investment Measure

Overemphasis on ROI can produce myopic behavior. Two negative aspects associated with ROI frequently are mentioned:

1. It can produce a narrow focus on divisional profitability at the expense of profitability for the overall firm.
2. It encourages managers to focus on the short run at the expense of the long run.

These disadvantages are illustrated by the following two scenarios.

**Narrow Focus on Divisional Profitability** A Cleaning Products Division has the opportunity to invest in two projects for the coming year. The outlay required for each investment, the dollar returns, and the ROI are as follows:

	Project I	Project II
Investment	\$10,000,000	\$4,000,000
Operating income	1,300,000	640,000
ROI	13%	16%

The division currently earns ROI of 15 percent, with operating assets of \$50 million and operating income on current investments of \$7.5 million. The division has approval to request up to \$15 million in new investment capital. Corporate headquarters requires that all investments earn at least 10 percent (this rate represents the corporation's cost of acquiring the capital). Any capital not used by a division is invested by headquarters, and it earns exactly 10 percent.

The division manager has four alternatives: (1) invest in Project I, (2) invest in Project II, (3) invest in both Projects I and II, or (4) invest in neither project. The divisional ROI was computed for each alternative.

	Alternatives			
	Select Project I	Select Project II	Select Both Projects	Select Neither Project
Operating income	\$8,800,000	\$8,140,000	\$9,440,000	\$7,500,000
Operating assets	\$60,000,000	\$54,000,000	\$64,000,000	\$50,000,000
ROI	14.67%	15.07%	14.75%	15.00%

The division manager chose to invest only in Project II, since it would boost ROI from 15.00 percent to 15.07 percent.

While the manager's choice maximized divisional ROI, it did not maximize the profit the company could have earned. If Project I had been selected, the company would have earned \$1.3 million in profits. By not selecting Project I, the \$10 million in capital is invested at 10 percent, earning only \$1 million ( $0.10 \times \$10,000,000$ ). The single-minded focus on divisional ROI, then, cost the company \$300,000 in profits ( $\$1,300,000 - \$1,000,000$ ).

**Encourages Short-Run Optimization** Ruth Lunsford, manager of a Small Tools Division, was displeased with her division's performance during the first three quarters. Given the expected income for the fourth quarter, the ROI for the year would be 13 percent, at least two percentage points below where she had hoped to be. Such an ROI might not be strong enough to justify the early promotion she wanted. With only three months left, drastic action was needed. Increasing sales for the last quarter was unlikely. Most sales were booked at least two to three months in advance. Emphasizing extra sales activity would benefit next year's performance. What was needed were some ways to improve this year's performance.

After careful thought, Ruth decided to take the following actions:

1. Lay off five of the highest paid salespeople.
2. Cut the advertising budget for the fourth quarter by 50 percent.
3. Delay all promotions within the division for three months.
4. Reduce the preventive maintenance budget by 75 percent.
5. Use cheaper raw materials for fourth-quarter production.

In the aggregate, these steps would reduce expenses, increase income, and raise the ROI to about 15.2 percent for the current year.

While Ruth's actions increase the profits and ROI in the short run, they have some long-run negative consequences. Laying off the highest paid (and possibly the best) salespeople may harm the division's future sales-generating capabilities. Future sales could also be hurt by cutting back on advertising and using cheaper raw materials. Delaying promotions could hurt employee morale, which could, in turn, lower productivity and future sales. Finally, reducing preventive maintenance will likely increase downtime and decrease the life of the productive equipment.

**ETHICS** Ethical considerations also come into play when managers attempt to “game” ROI. Ruth's five top-earning salespeople probably were her best salespeople. Letting them go meant that sales would probably decrease, an outcome not in the best interests of the firm. Thus, her action is directly contrary to her obligation to take actions in the best interests of the company. The layoffs may also violate the implicit contract a company has with workers that outstanding work will lead to continued employment. ♦

## Measuring the Performance of Investment Centers by Using Residual Income and Economic Value Added

### OBJECTIVE > 4

Compute and explain residual income and economic value added.

To compensate for the tendency of ROI to discourage investments that are profitable for the company but that lower a division's ROI, some companies have adopted alternative performance measures such as residual income. Economic value added is an alternate way to calculate residual income that is being used in a number of companies, such as Herman Miller.

### Residual Income

**Residual income** is the difference between operating income and the minimum dollar return required on a company's operating assets:

$$\text{Residual Income} = \text{Operating Income} - (\text{Minimum Rate of Return} \times \text{Average Operating Assets})$$

**Cornerstone 22-5** shows how to calculate residual income.



## CORNERSTONE 22-5



### HOW TO Calculate Residual Income

**Information:**

Celimar Company's Western Division earned operating income last year as shown in the following income statement:

Sales	\$480,000
Cost of goods sold	222,000
Gross margin	<u>\$258,000</u>
Selling and administrative expense	210,000
Operating income	<u><u>\$ 48,000</u></u>

At the beginning of the year, the value of operating assets was \$277,000. At the end of the year, the value of operating assets was \$323,000. Celimar Company requires a minimum rate of return of 12 percent.

**Required:**

For the Western Division, calculate:

1. Average operating assets
2. Residual income

**Solution:**

1. Average Operating Assets = (Beginning Assets + Ending Assets)/2  

$$= (\$277,000 + \$323,000)/2$$

$$= \$300,000$$
2. Residual Income = Operating Income  

$$- (\text{Minimum Rate of Return} \times \text{Average Operating Assets})$$

$$= \$48,000 - (0.12 \times \$300,000)$$

$$= \$48,000 - \$36,000$$

$$= \$12,000$$

The minimum rate of return is set by the company and is the same as the hurdle rate mentioned in the section on ROI. If residual income is greater than zero, then the division is earning more than the minimum required rate of return (or hurdle rate). If residual income is less than zero, then the division is earning less than the minimum required rate of return. Finally, if residual income equals zero, then the division is earning precisely the minimum required rate of return.

**Advantage of Residual Income** Recall that the manager of the Cleaning Products Division rejected Project I because it would have reduced divisional ROI; however, that decision cost the company \$300,000 in profits. The use of residual income as the performance measure would have prevented this loss. The residual income for each project is computed as follows:

*Project I*

$$\begin{aligned} \text{Residual Income} &= \text{Operating Income} \\ &\quad - (\text{Minimum Rate of Return} \times \text{Average Operating Assets}) \\ &= \$1,300,000 - (0.10 \times \$10,000,000) \\ &= \$1,300,000 - \$1,000,000 \\ &= \$300,000 \end{aligned}$$

*Project II*

$$\begin{aligned}
 \text{Residual Income} &= \$640,000 - (0.10 \times \$4,000,000) \\
 &= \$640,000 - \$400,000 \\
 &= \$240,000
 \end{aligned}$$

Notice that both projects have positive residual income. For comparative purposes, the divisional residual income for each of the four alternatives identified are as follows:

	Alternatives			
	Select Only Project I	Select Only Project II	Select Both Projects	Select Neither Project
Operating assets	\$60,000,000	\$54,000,000	\$64,000,000	\$50,000,000
Operating income	\$ 8,800,000	\$ 8,140,000	\$ 9,440,000	\$ 7,500,000
Minimum return*	6,000,000	5,400,000	6,400,000	5,000,000
Residual income	<u>\$ 2,800,000</u>	<u>\$ 2,740,000</u>	<u>\$ 3,040,000</u>	<u>\$ 2,500,000</u>

\* $0.10 \times$  Operating assets.

As shown in the table, selecting both projects produces the greatest increase in residual income. The use of residual income encourages managers to accept any project that earns a return that is above the minimum rate.

**Disadvantages of Residual Income** Residual income, like ROI, can encourage a short-run orientation. If Ruth Lunsford were being evaluated on the basis of residual income, she could have taken the same actions.

Another problem with residual income is that, unlike ROI, it is an absolute measure of profitability. Thus, direct comparison of the performance of two different investment centers becomes difficult, as the level of investment may differ. For example, consider the residual income computations for Division A and Division B, where the minimum required rate of return is 8 percent.

	Division A	Division B
Average operating assets	<u>\$15,000,000</u>	<u>\$2,500,000</u>
Operating income	\$ 1,500,000	\$ 300,000
Minimum return <sup>a</sup>	(1,200,000)	(200,000)
Residual income	<u>\$ 300,000</u>	<u>\$ 100,000</u>
Residual return <sup>b</sup>	2%	4%

<sup>a</sup>  $0.08 \times$  Operating assets.

<sup>b</sup> Residual income divided by operating assets.

It is tempting to claim that Division A is outperforming Division B since its residual income is three times higher. Notice, however, that Division A is considerably larger than Division B and has six times as many assets. One possible way to correct this disadvantage is to compute both ROI and residual income and to use both measures for performance evaluation. ROI could then be used for interdivisional comparisons.

## Economic Value Added

A specific way of calculating residual income is *economic value added*. **Economic value added (EVA)**<sup>2</sup> is net income (operating income minus taxes) minus the total annual cost of capital. Basically, EVA is residual income with the minimum rate of return equal to the actual cost of capital for the firm (as opposed to some minimum rate of return desired by the company for other reasons). It is said that if EVA is positive, then the company has increased its wealth during the period; if EVA is negative, then the company has decreased its wealth during the period. Consider the old saying, “It takes money to make money.” EVA helps the company to determine whether the money it makes is more than the money it takes to make it. Over the long term, only those companies creating capital, or wealth, can survive.

<sup>2</sup>EVA was developed by Stern Stewart & Company in the 1990s. More information can be found on the firm’s website, <http://www.sternstewart.com/evaabout/whatis.php>.

As a form of residual income, EVA is a dollar figure, not a percentage rate of return. However, it does bear a resemblance to rates of return such as ROI because it links net income (return) to capital employed. The key feature of EVA is its emphasis on *after-tax* operating profit and the *actual* cost of capital. Residual income, on the other hand, uses a minimum expected rate of return. Investors like EVA because it relates profit to the amount of resources needed to achieve it. A number of companies have been evaluated on the basis of EVA. In 2003, for example, economic value added for **General Electric** was \$5.98 billion, for **Wal-Mart** Stores it was \$2.93 billion, and for **Merck & Co.** it was \$3.87 billion.<sup>3</sup> Among large companies showing negative EVA were **IBM** at (\$8.03) billion, **Verizon Communications** at (\$5.61) billion, and **Disney Company** at (\$2.07) billion. Smaller companies also differed in terms of their economic value added. **Pixar**'s was positive at \$31 million, while **JetBlue Airways Corp.** came in at \$15 million.

## CONCEPT Q&A

What are the differences and similarities between the basic residual income calculation and EVA?

Residual income can use either before-tax income (operating income) or after-tax income. In addition, residual income uses a minimum required rate of return set by upper management. EVA, on the other hand, uses after-tax income and requires the company to compute its actual cost of capital.

Possible Answer:

**Calculating Economic Value Added** EVA is after-tax operating income minus the dollar cost of capital employed. The dollar cost of capital employed is the actual percentage cost of capital<sup>4</sup> multiplied by the total capital employed. The equation for EVA is expressed as follows:

$$\begin{aligned} \text{EVA} &= \text{After-Tax Operating Income} \\ &\quad - (\text{Actual Percentage Cost of Capital} \\ &\quad \times \text{Total Capital Employed}) \end{aligned}$$

Cornerstone 22-6 shows how to calculate EVA.



### CORNERSTONE 22-6



## HOW TO Calculate Economic Value Added

### Information:

Celimar Company's Western Division earned net income last year as shown in the following income statement:

Sales	\$480,000
Cost of goods sold	222,000
Gross margin	\$258,000
Selling and administrative expense	210,000
Operating income	\$ 48,000
Less: Income taxes (@ 30%)	14,400
Net income	<u>\$ 33,600</u>

Total capital employed equaled \$300,000. Celimar Company's actual cost of capital is 10 percent.

### Required:

Calculate EVA for the Western Division.

### Solution:

$$\begin{aligned} \text{EVA} &= \text{After-Tax Operating Income} - (\text{Actual Percentage Cost of Capital} \\ &\quad \times \text{Total Capital Employed}) \\ &= \$33,600 - (0.10 \times \$300,000) \\ &= \$33,600 - \$30,000 \\ &= \$3,600 \end{aligned}$$

<sup>3</sup>Stephen Taub, "MVPs of MVA," *CFO Magazine* (July 1, 2003), <http://www.cfo.com/article/1,5309,9854%7C22%7CA%7C14%7C,00.html> (accessed December 13, 2006).

<sup>4</sup>The computation of a company's actual cost of capital is reserved for advanced accounting courses.

**Behavioral Aspects of Economic Value Added** A number of companies have discovered that EVA helps to encourage the right kind of behavior from their divisions in a way that emphasis on operating income alone cannot. The underlying reason is EVA's reliance on the true cost of capital. In some companies, the responsibility for investment decisions rests with corporate management. As a result, the cost of capital is considered a corporate expense rather than an expense attributable to particular divisions. If a division builds inventories and investment, the cost of financing that investment is passed along to the overall income statement and does not show up as a reduction from that division's operating income as it would under an EVA analysis. Without an EVA analysis, the result is to make investment seem free to the divisions, and of course, they want more. Not surprisingly, research indicates that more firms continue to adopt EVA measures as part of their overall performance evaluation package.<sup>5</sup> It should be cautioned, however, that research also shows that some firms that collect EVA measures struggle to integrate these relatively complex measures into managerial decision making without considerable training for their managers.<sup>6</sup>

## The Balanced Scorecard—Basic Concepts

### OBJECTIVE 5

Explain the uses of the Balanced Scorecard and the role of transfer pricing in a decentralized firm.

Segment income, ROI, residual income, and EVA are important measures of managerial performance. As such, the temptation exists for managers to focus only on dollar figures. This focus may not tell the whole story for the company. In addition, lower-level managers and employees may feel helpless to affect income or investment because such financial measures appear so far removed from their everyday work activities. As a result, many companies develop and manage nonfinancial operating measures as well as financial measures. For example, top management could look at such factors as market share, customer complaints, personnel turnover ratios, and personnel development. By letting lower-level managers know that attention to long-run factors also is vital, the tendency to overemphasize financial measures is reduced.

Managers in an advanced manufacturing environment are especially likely to use multiple measures of performance and to include nonfinancial as well as financial measures. For example, **General Motors** evaluated Robert Lutz, then head of product development, on the basis of 12 criteria. These criteria include how well he used existing parts in new vehicles and how many engineering hours he cut from the development process.<sup>7</sup>

The **Balanced Scorecard** is a strategic management system that defines a strategic-based responsibility accounting system. The Balanced Scorecard *translates* an organization's mission and strategy into operational objectives and performance measures for four different perspectives: the financial perspective, the customer perspective, the internal business process perspective, and the learning and growth (infrastructure) perspective. The **financial perspective** describes the economic consequences of actions taken in the other three perspectives. The **customer perspective** defines the customer and market segments in which the business unit will compete. The **internal business process perspective** describes the internal processes needed to provide value for customers and owners. Finally, the **learning and growth (infrastructure) perspective** defines the capabilities that an organization needs to create long-term growth and improvement. This last perspective is concerned with three major *enabling factors*: employee capabilities, information systems capabilities, and employee attitudes (motivation, empowerment, and alignment). Exhibit 22-7 shows a balanced scorecard for a typical hotel based on questionnaire data provided by a research survey of three- and four-star hotels.<sup>8</sup> The scorecard includes the four basic scorecard categories and objectives with key measures for each category.

<sup>5</sup> Stern Stewart Research, "Stern Stewart's EVA Clients Outperform the Market and Their Peers," *EVALuation: Special Report* (October 2002).

<sup>6</sup> Alexander Mersereau, "Pushing the Art of Management Accounting," *CMA Management*, Volume 79, Issue 9 (February 1, 2006).

<sup>7</sup> David Welch and Kathleen Kerwin, "Rick Wagoner's Game Plan," *Business Week* (February 10, 2003): 52–60.

<sup>8</sup> N. Evans, "Assessing the Balanced Scorecard as a Management Tool for Hotels," *International Journal of Contemporary Hospitality Management*, Volume 17, Issue 4/5, (2005): 376–390.

## Exhibit 22-7

**Balanced Scorecard for Ashley Hotel\***

<i>Objective</i>		<i>Measure</i>
<b>Financial Perspective</b>		
Operating Revenues		<ul style="list-style-type: none"> <li>• Total daily operating revenue</li> <li>• Revenue per available room (e.g., RevPar)</li> </ul>
Operating Costs		<ul style="list-style-type: none"> <li>• Operating expenses relative to budget</li> <li>• Cost per occupant</li> </ul>
<b>Customer Perspective</b>		
Customer Satisfaction		<ul style="list-style-type: none"> <li>• Customer satisfaction ratings</li> <li>• Number of monthly complaints</li> </ul>
Customer Loyalty		<ul style="list-style-type: none"> <li>• Number of new reward club members</li> <li>• Percent of returning guests</li> </ul>
<b>Internal Perspective</b>		
Employee Turnover		<ul style="list-style-type: none"> <li>• Employee turnover rate</li> <li>• Number of employee complaints</li> </ul>
Response to Customer Complaint		<ul style="list-style-type: none"> <li>• Percentage of complaints receiving response</li> <li>• Average response time</li> </ul>
<b>Learning and Growth</b>		
New Market Identification		<ul style="list-style-type: none"> <li>• Growth in reward club membership for new demographic segments</li> </ul>
Employee Training and Advancement		<ul style="list-style-type: none"> <li>• Percentage of employees participating in training courses</li> <li>• Survey scores pre- and post-training sessions</li> </ul>

\*Measures are based on survey data reported from actual hotels—N. Evans, 2005. Assessing the Balanced Scorecard as a Management Tool for Hotels, *International Journal of Contemporary Hospitality Management*, Vol. 17 (Issue 4/5): 376–390.

## The Role of Performance Measures

The Balanced Scorecard is not simply a collection of critical performance measures. The performance measures are derived from a company's vision, strategy, and objectives. These measures must be *balanced* between performance driver measures (i.e., lead indicators of future financial performance) and outcome measures (i.e., lagged indicators of financial performance), between objective and subjective measures, between external and internal measures, and between financial and nonfinancial measures. The performance measures must also be carefully *linked* to the organization's strategy. Doing so creates significant advantages for an organization. For example, each quarter, **Analog Devices'** senior managers gather to discuss Balanced Scorecard results for the various divisions. On one occasion, managers noted problems with their new-product ratios—used to measure the effectiveness of R&D spending. They quickly discovered that one division lagged in developing new products. The division's manager focused more heavily on R&D by investing more money and exploring new market segments, new product sales, and marketing strategies. Analog Devices' corporate vice president for marketing, quality, and planning noted that they

wouldn't have been able to catch the problem so early if they just looked at financials.<sup>9</sup> Other companies, such as **Bank of Montreal**, **Hilton Hotels Corporation**, **Verizon Communications**, **Duke University Children's Hospital**, **City of Charlotte**, **NatWest Bancorp**, and **AT&T Canada LDS**, have had similar success. The rapid and widespread adoption of this strategic management system is a strong testimonial of its worth. For example, companies such as **General Electric**, Verizon, and **Microsoft** have adapted their initial Balanced Scorecards into risk dashboards that contain key financial and nonfinancial measures pertaining to the important risks that threaten organizational success.<sup>10</sup> In addition, other organizations, like **Wal-Mart**, adapt their Balanced Scorecards to include measures that help their suppliers focus on increasingly important sustainability issues like using less packaging materials and more effective packaging techniques.<sup>11</sup>

## Transfer Pricing

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One final issue that affects the performance measurement and evaluation of divisions within a decentralized organization is that of transfer pricing. In many decentralized organizations, the output of one division is used as the input of another. For example, assume that one division of **Sony** manufactures batteries for its VAIO computers, which in turn sells the batteries to another Sony division that uses them to complete the computer manufacturing process. This internal transfer between two divisions within Sony raises an accounting issue. How is the transferred good valued? When divisions are treated as responsibility centers, they are evaluated on the basis of their contribution to costs, revenues, operating income, ROI, and residual income or EVA, depending on the particular center type. As a result, the value of the transferred good is revenue to the selling division and cost to the buying division. This value, or internal price, is called the *transfer price*. In other words, a **transfer price** is the price charged for a component by the selling division to the buying division of the same company. Transfer pricing is a complex issue. The impact of transfer prices on divisions and the company as a whole, as well as methods of setting transfer prices, will be explored briefly in the following section.

### Impact of Transfer Pricing on Divisions and the Firm as a Whole

When one division of a company sells to another division, both divisions as well as the company as a whole are affected. The price charged for the transferred good affects the costs of the buying division and the revenues of the selling division. Thus, the profits of both divisions, as well as the evaluation and compensation of their managers, are affected by the transfer price. Since profit-based performance measures of the two divisions are affected (for example, ROI and residual income), transfer pricing often can be a very emotionally charged issue. Exhibit 22-8 illustrates the effect of the transfer price on two divisions of ABC Inc. Division A produces a component and sells it to another division of the same company, Division C. The \$30 transfer price is revenue to Division A; clearly, Division A wants the price to be as high as possible. Conversely, the \$30 transfer price is cost to Division C, just like the cost of any raw material. Division C prefers as low a transfer price as possible.

The actual transfer price nets out for the company *as a whole* in that total *pretax* income for the company is the same regardless of the transfer price. However, transfer pricing can affect the level of *after-tax* profits earned by the multinational company that operates in multiple countries with different corporate tax rates and other legal requirements set by the countries in which the various divisions generate income. For example, if the selling division operates in a low-tax country and the buying division operates in a high-tax country, the transfer price may be set quite

<sup>9</sup> Joel Kurtzman, "Is Your Company Off Course: Now You Can Find Out Why," *Fortune* (February 17, 1997), [http://money.cnn.com/magazines/fortune/fortune\\_archive/1997/02/17/222180/index.htm](http://money.cnn.com/magazines/fortune/fortune_archive/1997/02/17/222180/index.htm) (accessed December 13, 2006).

<sup>10</sup> Spencer Ante, "Giving the Boss the Big Picture," *Business Week* (February 13, 2006).

<sup>11</sup> "Getting Leaner—Ahead of the Pack: Suppliers Adjust to New Packaging Priorities," *Retailing Today* (2006): 16–18.

## Exhibit 22-8

**Impact of Transfer Price on Transferring Divisions and the Company, ABC Inc., as a Whole**

Division A	Division C
Produces component and transfers it to C for transfer price of \$30 per unit	Purchases component from A at transfer price of \$30 per unit and uses it in production of final product
Transfer price = \$30 per unit	Transfer price = \$30 per unit
Revenue to A	Cost to C
Increases income	Decreases income
Increases ROI	Decreases ROI

Note: Transfer price revenue = Transfer price cost; zero dollar impact on ABC Inc.

high. Then, the high transfer price (a revenue for A) would increase profit in the division in the low-tax country, and the high transfer price (a cost for B) would decrease profit in the division in the high-tax country. This transfer pricing strategy has the result of reducing overall corporate income taxes. The international transfer pricing situation is examined in detail in more advanced courses.

### Transfer Pricing Policies

Recall that a decentralized company allows much more authority for decision making at lower management levels. It would be counterproductive for the decentralized company to then decide on the actual transfer prices between two divisions. As a result, top management usually sets the transfer pricing policy.

Several transfer pricing policies are used in practice. These transfer pricing policies include market price, cost-based transfer prices, and negotiated transfer prices.

If there is a competitive outside market for the transferred product, then the best transfer price is the *market price*. In such a case, division managers' actions will simultaneously optimize divisional profits and firmwide profits. Furthermore, no division can benefit at the expense of another. In this setting, top management will not be tempted to intervene.

Suppose that the Furniture Division of a corporation produces hide-a-beds. The Mattress Division of that same corporation produces mattresses, including a mattress model that fits into the hide-a-bed. If mattresses are transferred from the Mattress Division to the Furniture Division, a transfer pricing opportunity exists. Suppose that the mattresses can be sold to outside buyers at \$50 each; this \$50 is the market price and likely would serve as the transfer price.

Frequently, there is no good outside market price. The lack of a market price might occur because the transferred product uses patented designs owned by the parent company. Then, a company might use a *cost-based* transfer pricing approach. For example, suppose that the mattress company uses a high-density foam padding in the hide-a-bed mattress and that outside companies do not produce this type of mattress in the appropriate size. If the company has set a cost-based transfer pricing policy, then the Mattress Division will charge some measure of cost as the transfer price, such as the \$28 mattress production cost.

Finally, top management may allow the selling and buying division managers to *negotiate* a transfer price. This approach is particularly useful in cases with market imperfections, such as the ability of an in-house division to avoid selling and distribution costs that external market participants would have to incur. Using a negotiated transfer price then allows the two divisions to share any cost savings resulting from avoided costs.

Using the example of the Mattress and Furniture divisions, suppose that the hide-a-bed mattress typically sells for \$50 and has product cost of \$28. Normally, a sales commission of \$5 is paid to the salesperson, but that cost will not be incurred for any internal transfers. Now, a bargaining range exists. That range goes from the minimum transfer price to the maximum. The two divisions will negotiate the transfer price deciding how much of the cost savings will go to each division.

## Here's The



## Real Kicker

Kicker's top management is closely involved in all aspects of the company, from design and development through production, sales, delivery, and aftermarket activities. Profit performance, as measured by periodic income statements, is an important measure. In addition, Kicker keeps track of a number of other measures of performance.

For example, financial information is very important. Financial statements are presented to the president and vice presidents every month. These are reviewed carefully for trends and are compared with the budgeted amounts. Worrisome increases in expenses or decreases in revenue are analyzed to see what the underlying factors might be. This leads to the next perspective.

Customer satisfaction is also continually measured. Kicker has two major types of customers—dealers who sell Kicker products and end users who have Kicker speakers installed in the car. Each customer type has specific needs. For example, dealers have the exclusive right to sell Kicker products. Theoretically, you must buy from a dealer to get a new set of speakers, amplifier, and so on. Kicker offers a one-year warranty on speakers sold through a dealer.

However, end users want as low a price as possible. Speakers are available on the Internet, which are called "gray market" speakers (that is, the seller is not authorized to sell them). In the past,

no warranty was available on non-dealer-sold speakers. Problems arose when customers purchased obviously new products through the Internet, something went wrong, and they were not covered under warranty. It was very difficult to explain the no-warranty policy. Finally, Kicker decided to offer a shorter warranty for new products sold by unauthorized sellers. The objective of keeping the customer base happy and increasing satisfaction was achieved.

Kicker focuses on strategic objectives for the long term. For example, engineers in R&D take continuing education to stay current in their fields. When Kicker approached producing and selling original equipment manufacture (OEM) speakers to a major automobile maker, a number of employees had to learn International Organization for Standardization (ISO) quality concepts quickly. They took classes, met with consultants, and traveled to the site of other ISO-qualified firms to learn how to meet quality standards.

## Summary of Learning Objectives

### LO1. Explain how and why firms choose to decentralize.

- In a decentralized organization, lower-level managers make and implement decisions. In a centralized organization, lower-level managers are responsible only for implementing decisions.
- Reasons why companies decentralize:
  - Local managers can make better decisions using local information.
  - Local managers can provide a more timely response.
  - It is impossible for any one central manager to be fully knowledgeable about all products and markets.
- Decentralization can train and motivate local managers and free top management from day-to-day operating conditions so that they can spend time on more long-range activities, such as strategic planning. Managerial accounting plays an important role in designing effective performance measures and incentive systems to help ensure that managers in a decentralized organization use their decision-making authority in a way that improves the organization's performance.
- Four types of responsibility centers are:
  - Cost centers—manager is responsible for costs.
  - Revenue centers—manager is responsible for price and quantity sold.
  - Profit centers—manager is responsible for costs and revenues.
  - Investment centers—manager is responsible for costs, revenues, and investment.

### LO2. Explain the difference between absorption and variable costing, and prepare segmented income statements.

- Absorption costing treats fixed factory overhead as a product cost. Unit product cost consists of direct materials, direct labor, variable factory overhead, and fixed factory overhead.

- Absorption-costing income statement groups expenses according to function:
  - Production cost—cost of goods sold, including variable and fixed product cost.
  - Selling expense—variable and fixed cost of selling and distributing product.
  - Administrative expense—variable and fixed cost of administration.
- Variable costing treats fixed factory overhead as a period expense. Unit product cost consists of direct materials, direct labor, and variable factory overhead.
- Variable-costing income statement groups expenses according to cost behavior:
  - Variable expenses of manufacturing, selling, and administration.
  - Fixed expenses of manufacturing (fixed factory overhead), selling, and administration.
- Impact of units produced and units sold on absorption-costing income and variable-costing income:
  - If units produced  $>$  units sold, then absorption-costing income  $>$  variable-costing income.
  - If units produced  $<$  units sold, then absorption-costing income  $<$  variable-costing income.
  - If units produced = units sold, then absorption-costing income = variable-costing income.

**LO3. Compute and explain return on investment.**

- ROI is the ratio of operating income to average operating assets.
- Margin is operating income divided by sales.
- Turnover is sales divided by average operating assets.
- Advantage: ROI encourages managers to focus on improving sales, controlling costs, and using assets efficiently.
- Disadvantage: ROI can encourage managers to sacrifice long-run benefits for short-run benefits.

**LO4. Compute and explain residual income and economic value added.**

- Residual income is operating income minus a minimum percentage cost of capital times capital employed.
  - If residual income  $>$  0, then the division is earning more than the minimum cost of capital.
  - If residual income  $<$  0, then the division is earning less than the minimum cost of capital.
  - If residual income = 0, then the division is earning just the minimum cost of capital.
- Economic value added is *after-tax* operating profit minus the *actual* total annual cost of capital.
  - If EVA  $>$  0, then the company is creating wealth (or value).
  - If EVA  $<$  0, then the company is destroying wealth.

**LO5. Explain the uses of the Balanced Scorecard and the role of transfer pricing in a decentralized firm.**

- Balanced Scorecard is a strategic management system.
- Objectives and measures are developed for four perspectives:
  - Financial perspective
  - Customer perspective
  - Process perspective
  - Learning and growth perspective
- Transfer price is charged by the selling division of a company to a buying division of the same company.
  - Increases revenue to the selling division.
  - Increases cost to the buying division.
- Common transfer pricing policies are:
  - Cost based (e.g., total product cost)
  - Market based (price charged in the outside market)
  - Negotiated (between the buying and selling divisions' managers).

## Summary of Important Equations

1. Absorption-Costing Product Cost = Direct Materials + Direct Labor + Variable Overhead + Fixed Overhead
2. Variable-Costing Product Cost = Direct Materials + Direct Labor + Variable Overhead
3.  $ROI = \frac{\text{Operating Income}}{\text{Average Operating Assets}}$   
 $ROI = \text{Margin} \times \text{Turnover}$
4. Average Operating Assets = (Beginning Operating Assets + Ending Operating Assets)/2
5. Margin =  $\frac{\text{Operating Income}}{\text{Sales}}$
6. Turnover =  $\frac{\text{Sales}}{\text{Average Operating Assets}}$
7. Residual Income = Operating Income – (Minimum Rate of Return × Average Operating Assets)
8. EVA = After-Tax Income – (Actual Percentage Cost of Capital × Total Capital Employed)

**CORNERSTONE 22-1** How to compute inventory cost under absorption and variable costing, page 1163

**CORNERSTONE 22-2** How to prepare income statements under absorption and variable costing, page 1164

**CORNERSTONE 22-3** How to prepare a segmented income statement, page 1167

**CORNERSTONE 22-4** How to calculate average operating assets, margin, turnover, and return on investment, page 1169

**CORNERSTONE 22-5** How to calculate residual income, page 1174

**CORNERSTONE 22-6** How to calculate economic value added, page 1176



### CORNERSTONES FOR CHAPTER 22

## Key Terms

Absorption costing, 1162	Margin, 1169
Balanced Scorecard, 1177	Operating assets, 1168
Common fixed expenses, 1166	Operating income, 1168
Cost center, 1160	Profit center, 1160
Customer perspective, 1177	Residual income, 1173
Decentralization, 1158	Responsibility center, 1160
Direct fixed expenses, 1166	Return on investment (ROI), 1168
Economic value added (EVA), 1175	Revenue center, 1160
Financial perspective, 1177	Segment, 1166
Internal business process perspective, 1177	Segment margin, 1168
Investment center, 1160	Transfer price, 1179
Learning and growth (infrastructure) perspective, 1177	Turnover, 1169
	Variable costing, 1162

## Review Problem

### I. Absorption and Variable Costing; Segmented Income Statements

Fine Leathers Company produces a ladies' wallet and a men's wallet. Selected data for the past year follow:

	Ladies' Wallet	Men's Wallet
Production (units)	100,000	200,000
Sales (units)	90,000	210,000
Selling price	\$5.50	\$4.50
Direct labor hours	50,000	80,000
Manufacturing costs:		
Direct materials	\$ 75,000	\$100,000
Direct labor	250,000	400,000
Variable overhead	20,000	24,000
Fixed overhead:		
Direct	50,000	40,000
Common <sup>a</sup>	20,000	20,000
Nonmanufacturing costs:		
Variable selling	30,000	60,000
Direct fixed selling	35,000	40,000
Common fixed selling <sup>b</sup>	25,000	25,000

<sup>a</sup> Common overhead totals \$40,000 and is divided equally between the two products.

<sup>b</sup> Common fixed selling costs total \$50,000 and are divided equally between the two products.

Budgeted fixed overhead for the year, \$130,000, equaled the actual fixed overhead. Fixed overhead is assigned to products using a plantwide rate based on expected direct labor hours, which were 130,000. The company had 10,000 men's wallets in inventory at the beginning of the year. These wallets had the same unit cost as the men's wallets produced during the year.

#### Required:

1. Compute the unit cost for the ladies' and men's wallets using the variable-costing method. Compute the unit cost using absorption costing.
2. Prepare an income statement using absorption costing.
3. Prepare an income statement using variable costing.
4. Reconcile the difference between the two income statements.
5. Prepare a segmented income statement using products as segments.

#### Solution:

1. The unit cost for the ladies' wallet is as follows:

Direct materials (\$75,000/100,000)	\$0.75
Direct labor (\$250,000/100,000)	2.50
Variable overhead (\$20,000/100,000)	0.20
Variable cost per unit	\$3.45
Fixed overhead [(50,000 × \$1.00)/100,000]	0.50
Absorption cost per unit	<u>\$3.95</u>

The unit cost for the men's wallet is as follows:

Direct materials (\$100,000/200,000)	\$0.50
Direct labor (\$400,000/200,000)	2.00
Variable overhead (\$24,000/200,000)	0.12
Variable cost per unit	\$2.62
Fixed overhead [(80,000 × \$1.00)/200,000]	0.40
Absorption cost per unit	<u>\$3.02</u>

Notice that the only difference between the two unit costs is the assignment of the fixed overhead cost. Notice also that the fixed overhead unit cost is assigned using the predetermined fixed overhead rate ( $\$130,000/130,000$  hours =  $\$1$  per hour). For example, the ladies' wallets used 50,000 direct labor hours and so receive  $\$1 \times 50,000$ , or  $\$50,000$ , of fixed overhead. This total, when divided by the units produced, gives the  $\$0.50$  per-unit fixed overhead cost. Finally, observe that variable nonmanufacturing costs are not part of the unit cost under variable costing. For both approaches, only manufacturing costs are used to compute the unit costs.

2. The income statement under absorption costing is as follows:

Sales $[(\$5.50 \times 90,000) + (\$4.50 \times 210,000)]$	\$1,440,000
Less: Cost of goods sold $[(\$3.95 \times 90,000) + (\$3.02 \times 210,000)]$	<u>989,700</u>
Gross margin	\$ 450,300
Less: Selling expenses*	<u>215,000</u>
Operating income	<u>\$ 235,300</u>

\*The sum of selling expenses for both products.

3. The income statement under variable costing is as follows:

Sales $[(\$5.50 \times 90,000) + (\$4.50 \times 210,000)]$	\$1,440,000
Less variable expenses:	
Variable cost of goods sold $[(\$3.45 \times 90,000) + (\$2.62 \times 210,000)]$	(860,700)
Variable selling expenses	<u>(90,000)</u>
Contribution margin	\$ 489,300
Less fixed expenses:	
Fixed overhead	(130,000)
Fixed selling	<u>(125,000)</u>
Operating income	<u>\$ 234,300</u>

4. Reconciliation is as follows:

$$I_A - I_V = \$235,300 - \$234,300 = \$1,000$$

Thus, variable-costing income is  $\$1,000$  less than absorption-costing income. This difference can be explained by the net change of fixed overhead found in inventory under absorption costing.

Ladies' wallet:	
Units produced	100,000
Units sold	<u>90,000</u>
Increase in inventory	10,000
Unit fixed overhead	<u><math>\times \\$0.50</math></u>
Increase in fixed overhead	<u>\$5,000</u>
Men's wallet:	
Units produced	200,000
Units sold	<u>210,000</u>
Decrease in inventory	(10,000)
Unit fixed overhead	<u><math>\times \\$0.40</math></u>
Decrease in fixed overhead	<u><u>\$(4,000)</u></u>

The net change is a  $\$1,000$  ( $\$5,000 - \$4,000$ ) increase in fixed overhead in inventories. Thus, under absorption costing, there is a net flow of  $\$1,000$  of the current period's fixed overhead into inventory. Since variable costing recognized all of the current period's fixed overhead as an expense, variable-costing income should be  $\$1,000$  lower than absorption costing, as it is.

## 5. Segmented income statement:

	Ladies' Wallet	Men's Wallet	Total
Sales	\$ 495,000	\$ 945,000	\$ 1,440,000
Less variable expenses:			
Variable cost of goods sold	(310,500)	(550,200)	(860,700)
Variable selling expenses	(30,000)	(60,000)	(90,000)
Contribution margin	\$ 154,500	\$ 334,800	\$ 489,300
Less direct fixed expenses:			
Direct fixed overhead	(50,000)	(40,000)	(90,000)
Direct selling expenses	(35,000)	(40,000)	(75,000)
Segment margin	\$ 69,500	\$ 254,800	\$ 324,300
Less common fixed expenses:			
Common fixed overhead			(40,000)
Common selling expenses			(50,000)
Operating income			\$ 234,300

**II. Weighted Average Cost of Capital and Economic Value Added**

El Suezco Inc. had after-tax operating income last year of \$600,000. Two sources of financing were used by the company: \$2.5 million of mortgage bonds paying 8 percent interest and \$10 million in common stock, which was considered to be no more or less risky than other stocks. The rate of return on long-term government bonds is 6 percent. El Suezco pays a marginal tax rate of 40 percent. Total capital employed is \$5.3 million.

**Required:**

1. What is the weighted cost of capital for El Suezco?
2. Calculate EVA for El Suezco.

**Solution:**

1. After-tax cost of the mortgage bonds:

$$= (1 - 0.4) \times 0.08 = 0.048$$

Cost of the common stock:

$$= \text{Return on Long-Term Government Bonds} + \text{Average Premium}$$

$$= 6\% + 6\%$$

$$= 12\%$$

	Amount	Percent	After-Tax Cost	=	Weighted Cost
Mortgage bonds	\$ 2,500,000	0.20	0.048		0.0096
Common stock	10,000,000	0.80	0.120		0.0960
Total	<u>\$12,500,000</u>				
Weighted average cost of capital					<u>0.1056</u>

2. Cost of capital = \$5,300,000 × 0.1056 = \$559,680

After-tax operating income	\$600,000
Less: Cost of capital	<u>559,680</u>
EVA	<u>\$ 40,320</u>

**Discussion Questions**

1. Discuss the differences between centralized and decentralized decision making.
2. What is decentralization?
3. Explain why firms choose to decentralize.
4. What are margin and turnover? Explain how these concepts can improve the evaluation of an investment center.

5. What are the three benefits of ROI? Explain how each benefit can lead to improved profitability.
6. What is residual income? What is EVA? How does EVA differ from the general definition of residual income?
7. Can residual income or EVA ever be negative? What is the meaning of negative residual income or EVA?
8. What is a transfer price?
9. Briefly explain three common transfer pricing policies used by organizations.
10. What is the difference between the unit cost of a product under absorption costing and under variable costing?
11. If a company produces 10,000 units and sells 8,000 units during a period, which method of computing operating income (absorption costing or variable costing) will result in the higher operating income? Why?
12. What is a segment?
13. What is the difference between contribution margin and segment margin?
14. What is the Balanced Scorecard?
15. Describe the four perspectives of the Balanced Scorecard.

## Multiple-Choice Exercises

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**22-1** The practice of delegating authority to division-level managers by top management is:

- a. centralization.
- b. good business practice.
- c. decentralization.
- d. autonomy.
- e. never done in business today.

**22-2** Which of the following is not a reason for decentralizing?

- a. Training and motivating managers
- b. Unmasking inefficiencies in subdivisions of an overall profitable company
- c. Allowing top management to focus on strategic decision making
- d. Allowing top management to make all key operating decisions throughout the company
- e. All of the above are reasons for decentralizing.

**22-3** A responsibility center in which a manager is responsible for both revenues and costs is a(n):

- a. cost center.
- b. profit center.
- c. revenue center.
- d. investment center.

**22-4** A responsibility center in which a manager is responsible for revenues, costs, and investments is a(n):

- a. cost center.
- b. profit center.
- c. revenue center.
- d. investment center.

**22-5** If sales and average operating assets for year 2 are identical to their values in year 1, yet operating income is higher, year 2 return on investment (compared with year 1 ROI) will:

- a. increase.
- b. decrease.
- c. stay the same.
- d. The direction of change in ROI cannot be determined by this information.

**22-6** If sales and average operating assets for year 2 are identical to their values in year 1, yet operating income is higher, year 2 turnover (compared with year 1 turnover) will:

- increase.
- decrease.
- stay the same.
- The direction of change in turnover cannot be determined by this information.

**22-7** The key difference between residual income and economic value added is that EVA:

- uses the actual cost of capital for the company rather than a minimum required cost of capital.
- uses the minimum required cost of capital for a company rather than the actual percentage cost of capital.
- is a ratio rather than an absolute dollar amount.
- cannot be negative.
- There is no difference between residual income and EVA.

**22-8** If return on investment for a division is 15 percent and the company's minimum required cost of capital is 18 percent, then:

- residual income for the division is negative.
- residual income for the division takes on a value between zero and positive one.
- residual income cannot be computed.
- EVA must be negative.
- residual income is positive.

**22-9** Which of the following is a common transfer pricing policy?

- Negotiated between buyer and seller
- Cost based
- Market based
- All of the above
- None of the above

**22-10** HD Television is a multinational corporation that operates two divisions, A and B, in two different countries. Division A operates in a country with a 20% corporate tax rate while Division B operates in a country with a 40% corporate tax rate. Division A manufactures an electrical component that it sells to Division B, which in turn uses the electrical component to complete final construction of the televisions. Therefore, the internal sale between the two divisions requires that a transfer price be established. Which of the following transfer prices would result in the *smallest* after-tax profit for HD Television as a whole?

- \$26
- \$40
- \$33
- \$38
- \$44

**22-11** A company shows the following unit costs for its product:

Direct materials	\$40
Direct labor	30
Variable overhead	2
Fixed overhead	5

The company started the year with 8,000 units in inventory, produced 50,000 units during the year, and sold 55,000 units. The value of ending inventory is:

- greater under absorption costing than variable costing.
- greater under variable costing than absorption costing.
- the same under both variable and absorption costing.
- There is no ending inventory.
- This situation cannot happen.

**22-12** In a segmented income statement, which of the following statements is true?

- Segment margin is greater than contribution margin.
- Common fixed expenses must be allocated to each segment.
- Contribution margin is equal to sales less all variable and direct fixed expenses of a segment.
- Segment margin is equal to contribution margin less direct fixed expenses.
- Segment margin is equal to contribution margin less direct and common fixed expenses.

**22-13** Which of the following is *not* a perspective of the Balanced Scorecard?

- Learning and growth (infrastructure)
- Internal business process
- Customer
- Financial
- All of the above are perspectives of the Balanced Scorecard.

## Cornerstone Exercises

### Cornerstone Exercise 22-14 COMPUTING INVENTORY COST UNDER ABSORPTION AND VARIABLE COSTING

OBJECTIVE 2  
CORNERSTONE 22-1

During the most recent year, B&O Café had the following data associated with the items it makes:

Units in beginning inventory	—
Units produced	17,000
Units sold (\$200 per unit)	14,000
Variable costs per unit:	
Direct materials	\$35
Direct labor	\$65
Variable overhead	\$30
Fixed costs:	
Fixed manufacturing overhead per unit produced	\$20
Fixed selling and administrative	\$200,000

#### Required:

- How many units are in ending inventory?
- Using absorption costing, calculate the per-unit product cost. What is the value of ending inventory?
- Using variable costing, calculate the per-unit product cost. What is the value of ending inventory?

### Cornerstone Exercise 22-15 PREPARING INCOME STATEMENTS UNDER ABSORPTION AND VARIABLE COSTING

OBJECTIVE 2  
CORNERSTONE 22-2

During the most recent year, B&O Café had the following data associated with the items it makes:

Units in beginning inventory	—
Units produced	17,000
Units sold (\$200 per unit)	14,000

Variable costs per unit:	
Direct materials	\$35
Direct labor	\$65
Variable overhead	\$30
Fixed costs:	
Fixed overhead per unit produced	\$20
Fixed selling and administrative	\$200,000

**Required:**

1. Calculate the cost of goods sold under absorption costing.
2. Calculate the cost of goods sold under variable costing.
3. Prepare an income statement using absorption costing.
4. Prepare an income statement using variable costing.

**OBJECTIVE** > **2**  
**CORNERSTONE 22-3**

**Cornerstone Exercise 22-16 PREPARING A SEGMENTED INCOME STATEMENT**

Trendy Inc. produces high-end sweaters and jackets in a single factory. The following information was provided for the coming year.

	Sweaters	Jackets
Sales	\$300,000	\$420,000
Variable cost of goods sold	180,000	200,000
Direct fixed overhead	25,000	40,000

A sales commission of 5 percent of sales is paid for each of the two product lines. Direct fixed selling and administrative expense was estimated to be \$20,000 for the sweater line and \$50,000 for the jacket line.

Common fixed overhead for the factory was estimated to be \$45,000; common selling and administrative expense was estimated to be \$15,000.

**Required:**

Prepare a segmented income statement for Trendy Inc. for the coming year, using variable costing.

**OBJECTIVE** > **3**  
**CORNERSTONE 22-4**

**Cornerstone Exercise 22-17 CALCULATING AVERAGE OPERATING ASSETS, MARGIN, TURNOVER, AND RETURN ON INVESTMENT**

East Mullett Manufacturing earned operating income last year as shown in the following income statement:

Sales	\$531,250
Cost of goods sold	<u>280,000</u>
Gross margin	\$251,250
Selling and administrative expense	<u>187,500</u>
Operating income	<u>\$ 63,750</u>

At the beginning of the year, the value of operating assets was \$390,000. At the end of the year, the value of operating assets was \$460,000.

**Required:**

For East Mullett Manufacturing, calculate:

1. Average operating assets
2. Margin
3. Turnover
4. Return on investment

**OBJECTIVE** > **4**  
**CORNERSTONE 22-5**

**Cornerstone Exercise 22-18 CALCULATING RESIDUAL INCOME**

East Mullett Manufacturing earned operating income last year as shown in the following income statement:

Sales	\$531,250
Cost of goods sold	<u>280,000</u>
Gross margin	\$251,250
Selling and administrative expense	<u>187,500</u>
Operating income	<u>\$ 63,750</u>

At the beginning of the year, the value of operating assets was \$390,000. At the end of the year, the value of operating assets was \$460,000. East Mullett requires a minimum rate of return of 10 percent.

**Required:**

For East Mullett, calculate:

1. Average operating assets
2. Residual income

**Cornerstone Exercise 22-19 CALCULATING ECONOMIC VALUE ADDED**

**OBJECTIVE** > 4

East Mullett Manufacturing earned net income last year as shown in the following income statement:

**CORNERSTONE 22-6**

Sales	\$531,250
Cost of goods sold	<u>280,000</u>
Gross margin	\$251,250
Selling and administrative expense	<u>187,500</u>
Operating income	\$ 63,750
Less: Income taxes (@ 40%)	<u>25,500</u>
Net income	<u>\$ 38,250</u>

Total capital employed equaled \$400,000. East Mullett's actual cost of capital is 8 percent.

**Required:**

Calculate the EVA for East Mullett.

## Exercises

**Exercise 22-20 TYPES OF RESPONSIBILITY CENTERS**

**OBJECTIVE** > 1

Consider each of the following independent scenarios:

- a. Terrin Belson, plant manager for the laser printer factory of Compugear Inc., brushed his hair back and sighed. December had been a bad month; two machines had broken down, and some factory production workers (all on salary) were idled for part of the month. Materials prices increased, and insurance premiums on the factory increased. No way out of it; costs were going up. He hoped that the marketing vice president would be able to push through some price increases, but that really wasn't his department.
- b. Joanna Pauly was delighted to see that her ROI figures had increased for the third straight year. She was sure that her campaign to lower costs and use machinery more efficiently (enabling her factories to sell several older machines) was the reason why. Joanna planned to take full credit for the improvements at her semiannual performance review.
- c. Gil Rodriguez, sales manager for ComputerWorks, was not pleased with a memo from headquarters detailing the recent cost increases for the laser printer line. Headquarters suggested raising prices. "Great," thought Gil, "an increase in price will kill sales and revenue will go down. Why can't the plant shape up and cut costs like every other company in America is doing? Why turn this into my problem?"
- d. Susan Whitehorse looked at the quarterly profit/loss statement with disgust. Revenue was down, and cost was up—what a combination! Then she had an idea. If she

cut back on maintenance of equipment and let a product engineer go, expenses would decrease—perhaps enough to reverse the trend in income.

- e. Shonna had just been hired to improve the fortunes of the Southern Division of ABC Inc. She met with top staff and hammered out a three-year plan to improve the situation. A centerpiece of the plan is the retiring of obsolete equipment and the purchasing of state-of-the-art, computer-assisted machinery. The new machinery would take time for the workers to learn to use, but once that was done, waste would be virtually eliminated.

**Required:**

For each of the above independent scenarios, indicate the type of responsibility center involved (cost, revenue, profit, or investment).

**OBJECTIVE** > **2**

**Exercise 22-21 INVENTORY VALUATION UNDER ABSORPTION COSTING**

Abile Company produced 15,000 units during its first year of operations and sold 13,800 at \$22 per unit. The company chose practical activity—at 15,000 units—to compute its predetermined overhead rate. Manufacturing costs are as follows:

Direct materials	\$ 79,500
Direct labor	105,000
Variable overhead	15,900
Fixed overhead	51,000

**Required:**

1. Calculate the unit cost for each of these four costs.
2. Calculate the cost of one unit of product under absorption costing.
3. How many units are in ending inventory?
4. Calculate the cost of ending inventory under absorption costing.

**OBJECTIVE** > **2**

**Exercise 22-22 INVENTORY VALUATION UNDER VARIABLE COSTING**

Refer to the Abile Company information in **Exercise 22-21**.

**Required:**

1. Calculate the cost of one unit of product under variable costing.
2. Calculate the cost of ending inventory under variable costing.

**OBJECTIVE** > **2**

**Exercise 22-23 INVENTORY VALUATION UNDER ABSORPTION AND VARIABLE COSTING**



The following information pertains to Gabon Inc. for last year:

Beginning inventory in units	—
Units produced	20,000
Units sold	17,200
Costs per unit:	
Direct materials	\$8.00
Direct labor	\$4.00
Variable overhead	\$1.50
Fixed overhead*	\$4.15
Variable selling expenses	\$3.00
Fixed selling and administrative costs	\$24,300

\*Fixed overhead totals \$83,000 per year.

**Required:**

1. Calculate the cost of one unit of product under absorption costing.
2. Calculate the cost of one unit of product under variable costing.
3. How many units are in ending inventory?
4. Calculate the cost of ending inventory under absorption costing.
5. Calculate the cost of ending inventory under variable costing.

**Exercise 22-24 INCOME STATEMENTS UNDER ABSORPTION AND VARIABLE COSTING****OBJECTIVE** > 2

Refer to the Gabon Inc. information in **Exercise 22-23**. Also, assume that the selling price is \$32 per unit.

**Required:**

1. Prepare an income statement using absorption costing.
2. Prepare an income statement using variable costing.

**Exercise 22-25 MARGIN, TURNOVER, RETURN ON INVESTMENT****OBJECTIVE** > 3

Pelak Company had sales of \$350,000, expenses of \$315,000, and average operating assets of \$140,000.

**Required:**

1. Compute the operating income.
2. Compute the margin and turnover ratios.
3. Compute the ROI.

**Exercise 22-26 MARGIN, TURNOVER, RETURN ON INVESTMENT, AVERAGE OPERATING ASSETS****OBJECTIVE** > 3

Elway Company provided the following income statement for last year:

Sales	\$285,000
Less: Variable expenses	171,000
Contribution margin	\$114,000
Less: Fixed expenses	91,200
Operating income	<u>\$ 22,800</u>



At the beginning of last year, Elway had \$180,000 in operating assets. At the end of the year, Elway had \$200,000 in operating assets.

**Required:**

1. Compute average operating assets.
2. Compute the margin and turnover ratios for last year.
3. Compute ROI.

**Exercise 22-27 RETURN ON INVESTMENT, MARGIN, TURNOVER****OBJECTIVE** > 3

Data follow for the Construction Division of D. Jack Inc.:

	Year 1	Year 2
Sales	\$12,500,000	\$10,000,000
Operating income	2,500,000	1,800,000
Average operating assets	5,000,000	5,000,000

**Required:**

1. Compute the margin and turnover ratios for each year.
2. Compute the ROI for the Construction Division for each year.

**Exercise 22-28 RESIDUAL INCOME****OBJECTIVE** > 4

The Tuxedo Division of Shamus O'Toole Company had operating income last year of \$180,000 and average operating assets of \$2,000,000. O'Toole's minimum acceptable rate of return is 7 percent.

**Required:**

1. Calculate the residual income for the Tuxedo Division.
2. Was the ROI for the Tuxedo Division greater than, less than, or equal to 7 percent?

**Exercise 22-29 ECONOMIC VALUE ADDED****OBJECTIVE** > 4

Falconer Company had net (after-tax) income last year of \$1,100,000 and average operating assets of \$3,000,000. Falconer's actual cost of capital was 11 percent.

**Required:**

1. Calculate the EVA for Falconer Company.
2. Is Falconer creating or destroying wealth?

**OBJECTIVE** > **4****Exercise 22-30 ECONOMIC VALUE ADDED**

Washington Company has two divisions: the Adams Division and the Jefferson Division. The following information pertains to last year's results:

	Adams Division	Jefferson Division
Net (after-tax) income	\$ 605,000	\$ 315,000
Average operating assets	4,000,000	3,250,000

Washington's actual cost of capital was 12 percent.

**Required:**

1. Calculate the EVA for the Adams Division.
2. Calculate the EVA for the Jefferson Division.
3. Is each division creating or destroying wealth?

**OBJECTIVE** > **4****Exercise 22-31 RESIDUAL INCOME**

Refer to the Washington Company information in **Exercise 22-30**. In addition, Washington Company's top management has set a minimum acceptable rate of return equal to 8 percent.

**Required:**

1. Calculate the residual income for the Adams Division.
2. Calculate the residual income for the Jefferson Division.

## Problems

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**OBJECTIVE** > **2****Problem 22-32 VARIABLE- AND ABSORPTION-COSTING INCOME**

Spicer Company produces and sells wooden pallets that are used for moving and stacking materials. The operating costs for the past year were as follows:

Variable costs per unit:	
Direct materials	\$ 2.45
Direct labor	2.10
Variable overhead	0.25
Variable selling	0.30
Fixed costs per year:	
Fixed overhead	180,000
Selling and administrative	56,000

During the year, Spicer produced 200,000 wooden pallets and sold 208,000 at \$9 each. Spicer had 11,300 pallets in beginning finished goods inventory; costs have not changed from last year to this year. An actual cost system is used for product costing.

**Required:**

1. What is the per-unit inventory cost that will be reported on Spicer's balance sheet at the end of the year? How many units are in ending inventory? What is the total cost of ending inventory?
2. Calculate absorption-costing income.
3. What would the per-unit inventory cost be under variable costing? Does this differ from the unit cost computed in Requirement 1? Why or why not?
4. Calculate variable-costing income.
5. Suppose that Spicer Company had sold 196,700 pallets during the year. What would absorption-costing income have been? Variable-costing income?

**Problem 22-33 VARIABLE COSTING, ABSORPTION COSTING, SEGMENTED INCOME STATEMENTS, INVENTORY VALUATION****OBJECTIVE** > 2

During its first year of operations, Sugarsmooth Inc. produced 55,000 jars of hand cream based on a formula containing 10 percent glycolic acid. Unit sales were 53,500 jars. Fixed overhead totaled \$27,500 and was applied at the rate of \$0.50 per unit produced. The results of the year's operations are as follows (on an absorption-costing basis):

Sales (53,500 units @ \$8.50)	\$454,750
Less: Cost of goods sold	<u>160,500</u>
Gross margin	\$294,250
Less: Selling and administrative (all fixed)	<u>120,000</u>
Operating income	<u><u>\$174,250</u></u>

At the end of the first year of operations, Sugarsmooth is considering expanding its customer base. In its first year, it sold to small drugstores and supermarkets. Now, Sugarsmooth wants to add large discount stores and small beauty shops. Working together, the company controller and marketing manager have accumulated the following information:

- Anticipated sales to discount stores would be 20,000 units at a discounted price of \$6.75. Higher costs of shipping and return penalties would be incurred. Shipping would amount to \$45,000 per year, and return penalties would average 1 percent of sales. In addition, a clerk would need to be hired solely to handle the discount stores' accounts. The clerk's salary and benefits would be \$30,000 per year.
- Anticipated sales to beauty shops would be 10,000 units at a price of \$9. A commission of 10 percent of sales would be paid to independent jobbers who sell to the shops. In addition, an extra packing expense of \$0.50 per unit would be incurred because the shops require fewer bottles per carton.
- The fixed overhead and selling and administrative expenses would remain unchanged and are treated as common costs.

**Required:**

- Calculate the cost of Sugarsmooth's ending inventory at the end of the first year under absorption costing.
- Calculate the cost of Sugarsmooth's ending inventory at the end of the first year under variable costing. What is operating income for the first year using variable costing?
- Prepare a segmented variable-costing income statement for next year. The segments correspond to customer groups: drugstores and supermarkets, discount stores, and beauty shops.
- Are all three customer groups profitable? Should Sugarsmooth expand its marketing base?

**Problem 22-34 RETURN ON INVESTMENT AND INVESTMENT DECISIONS****OBJECTIVE** > 3 4

Leslie Blandings, division manager of Audiotech Inc., was debating the merits of a new product—a weather radio that would put out a warning if the county in which the listener lived were under a severe thunderstorm or tornado alert.

The budgeted income of the division was \$725,000 with average operating assets of \$3,625,000. The proposed investment would add income of \$640,000 and would require an additional investment in equipment of \$4,000,000. The minimum required return on investment for the company is 12 percent. Round all numbers to two decimal places.

**Required:**

- Compute the ROI of:
  - The division if the radio project is not undertaken.
  - The radio project alone.
  - The division if the radio project is undertaken.
- Compute the residual income of:
  - The division if the radio project is not undertaken.
  - The radio project alone.
  - The division if the radio project is undertaken.
- Do you suppose that Leslie will decide to invest in the new radio? Why or why not?

**OBJECTIVE** > **3** **Problem 22-35 RETURN ON INVESTMENT, MARGIN, TURNOVER**

Ready Electronics is facing stiff competition from imported goods. Its operating income margin has been declining steadily for the past several years; the company has been forced to lower prices so that it can maintain its market share. The operating results for the past three years are as follows:

	Year 1	Year 2	Year 3
Sales	\$10,000,000	\$ 9,500,000	\$ 9,000,000
Operating income	1,200,000	1,045,000	945,000
Average operating assets	15,000,000	15,000,000	15,000,000

For the coming year, Ready's president plans to install a JIT purchasing and manufacturing system. She estimates that inventories will be reduced by 70 percent during the first year of operations, producing a 20 percent reduction in the average operating assets of the company, which would remain unchanged without the JIT system. She also estimates that sales and operating income will be restored to year 1 levels because of simultaneous reductions in operating expenses and selling prices. Lower selling prices will allow Ready to expand its market share.

**Required:**

1. Compute the ROI, margin, and turnover for years 1, 2, and 3.
2. Suppose that in year 4 the sales and operating income were achieved as expected, but inventories remained at the same level as in year 3. Compute the expected ROI, margin, and turnover. Explain why the ROI increased over the year 3 level.
3. Suppose that the sales and net operating income for year 4 remained the same as in year 3 but inventory reductions were achieved as projected. Compute the ROI, margin, and turnover. Explain why the ROI exceeded the year 3 level.
4. Assume that all expectations for year 4 were realized. Compute the expected ROI, margin, and turnover. Explain why the ROI increased over the year 3 level.

**OBJECTIVE** > **3** **4** **Problem 22-36 RETURN ON INVESTMENT FOR MULTIPLE INVESTMENTS, RESIDUAL INCOME**

The manager of a division that produces add-on products for the automobile industry has just been presented the opportunity to invest in two independent projects. The first is an air conditioner for the back seats of vans and minivans. The second is a turbocharger. Without the investments, the division will have average operating assets for the coming year of \$28.9 million and expected operating income of \$4.335 million. The outlay required for each investment and the expected operating incomes are as follows:

	Air Conditioner	Turbocharger
Outlay	\$750,000	\$540,000
Operating income	90,000	82,080

**Required:**

1. Compute the ROI for each investment project.
2. Compute the budgeted divisional ROI for each of the following four alternatives:
  - a. The air conditioner investment is made.
  - b. The turbocharger investment is made.
  - c. Both investments are made.
  - d. Neither additional investment is made.

Assuming that division managers are evaluated and rewarded on the basis of ROI performance, which alternative do you think the division manager will choose?
3. Suppose that the company sets a minimum required rate of return equal to 14 percent. Calculate the residual income for each of the following four alternatives:
  - a. The air conditioner investment is made.
  - b. The turbocharger investment is made.

- c. Both investments are made.
  - d. Neither additional investment is made.
- Which option will the manager choose based on residual income? Explain.
4. Suppose that the company sets a minimum required rate of return equal to 10 percent. Calculate the residual income for each of the following four alternatives:
    - a. The air conditioner investment is made.
    - b. The turbocharger investment is made.
    - c. Both investments are made.
    - d. Neither additional investment is made.

Based on residual income, are the investments profitable? Why does your answer differ from your answer in Requirement 3?

**Problem 22-37 RETURN ON INVESTMENT AND ECONOMIC VALUE ADDED CALCULATIONS WITH VARYING ASSUMPTIONS**

OBJECTIVE > 3 4



Knitpix Products is a division of Parker Textiles Inc. During the coming year, it expects to earn income of \$310,000 based on sales of \$3.45 million; without any new investments, the division will have average operating assets of \$3 million. The division is considering a capital investment project—adding knitting machines to produce gaiters—that requires an additional investment of \$600,000 and increases net income by \$57,500 (sales would increase by \$575,000). If made, the investment would increase beginning operating assets by \$600,000 and ending operating assets by \$400,000. Assume that the actual cost of capital for the company is 7 percent.

**Required:**

1. Compute the ROI for the division without the investment.
2. Compute the margin and turnover ratios without the investment. Show that the product of the margin and turnover ratios equals the ROI computed in Requirement 1.
3. Compute the ROI for the division with the new investment. Do you think the division manager will approve the investment?
4. Compute the margin and turnover ratios for the division with the new investment. Compare these with the old ratios.
5. Compute the EVA of the division with and without the investment. Should the manager decide to make the knitting machine investment?

**Problem 22-38 BALANCED SCORECARD**

OBJECTIVE > 5

The following list gives a number of measures associated with the Balanced Scorecard:

- a. Number of new customers
- b. Percentage of customer complaints resolved with one contact
- c. Unit product cost
- d. Cost per distribution channel
- e. Suggestions per employee
- f. Warranty repair costs
- g. Consumer satisfaction (from surveys)
- h. Cycle time for solving a customer problem
- i. Strategic job coverage ratio
- j. On-time delivery percentage
- k. Percentage of revenues from new products

**Required:**

1. Classify each performance measure as belonging to one of the following perspectives: financial, customer, internal business process, or learning and growth.
2. Suggest an additional measure for each of the four perspectives.

## Cases

### OBJECTIVE > 3

#### Case 22-39 RETURN ON INVESTMENT ETHICAL CONSIDERATIONS

Jason Kemp was torn between conflicting emotions. On the one hand, things were going so well. He had just completed six months as the assistant financial manager in the Electronics Division of Med-Products Inc. The pay was good, he enjoyed his coworkers, and he felt that he was part of a team that was making a difference in American health care. On the other hand, his latest assignment was causing some sleepless nights. Mel Cravens, his boss, had asked him to “refine” the figures on the division’s latest project—a portable imaging device code—named ZM. The original estimates called for investment of \$15.6 million and projected annual income of \$1.87 million. Med-Products required an ROI of at least 15 percent for new project approval; so far, ZM’s rate of return was nowhere near that hurdle rate. Mel encouraged him to show increased sales and decreased expenses in order to get the projected income above \$2.34 million. Jason asked for a meeting with Mel to voice his concerns.

**Jason:** Mel, I’ve gone over the figures for the new project and can’t find any way to get the income above \$1.9 million. The salespeople have given me the most likely revenue figures, and production feels that the expense figures are solid.

**Mel:** Jason, those figures are just projections. Sales doesn’t really know what the revenue will be. In fact, when I talked with Sue Harris, our sales vice president, she said that sales could range from \$1.5 million to \$2.5 million. Use the higher figure. I’m sure this product will justify our confidence in it!

**Jason:** I know the range of sales was that broad, but Sue felt the \$2.5 million estimate was pretty unlikely. She thought that during the first five years or so that ZM sales would stay in the lower end of the range.

**Mel:** Again, Sue doesn’t know for sure. She’s just estimating. Let’s go with the higher estimate. We really need this product to expand our line and to give our division a chance to qualify for sales-based bonuses. If ZM sells at all, our revenue will go up, and we’ll all share in the bonus pool!

**Jason:** I don’t know, Mel. I feel pretty bad signing off on ROI projections that I have so little confidence in.

**Mel:** (frustrated) Look, Jason, just prepare the report. I’ll back you up.

#### Required:

1. What is the ROI of project ZM based on the initial estimates? What would the ROI be if the income rose to \$2.34 million?
2. Do you agree that Jason has an ethical dilemma? Explain. Is there any way that Mel could ethically justify raising the sales estimates and/or lowering expense estimates?
3. What do you think Jason should do? Explain.

### OBJECTIVE > 1 2

#### Case 22-40 ETHICAL ISSUES, ABSORPTION COSTING, PERFORMANCE MEASUREMENT

Ruth Swazey, division controller and certified management accountant, was upset by a recent memo she received from the division manager, Paul Chesser. Ruth was scheduled to present the division’s financial performance at headquarters in one week. In the memo, Paul had given Ruth some instructions for this upcoming report. In particular, she had been told to emphasize the significant improvement in the division’s profits over last year. Ruth, however, didn’t believe that there was any real underlying improvement in the division’s performance and was reluctant to say otherwise. She knew that the increase in profits was because of Paul’s conscious decision to produce for inventory.

In an earlier meeting, Paul had convinced his plant managers to produce more than they knew they could sell. By doing so, more of the fixed factory overhead

could be moved into inventory with the extra units produced. He argued that by deferring some of this period's fixed costs, reported profits would jump. He pointed out two significant benefits. First, by increasing profits, the division could exceed the minimum level needed so that all the managers would qualify for the annual bonus. Second, by meeting the budgeted profit level, the division would be better able to compete for much-needed capital. Ruth had objected but had been overruled. The most persuasive counterargument was that the increase in inventory could be liquidated in the coming year as the economy improved. However, Ruth considered this event unlikely. Based on past experience, she believed that it would take at least two years of improved market demand before the productive capacity of the division was exceeded.

**Required:**

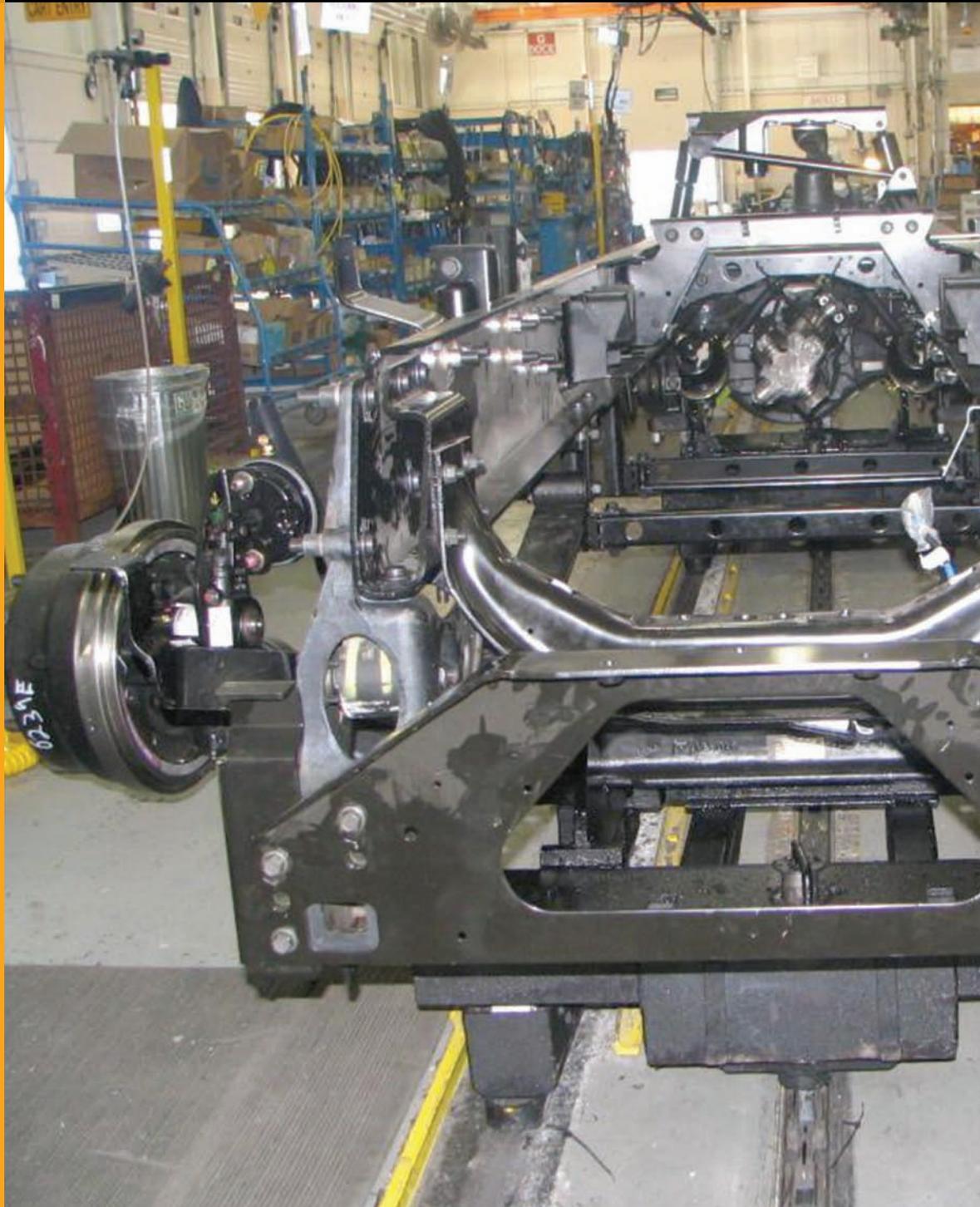
1. Discuss the behavior of Paul Chesser, the division manager. Was the decision to produce for inventory an ethical one?
2. What should Ruth Swazey do? Should she comply with the directive to emphasize the increase in profits? If not, what options does she have?
3. Review the Institute of Management Accountants "Statement of Ethical Professional Practice" found at [https://www.imanet.org/about\\_ethics\\_statement.asp](https://www.imanet.org/about_ethics_statement.asp). Identify any standards that apply in this situation.

# 23

## Short-Run Decision Making: Relevant Costing and Inventory Management

After studying Chapter 23,  
you should be able to:

- **1** Describe the short-run decision-making model, and explain how cost behavior affects the information used to make decisions.
- **2** Apply relevant costing and decision-making concepts in a variety of business situations.
- **3** Choose the optimal product mix when faced with one constrained resource.
- **4** Explain the impact of cost on pricing decisions.
- **5** Discuss inventory management and just-in-time (JIT) models.





# **E**xperience Managerial Decisions with Navistar

Relevant decision analysis represents one of the most exciting and widely applicable managerial accounting tools in existence. One big proponent of relevant analysis is **Navistar International Truck and Engine Corporation**, a multi-billion Fortune 300 Company founded in 1902. More than 100 years later, the company has grown to manufacture components and electronics for a wide variety of vehicles, including buses, tractor trailers, military vehicles, and trucks, to its diverse customers all around the world. Faced with additional important long-term growth issues, Navistar used relevant analysis to decide whether to expand axle production at its truck assembly plant in Ontario or to outsource its extra axle production requirements to an outside supplier company. Before the analysis could be conducted, Navistar's managerial accountants first had to identify all relevant factors, both quantitative and qualitative, as well as the short-term and long-term impacts of these factors. Some factors were relatively easy to identify and measure, such as the labor cost that would be required if the additional axles were made in-house or the cost of acquiring the extra factory space needed to produce the additional axles in-house. However, other factors complicated the in-house analysis for Navistar, such as the need to eliminate bottlenecks that would be created from producing the additional axles in-house. In addition,

if Navistar decided to make the additional axles in-house, it would require significant capacity-related capital expenditures, which carried a risk associated with the possibility that the current demand for additional axles might not persist in the long term. In this case, Navistar would be stuck with the cost of the additional capacity without the business to generate additional revenues to cover those costs. On the other hand, if the additional axle production were outsourced, Navistar would have to ensure that its new axle supplier partnered with the Canadian Auto Workers union to minimize the outsourcing effect on Navistar's existing workforce labor agreements. Furthermore, suppliers would have to be trained to deliver parts and subassemblies in sequence with Navistar's demanding schedule. This training represented a considerable outsourcing cost to Navistar. In the end, the relevant costing analysis helped Navistar's executives decide to outsource its additional axle production. As a result, Navistar's Ontario plant has enjoyed annual cost savings of over \$3 million! A careful analysis of all relevant factors helped the company make the right decision and avoid being burdened in the long run by the costs of excess capacity that occur in the always cyclical truck assembly business.



Decision making is a key part of management. Often, it is useful to consider decision making as either long run or short run. Long-run decision making, often involving investment in property, plant, and equipment, is referred to as *capital budgeting*. That topic is covered in Chapter 24. The use of cost and revenue data in making short-run decisions, such as the acceptance of special orders or setting an optimal level of inventory, is the focus of this chapter.

### OBJECTIVE > 1

Describe the short-run decision-making model, and explain how cost behavior affects the information used to make decisions.

## Short-Run Decision Making

Short-run decision making consists of choosing among alternatives with an immediate or limited end in view. Accepting a special order for less than the normal selling price to utilize idle capacity and to increase this year's profits is an example. Thus, some decisions tend to be *short run* in nature and sometimes are referred to as tactical decisions; however, it should be emphasized that short-run decisions often have long-run consequences. Consider a second example. Suppose that a company is thinking about producing a component instead of buying it from suppliers. The immediate objective may be to lower the cost of making the main product. Yet this decision may be a small part of the overall strategy of establishing a cost leadership position for the firm. Therefore, short-run decisions are often *small-scale actions* that serve a larger purpose.

### The Decision-Making Model

How does a company go about making good short-run decisions? A **decision model**, a specific set of procedures that produces a decision, can be used to structure the decision maker's thinking and to organize the information to make a good decision. The following is an outline of one decision-making model.

1. Recognize and define the problem.
2. Identify alternatives as possible solutions to the problem; eliminate alternatives that clearly are not feasible.
3. Identify the costs and benefits associated with each feasible alternative. Classify costs and benefits as relevant or irrelevant, and eliminate irrelevant ones from consideration.
4. Estimate the relevant costs and benefits for each alternative.
5. Assess qualitative factors.
6. Make the decision by selecting the alternative with the greatest overall net benefit.

The decision-making model described has six steps. Nothing is special about this particular listing. You may find it more useful to break the steps into 8 or 10 segments. Alternatively, you may find it useful to aggregate them into a shorter list. For example, you could use a three-step model: (1) identify the decision, (2) identify alternatives and their associated relevant costs, and (3) make the decision. The key point is to find a comfortable way for you to remember the important steps in the decision-making model.

## Here's The

Two years ago, the loan officer at Kicker's bank left for another job out of state. This was an excellent time for Kicker to reevaluate its banking relationship. The company took a number of bids from the four major banks in town. In the process, Kicker executives learned a great deal about various banking services and the way that banks charged for them. Some examples include Internet service, loan rates, credit card transactions, returned check fees, and wire fees. Qualitative factors played a role in the ultimate decision.



## Real Kicker

For example, how quickly does the bank respond? Does Kicker feel comfortable with its banking officer (is she or he knowledgeable about the speaker and electronics industry and attuned to Kicker's special needs)? After weighing both the monetary and nonmonetary factors, Kicker switched banks.



To illustrate the decision-making model, consider Audio-Blast Inc., a company that manufactures speaker systems for new automobiles. Recently, Audio-Blast was approached by a major automobile manufacturer about the possibility of installing Audio-Blast's main product—the mega-blast speaker system—into its new sports car. That way, Audio-Blast speakers would be installed at the factory. Suppose that Audio-Blast Inc. decides to pursue the speaker order from the automobile manufacturer. Currently, the company does not have sufficient productive and storage capacity to fulfill the order. How might the decision-making model help Audio-Blast find the best way of obtaining that capacity?

### Step 1: Define the Problem

The first step is to recognize and define a specific problem. For example, the members of Audio-Blast's management team recognized the need for additional productive capacity as well as increased space for raw materials and finished goods inventories. The number of workers and the amount of space needed, the reasons for the need, and how the additional space would be used are all important dimensions of the problem. However, the central question is *how* to acquire the additional capacity.

### Step 2: Identify the Alternatives

The second step is to list and consider possible solutions. Suppose that the production head and the consulting engineer identified the following possible solutions:

1. Build a new factory with sufficient capacity to handle current and foreseeable needs.
2. Lease a larger facility, and sublease its current facility.
3. Lease an additional, similar facility.
4. Institute a second shift in the main factory, and lease an additional building that would be used for storage of raw materials and finished goods inventories only, thereby freeing up space for expanded production.
5. Outsource production to another company, and resell the speakers to the auto manufacturer.

As part of this step, Audio-Blast's upper management team met to discuss and eliminate alternatives that clearly were not feasible. The first alternative was eliminated because it carried too much risk for the company. The order had not even been secured, and the popularity of the new sports car model was not proven. Audio-Blast's president refused to "bet the company" on such a risky proposition. The second alternative was rejected because the economy in Audio-Blast's small town was such that subleasing a facility of its size was not possible. The third alternative was eliminated because it went too far in solving the space problem and, presumably, was too expensive. The fourth and fifth alternatives were feasible; they were within the cost and risk constraints and solved the needs of the company. Notice that the president linked the short-run decision (increase productive capacity) to the company's overall growth strategy by rejecting alternatives that involved too much risk at this stage of the company's development.

### Step 3: Identify the Costs and Benefits Associated with Each Feasible Alternative

In the third step, the costs and benefits associated with each feasible alternative are identified. At this point, clearly irrelevant costs can be eliminated from consideration. (It is fine to include irrelevant costs and benefits in the analysis as long as they are included for all alternatives. The reason we usually do not include them is that focusing only on the relevant costs and benefits reduces the amount of data to be collected.) Typically, the controller is responsible for gathering necessary data.

Assume that Audio-Blast determines that the costs of making 20,000 speakers include the following:

Direct materials	\$ 60,000
Direct labor	110,000
Variable overhead	10,000
Total variable production cost	<u>\$180,000</u>

In addition, a second shift must be put in place and a warehouse must be leased to store raw materials and finished goods inventories if Audio-Blast continues to manufacture the speakers internally. Additional costs of the second shift, including a production supervisor and part-time maintenance and engineering, amount to \$90,000 per year. A building that could serve as a warehouse is sitting empty across the street and can be rented for \$20,000 per year. Costs of operating the building for inventory storage, including telephone and Internet access as well as salaries of materials handlers, would amount to \$80,000 per year. The second alternative is to purchase the speakers externally and use the freed-up production space for inventory. An outside supplier has offered to supply sufficient volume for \$360,000 per year.

It should be mentioned that when the cash flow patterns become complicated for competing alternatives, it becomes difficult to produce a stream of equal cash flows for each alternative. In such a case, more sophisticated procedures can and should be used for the analysis. These procedures are discussed in Chapter 24, which deals with the long-run investment decisions referred to as *capital expenditure decisions*.

#### Step 4: Estimate the Relevant Costs and Benefits for Each Feasible Alternative

We now see that the fourth alternative—continuing to produce internally and leasing more space—costs \$370,000, while the fifth alternative—purchasing outside and using internal space—costs \$360,000. The comparison follows:

Alternative 4		Alternative 5	
Variable cost of production	\$180,000	Purchase price	<u>\$360,000</u>
Added second shift costs	90,000		
Building lease and operating costs	<u>100,000</u>		
Total	<u>\$370,000</u>		

The **differential cost** is the difference between the summed costs of two alternatives in a decision. Notice that the differential cost is \$10,000 in favor of the fifth alternative. Typically, a differential cost compares the sum of each alternative's *relevant* costs only, as in the differential cost comparison of alternatives 4 and 5. Emphasis on differential cost allows decision makers to occasionally include irrelevant costs in the alternatives if they choose to do so. However, the inclusion of irrelevant costs is acceptable *only if all irrelevant costs are included for each alternative*. For example, suppose that the controller had included fixed manufacturing cost that must be paid whether or not the speakers are made internally or externally. Then, the total cost of each alternative would increase, but the differential cost would still be \$10,000. Again, as noted earlier in the chapter, it is recommended to compare only relevant costs because the inclusion of irrelevant costs often adds unnecessary data collection expenses and confusion in communicating additional information that is not relevant to the given analysis.

#### Step 5: Assess the Qualitative Factors

While the costs and revenues associated with the alternatives are important, they do not tell the whole story. Qualitative factors can significantly affect the manager's decision. Qualitative factors are simply those factors that are hard to put a number on. For example, companies like **Ford Motor Company** and **Levi's** that relocate some or all of their U.S. manufacturing facilities to countries outside of the U.S. with cheaper labor often face stiff political pressure in the United States as a result of such offshoring decisions.

Some managers worry that such political pressure from customers can have long-term negative effects on sales that more than offset the labor cost savings that spurred the decision to offshore. Product safety represents another key qualitative factor for outsourcing organizations, as illustrated by the trouble **Mattel** encountered when it was discovered that its Chinese suppliers used illegal lead paint on thousands of its toys.

Returning to Audio-Blast, its president likely would be concerned with qualitative considerations such as the quality of the speakers purchased externally, the reliability of supply sources, the expected stability of prices over the next several years, labor relations, community image, and so on. To illustrate the possible impact of qualitative factors on Audio-Blast's decision, consider the first two factors, quality and reliability of supply. If the quality of speakers is significantly less when purchased externally from what is available internally, then the quantitative advantage from purchasing may be more fictitious than real. Reselling lower-quality speakers to such a high-profile buyer could permanently damage Audio-Blast's reputation. Because of this possibility, Audio-Blast may choose to continue to produce the speakers internally. Similarly, if supply sources are not reliable, production schedules could be interrupted, and customer orders could arrive late. These factors can increase labor costs and overhead and hurt sales. Again, depending on the perceived trade-offs, Audio-Blast may decide that producing the speakers internally is better than purchasing them, even if relevant cost analysis gives the initial advantage to purchasing.

How should qualitative factors be handled in the decision-making process? First, they must be identified. Secondly, the decision maker should try to quantify them. Often, qualitative factors are simply more difficult to quantify, not impossible. For example, possible unreliability of the outside supplier might be quantified as the probable number of late delivery days multiplied by the penalty Audio Blast would be charged by the auto manufacturer for later delivery. More difficult measurement challenges exist. For example, **Mobil Corporation** decided to implement a strategic change of focusing on a new target audience, including “road warriors” (employees who drive a lot), “true blues” (affluent, loyal customers), and generation F3 (yuppies on the go who want fuel, want food, and want them fast).<sup>1</sup> However, successful implementation required that the company find a way to measure the experience of new target customers at newly designed Mobil gas pumps and convenience stores. After considerable thought, an innovative manager developed one of the first recognized “secret shopper” programs in which Mobil employees secretly dressed as customers in order to live the Mobil gas station “experience.” These secret shoppers then recorded numerous aspects of their experience on quantitative scales for feedback to station managers. Without such evaluative data, it would have been extremely difficult for Mobil managers to assess the causes of success or failure of the new strategy implementation. Finally, truly qualitative factors, such as the impact of late orders on customer relations, must be taken into consideration in the final step of the decision-making model—the selection of the alternative with the greatest overall benefit.

## CONCEPT Q&A

Apply the decision-making model outlined in this section to a problem you have faced. For example, the problem might be whether or not to go to college or which car to buy. Include all of the steps. Will the application of the decision-making model help you to make the decision? Why or why not?

*List the six steps of the decision-making model, and briefly explain how each one applies to your decision. Answers will vary.*

**Possible Answer:**

## Step 6: Make the Decision

Once all relevant costs and benefits for each alternative have been assessed and the qualitative factors weighed, a decision can be made.

## Ethics in Decision Making

**ETHICS** Ethical concerns revolve around the way in which decisions are implemented and the possible sacrifice of long-run objectives for short-run gain. Relevant

<sup>1</sup>Marc Epstein and Bill Birchard, *Counting What Counts: Turning Corporate Accountability to Competitive Advantage*. Perseus Books, New York, NY. 2000.

costs are used in making short-run decisions. However, decision makers should always maintain an ethical framework. Reaching objectives is important, but how you get there is perhaps more important. Unfortunately, many managers have the opposite view. Part of the reason for the problem is the extreme pressure to perform that many managers face. Often, the individual who is not a top performer may be laid off or demoted. Under such conditions, the temptation is often great to engage in questionable behavior today and to let the future take care of itself. Unfortunately, as the recent historic banking regulatory upheaval demonstrates, many financial services institutions in the mid-2000s yielded to unethical temptations to lend excessive amounts of money to prospective homeowners who in the end could not afford such loans. Whenever relevant costing is used, it is important to include all costs that are relevant—including those involving ethical ramifications. ♦

## Relevant Costs Defined

The decision-making approach just described emphasized the importance of identifying and using relevant costs. **Relevant costs** possess two characteristics: (1) they are *future* costs and (2) they *differ* across alternatives. All pending decisions relate to the future; accordingly, only future costs can be relevant to decisions. However, to be relevant, a cost must not only be a future cost but must also differ from one alternative to another. If a future cost is the same for more than one alternative, then it has no effect on the decision. Such a cost is *irrelevant*. The same relevance characteristics also apply to benefits. One alternative may produce an amount of future benefits different from another alternative (e.g., differences in future revenues). If future benefits differ across alternatives, then they are relevant and should be included in the analysis. The ability to identify relevant and irrelevant costs (and revenues) is a very important decision-making skill.

**Relevant Costs Illustrated** To illustrate the concept of relevant costs, consider Audio-Blast's make-or-buy alternatives. The cost of direct labor to produce the additional 20,000 speakers is \$110,000. Is the direct labor cost a future cost that differs across the two alternatives? It is certainly a future cost. Producing the speakers for the auto manufacturer requires the services of direct laborers who must be paid. But does it differ across the two alternatives? If the speakers are purchased from an external supplier, then a second shift, with its direct labor, will not be needed. Thus, the cost of direct labor differs across alternatives (\$110,000 for the make alternative and \$0 for the buy alternative). Therefore, it is a relevant cost.

Implicit in this analysis is the use of a past cost to estimate a future cost. The most recent cost of direct labor has averaged \$5.50 per speaker; for 20,000 speakers, the direct labor will cost \$110,000. This past cost was used as the estimate of next year's cost. Although past costs are never relevant, they often are used to predict what future costs will be.

Another type of relevant cost is opportunity cost. **Opportunity cost** is the benefit sacrificed or foregone when one alternative is chosen over another. Therefore, an opportunity cost is relevant because it is both a future cost and one that differs across alternatives. While an opportunity cost is never an accounting cost, because accountants do not record the cost of what might happen in the future (i.e., they do not appear in financial statements), it is an important consideration in decision making. For example, if you are deciding whether to work full time or to go to school full time, the opportunity cost of going to school would be the wages you give up by not working. Companies also include opportunity costs in many of their decision analyses. When **Ernst & Young** estimates the net benefit of sending thousands of its accountants to week-long training courses, it includes the opportunity cost of the tens of millions of dollars in lost revenue that it foregoes by not being able to bill clients for the time accountants spend in training. Oftentimes, opportunity costs are quite challenging to estimate. However, their inclusion can change the final result of the analysis, such as whether or not to accept a special sales opportunity or to outsource a product rather than make it in-house. Therefore, managerial accountants

have the ability to add significant value to relevant decision making by finding ways to measure particularly challenging opportunity costs.

**Irrelevant Past Cost Illustrated** Audio-Blast uses large power saws to cut the lumber that forms the housings for speakers. These saws were purchased three years ago and are being depreciated at an annual rate of \$25,000. Is this \$25,000 a relevant cost? In other words, is depreciation a future cost that differs across the two alternatives?

Depreciation represents an allocation of a cost already incurred. It is a **sunk cost**, a cost that cannot be affected by any future action. Although we allocate this sunk cost to future periods and call that allocation depreciation, none of the original cost is avoidable. Sunk costs are always the same across alternatives and, therefore, always irrelevant.

Thus, depreciation costs, like all sunk costs, fail to possess the two characteristics required of relevant costs and, therefore, always are irrelevant. In choosing between the two alternatives, the original cost of the power saws and their associated depreciation are not relevant factors. However, it should be noted that salvage value of the machinery is a relevant cost for certain decisions. For example, if Audio-Blast decides to transform itself into a distributor, not a producer, of speakers, the amount that can be realized from the sale of the power equipment will be relevant and will be included as a benefit of the switch to distributor status.

Finally, it is important to note the psychology behind managers' treatment of sunk costs. Although managers *should ignore* sunk costs for relevant decisions, such as whether or not to continue funding a particular product in the future, it unfortunately is human nature to allow sunk costs to affect these decisions. For example, **Toshiba** and its HD DVD product team engaged in a fierce, multi-year battle with **Sony** and its Blu-ray product team for recognition as the universally accepted format in the growing next-generation high-definition DVD market. Throughout the battle, both sides spent millions of dollars developing, manufacturing, and advertising its own format. However, Sony's Blu-ray sales trounced Toshiba's HD DVD sales one Christmas shopping season, which prompted Hollywood giant **Warner Bros.** to decide to release its films only on Sony's Blu-ray format, rather than on both formats as it had done previously (the other major production companies had already sided with Sony as well). Around the same time, **Blockbuster Video** announced that it would only carry DVDs with the Blu-ray format. To objective entertainment business experts outside of Toshiba, these decisions by Warner Bros. and Blockbuster were the final blow to Toshiba's format and it was obvious that the HD DVD product line should be discontinued immediately to cut its losses and stop the financial bleeding. However, rather than ignore its significant sunk costs by cutting its future losses, Toshiba announced that it was "unwilling to concede defeat in the next-generation-DVD battle" and decided to launch an "aggressive advertising campaign to promote its [Toshiba's] HD DVD players and slash prices about 50 percent."<sup>2</sup> Therefore, not only did Toshiba continue to spend money developing, manufacturing, and marketing its failed product, it expected to earn only about half of the regular sales revenue per unit sold! Eventually, even Toshiba recognized the handwriting on the wall and dropped its HD DVD format, but only after throwing away a considerable amount of money on a product that most experts believed should have been dropped much earlier.

Another classic example of inappropriately honoring sunk costs is **Coca-Cola's** New Coke debacle in the mid-1980s. The development and launching of New Coke was very costly and also an undeniably huge failure. However, Coca-Cola unwisely elected to continue to spend money to advertise and maintain its failed new product simply because it had already spent so much money on the product in the past. As business experts repeatedly noted, no amount of advertising cost was going to change the company's past expenditures to develop and launch New Coke and the company would have been far better off to scrap New Coke as soon as its failure was apparent. The **XFL** football league in 2001 and the Concorde supersonic jet over a period of 20 years are additional examples of companies that failed to cut their losses and drop

<sup>2</sup>Michelle Kessler, "Toshiba Turns Up Heat in DVD War," *USA Today* (January 15, 2008): 4B.

their product or service and instead continued to pour money into past failed ideas because of their large associated sunk costs.

**Irrelevant Future Cost Illustrated** Suppose that Audio-Blast currently pays an Internet provider \$5,000 per year to store its website on the server. Since Audio-Blast intends to keep the web page no matter what is decided regarding the potential speaker order, that cost is not relevant to the decision.

The same concepts apply to benefits. One alternative may produce an amount of future benefits different from another alternative (e.g., differences in future revenues). If future benefits differ across alternatives, then they are relevant and should be included in the analysis.

## Cost Behavior and Relevant Costs

Most short-run decisions require extensive consideration of cost behavior. It is easy to fall into the trap of believing that variable costs are relevant and fixed costs are not. But this assumption is not true. For example, the variable costs of production were relevant to Audio-Blast's decision. The fixed costs associated with the existing factory were not relevant. However, the additional fixed cost of the supervisor for a second shift was relevant to the decision.

The key point is that changes in supply and demand for resources must be considered when assessing relevance. If changes in demand and supply for resources across alternatives bring about changes in spending, then the changes in resource spending are the relevant costs that should be used in assessing the relative desirability of the two alternatives.

Flexible resources can be easily purchased in the amount needed and at the time of use. For example, electricity used to run stoves that boil fruit in the production of jelly is a resource that can be acquired as used and needed. Thus, if the jelly manufacturer wants to increase production of jelly, electricity will increase just enough to satisfy that demand. This type of resource is typically referred to as a strictly variable cost.

Some resources are purchased before they are used. Clearly, investment in a factory of a particular size falls into this category; so does a year-to-year lease of office space or equipment. These costs usually are treated as fixed costs. If the decision covers a situation shorter than the time period for which the resource is fixed, then this cost usually is irrelevant.

Still other resources are acquired in advance of usage through implicit contracting; they are usually acquired in lumpy amounts. In Chapter 14, these costs were shown as step costs. This category may include an organization's salaried and hourly employees. The implicit understanding is that the organization will maintain employment levels even though there may be temporary downturns in the quantity of an activity used. This understanding means that an activity may have unused capacity available. Recall that the relevant range is important in considering step costs. As long as a company remains within the relevant range, it will not go up or down a step, so the cost is fixed for all intents and purposes. For example, assume that a company has three purchasing agents who can process 15,000 purchase orders a year. This assumption means that the existing staff can handle 45,000 purchase orders a year. If the company is processing only 40,000 purchase orders, then there is some unused capacity in purchasing. If the company is considering a special order that will require an additional 2,000 purchase orders, then there is no increased cost to purchasing. However, if the company considers an expansion that will require an additional 8,000 purchase orders per year, then additional staffing will be needed in purchasing.

### OBJECTIVE > 2

Apply relevant costing and decision-making concepts in a variety of business situations.

## Some Common Relevant Cost Applications

Relevant costing is of value in solving many different types of problems. Traditionally, these applications include decisions to make or buy a component, to keep or drop a segment or product line, to accept a special order at less than the usual price, and to further

process joint products or sell them at the split-off point. Though by no means an exhaustive list, many of the same decision-making principles apply to a variety of problems.

## Make-or-Buy Decisions

Managers often are faced with the decision of whether to make a particular product or service or to buy it from an outside supplier. A manufacturer may need to consider whether to make or buy components used in manufacturing. A manager of a service firm may need to decide whether to provide a service in-house or to outsource it. Many services traditionally performed within the company, such as payroll processing, individual income tax form preparation, or human resources, are now being outsourced. **Make-or-buy decisions** are those decisions involving a choice between internal and external production. Exhibit 23-1 illustrates the make-or-buy decision.

To illustrate more fully the cost analysis of a make-or-buy problem, assume that Swasey Manufacturing currently produces an electronic component used in one of its printers. In one year, Swasey will switch production to another type of printer, and the electronic component will not be used. However, for the coming year, Swasey must produce 10,000 of these parts to support the production requirements for the old printer.

A potential supplier has approached Swasey about the component. The supplier will build the electronic component to Swasey's specifications for \$4.75 per unit. The offer sounds very attractive since the full manufacturing cost per unit is \$8.20. Should Swasey Manufacturing make or buy the component?

The problem and the feasible alternatives are both readily identifiable. Since the horizon for the decision is only one period, there is no need to be concerned about periodically recurring costs. Relevant costing is particularly useful for short-run analysis. We simply need to identify the relevant costs, total them, and make a choice (assuming no overriding qualitative concerns).

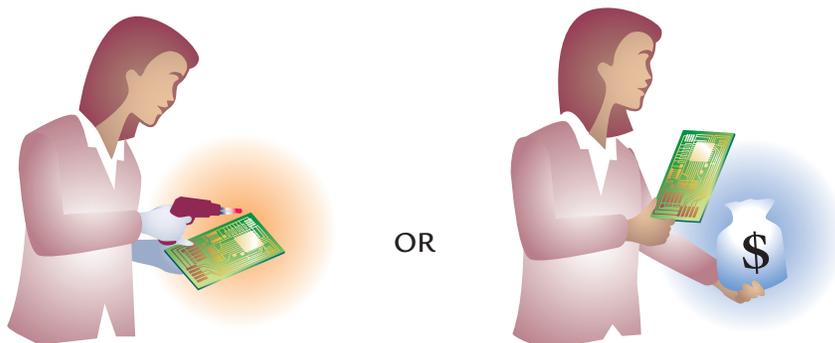
The full absorption cost of the component is computed as follows:

	Total Cost	Unit Cost
Direct materials	\$10,000	\$1.00
Direct labor	20,000	2.00
Variable overhead	8,000	0.80
Fixed overhead	44,000	4.40
Total	<u>\$82,000</u>	<u>\$8.20</u>

Fixed overhead consists of common factory costs that are allocated to each product line. No matter what happens to the component line, overall fixed overhead will not be affected. As a result, the fixed overhead is irrelevant; it can be safely ignored in structuring the problem. All other costs are relevant. The costs of direct materials and direct labor are relevant because they will not be needed if the part is bought

Exhibit 23-1

### Make or Buy



externally. Similarly, variable overhead is relevant, because its cost would not be incurred if the component were bought externally.

Now, what about the purchase of the component? Of course, the purchase price is relevant. If the component were made, this cost would not be incurred. Are there any other costs associated with an outside purchase? A check with the purchasing department and receiving dock confirmed that there was sufficient slack in the system to easily handle the additional purchase. **Cornerstone 23-1** shows how to structure this make-or-buy problem.



## CORNERSTONE 23-1



### HOW TO Structure a Make-or-Buy Problem

#### Information:

Swasey Manufacturing needed to determine if it would be cheaper to make 10,000 units of a component in-house or to purchase them from an outside supplier for \$4.75 each. Cost information on internal production includes the following:

	Total Cost	Unit Cost
Direct materials	\$10,000	\$1.00
Direct labor	20,000	2.00
Variable overhead	8,000	0.80
Fixed overhead	44,000	4.40
Total	<u>\$82,000</u>	<u>\$8.20</u>

Fixed overhead will continue whether the component is produced internally or externally. No additional costs of purchasing will be incurred beyond the purchase price.

#### Required:

1. What are the alternatives for Swasey Manufacturing?
2. List the relevant cost(s) of internal production and of external purchase.
3. Which alternative is more cost effective and by how much?
4. Now assume that the fixed overhead includes \$10,000 of cost that can be avoided if the component is purchased externally. Which alternative is more cost effective and by how much?

#### Solution:

1. There are two alternatives: make the component in-house or purchase it externally.
2. Relevant costs of making the component in-house include direct materials, direct labor, and variable overhead. Relevant costs of purchasing the component externally include the purchase price.
- 3.

	Alternatives		Differential Cost to Make
	Make	Buy	
Direct materials	\$10,000	—	\$ 10,000
Direct labor	20,000	—	20,000
Variable overhead	8,000	—	8,000
Purchase cost	—	\$47,500	(47,500)
Total relevant cost	<u>\$38,000</u>	<u>\$47,500</u>	<u>\$ (9,500)</u>

It is cheaper to make the component in-house. This alternative is cheaper by \$9,500.

4.

	Alternatives		Differential Cost to Make
	Make	Buy	
Direct materials	\$10,000	—	\$ 10,000
Direct labor	20,000	—	20,000
Variable overhead	8,000	—	8,000
Avoidable fixed overhead	10,000	—	10,000
Purchase cost	—	<u>\$47,500</u>	(47,500)
Total relevant cost	<u>\$48,000</u>	<u>\$47,500</u>	<u>\$ 500</u>

**CORNERSTONE**  
**23-1**  
*(continued)*

Now it is cheaper to purchase the component. This alternative is cheaper by \$500.

Be sure to read the analysis in Cornerstone 23-1 carefully. At first, the fixed overhead remains whether or not the component is made internally. In this case, fixed overhead is not relevant, and making the product is \$9,500 cheaper than buying it. Later, in Requirement 4, part of the fixed overhead is avoidable. This condition means that purchasing the component externally will save \$10,000 in fixed cost (i.e., Swasey can avoid \$10,000 of fixed overhead if it buys the component). Now, the \$10,000 of fixed cost is relevant—it is a future cost and it differs between the two alternatives—and the offer of the supplier should be accepted; it is \$500 cheaper to buy the component.

The same analysis can be performed on a unit-cost basis. Once the relevant costs are identified, relevant unit costs can be compared. For this example, these costs are \$3.80 (\$38,000/10,000) for the make alternative and \$4.75 (\$47,500/10,000) for the buy alternative.

One type of relevant cost that is becoming increasingly larger due to globalization and the green environmental movement concerns the disposal costs associated with electronic waste (or e-waste). Increasingly government agencies are assessing manufacturers of computers, televisions, digital music devices, etc., a costly fee at production to cover product disposal costs that public landfills eventually incur once the products reach the end of their life cycle, become obsolete, and are thrown out to pollute the environment. **Hewlett-Packard Co.** has taken a strategic leadership position by recycling approximately 10 percent of its sales as a more cost effective means than incurring the aforementioned governmental fees at production.<sup>3</sup> The failure to include relevant life cycle costs can cause the make side of the make-or-buy analysis to appear more attractive (i.e., less costly) than it is in reality.

## Special-Order Decisions

From time to time, a company may consider offering a product or service at a price different from the usual price. For example, bid prices can vary to customers in the same market, and firms often have the opportunity to consider special orders from

## CONCEPT Q&A

You also have make-or-buy decisions to make. For example, do you change the oil in your car yourself, or do you take it to the shop? Do you make your own clothing or complete home improvement projects? Choose one such decision, and explain why you have chosen to “make it” or “buy it.” What factors could influence you to change your mind?

Suppose that you choose the oil-change decision. You might decide to change it yourself because (1) you know how to, (2) you have the appropriate tools to do the job, (3) you have the time, and (4) you don't mind messing around under the hood. Alternatively, you might decide to have it done because (1) you don't have confidence in your ability to do it, (2) you don't own the equipment (nozzle, pan to hold oil), (3) you are unsure which oil to choose, or (4) you don't want to do the job. A factor that could influence your decision from changing your own oil to taking it to a shop might be that you have graduated from college and are working full time and really don't want to mess with oil changes in the few hours of free time that you do have.

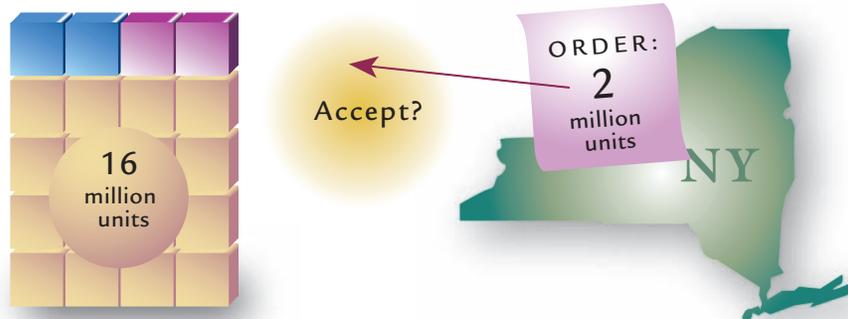
Possible Answer:

<sup>3</sup> Lorraine Woellert, “HP Wants Your Old PCs Back,” *BusinessWeek Online* (April 10, 2006).

potential customers in markets not ordinarily served. For example, **General Motors** contracted with the Pentagon to use excess production capacity to manufacture its popular 4-wheel drive pickup truck for use by U.S. troops in desert combat situations, except that these trucks were altered to include bulletproof windows, mounts for machine guns, and night vision capability. A potentially important qualitative factor in this example is that certain customer segments might hold strong opinions about General Motors' association with combat activities. Such opinions might help or hurt regular sales, but their effect should be estimated and included in the relevant analysis if they are deemed to be significant. **Special-order decisions** focus on whether a specially priced order should be accepted or rejected. These orders often can be attractive, especially when the firm is operating below its maximum productive capacity. Exhibit 23-2 illustrates the special-order decision.

**Exhibit 23-2**
**Accept or Reject a Special Order**

Capacity: 20 million units



Suppose, for example, that an ice cream company produces only premium ice cream. Its factory has a capacity of 20 million half-gallon units but only plans to produce 16 million units. The total costs associated with producing and selling 16 million units are as follows (in thousands of dollars):

	Total	Unit Cost
Variable costs:		
Ingredients	\$15,200	\$0.95
Packaging	3,200	0.20
Direct labor	4,000	0.25
Variable overhead	1,280	0.08
Selling commission	320	0.02
Total variable costs	<u>\$24,000</u>	<u>\$1.50</u>
Total fixed costs	1,552	0.097
Total costs	<u><u>\$25,552</u></u>	<u><u>\$1.597</u></u>
Selling price		<u><u>\$2.00</u></u>

An ice cream distributor from a geographic region not normally served by the company has offered to buy 2 million units at \$1.55 per unit, provided its own label can be attached to the product. Since the distributor approached the company directly, there is no sales commission. As the manager of the ice cream company, would you accept or reject this order?

The offer of \$1.55 is well below the normal selling price of \$2.00; in fact, it is even below the total unit cost. Even so, accepting the order may be profitable. The company has idle capacity, and the order will not replace, or cannibalize, other units being produced to sell at the normal price. Additionally, some of the costs are not

relevant; fixed costs will continue regardless of whether the order is accepted or rejected.

If the order is accepted, a benefit of \$1.55 per unit will be realized that otherwise wouldn't be. However, all of the variable costs except for commissions (\$0.02) also will be incurred, producing a cost of \$1.48 per unit. The net benefit is \$0.07 (\$1.55 – \$1.48) per unit. The relevant cost analysis can be summarized as follows:

	Accept	Reject	Differential Benefit to Accept
Revenues	\$ 3,100,000	\$—	\$ 3,100,000
Ingredients	(1,900,000)	—	(1,900,000)
Packaging	(400,000)	—	(400,000)
Direct labor	(500,000)	—	(500,000)
Variable overhead	(160,000)	—	(160,000)
Profit	<u>\$ 140,000</u>	<u>\$ 0</u>	<u>\$ 140,000</u>

We see that for this company, accepting the special order will increase profits by \$140,000 ( $\$0.07 \times 2,000,000$ ).

**Cornerstone 23-2** shows how to apply relevant costing to a special-order problem.

## HOW TO Structure a Special-Order Problem

### Information:

Leibnitz Company has been approached by a new customer with an offer to purchase 20,000 units of model TR8 at a price of \$9 each. The new customer is geographically separated from the company's other customers, and existing sales would not be affected. Leibnitz normally produces 100,000 units of TR8 per year but only plans to produce and sell 75,000 in the coming year. The normal sales price is \$14 per unit. Unit cost information for the normal level of activity is as follows:

Direct materials	\$3.00
Direct labor	2.80
Variable overhead	1.50
Fixed overhead	2.00
Total	<u>\$9.30</u>

Fixed overhead will not be affected by whether or not the special order is accepted.

### Required:

1. What are the relevant costs and benefits of the two alternatives (accept or reject the special order)?
2. By how much will operating income increase or decrease if the order is accepted?

### Solution:

1. Relevant costs and benefits of accepting the special order include the sales price of \$9, direct materials, direct labor, and variable overhead. No relevant costs or benefits are attached to rejecting the order.



## CORNERSTONE 23-2



**CORNERSTONE**  
**23-2**  
*(continued)*

2. If the problem is analyzed on a unit basis:

	Accept	Reject	Differential Benefit to Accept
Price	\$ 9.00	\$—	\$ 9.00
Direct materials	(3.00)	—	(3.00)
Direct labor	(2.80)	—	(2.80)
Variable overhead	(1.50)	—	(1.50)
Increase in operating income	<u>\$ 1.70</u>	<u>\$ 0</u>	<u>\$ 1.70</u>

Operating income will increase by \$34,000 ( $\$1.70 \times 20,000$  units) if the special order is accepted.

### Keep-or-Drop Decisions

Often, a manager needs to determine whether or not a segment, such as a product line, should be kept or dropped. Keep-or-drop decisions can be relatively small scale in nature, such as when **Nike** decides what to do with particular existing celebrity- and athlete-sponsored clothing or equipment lines. On the other hand, these decisions can be very large scale in nature, such as when Ford Motor Company contemplated the sale of its luxury Jaguar and Land Rover automobile lines. Segmented reports prepared on a variable-costing basis provide valuable information for these **keep-or-drop decisions**. Both the segment's contribution margin and its segment margin are useful in evaluating the performance of segments. However, while segmented reports provide useful information for keep-or-drop decisions, relevant costing describes how the information should be used to arrive at a decision.

To illustrate, consider Norton Materials Inc., which produces concrete blocks, bricks, and roofing tile. The controller has prepared the following estimated segment income statement for next year (in thousands of dollars):

	Blocks	Bricks	Tile	Total
Sales revenue	\$500	\$800	\$150	\$1,450
Less: Variable expenses	<u>250</u>	<u>480</u>	<u>140</u>	<u>870</u>
Contribution margin	\$250	\$320	\$ 10	\$ 580
Less direct fixed expenses:				
Advertising	(10)	(10)	(10)	(30)
Salaries	(37)	(40)	(35)	(112)
Depreciation	<u>(53)</u>	<u>(40)</u>	<u>(10)</u>	<u>(103)</u>
Segment margin	<u>\$150</u>	<u>\$230</u>	<u>\$ (45)</u>	<u>\$ 335</u>

The projected performance of the roofing tile line shows a negative segment margin. This occurrence would be the third consecutive year of poor performance for that line. The president of Norton Materials, Tom Blackburn—concerned about this poor performance—is trying to decide whether to drop or keep the roofing tile line.

His first reaction is to try to increase the sales revenue of roofing tiles, possibly through an aggressive sales promotion coupled with an increase in the selling price. The marketing manager thinks that this approach would be fruitless, however; the market is saturated, and the level of competition is too keen to hold out any hope for increasing the firm's market share.

Increasing the product line's profits through cost cutting is not feasible either. Costs were cut the past two years to reduce the loss to its present anticipated level. Any further reductions would lower the quality of the product and adversely affect sales.

With no hope for improving the profit performance of the line beyond its projected level, Tom has decided to drop it. He reasons that the firm will lose a total of \$10,000 in contribution margin but will save \$45,000 by dismissing the line's supervisor and eliminating its advertising budget. (The depreciation cost of \$10,000 is not relevant because it represents an allocation of a sunk cost.) Thus, dropping the product line has a \$35,000 advantage over keeping it. **Cornerstone 23-3** shows how to structure this information as a keep-or-drop product line problem.

## HOW TO Structure a Keep-or-Drop Product Line Problem

### Information:

Shown below is a segmented income statement (in thousands of dollars) for Norton Materials, Inc.'s three product lines:

	Blocks	Bricks	Tile	Total
Sales revenue	\$500	\$800	\$150	\$1,450
Less: Variable expenses	250	480	140	870
Contribution margin	\$250	\$320	\$ 10	\$ 580
Less direct fixed expenses:				
Advertising	(10)	(10)	(10)	(30)
Salaries	(37)	(40)	(35)	(112)
Depreciation	(53)	(40)	(10)	(103)
Segment margin	\$150	\$230	\$ (45)	\$ 335

The roofing tile line has a contribution margin of \$10,000 (sales of \$150,000 less total variable costs of \$140,000). All variable costs are relevant. Relevant fixed costs associated with this line include \$10,000 in advertising and \$35,000 in supervision.

### Required:

- List the alternatives being considered with respect to the roofing tile line.
- List the relevant benefits and costs for each alternative.
- Which alternative is more cost effective and by how much?

### Solution:

- The two alternatives are to keep the roofing tile line or to drop it.
- The relevant benefits and costs of keeping the roofing tile line include sales of \$150,000, variable costs of \$140,000, advertising cost of \$10,000, and supervision cost of \$35,000.  
None of the relevant benefits and costs of keeping the roofing tile line would occur under the drop alternative.
- 

	Keep	Drop	Differential Amount to Keep
Sales	\$150,000	\$—	\$150,000
Less: Variable expenses	140,000	—	140,000
Contribution margin	\$ 10,000	\$—	\$ 10,000
Less: Advertising	(10,000)	—	(10,000)
Cost of supervision	(35,000)	—	(35,000)
Total relevant benefit (loss)	\$ (35,000)	\$ 0	\$ (35,000)

The difference is \$35,000 in favor of dropping the roofing tile line.



## CORNERSTONE 23-3



A merger between companies is another type of keep-or-drop decision that requires managerial accountants to estimate relevant costs, such as which costs would go away when two companies merge and which costs would remain. For example, when **XM Satellite Radio** and **Sirius Satellite Radio** considered merging into one giant satellite radio company, proponents argued that the merger would create significant cost savings to the new company that could be passed along to consumers in the form of lower prices.<sup>4</sup> They reasoned that many of the costs that XM and Sirius incurred as separate companies would either decrease or be eliminated because the new combined company would need only one research and development group, one marketing department, etc. Any costs that would decrease or go away after the merger would be relevant costs for the merger analysis, while any costs that would remain unchanged after the merger would be irrelevant.

**Keep or Drop with Complementary Effects** Suppose that dropping the roofing tile line would lower sales of blocks by 10 percent and bricks by 8 percent, as many customers buy roofing tile at the same time that they purchase blocks or bricks. Some customers will go elsewhere if they cannot buy both products at the same location. How does this information affect the keep-or-drop decision? **Cornerstone 23-4** shows the impact on all product lines.



## CORNERSTONE 23-4



### HOW TO Structure a Keep-or-Drop Product Line Problem with Complementary Effects

#### Information:

Refer to Norton Material's segmented income statement in Cornerstone 23-3. Assume that dropping the product line reduces sales of blocks by 10 percent and sales of bricks by 8 percent. All other information remains the same.

#### Required:

1. If the roofing tile line is dropped, what is the contribution margin for the block line? For the brick line?
2. Which alternative (keep or drop the roofing tile line) is now more cost effective and by how much?

#### Solution:

1. Previous contribution margin of blocks was \$250,000. A 10 percent decrease in sales implies a 10 percent decrease in total variable costs, so the contribution margin decreases by 10 percent.  
 New contribution margin for blocks =  $\$250,000 - 0.10(\$250,000) = \$225,000$ .  
 The reasoning is the same for the brick line, but the decrease is 8 percent.  
 New contribution margin for bricks =  $\$320,000 - 0.08(\$320,000) = \$294,400$ .  
 Therefore, if the roofing tile product line were dropped, the resulting total contribution margin for Norton would equal \$519,400 ( $\$225,000 + \$294,400$ ).

2. \_\_\_\_\_

	Keep	Drop	Differential Amount to Keep
Contribution margin	\$ 580,000	\$519,400	\$ 60,600
Less: Advertising	(30,000)	(20,000)	(10,000)
Cost of supervision	(112,000)	(77,000)	(35,000)
Total	<u>\$ 438,000</u>	<u>\$422,400</u>	<u>\$ 15,600</u>

<sup>4</sup>Kim Peterson, "XM Plus Sirius Doesn't Equal Monopoly?" (March 24, 2008): accessed April 5, 2008, from <http://blogs.moneycentral.msn.com/topstocks/archive/2008/03/24/xm-plus-sirius-doesn-t-equal-monopoly-feds-say.aspx>.

Notice that the contribution margin for the drop alternative equals the new contribution margins of the block and brick lines (\$225,000 + \$294,400). Also, advertising and supervision remain relevant across these alternatives.

Now the analysis favors keeping the roofing tile line. In fact, company income will be \$15,600 higher if all three lines are kept as opposed to dropping the roofing tile line.

**CORNERSTONE**  
**23-4**  
*(continued)*

The example provides some insights beyond the simple application of the decision model. The initial analysis, which focused on two feasible alternatives, led to a tentative decision to drop the product line. Additional information provided by the marketing manager led to a reversal of the first decision. Perhaps other feasible alternatives exist as well. These additional alternatives would require still more analyses.

## Further Processing of Joint Products

**Joint products** have common processes and costs of production up to a split-off point. At that point, they become distinguishable as separately identifiable products. For example, certain minerals such as copper and gold may both be found in a given ore. The ore must be mined, crushed, and treated before the copper and gold are separated. The point of separation is called the **split-off point**. The costs of mining, crushing, and treatment are common to both products.

Many joint products are sold at the split-off point. However, sometimes it is more profitable to process a joint product further, beyond the split-off point, prior to selling it. A **sell-or-process-further decision** is an important relevant decision that a manager must make.

To illustrate, consider Appletime Corporation, a large corporate farm that specializes in growing apples. Each plot produces approximately one ton of apples. The trees in each plot must be sprayed, fertilized, watered, and pruned. When the apples are ripened, workers are hired to pick them. The apples are then transported to a warehouse, where they are washed and sorted. The approximate cost of all these activities (including processing) is \$300 per ton per year.

Apples are sorted into three grades (A, B, and C), determined by size and blemishes. Large apples without blemishes (bruises, cuts, wormholes, and so on) are sorted into one bin and classified as Grade A. Small apples without blemishes are sorted into a second bin and classified as Grade B. All remaining apples are placed in a third bin and classified as Grade C. Every ton of apples produces 800 pounds of Grade A, 600 pounds of Grade B, and 600 pounds of Grade C.

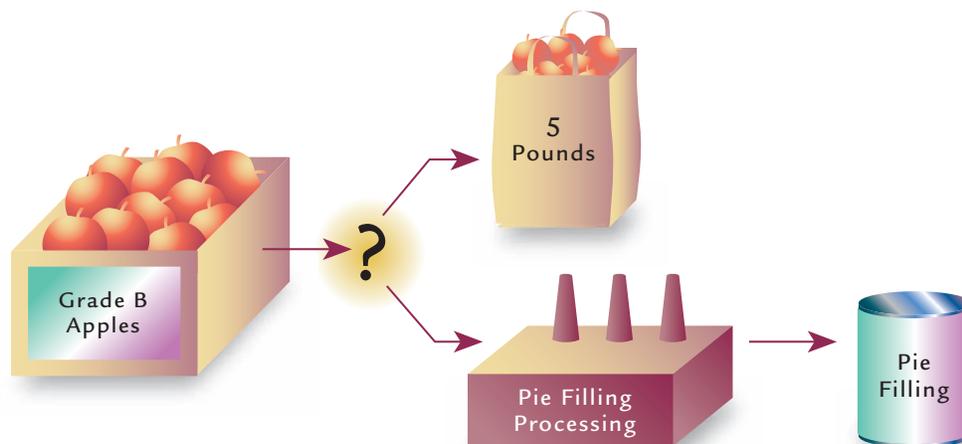
Grade A apples are sold to large supermarkets for \$0.40 per pound. Grade B apples are packaged in five-pound bags and sold to supermarkets for \$1.25 per bag. (The cost of each bag is \$0.05.) Grade C apples are processed further and made into applesauce. The sauce is sold in 16-ounce cans for \$0.75 each. The cost of processing is \$0.10 per pound of apples. The final output is 500 sixteen-ounce cans.

A large supermarket chain recently requested that Appletime supply 16-ounce cans of apple pie filling for which the chain is willing to pay \$0.90 per can. Appletime determined that the Grade B apples would be suitable for this purpose and estimated that it would cost \$0.24 per can to process the apples into pie filling. The output would be 500 cans. Exhibit 23-3 illustrates the decision to sell grade B apples at the split-off point or to process them further into pie filling.

In deciding whether to sell Grade B apples at split-off or to process them further and sell them as pie filling, the common costs of spraying, pruning, and so on are not relevant. The company must pay the \$300 per ton for these activities regardless of whether it sells at split-off or processes further. However, the revenues earned at

## Exhibit 23-3

## Further Processing of Joint Products



split-off are likely to differ from the revenues that would be received if the Grade B apples were further processed and sold as pie filling. Therefore, revenues are a relevant consideration. Similarly, the processing costs occur only if further processing takes place. Hence, processing costs are relevant. **Cornerstone 23-5** shows how to structure the sell-or-process-further decision for the Grade B apples.


**CORNERSTONE**  
**23-5**

**HOW TO Structure the Sell-or-Process-Further Decision**
**Information:**

Appletime grows apples and then sorts them into one of three grades, A, B, or C, based on their condition. Appletime must decide whether to sell the Grade B apples at split-off or to process them into apple pie filling. The company normally sells the Grade B apples in 120 five-pound bags at a per-unit price of \$1.25. If the apples are processed into pie filling, the result will be 500 cans of filling with additional costs of \$0.24 per can. The buyer will pay \$0.90 per can.

**Required:**

1. What is the contribution to income from selling the Grade B apples in five-pound bags?
2. What is the contribution to income from processing the Grade B apples into pie filling?
3. Should Appletime continue to sell the Grade B apples in bags or process them further into pie filling?

**Solution:**

1. Revenue from apples in bags =  $\$1.25 \times 120 = \$150$ .
2. Revenue from further processing =  $\$0.90 \times 500 = \$450$ .  
Further processing cost =  $\$0.24 \times 500 = \$120$ .  
Income from further processing =  $\$450 - \$120 = \$330$ .
3. Appletime should process the Grade B apples into pie filling because the company will make \$330 versus the \$150 it would make by selling the apples in bags.

## Product Mix Decisions

### OBJECTIVE > 3

Choose the optimal product mix when faced with one constrained resource.

Most of the time, organizations have wide flexibility in choosing their product mix. Decisions about product mix can have a significant impact on an organization's profitability. Each mix represents an alternative that carries with it an associated profit level. A manager should choose the alternative that maximizes total profits. Since fixed costs do not vary with activity level, the total fixed costs of a firm will be the same for all possible mixes and, therefore, are not relevant to the decision. Thus, a manager needs to choose the alternative that maximizes total contribution margin.

Assume, for example, that Jorgenson Company produces two types of gears: X and Y, with unit contribution margins of \$25 and \$10, respectively. If the firm possesses unlimited resources and the demand for each product is unlimited, then the product mix decision is simple—produce an infinite number of each product. Unfortunately, every firm faces limited resources and limited demand for each product. These limitations are called **constraints**. A manager must choose the optimal mix given the constraints found within the firm.

Assuming that Jorgenson can sell all that is produced, some individuals might argue that only Gear X should be produced and sold—it has the larger contribution margin. However, this solution is not necessarily the best choice. The selection of the optimal mix can be significantly affected by the relationships of the constrained resources to the individual products. These relationships affect the quantity of each product that can be produced and, consequently, the total contribution margin that can be earned. This point is most vividly illustrated when faced with one resource constraint. **Cornerstone 23-6** shows how to determine the optimal product mix with one constrained resource.

### HOW TO Determine the Optimal Product Mix with One Constrained Resource

#### Information:

Jorgenson Company produces two types of gears, X and Y, with unit contribution margins of \$25 and \$10, respectively. Each gear must be notched by a special machine. The firm owns eight machines that together provide 40,000 hours of machine time per year. Gear X requires two hours of machine time, and Gear Y requires 0.5 hour of machine time. There are no other constraints.

#### Required:

1. What is the contribution margin per hour of machine time for each gear?
2. What is the optimal mix of gears?
3. What is the total contribution margin earned for the optimal mix?

#### Solution:

1.		<b>Gear X</b>	<b>Gear Y</b>
	Contribution margin per unit	\$25.00	\$10.00
	Required machine time per unit	$\div 2$	$\div 0.5$
	Contribution margin per hour of machine time	<u>\$12.50</u>	<u>\$20.00</u>

2. Since Gear Y yields \$20 of contribution margin per hour of machine time, all machine time should be devoted to the production of Gear Y.

$$\text{Units Gear Y} = 40,000 \text{ total hours} / 0.5 \text{ hour per Gear Y} = 80,000 \text{ units}$$

The optimal mix is Gear Y—80,000 units and Gear X—0 units.

3. Total contribution margin of optimal mix = (80,000 units Gear Y)\$10  
= \$800,000



### CORNERSTONE 23-6



Cornerstone 23-6 clearly illustrates a fundamentally important point involving relevant decision making with a constrained resource. This point is that the contribution margin *per unit* of each product is not the critical concern when deciding how much of each product type to produce and sell. Instead, the contribution margin *per unit of the scarce resource* is the deciding factor, which means that the product yielding the highest contribution margin per unit of the scarce resource should be selected. Returning to Cornerstone 23-6, Gear X earns contribution margin per unit

of \$25, which is 2.5 times greater than the \$10 contribution margin per unit earned by Gear Y. However, each Gear X unit requires *more* than 2.5 times as much machine time (the constrained factor) to produce than does each Gear Y unit, thereby making Gear Y more attractive financially than Gear X. Specifically, Gear X earns \$12.50 of contribution margin per machine hour ( $\$25/2$ ), but Gear Y earns \$20 of contribution margin per machine hour ( $\$10/0.5$ ). Thus, Gear Y is the more attractive product and the optimal mix is 80,000 units of Gear Y and no units of Gear X.

Suppose, however, that there is also a demand constraint. Only 60,000 units of Gear Y can be sold. **Cornerstone 23-7** shows how to incorporate this additional constraint. Coffee chain **Caribou Coffee**, as well as other retail businesses, pay careful attention to profitability and sales per square foot of café floor space, which often is the most important constrained resource. The importance of this metric explains why fast-food restaurants like **McDonald's** push their drive-through service—customers using the drive-through option do not require any internal store floor space. In fact, some restaurants generate more than 80 percent of sales from this service!

## CONCEPT Q&A

Consider your, or a friend's, cell phone plan. Often, there are different types of minutes—priced at different levels. For example, a plan might include 300 “anytime” minutes and 1,000 “night and weekend minutes.” Discuss these different types of minutes as constraints. What do they constrain? Do these constraints affect the decision to call a friend?

They constrain the amount of time that you can talk per month. Early in the month, you might phone friends regularly. Later in the month, you might try to figure out how many minutes you have left and try harder to time your calls. For example, calls that must be made at a particular time may use “anytime minutes” (e.g., to set up a job interview appointment between 9 A.M. and 5 P.M.). Calls to friends and family might be postponed to the evening or the weekend.

Possible Answer:



### CORNERSTONE 23-7



## HOW TO Determine the Optimal Product Mix with One Constrained Resource and a Sales Constraint

### Information:

Jorgenson Company produces two types of gears, X and Y, with unit contribution margins of \$25 and \$10, respectively. Each gear must be notched by a special machine. The firm owns eight machines that together provide 40,000 hours of machine time per year. Gear X requires two hours of machine time, and Gear Y requires 0.5 hour of machine time. A maximum of 60,000 units of each gear can be sold.

### Required:

1. What is the contribution margin per hour of machine time for each gear?
2. What is the optimal mix of gears?
3. What is the total contribution margin earned for the optimal mix?

### Solution:

1.		<b>Gear X</b>	<b>Gear Y</b>
	Contribution margin per unit	\$25.00	\$10.00
	Required machine time per unit	$\div 2$	$\div 0.5$
	Contribution margin per hour of machine time	<u>\$12.50</u>	<u>\$20.00</u>





## CORNERSTONE 23-8



### HOW TO Calculate Price by Applying a Markup Percentage to Cost

#### Information:

Elvin Company assembles and installs computers to customer specifications. Elvin has decided to price its jobs at the cost of direct materials and direct labor plus 20 percent. The job for a local vocational-technical school included the following costs:

Direct materials	\$65,000
Direct labor (assembly and installation)	4,000

#### Required:

Calculate the price charged by Elvin Company to the vocational technical school.

#### Solution:

$$\begin{aligned}
 \text{Price} &= \text{Cost} + \text{Markup Percentage} \times \text{Cost} \\
 &= \$69,000 + 0.20(\$69,000) \\
 &= \$69,000 + \$13,800 \\
 &= \$82,800
 \end{aligned}$$

profit—it goes toward the salaries of the clerks, payment for space and equipment (cash registers, furniture, and fixtures), utilities, advertising, and so on. A major advantage of markup pricing is that standard markups are easy to apply. Consider the difficulty of setting a price for every piece of merchandise in a hardware or department store. It is much simpler to apply a uniform markup to cost and then to adjust prices as needed if demand is less than anticipated.

Several important observations are in order at this point concerning the relationship between the base cost, the markup percentage, and the firm's cost system. First, when the firm includes relatively few costs in the base cost (rather than a large number of costs), it usually becomes very important that the firm selects a large enough markup percentage to ensure that the markup covers all of the remaining costs not included in the base cost. Covering more costs with the markup requires significant judgment and cost estimation. Second, on a related note, the effectiveness of cost-plus pricing relies heavily on the accuracy of the cost system and pricing managers' understanding of the firm's cost structure. For example, assume that a firm marks up only its direct manufacturing costs and does not understand well the behavior of its indirect manufacturing costs or its nonmanufacturing costs (e.g., research and development costs, distribution costs, customer service costs, etc.). In this case, it is likely that the firm will encounter problems in setting prices either too high—and will be undercut by competitors with more appropriate lower prices—or too low—and will not cover all costs, thereby resulting in a net loss.

## CONCEPT Q&A

Consider a situation in which you want to buy something, but it is quite expensive. Suppose the salesperson says that the price of the item is high because the cost to the store is high. (That is, price is related to cost.) Suppose, on the other hand, that the salesperson says the price is high because the demand for the item is strong. (That is, price is not related to cost.) Which explanation would make you happier to buy the item?

You might be more likely to buy the item when the reason for the high price is high cost to the store. This situation makes the high price seem "fairer" to you, since the store is not gouging you but simply is trying to make a normal profit. However, different customers view pricing situations differently.

Possible Answer:

## Target Costing and Pricing

Many American and European firms set the price of a new product as the sum of the costs and the desired profit. The rationale is that the company must earn sufficient revenues to cover all costs and yield a profit. Peter Drucker writes, "This is true but

irrelevant: Customers do not see it as their job to ensure manufacturers a profit. The only sound way to price is to start out with what the market is willing to pay.”<sup>5</sup>

**Target costing** is a method of determining the cost of a product or service based on the price (target price) that customers are willing to pay. The marketing department determines what characteristics and price for a product are most acceptable to consumers; then, it is the job of the company’s engineers to design and develop the product such that cost and profit can be covered by that price. Japanese firms have been doing this for years; American companies are beginning to use target costing. For example, **Olympus**, **Toyota**, **Boeing**, **Nissan**, and **Caterpillar** have used a value chain perspective to implement target costing. Target costing recognizes that between 75 and 90 percent of a product’s cost becomes “committed” or “locked into” by the time it finishes the design stage.<sup>6</sup> Therefore, it is most effective to make such large changes in the design and development stage of the product life cycle because at this point the features of the product, as well as its costs, still are fairly easy to adjust. Typical target costing efforts to reduce costs focus on redesigning the product to require fewer or less costly materials, labor, and processes during production, delivery and customer service. **Mercedes**, for instance, used target costing extensively in the design of its popular M-class sports utility vehicle series, which made its public debut in the blockbuster movie *Jurassic Park*.

Consider the target costing experience used by Digitime Company in developing a wristwatch that incorporates a PDA (personal digital assistant). The “cool factor” on this item is high, but actually inputting data on the watch is difficult. So, the company expects to be able to charge a premium price to a relatively small number of early adopters. The marketing vice president’s price estimate is \$200. Digitime’s management requires a 15 percent profit on new products. **Cornerstone 23-9** shows how to calculate a target cost.

## HOW TO Calculate a Target Cost

### Information:

Digitime manufactures wristwatches and is designing a new watch model that incorporates a PDA (personal digital assistant), which Digitime hopes consumers will view as a cool and valuable design feature. As such, the new PDA watch has a target price of \$200. Management requires a 15 percent profit on new products.

### Required:

1. Calculate the amount of desired profit.
2. Calculate the target cost.

### Solution:

1.  $\text{Desired Profit} = 0.15 \times \text{Target Price}$   
 $= 0.15 \times \$200$   
 $= \$30$
2.  $\text{Target Cost} = \text{Target Price} - \text{Desired Profit}$   
 $= \$200 - \$30$   
 $= \$170$



## CORNERSTONE 23-9



<sup>5</sup> Peter Drucker, “The Five Deadly Business Sins,” *The Wall Street Journal* (October 21, 1993): A22.

<sup>6</sup> Antonio Davila and Marc Wouters, “Designing Cost-Competitive Technology Products through Cost Management,” *Accounting Horizons*, Vol. 18, No. 1 (2004): 13–26.

Target costing involves much more upfront work than cost-based pricing. If Digitime can't make the watch for \$170, then the engineers and designers will have to go back to the drawing board and find a way to get it done on budget. However, let's not forget the additional work that must be done if the cost-based price turns out to be higher than what customers will accept. Then, the arduous task of bringing costs into line to support a lower price, or the opportunity cost of missing the market altogether, begins. For example, in the 1980s, the U.S. consumer electronics market became virtually nonexistent because cost-based pricing led to increasingly higher prices. Japanese (and later Korean) firms practicing target costing offered lower prices and just the features wanted by consumers to win the market.

Target costing can be used most effectively in the design and development stage of the product life cycle. At that point, the features of the product as well as its costs are still fairly easy to adjust.

## OBJECTIVE 5

Discuss inventory management and just-in-time (JIT) models.

## Decision Making for Inventory Management

Other types of short-run decisions relate to inventories of raw materials, work in process, and finished goods. For example, companies sometimes experience problems with raw materials and finished goods inventories, such as a lack of storage for these inventories that then has a spill-over effect on productive capacity and warehouse costs.

### Inventory-Related Costs

When the demand for a product or material is known with near certainty for a given period of time (usually a year), two major costs are associated with inventory. If the inventory is a material or good purchased from an outside source, then these inventory-related costs are known as *ordering costs* and *carrying costs*. (If the material or good is produced internally, then the costs are called *setup costs* and *carrying costs*.)

**Ordering costs** are the costs of placing and receiving an order. Examples include order processing costs (clerical costs and documents), the cost of insurance for shipment, and unloading costs. **Carrying costs** are the costs of carrying inventory. Examples include insurance, inventory taxes, obsolescence, the opportunity cost of funds tied up in inventory, handling costs, and storage space.

If demand is not known with certainty, then a third category of inventory costs—called *stockout costs*—exists. **Stockout costs** are the costs of not having a product available when demanded by a customer or the cost of not having a raw material available when needed for production. Examples are lost sales (both current and future), the costs of expediting (increased transportation charges, overtime, and so on), and the costs of interrupted production (e.g., idled workers).

It is important to realize that the purchase price of raw materials is not a part of the total cost associated with carrying inventory. That price must be paid anyway.

Exhibit 23-4 summarizes the reasons typically offered for carrying inventory. It's important to realize that these reasons are given to *justify* carrying inventories. A host of other reasons can be offered that *encourage* the carrying of inventories, which might be either good or bad for the company's profitability. For example, performance indicators such as measures of machine and labor efficiency might promote the buildup of inventories.

## CONCEPT Q&A

Has a store ever been out of an item that you wanted to buy? What did you do? What is the impact of the stockout on the store?

You might have gone to another store or tried to buy the item from a catalog or online. The stockout cost the first store not only the profit to be made from selling to you, but also, potentially, your future business.

Possible Answer:

### Just-in-Time Approach to Inventory Management

The economic environment for many traditional, large-batch, high setup cost firms has changed dramatically in the past 10 to 20 years. Advances in transportation and communication have contributed significantly to the creation of global competition. Advances in technology have contributed to shorter life cycles for products, and product diversity has increased. These

### Traditional Reasons for Carrying Inventory

1. To balance ordering or setup costs and carrying costs.
2. To satisfy customer demand (for example, meet delivery dates).
3. To avoid shutting down manufacturing facilities because of:
  - a. Machine failure.
  - b. Defective parts.
  - c. Unavailable parts.
  - d. Late delivery of parts.
4. To buffer against unreliable production processes.
5. To take advantage of discounts.
6. To hedge against future price increases.

competitive pressures have led many firms to abandon the EOQ model in favor of a just-in-time (JIT) approach. In this way, the costs of ordering and carrying inventory are simply not incurred. However, it is still necessary to solve the underlying problems with uncertainty.

The **just-in-time (JIT)** approach maintains that goods should be pulled through the system by present demand rather than being pushed through on a fixed schedule based on anticipated demand. Many fast-food restaurants, like McDonald's, use a pull system to control their finished goods inventory. When a customer orders a hamburger, it is taken from the rack. When the number of hamburgers gets too low, the cooks make more hamburgers. Customer demand pulls the materials through the system. This same principle is used in manufacturing settings. Each operation produces only what is necessary to satisfy the demand of the succeeding operation. The material or subassembly arrives just in time for production to occur so that demand can be met.

The hallmark of JIT is to reduce all inventories to very low levels. The pursuit of insignificant levels of inventories is vital to the success of JIT. This idea of pursuing insignificant inventories, however, necessarily challenges the traditional reasons for holding inventories (Exhibit 23-4). These reasons are no longer viewed as valid without supportive performance measurement data.

According to the traditional view, inventories solve some underlying problem related to each of the reasons listed in Exhibit 23-4. For example, the problem of resolving the conflict between ordering or setup costs and carrying costs is solved by selecting an inventory level that minimizes the sum of these costs. If demand is greater than expected or if production is reduced by breakdowns and production inefficiencies, then inventories serve as buffers, providing products to customers that may otherwise not have been available. Similarly, inventories can prevent shutdowns caused by late deliveries of materials, defective parts, and failures of machines used to produce subassemblies. Finally, inventories are often the solution to the problem of buying the best raw materials for the least cost through the use of quantity discounts. JIT inventory management offers alternative solutions that do not require high inventories.

Ordering costs are reduced by developing close relationships with suppliers. Negotiating long-term contracts for the supply of outside materials will obviously reduce the number of orders and the associated ordering costs. Some retailers have reduced ordering costs by allowing the manufacturer to handle inventory management for the retailer. The manufacturer tells the retailer when and how much stock to reorder. The retailer reviews the recommendation and approves the order if it makes sense. **Wal-Mart** and **Procter & Gamble**, for example, use this arrangement to reduce inventories as well as stockout problems.

Uncertainty in demand is approached by reducing setup times. Then, manufacturers can literally produce to order. Most shutdowns occur for one of three reasons: machine failure, defective material or subassembly, and unavailability of a raw material or subassembly. Holding inventories is one traditional solution to all three problems.

Those espousing the JIT approach claim that inventories do not solve these problems but rather cover up or hide them. JIT solves the three problems by emphasizing total preventive maintenance and total quality control and by building the right kind of relationship with suppliers.

Traditionally, inventories are carried so that a firm can take advantage of quantity discounts and hedge against future price increases of the items purchased. The objective is to lower the cost of inventory. JIT achieves the same objective without carrying inventories. The JIT solution is to negotiate long-term contracts with a few chosen suppliers located as close to the production facility as possible and to establish more extensive supplier involvement. Suppliers are not selected on the basis of price alone. Performance—the quality of the component and the ability to deliver as needed—and commitment to JIT purchasing are vital considerations. Other benefits of long-term contracts exist. They stipulate prices and acceptable quality levels. Long-term contracts also reduce dramatically the number of orders placed, which helps to drive down the ordering cost.

JIT does have limitations. It is often referred to as a program of simplification—yet this does not imply that JIT is simple or easy to implement. Time is required, for example, to build sound relationships with suppliers. Insisting on immediate changes in delivery times and quality may not be realistic and may cause difficult confrontations between a company and its suppliers. Workers also may be affected by JIT. Studies have shown that sharp reductions in inventory buffers may cause a regimented workflow and high levels of stress among production workers. If the workers perceive JIT as a way of simply squeezing more out of them, then JIT efforts may be doomed. Perhaps a better strategy for JIT implementation is one where inventory reductions follow the process improvements that JIT offers. It requires careful and thorough planning and preparation. Companies should expect some struggle and frustration.

The most glaring deficiency of JIT is the absence of inventory to buffer production interruptions. Current sales are constantly being threatened by an unexpected interruption in production. In fact, if a problem occurs, JIT's approach consists of trying to find and solve the problem before any further production activity occurs. Retailers who use JIT tactics also face the possibility of shortages. (JIT retailers order what they need now—not what they expect to sell—the idea is to flow goods through the channel as late as possible, keeping inventories low and decreasing the need for markdowns.) If demand increases well beyond the retailer's supply of inventory, then the retailer may be unable to make order adjustments quickly enough to avoid lost sales and irritated customers. The JIT manufacturing company is also willing to place current sales at risk to achieve assurance of future sales. This assurance comes from higher quality, quicker response time, and less operating costs. Even so, we must recognize that a sale lost today is a sale lost forever. Installing a JIT system so that it operates with little interruption is not a short-run project. Thus, losing sales is a real cost of installing a JIT system.

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## Summary of Learning Objectives

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**LO1. Describe the short-run decision-making model, and explain how cost behavior affects the information used to make decisions.**

- Six steps of the decision making model are:
  - Recognize and define the problem.
  - Identify feasible alternatives.
  - Identify costs and benefits for each feasible alternative.
  - Total relevant costs and benefits for each alternative.
  - Assess qualitative factors.
  - Make the decision and select the alternative with the greatest overall net benefit.
- Relevant costs:
  - These are future costs that differ across alternatives
  - They frequently are variable costs—called *flexible resources*.

- LO2. Apply relevant costing and decision-making concepts in a variety of business situations.**
- Make-or-buy decision
  - Special-order decision
  - Keep-or-drop decision
  - Further processing of joint products
- LO3. Choose the optimal product mix when faced with one constrained resource.**
- Single constraint leads to production of product with the greatest contribution margin per unit of scarce resource.
  - Multiple constraints require linear programming.
- LO4. Explain the impact of cost on pricing decisions.**
- Markup costing applies markup to cost to determine price.
  - Target costing works backward from desired price to find allowable cost.
- LO5. Discuss inventory management and just-in-time (JIT) models.**
- JIT models solve problems of uneven demand, production failures, and so on, without using inventory.
    - Long-term contracts
    - Supplier relationships
    - Reduce setup times to produce on demand
    - Maximizing quality and productivity

## Summary of Important Equations

- Contribution Margin per Unit of Scarce Resource =  $\frac{\text{Contribution Margin per Unit}}{\text{Amount of Scarce Resource to Make One Unit}}$
- Price Using Markup = Cost per Unit + (Cost per Unit × Markup Percentage)
- Target Cost = Target Price – Desired Profit

- CORNERSTONE 23-1** How to structure a make-or-buy problem, page 1210
- CORNERSTONE 23-2** How to structure a special-order problem, page 1213
- CORNERSTONE 23-3** How to structure a keep-or-drop product line problem, page 1215
- CORNERSTONE 23-4** How to structure a keep-or-drop product line problem with complementary effects, page 1216
- CORNERSTONE 23-5** How to structure the sell-or-process-further decision, page 1218
- CORNERSTONE 23-6** How to determine the optimal product mix with one constrained resource, page 1219
- CORNERSTONE 23-7** How to determine the optimal product mix with one constrained resource and a sales constraint, page 1220
- CORNERSTONE 23-8** How to calculate price by applying a markup percentage to cost, page 1222
- CORNERSTONE 23-9** How to calculate a target cost, page 1223



### CORNERSTONES FOR CHAPTER 23

## Key Terms

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Carrying costs, 1224	Ordering costs, 1224
Constraints, 1219	Relevant costs, 1206
Decision model, 1202	Sell-or-process-further decision, 1217
Differential cost, 1204	Special-order decisions, 1212
Joint products, 1217	Split-off point, 1217
Just-in-time (JIT), 1225	Stockout costs, 1224
Keep-or-drop decisions, 1214	Sunk cost, 1207
Make-or-buy decisions, 1209	Target costing, 1223
Markup, 1221	
Opportunity cost, 1206	

## Review Problem

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### I. Special-Order Decision

Pastin Company produces a light-weight travel raincoat with the following unit cost:

Direct materials	\$4.00
Direct labor	1.00
Variable overhead	1.75
Fixed overhead	2.00
Unit cost	<u>\$8.75</u>

While production capacity is 200,000 units per year, Pastin expects to produce only 170,000 raincoats for the coming year. The fixed selling costs total \$85,000 per year, and variable selling costs are \$0.50 per unit sold. The raincoats normally sell for \$12 each.

At the beginning of the year, a customer from a geographic region outside the area normally served by the company offered to buy 20,000 raincoats for \$8 each. The customer would pay all transportation costs, and there would be no variable selling costs.

#### Required:

Should the company accept the order? Provide both qualitative and quantitative justification for your decision. Assume that no other orders are expected beyond the regular business and the special order.

#### Solution:

The company expects idle capacity. Accepting the special order would bring production up to near capacity. The two options are to accept or reject the order. If the order is accepted, then the company could avoid laying off employees and would enhance and maintain its community image. However, the order is considerably below the normal selling price of \$12. Because the price is so low, the company needs to assess the potential impact of the sale on its regular customers and on the profitability of the firm. Considering the fact that the customer is located in a region not usually served by the company, the likelihood of an adverse impact on regular business is not high. Thus, the qualitative factors seem to favor acceptance.

To assess profitability, the firm should identify the relevant costs and benefits of each alternative. This analysis is as follows:

	Accept	Reject
Revenues	\$160,000	\$—
Direct materials	(80,000)	—
Direct labor	(20,000)	—
Variable overhead	(35,000)	—
Total benefits	<u>\$ 25,000</u>	<u>\$ 0</u>

Accepting the order would increase profits by \$25,000. (The fixed overhead and selling costs are all irrelevant because they are the same across both alternatives.) *Conclusion:* The order should be accepted because both qualitative and quantitative factors favor it.

## II. Optimal Mix

Two types of gears are produced: A and B. Gear A has a unit contribution margin of \$200, and Gear B has a unit contribution margin of \$400. Gear A uses two hours of grinding time, and Gear B uses five hours of grinding time. There are 200 hours of grinding time available per week. This is the only constraint.

### Required:

1. Is the grinding constraint an internal constraint or an external constraint?
2. Determine the optimal mix. What is the total contribution margin?
3. Suppose that there is an additional demand constraint: Market conditions will allow the sale of only 80 units of each gear. Now, what is the optimal mix? The total contribution margin?

### Solution:

1. It's an internal constraint.
2. Gear A:  $\$200/2 = \$100$  per grinding hour  
Gear B:  $\$400/5 = \$80$  per grinding hour  
Since Gear A earns more contribution margin per unit of scarce resource than Gear B, only Gear A should be produced and sold (this is based on the fact that we can sell all we want of each product).  
Optimal mix: Gear A = 100 units\* and Gear B = 0  
Total contribution margin =  $\$200 \times 100 = \$20,000$  per week  
\* $200/2 = 100$  units of A can be produced per week
3. Now, we should sell 80 units of Gear A using 160 hours ( $2 \times 80$ ) and eight units of Gear B ( $40/5$ ).  
Total contribution margin =  $(80 \times \$200) + (8 \times \$400) = \$19,200$  per week.

## Discussion Questions

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1. What is the difference between tactical and strategic decisions?
2. Explain why depreciation on an existing asset is always irrelevant.
3. Give an example of a future cost that is not relevant.
4. What role do past costs play in relevant costing decisions?
5. Can direct materials ever be irrelevant in a make-or-buy decision? Explain.
6. Discuss the importance of complementary effects in a keep-or-drop decision.
7. What are some ways that a manager can identify his or her knowledge of the feasible set of alternatives?
8. Should joint costs be considered in a sell-or-process-further decision? Explain.
9. Suppose that a product can be sold at split-off for \$5,000 or processed further at a cost of \$1,000 and then sold for \$6,400. Should the product be processed further?
10. Suppose that a firm produces two products. Should the firm always place the most emphasis on the product with the largest contribution margin per unit? Explain.
11. Why would a firm ever offer a price on a product that is below its full cost?
12. What are ordering costs? Carrying costs? Give examples of each.
13. What are the reasons for carrying inventory?

## Multiple-Choice Exercises

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**23-1** Which of the following is *not* a step in the short-run decision-making model?

- a. Defining the problem
- b. Identifying alternatives
- c. Identifying the costs and benefits of feasible alternatives
- d. Assessing qualitative factors
- e. All of the above are steps in the short-run decision-making model.

**23-2** Costs that cannot be affected by any future action are called:

- a. differential costs.
- b. relevant costs.
- c. inventory costs.
- d. sunk costs.
- e. joint costs.

**23-3** Sandy is considering moving from her apartment into a small house with a fenced yard. The apartment is noisy, and she has difficulty studying. In addition, the fenced yard would be great for her dog. The distance from school is much the same from the house and from the apartment. The apartment costs \$750 per month, and she has two months remaining on her lease. The lease cannot be broken, so Sandy must pay the last two months of rent whether she lives there or not. The rent for the house is \$450 per month, plus utilities, which should average \$100 per month. The apartment is furnished; the house is not. If Sandy moves into the house, she will need to buy a bed, dresser, desk, and chair immediately. She thinks that she can pick up some used furniture for a good price.

Which of the following costs is irrelevant to Sandy's decision to stay in the apartment or move to the house?

- a. House rent of \$450 per month
- b. Utilities for the house of \$100 per month
- c. The noise in the apartment house
- d. The cost of the used furniture
- e. The last two months of rent in the apartment

**23-4** Please refer to the information in Multiple-Choice Exercise 23-3. Which of the following is a qualitative factor?

- a. House rent of \$450 per month
- b. Utilities for the house of \$100 per month
- c. The noise in the apartment house
- d. The cost of the used furniture
- e. The last two months of rent in the apartment

**23-5** Please refer to the information in Multiple-Choice Exercise 23-3. Suppose that the apartment building was within walking distance to campus and the house was five miles away. Sandy does not own a car. How would that affect her decision?

- a. It would make the apartment more desirable.
- b. It would make the house more desirable.
- c. It would make both choices less desirable.
- d. It would make both choices more desirable.
- e. It would have no effect on the decision; buying or not buying a car is a separate decision.

**23-6 Which of the following is a true statement?**

- a. Fixed costs are always irrelevant.
- b. Variable costs are always relevant.
- c. Step costs may be relevant if an alternative requires moving outside the existing relevant range.
- d. Usually, variable costs are irrelevant.
- e. All of the above.

**23-7 In a make-or-buy decision,**

- a. the company must choose between expanding or dropping a product line.
- b. the company must choose between accepting or rejecting a special order.
- c. the company would consider the purchase price of the externally provided good to be relevant.
- d. the company would consider all fixed overhead to be irrelevant.
- e. none of the above.

**23-8 Carroll Company, a manufacturer of vitamins and minerals, has been asked by a large drugstore chain to provide bottles of vitamin E. The bottles would be labeled with the name of the drugstore chain, and the chain would pay Carroll Company charges \$2.30 per bottle rather than the \$3.00 regular price. Which type of a decision is this?**

- a. Make-or-buy
- b. Keep-or-drop
- c. Special-order
- d. Economic order quantity
- e. Markup pricing

**23-9 Jennings Hardware Store marks up its merchandise by 80 percent. If a part costs \$1.50, which of the following is true?**

- a. The price is \$1.20.
- b. The markup is \$2.70.
- c. The price is \$2.70.
- d. The markup is pure profit.
- e. All of the above.

**23-10 When a company faces a production constraint or scarce resource (e.g., only a certain number of machine hours is available), it is important to:**

- a. produce the product with the highest contribution margin in total.
- b. produce the product with the lowest full manufacturing cost.
- c. produce the product with the highest contribution margin per unit of scarce resource.
- d. produce the product with the highest contribution margin per unit.
- e. The constraint is not relevant to the production problem.

**23-11 In the keep-or-drop decision, the company will find which of the following income statement formats most useful?**

- a. A segmented income statement in the contribution margin format
- b. A segmented income statement in the full costing format that is used for financial reporting
- c. An overall income statement in the contribution margin format
- d. An overall income statement in the full costing format that is used for financial reporting
- e. Income statements are of no use in making this type of decision.

**23-12** In the sell-or-process-further decision,

- joint costs are always relevant.
- total costs of joint processing and further processing are relevant.
- all costs incurred prior to the split-off point are relevant.
- the most profitable outcome can be to further process some separately identifiable products beyond the split-off point, but sell others at the split-off point.
- none of the above.

**23-13** Which of the following is a reason for carrying inventory?

- To balance setup and carrying costs
- To satisfy customer demand
- To avoid shutting down manufacturing facilities
- To take advantage of discounts
- All of the above

## Cornerstone Exercises

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**OBJECTIVE** > **2**  
**CORNERSTONE 23-1**

**Cornerstone Exercise 23-14 STRUCTURING A MAKE-OR-BUY PROBLEM**

Fresh Foods, a large restaurant chain, needed to determine if it would be cheaper to produce 5,000 units of its main food ingredient for use in its restaurants or to purchase them from an outside supplier for \$12 each. Cost information on internal production includes the following:

	<u>Total Cost</u>	<u>Unit Cost</u>
Direct materials	\$25,000	\$ 5.00
Direct labor	15,000	3.00
Variable manufacturing overhead	7,500	1.50
Variable marketing overhead	10,000	2.00
Fixed plant overhead	<u>30,000</u>	<u>6.00</u>
Total	<u>\$87,500</u>	<u>\$17.50</u>

Fixed overhead will continue whether the ingredient is produced internally or externally. No additional costs of purchasing will be incurred beyond the purchase price.

**Required:**

- What are the alternatives for Fresh Foods?
- List the relevant cost(s) of internal production and of external purchase.
- Which alternative is more cost effective and by how much?
- Now assume that 40 percent of the fixed overhead can be avoided if the ingredient is purchased externally. Which alternative is more cost effective and by how much?

**OBJECTIVE** > **2**  
**CORNERSTONE 23-2**

**Cornerstone Exercise 23-15 STRUCTURING A SPECIAL-ORDER PROBLEM**

Harrison Ford Company has been approached by a new customer with an offer to purchase 10,000 units of its model IJ4 at a price of \$4 each. The new customer is geographically separated from the company's other customers, and existing sales would not be affected. Harrison normally produces 75,000 units of IJ4 per year but only plans to produce and sell 60,000 in the coming year. The normal sales price is \$12 per unit. Unit cost information for the normal level of activity is as follows:

Direct materials	\$1.50
Direct labor	2.00
Variable overhead	1.00
Fixed overhead	<u>3.25</u>
Total	<u>\$7.75</u>

Fixed overhead will not be affected by whether or not the special order is accepted.

**Required:**

1. What are the relevant costs and benefits of the two alternatives (accept or reject the special order)?
2. By how much will operating income increase or decrease if the order is accepted?

**Cornerstone Exercise 23-16 STRUCTURING A KEEP-OR-DROP PRODUCT LINE PROBLEM****OBJECTIVE** > **2**  
**CORNERSTONE 23-3**

Shown below is a segmented income statement for Hickory Company's three wooden flooring product lines:

	Strip	Plank	Parquet	Total
Sales revenue	\$400	\$200	\$300	\$900
Less: Variable expenses	<u>225</u>	<u>120</u>	<u>250</u>	<u>595</u>
Contribution margin	\$175	\$ 80	\$ 50	\$305
Less direct fixed expenses:				
Machine rent	(5)	(20)	(30)	(55)
Supervision	(15)	(10)	(5)	(30)
Depreciation	<u>(35)</u>	<u>(10)</u>	<u>(25)</u>	<u>(70)</u>
Segment margin	<u>\$120</u>	<u>\$ 40</u>	<u>\$ (10)</u>	<u>\$150</u>

Hickory is considering dropping its least profitable product line. Hickory's parquet flooring product line has a contribution margin of \$50,000 (sales of \$300,000 less total variable costs of \$250,000). All variable costs are relevant. Relevant fixed costs associated with this line include \$30,000 in machine rent and \$5,000 in supervision salaries.

**Required:**

1. List the alternatives being considered with respect to the parquet flooring line.
2. List the relevant benefits and costs for each alternative.
3. Which alternative is more cost effective and by how much?

**Cornerstone Exercise 23-17 STRUCTURING A KEEP-OR-DROP PRODUCT LINE PROBLEM WITH COMPLEMENTARY EFFECTS****OBJECTIVE** > **2**  
**CORNERSTONE 23-4**

Refer to Hickory Company's segmented income statement in **Cornerstone Exercise 23-16**. Assume that dropping the parquet product line would reduce sales of the strip line by 25 percent and sales of the plank line by 20 percent. All other information remains the same.

**Required:**

1. If the parquet product line is dropped, what is the contribution margin for the strip line? For the plank line?
2. Which alternative (keep or drop the parquet product line) is now more cost effective and by how much?

**Cornerstone Exercise 23-18 STRUCTURING THE SELL-OR-PROCESS-FURTHER DECISION****OBJECTIVE** > **2**  
**CORNERSTONE 23-5**

Jack's Lumber Yard receives 8,000 large trees each period that it subsequently processes into rough logs by stripping off the tree bark and leaves. Jack's then must decide whether to sell its rough logs (for use in log cabin construction) at split-off or to process them further into refined lumber (for use in regular construction framing). Jack's normally sells logs for a per-unit price of \$500. Alternately, each log can be processed further into 800 feet of lumber at an additional cost of \$0.05 per foot. Also, lumber can be sold for \$0.75 per board foot.

**Required:**

1. What is the contribution to income from selling the logs for log cabin construction?
2. What is the contribution to income from processing the logs into lumber?
3. Should Jack's continue to sell the logs or process them further into lumber?

**OBJECTIVE** > **3**  
**CORNERSTONE 23-6**

**Cornerstone Exercise 23-19 DETERMINING THE OPTIMAL PRODUCT MIX WITH ONE CONSTRAINED RESOURCE**

Comfy Fit Company manufactures two types of university sweatshirts, the Swoop and the Rufus, with unit contribution margins of \$5 and \$15, respectively. Regardless of type, each sweatshirt must be fed through a stitching machine to affix the appropriate university logo. The firm leases seven machines that each provide 1,000 hours of machine time per year. Each Swoop sweatshirt requires 6 minutes of machine time, and each Rufus sweatshirt requires 30 minutes of machine time. There are no other constraints.

**Required:**

1. What is the contribution margin per hour of machine time for each type of sweatshirt?
2. What is the optimal mix of sweatshirts?
3. What is the total contribution margin earned for the optimal mix?

**OBJECTIVE** > **3**  
**CORNERSTONE 23-7**

**Cornerstone Exercise 23-20 DETERMINING THE OPTIMAL PRODUCT MIX WITH ONE CONSTRAINED RESOURCE AND A SALES CONSTRAINT**

Comfy Fit Company manufactures two types of university sweatshirts, the Swoop and the Rufus, with unit contribution margins of \$5 and \$15, respectively. Regardless of type, each sweatshirt must be fed through a stitching machine to affix the appropriate university logo. The firm leases seven machines that each provide 1,000 hours of machine time per year. Each Swoop sweatshirt requires 6 minutes of machine time, and each Rufus sweatshirt requires 30 minutes of machine time. A maximum of 50,000 units of each sweatshirt can be sold.

**Required:**

1. What is the contribution margin per hour of machine time for each type of sweatshirt?
2. What is the optimal mix of sweatshirts?
3. What is the total contribution margin earned for the optimal mix?

**OBJECTIVE** > **4**  
**CORNERSTONE 23-8**

**Cornerstone Exercise 23-21 CALCULATING PRICE BY APPLYING A MARKUP PERCENTAGE TO COST**

Integrity Accounting Firm provides various financial services to organizations. Integrity has decided to price its jobs at the total variable costs of the job plus 15 percent. The job for a medium-sized dance club client included the following costs:

Direct materials	\$ 5,000
Direct labor (partners and staff accountants)	90,000
Depreciation (using straight-line method) on Integrity's office building	50,000

**Required:**

Calculate the price charged by Integrity Accounting to the dance club.

**OBJECTIVE** > **4**  
**CORNERSTONE 23-9**

**Cornerstone Exercise 23-22 CALCULATING A TARGET COST**

Yuhu manufactures cell phones and is developing a new model with a feature (aptly named Don't Drink and Dial) that prevents the phone from dialing an owner-defined list of phone numbers between the hours of midnight and 6:00 a.m. The new phone model has a target price of \$350. Management requires a 10 percent profit on new products.

**Required:**

1. Calculate the amount of desired profit.
2. Calculate the target cost.

## Exercises

### Exercise 23-23 MODEL FOR MAKING TACTICAL DECISIONS

OBJECTIVE > 1

The model for making tactical decisions described in the text has six steps. These steps are listed, out of order, below.

**Required:**

Put the steps in the correct order, starting with the step that should be taken first.

1. Select the alternative with the greatest overall benefit.
2. Identify the costs and benefits associated with each feasible alternative.
3. Assess qualitative factors.
4. Recognize and define the problem.
5. Identify alternatives as possible solutions to the problem.
6. Total the relevant costs and benefits for each alternative.

### Exercise 23-24 MODEL FOR MAKING TACTICAL DECISIONS

OBJECTIVE > 1

Austin Porter is a sophomore at a small Midwestern university. He is considering whether to continue at this university or to transfer to one with a nationally recognized engineering program. Austin's decision-making process included the following:

- a. He surfed the web to check out the sites of a number of colleges and universities with engineering programs.
- b. Austin wrote to five of the universities to obtain information on their engineering colleges, tuition and room and board costs, the likelihood of being accepted, and so on.
- c. Austin compared costs of the five other schools with the cost of his present school. He totaled the balance in his checking and savings accounts, estimated the earnings from his work-study job, and asked his parents whether or not they would be able to help him out.
- d. Austin's high-school sweetheart had a long heart-to-heart talk with him about their future—specifically, that there might be no future if he left town.
- e. Austin thought that while he enjoyed his present college, its engineering program did not have the national reputation that would enable him to get a good job on either the East or West Coast. Working for a large company on the coast was an important dream of his.
- f. Austin's major advisor agreed that a school with a national reputation would make job hunting easier. However, he reminded Austin that small college graduates had occasionally gotten the kind of jobs that Austin wanted.
- g. Austin had a number of good friends at the university, and they were encouraging him to stay.
- h. A friend of Austin's from high school returned home for a long weekend. She attends a prestigious university and told Austin of the fun and opportunities available at her school. She encouraged Austin to check out the possibilities elsewhere.
- i. A friendly professor outside of Austin's major area ran into him at the student union. She listened to his thinking and reminded him that a degree from this university would easily get him into a good graduate program. Perhaps he should consider postponing the job hunt until he had his master's degree in hand.
- j. Two of the three prestigious universities accepted Austin and offered financial aid. The third one rejected his application.
- k. Austin made his decision.

**Required:**

Classify the events a through k under one of the six steps of the model for making tactical decisions described in your text.

### Exercise 23-25 MAKE-OR-BUY DECISION

OBJECTIVE > 1 2

Zion Manufacturing had always made its components in-house. However, Bryce Component Works recently offered to supply one component, K2, at a price of \$25 each.

Zion uses 10,000 units of Component K2 each year. The cost per unit of this component is as follows:

Direct materials	\$12.00
Direct labor	8.25
Variable overhead	3.50
Fixed overhead	<u>2.00</u>
Total	<u>\$25.75</u>

The fixed overhead is an allocated expense; none of it would be eliminated if production of Component K2 stopped.

**Required:**

1. What are the alternatives facing Zion Manufacturing with respect to production of Component K2?
2. List the relevant costs for each alternative.
3. If Zion decides to purchase the component from Bryce, by how much will operating income increase or decrease? Which alternative is better?

**OBJECTIVE** > **2** **Exercise 23-26 MAKE-OR-BUY DECISION**

Zion Manufacturing had always made its components in-house. However, Bryce Component Works had recently offered to supply one component, K2, at a price of \$25 each. Zion uses 10,000 units of Component K2 each year. The cost per unit of this component is as follows:

Direct materials	\$12.00
Direct labor	8.25
Variable overhead	3.50
Fixed overhead	<u>2.00</u>
Total	<u>\$25.75</u>

Assume that 75 percent of Zion Manufacturing's fixed overhead for Component K2 would be eliminated if that component were no longer produced.

**Required:**

If Zion decides to purchase the component from Bryce, by how much will operating income increase or decrease? Which alternative is better?

**OBJECTIVE** > **2** **Exercise 23-27 SPECIAL-ORDER DECISION**



Smooth Move Company manufactures professional paperweights and has been approached by a new customer with an offer to purchase 15,000 units at a per-unit price of \$7.00. The new customer is geographically separated from Smooth Move's other customers, and existing sales will not be affected. Smooth Move normally produces 82,000 units but plans to produce and sell only 65,000 in the coming year. The normal sales price is \$12 per unit. Unit cost information is as follows:

Direct materials	\$3.00
Direct labor	2.25
Variable overhead	1.15
Fixed overhead	<u>1.80</u>
Total	<u>\$8.20</u>

If Smooth Move accepts the order, no fixed manufacturing activities will be affected because there is sufficient excess capacity.

**Required:**

1. What are the alternatives for Smooth Move?
2. Should Smooth Move accept the special order? By how much will profit increase or decrease if the order is accepted?

**Exercise 23-28 SPECIAL ORDER****OBJECTIVE** > 2

Smooth Move Company manufactures professional paperweights and has been approached by a new customer with an offer to purchase 15,000 units at a per-unit price of \$7.00. The new customer is geographically separated from Smooth Move's other customers, and existing sales will not be affected. Smooth Move normally produces 82,000 units but plans to produce and sell only 65,000 in the coming year. The normal sales price is \$12 per unit. Unit cost information is as follows:

Direct materials	\$3.00
Direct labor	2.25
Variable overhead	1.15
Fixed overhead	1.80
Total	<u>\$8.20</u>

The customer wants to have its company logo affixed to each paperweight using a label. Smooth Move would have to purchase a special logo labeling machine that will cost \$14,000. The machine will be able to label the 15,000 units and then it will be scrapped (with no further value). No other fixed overhead activities will be affected.

**Required:**

Should Smooth Move accept the special order? By how much will profit increase or decrease if the order is accepted?

**Exercise 23-29 KEEP-OR-DROP DECISION****OBJECTIVE** > 2

Petoskey Company produces three products: Alanson, Boyne, and Conway. A segmented income statement, with amounts given in thousands, follows:

	Alanson	Boyne	Conway	Total
Sales revenue	\$1,280	\$185	\$300	\$1,765
Less: Variable expenses	<u>1,115</u>	<u>45</u>	<u>225</u>	<u>1,385</u>
Contribution margin	\$ 165	\$140	\$ 75	\$ 380
Less direct fixed expenses:				
Depreciation	(50)	(15)	(10)	(75)
Salaries	<u>(95)</u>	<u>(85)</u>	<u>(80)</u>	<u>(260)</u>
Segment margin	<u>\$ 20</u>	<u>\$ 40</u>	<u>\$ (15)</u>	<u>\$ 45</u>

Direct fixed expenses consist of depreciation and plant supervisory salaries. All depreciation on the equipment is dedicated to the product lines. None of the equipment can be sold. Also, each of the three products has a different supervisor whose position would *remain* if the associated product were dropped.

**Required:**

Estimate the impact on profit that would result from dropping Conway. Explain why Petoskey should keep or drop Conway.

**Exercise 23-30 KEEP-OR-DROP DECISION****OBJECTIVE** > 2

Petoskey Company produces three products: Alanson, Boyne, and Conway. A segmented income statement, with amounts given in thousands, follows:

	Alanson	Boyne	Conway	Total
Sales revenue	\$1,280	\$185	\$300	\$1,765
Less: Variable expenses	<u>1,115</u>	<u>45</u>	<u>225</u>	<u>1,385</u>
Contribution margin	\$ 165	\$140	\$ 75	\$ 380
Less direct fixed expenses:				
Depreciation	(50)	(15)	(10)	(75)
Salaries	<u>(95)</u>	<u>(85)</u>	<u>(80)</u>	<u>(260)</u>
Segment margin	<u>\$ 20</u>	<u>\$ 40</u>	<u>\$ (15)</u>	<u>\$ 45</u>

**OBJECTIVE** > **2** Direct fixed expenses consist of depreciation and plant supervisory salaries. All depreciation on the equipment is dedicated to the product lines. None of the equipment can be sold. Also, each of the three products has a different supervisor whose position would *be eliminated* if the associated product were dropped.

**Required:**

Estimate the impact on profit that would result from dropping Conway. Explain why Petoskey should keep or drop Conway.

**Exercise 23-31 KEEP-OR-DROP DECISION**

Refer to the Petoskey Company information provided in **Exercise 23-30**. In addition, assume that 20 percent of the Alanson customers choose to buy from Petoskey because it offers a full range of products, including Conway. If Conway were no longer available from Petoskey, these customers would go elsewhere to purchase Alanson.

**Required:**

Estimate the impact on profit that would result from dropping Conway. Explain why Petoskey should keep or drop Conway.

**OBJECTIVE** > **2** **Exercise 23-32 SELL AT SPLIT-OFF OR PROCESS FURTHER**

Bozo Inc. manufactures two products from a joint production process. The joint process costs \$110,000 and yields 6,000 pounds of LTE compound and 20,000 pounds of HS compound. LTE can be sold at split-off for \$55 per pound. HS can be sold at split-off for \$8 per pound. A buyer of HS asked Bozo Inc. to process HS further into CS compound. If HS were processed further, it would cost \$34,000 to turn 20,000 pounds of HS into 4,000 pounds of CS. The CS would sell for \$45 per pound.

**Required:**

1. What is the contribution to income from selling the 20,000 pounds of HS at split-off?
2. What is the contribution to income from processing the 20,000 pounds of HS into 4,000 pounds of CS? Should Bozo Inc. continue to sell the HS at split-off or process it further into CS?

**OBJECTIVE** > **3** **Exercise 23-33 CHOOSING THE OPTIMAL PRODUCT MIX WITH ONE CONSTRAINED RESOURCE**

Billings Company produces two products, Product Reno and Product Tahoe. Each product goes through its own assembly and finishing departments. However, both of them must go through the painting department. The painting department has capacity of 2,460 hours per year. Product Reno has a unit contribution margin of \$120 and requires five hours of painting department time. Product Tahoe has a unit contribution margin of \$75 and requires three hours of painting department time. There are no other constraints.

**Required:**

1. What is the contribution margin per hour of painting department time for each product?
2. What is the optimal mix of products?
3. What is the total contribution margin earned for the optimal mix?

**OBJECTIVE** > **3** **Exercise 23-34 CHOOSING THE OPTIMAL PRODUCT MIX WITH A CONSTRAINED RESOURCE AND A DEMAND CONSTRAINT**

Refer to the Billings Company information provided in **Exercise 23-33**. Also, assume that only 500 units of each product can be sold.

**Required:**

1. What is the optimal mix of products?
2. What is the total contribution margin earned for the optimal mix?

**Exercise 23-35 CALCULATING PRICE USING A MARKUP PERCENTAGE OF COST**

OBJECTIVE &gt; 4

Grinnell Lake Gift Shop has decided to price the candles that it sells at cost plus 80 percent. One type of carved bear-shaped candle costs \$12, and huckleberry-scented votive candles cost \$1.10 each.

**Required:**

1. What price will Grinnell Lake Gift Shop charge for the carved bear candle?
2. What price will Grinnell Lake Gift Shop charge for each scented votive candle?

**Exercise 23-36 TARGET COSTING**

OBJECTIVE &gt; 4

H. Banks Company would like to design, produce, and sell versatile toasters for the home kitchen market. The toaster will have four slots that adjust in thickness to accommodate both slim slices of bread and oversized bagels. The target price is \$75. Banks requires that new products be priced such that 25 percent of the price is profit.

**Required:**

1. Calculate the amount of desired profit per unit of the new toaster.
2. Calculate the target cost per unit of the new toaster.

**Exercise 23-37 ORDERING COST, CARRYING COST, AND TOTAL INVENTORY-RELATED COST**

OBJECTIVE &gt; 5

Aravan Company purchases 4,000 units of Product Beta each year in lots of 400 units per order. The cost of placing one order is \$20, and the cost of carrying one unit of product in inventory for a year is \$4.

**Required:**

1. How many orders for Product Beta does Aravan place per year?
2. What is the total ordering cost of Beta per year?
3. What is the total carrying cost of Beta per year?
4. What is the total cost of Aravan's inventory policy for Beta per year?

**Exercise 23-38 KEEP OR BUY, SUNK COSTS**

OBJECTIVE &gt; 1 2

Heather Alburty purchased a previously owned, two-year-old Grand Am for \$8,900. Since purchasing the car, she has spent the following amounts on parts and labor:

New stereo system	\$1,200
Trick paint	400
New wide racing tires	800
Total	<u>\$2,400</u>

Unfortunately, the new stereo doesn't completely drown out the sounds of a grinding transmission. Apparently, the Grand Am needs a considerable amount of work to make it reliable transportation. Heather estimates that the needed repairs include the following:

Transmission overhaul	\$2,000
Water pump	400
Master cylinder work	1,100
Total	<u>\$3,500</u>

In a visit to a used car dealer, Heather has found a one-year-old Neon in mint condition for \$9,400. Heather has advertised and found that she can sell the Grand Am for only \$6,400. If she buys the Neon, she will pay cash, but she would need to sell the Grand Am.

**Required:**

1. In trying to decide whether to restore the Grand Am or to buy the Neon, Heather is distressed because she already has spent \$11,300 on the Grand Am. The investment seems too much to give up. How would you react to her concern?
2. Assuming that Heather would be equally happy with the Grand Am or the Neon, should she buy the Neon, or should she restore the Grand Am?

**OBJECTIVE** > **2****Exercise 23-39 MAKE OR BUY**

Blasingham Company is currently manufacturing Part Q108, producing 35,000 units annually. The part is used in the production of several products made by Blasingham. The cost per unit for Q108 is as follows:

Direct materials	\$ 6.00
Direct labor	2.00
Variable overhead	1.50
Fixed overhead	3.50
Total	<u>\$13.00</u>

Of the total fixed overhead assigned to Q108, \$77,000 is direct fixed overhead (the lease of production machinery and salary of a production line supervisor—neither of which will be needed if the line is dropped). The remaining fixed overhead is common fixed overhead. An outside supplier has offered to sell the part to Blasingham for \$11. There is no alternative use for the facilities currently used to produce the part.

**Required:**

1. Should Blasingham Company make or buy Part Q108?
2. What is the most that Blasingham would be willing to pay an outside supplier?
3. If Blasingham buys the part, by how much will income increase or decrease?

**OBJECTIVE** > **1** **2****Exercise 23-40 MAKE OR BUY**

Blasingham Company is currently manufacturing Part Q108, producing 35,000 units annually. The part is used in the production of several products made by Blasingham. The cost per unit for Q108 is as follows:

Direct materials	\$ 6.00
Direct labor	2.00
Variable overhead	1.50
Fixed overhead	3.50
Total	<u>\$13.00</u>

All of the fixed overhead is common fixed overhead. An outside supplier has offered to sell the part to Blasingham for \$11. There is no alternative use for the facilities currently used to produce the part.

**Required:**

1. Should Blasingham Company make or buy Part Q108?
2. What is the most Blasingham would be willing to pay an outside supplier?
3. If Blasingham buys the part, by how much will income increase or decrease?

## Problems

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**OBJECTIVE** > **1** **2****Problem 23-41 SPECIAL-ORDER DECISION**

Rianne Company produces a light fixture with the following unit cost:

Direct materials	\$2
Direct labor	1
Variable overhead	3
Fixed overhead	<u>2</u>
Unit cost	<u>\$8</u>

The production capacity is 300,000 units per year. Because of a depressed housing market, the company expects to produce only 180,000 fixtures for the coming year. The company also has fixed selling costs totaling \$500,000 per year and variable selling costs of \$1 per unit sold. The fixtures normally sell for \$12 each.

At the beginning of the year, a customer from a geographic region outside the area normally served by the company offered to buy 100,000 fixtures for \$7 each. The customer also offered to pay all transportation costs. Since there would be no sales commissions involved, this order would not have any variable selling costs.

**Required:**

1. Based on a quantitative (numerical) analysis, should the company accept the order?
2. What qualitative factors might impact the decision? Assume that no other orders are expected beyond the regular business and the special order.

**Problem 23-42 MAKE OR BUY, QUALITATIVE CONSIDERATIONS**

OBJECTIVE > 1 2

Hetrick Dentistry Services operates in a large metropolitan area. Currently, Hetrick has its own dental laboratory to produce porcelain and gold crowns. The unit costs to produce the crowns are as follows:

	Porcelain	Gold
Raw materials	\$ 70	\$130
Direct labor	27	27
Variable overhead	8	8
Fixed overhead	22	22
Total	<u>\$127</u>	<u>\$187</u>

Fixed overhead is detailed as follows:

Salary (supervisor)	\$26,000
Depreciation	5,000
Rent (lab facility)	32,000

Overhead is applied on the basis of direct labor hours. These rates were computed by using 5,500 direct labor hours.

A local dental laboratory has offered to supply Hetrick all the crowns it needs. Its price is \$125 for porcelain crowns and \$150 for gold crowns; however, the offer is conditional on supplying both types of crowns—it will not supply just one type for the price indicated. If the offer is accepted, the equipment used by Hetrick's laboratory would be scrapped (it is old and has no market value), and the lab facility would be closed. Hetrick uses 2,000 porcelain crowns and 600 gold crowns per year.

**Required:**

1. Should Hetrick continue to make its own crowns, or should they be purchased from the external supplier? What is the dollar effect of purchasing?
2. What qualitative factors should Hetrick consider in making this decision?
3. Suppose that the lab facility is owned rather than rented and that the \$32,000 is depreciation rather than rent. What effect does this have on the analysis in Requirement 1?
4. Refer to the original data. Assume that the volume of crowns used is 3,400 porcelain and 600 gold. Should Hetrick make or buy the crowns? Explain the outcome.

**Problem 23-43 SELL OR PROCESS FURTHER**

OBJECTIVE > 1 2

Zanda Drug Corporation buys three chemicals that are processed to produce two types of analgesics used as ingredients for popular over-the-counter drugs. The purchased chemicals are blended for two to three hours and then heated for 15 minutes. The results of the process are two separate analgesics, depryl and pencol, which are sent to a drying room until their moisture content is reduced to 6 to 8 percent. For every 1,300 pounds of chemicals used, 600 pounds of depryl and 600 pounds of pencol are produced. After drying, depryl and pencol are sold to companies that process them into their final form.



The selling prices are \$12 per pound for depryl and \$30 per pound for pencol. The costs to produce 600 pounds of each analgesic are as follows:

Chemicals	\$8,500
Direct labor	6,735
Overhead	9,900

The analgesics are packaged in 20-pound bags and shipped. The cost of each bag is \$1.30. Shipping costs \$0.10 per pound.

Zanda could process depryl further by grinding it into a fine powder and then molding the powder into tablets. The tablets can be sold directly to retail drug stores as a generic brand. If this route were taken, the revenue received per bottle of tablets would be \$4.00, with 10 bottles produced by every pound of depryl. The costs of grinding and tableting total \$2.50 per pound of depryl. Bottles cost \$0.40 each. Bottles are shipped in boxes that hold 25 bottles at a shipping cost of \$1.60 per box.

**Required:**

- Should Zanda sell depryl at split-off, or should depryl be processed and sold as tablets?
- If Zanda normally sells 265,000 pounds of depryl per year, what will be the difference in profits if depryl is processed further?

**OBJECTIVE** > **1** **2**

**Problem 23-44 KEEP OR DROP**

AudioMart is a retailer of radios, stereos, and televisions. The store carries two portable sound systems that have radios, tape players, and speakers. System A, of slightly higher quality than System B, costs \$20 more. With rare exceptions, the store also sells a headset when a system is sold. The headset can be used with either system. Variable-costing income statements for the three products follow:

	System A	System B	Headset
Sales	\$45,000	\$ 32,500	\$8,000
Less: Variable expenses	<u>20,000</u>	<u>25,500</u>	<u>3,200</u>
Contribution margin	\$25,000	\$ 7,000	\$4,800
Less: Fixed costs*	<u>10,000</u>	<u>18,000</u>	<u>2,700</u>
Operating income	<u>\$15,000</u>	<u>\$(11,000)</u>	<u>\$2,100</u>

\*This includes common fixed costs totaling \$18,000, allocated to each product in proportion to its revenues.

The owner of the store is concerned about the profit performance of System B and is considering dropping it. If the product is dropped, sales of System A will increase by 30 percent, and sales of headsets will drop by 25 percent.

**Required:**

- Prepare segmented income statements for the three products using a better format.
- Prepare segmented income statements for System A and the headsets assuming that System B is dropped. Should B be dropped?
- Suppose that a third system, System C, with a similar quality to System B, could be acquired. Assume that with C the sales of A would remain unchanged; however, C would produce only 80 percent of the revenues of B, and sales of the headsets would drop by 10 percent. The contribution margin ratio of C is 50 percent, and its direct fixed costs would be identical to those of B. Should System B be dropped and replaced with System C?

**OBJECTIVE** > **1** **2**

**Problem 23-45 ACCEPT OR REJECT A SPECIAL ORDER**

Steve Murningham, manager of an electronics division, was considering an offer by Pat Sellers, manager of a sister division. Pat's division was operating below capacity and had just been given an opportunity to produce 8,000 units of one of its products for a customer in a market not normally served. The opportunity involves a product that uses an electrical component produced by Steve's division. Each unit that Pat's division

produces requires two of the components. However, the price that the customer is willing to pay is well below the price that is usually charged; to make a reasonable profit on the order, Pat needs a price concession from Steve's division. Pat had offered to pay full manufacturing cost for the parts. So Steve would know that everything was above board, Pat supplied the following unit cost and price information concerning the special order, excluding the cost of the electrical component:

Selling price	\$ 32
Less costs:	
Direct materials	(17)
Direct labor	(7)
Variable overhead	(2)
Fixed overhead	(3)
Operating profit	<u>\$ 3</u>

The normal selling price of the electrical component is \$2.30 per unit. Its full manufacturing cost is \$1.85 (\$1.05 variable and \$0.80 fixed). Pat argued that paying \$2.30 per component would wipe out the operating profit and result in her division showing a loss. Steve was interested in the offer because his division was also operating below capacity (the order would not use all the excess capacity).

**Required:**

1. Should Steve accept the order at a selling price of \$1.85 per unit? By how much will his division's profits be changed if the order is accepted? By how much will the profits of Pat's division change if Steve agrees to supply the part at full cost?
2. Suppose that Steve offers to supply the component at \$2. In offering this price, Steve says that it is a firm offer, not subject to negotiation. Should Pat accept this price and produce the special order? If Pat accepts the price, what is the change in profits for Steve's division?
3. Assume that Steve's division is operating at full capacity and that Steve refuses to supply the part for less than the full price. Should Pat still accept the special order? Explain.

**Problem 23-46 COST-BASED PRICING DECISION**

Jeremy Costa, owner of Costa Cabinets Inc., is preparing a bid on a job that requires \$1,800 of direct materials, \$1,600 of direct labor, and \$800 of overhead. Jeremy normally applies a standard markup based on cost of goods sold to arrive at an initial bid price. He then adjusts the price as necessary in light of other factors (e.g., competitive pressure). Last year's income statement is as follows:

Sales	\$130,000
Cost of goods sold	<u>48,100</u>
Gross margin	\$ 81,900
Selling and administrative expenses	<u>46,300</u>
Operating income	<u>\$ 35,600</u>

**Required:**

1. Calculate the markup that Jeremy will use.
2. What is Jeremy's initial bid price?

**Problem 23-47 PRODUCT MIX DECISION, SINGLE CONSTRAINT**

**OBJECTIVE** 3

Sealing Company manufactures three types of DVD storage units. Each of the three types requires the use of a special machine that has a total operating capacity of 15,000 hours per year. Information on the three types of storage units is as follows:

	Basic	Standard	Deluxe
Selling price	\$9.00	\$30.00	\$35.00
Variable cost	\$6.00	\$20.00	\$10.00
Machine hours required	0.10	0.50	0.75

Sealing Company's marketing director has assessed demand for the three types of storage units and believes that the firm can sell as many units as it can produce.

**Required:**

1. How many of each type of unit should be produced and sold to maximize the company's contribution margin? What is the total contribution margin for your selection?
2. Now suppose that Sealing Company believes that it can sell no more than 12,000 of the deluxe model but up to 50,000 each of the basic and standard models at the selling prices estimated. What product mix would you recommend, and what would be the total contribution margin?

**OBJECTIVE** > **1** **2**

**Problem 23-48 SPECIAL-ORDER DECISION, QUALITATIVE ASPECTS**

Randy Stone, manager of Specialty Paper Products Company, was agonizing over an offer for an order requesting 5,000 calendars. Specialty Paper Products was operating at 70 percent of its capacity and could use the extra business; unfortunately, the order's offering price of \$4.20 per box was below the cost to produce the calendars. The controller, Louis Barns, was opposed to taking a loss on the deal. However, the personnel manager, Yatika Blaine, argued in favor of accepting the order even though a loss would be incurred; it would avoid the problem of layoffs and would help to maintain the company's community image. The full cost to produce a calendar follows:

Direct materials	\$1.15
Direct labor	2.00
Variable overhead	1.10
Fixed overhead	1.00
Total	<u>\$5.25</u>

Later that day, Louis and Yatika met over coffee. Louis sympathized with Yatika's concerns and suggested that the two of them rethink the special-order decision. He offered to determine relevant costs if Yatika would list the activities that would be affected by a layoff. Yatika eagerly agreed and came up with the following activities: an increase in the state unemployment insurance rate from 1 percent to 2 percent of total payroll, notification costs to lay off approximately 20 employees, and increased costs of rehiring and retraining workers when the downturn was over. Louis determined that these activities would cost the following amounts:

- Total payroll is \$1,460,000 per year.
- Layoff paperwork is \$25 per laid-off employee.
- Rehiring and retraining is \$150 per new employee.

**Required:**

1. Assume that the company will accept the order only if it increases total profits. Should the company accept or reject the order? Provide supporting computations.
2. Consider the new information on activity costs associated with the layoff. Should the company accept or reject the order? Provide supporting computations.

**OBJECTIVE** > **1** **2**

**Problem 23-49 SELL OR PROCESS FURTHER, BASIC ANALYSIS**

Shenista Inc. produces four products (Alpha, Beta, Gamma, and Delta) from a common input. The joint costs for a typical quarter follow:

Direct materials	\$95,000
Direct labor	43,000
Overhead	85,000

The revenues from each product are as follows: Alpha, \$100,000; Beta, \$93,000; Gamma, \$30,000; and Delta, \$40,000.

Management is considering processing Delta beyond the split-off point, which would increase the sales value of Delta to \$75,000. However, to process Delta further means that the company must rent some special equipment that costs \$15,400 per quarter. Additional materials and labor also needed will cost \$8,500 per quarter.

**Required:**

1. What is the operating profit earned by the four products for one quarter?
2. Should the division process Delta further or sell it at split-off? What is the effect of the decision on quarterly operating profit?

**Problem 23-50 PRODUCT MIX DECISION, SINGLE CONSTRAINT****OBJECTIVE** > 3

Norton Company produces two products (Juno and Hera) that use the same material input. Juno uses two pounds of the material for every unit produced, and Hera uses five pounds. Currently, Norton has 16,000 pounds of the material in inventory. All of the material is imported. For the coming year, Norton plans to import an additional 8,000 pounds to produce 2,000 units of Juno and 4,000 units of Hera. The unit contribution margin is \$30 for Juno and \$60 for Hera.

Norton Company has received word that the source of the material has been shut down by embargo. Consequently, the company will not be able to import the 8,000 pounds it planned to use in the coming year's production. There is no other source of the material.

**Required:**

1. Compute the total contribution margin that the company would earn if it could manufacture 2,000 units of Juno and 4,000 units of Hera.
2. Determine the optimal usage of the company's inventory of 16,000 pounds of the material. Compute the total contribution margin for the product mix that you recommend.

**Problem 23-51 SELL AT SPLIT-OFF OR PROCESS FURTHER****OBJECTIVE** > 2

Eunice Company produces two products from a joint process. Joint costs are \$70,000 for one batch, which yields 1,000 liters of germain and 4,000 liters of hastain. Germain can be sold at the split-off point for \$24 or be processed further, into geraiten, at a manufacturing cost of \$4,100 (for the 1,000 liters) and sold for \$33 per liter.

If geraiten is sold, additional distribution costs of \$0.80 per liter and sales commissions of 10 percent of sales will be incurred. In addition, Eunice's legal department is concerned about potential liability issues with geraiten—issues that do not arise with germain.

**Required:**

1. Considering only gross profit, should germain be sold at the split-off point or processed further?
2. Taking a value-chain approach (by considering distribution, marketing, and after-the-sale costs), determine whether or not germain should be processed into geraiten.

**Problem 23-52 DIFFERENTIAL COSTING****OBJECTIVE** > 1 2

As pointed out earlier in "Here's the Real Kicker," Kicker changed banks a couple of years ago because the loan officer at its bank moved out of state. Kicker saw that as an opportunity to take bids for its banking business and to fine-tune the banking services it was using. This problem uses that situation as the underlying scenario but uses three banks: FirstBank, Community Bank, and RegionalOne Bank. A set of representative data was presented to each bank for the purpose of preparing a bid. The data are as follows:

Checking accounts needed: 6  
 Checks per month: 2,000\*  
 Foreign debits/credits on checking accounts per month: 200  
 Deposits per month: 300\*  
 Returned checks: 25 per month\*  
 Credit card charges per month: 4,000  
 Wire transfers per month: 100, of which 60 are to foreign bank accounts  
 Monthly credit needs (line of credit availability and cost): \$100,000 average monthly usage

\*These are overall totals for the six accounts during a month.



Internet banking services?  
 Knowledgeable loan officer?  
 Responsiveness of bank?

**FirstBank Bid:**

Checking accounts: \$5 monthly maintenance fee per account  
                           \$0.10 foreign debit/credit  
                           \$0.50 earned for each deposit  
                           \$3 per returned check

Credit card fees: \$0.50 per item

Wire transfers: \$15 to domestic bank accounts, \$50 to foreign bank accounts

Line of credit: Yes, the requested \$100,000 credit line is available,  
                           interest charged at prime plus 2 percent,  
                           subject to a 6 percent minimum interest rate

Internet banking services? Yes, full online banking available:  
                                   \$15 one-time setup fee for each account,  
                                   \$20 monthly fee for software module

The loan officer assigned to the potential Kicker account had 10 years of experience with medium to large business banking and showed an understanding of the audio industry.

**Community Bank Bid:**

Checking accounts: No fees for the accounts, and no credits earned on deposits;  
                           \$2.00 per returned check

Credit card fees: \$0.50 per item,  
                           \$7 per batch processed. Only manual processing was available, and  
                           Kicker estimated 20 batches per month

Wire transfers: \$30 per wire transfer

Line of credit: Yes, the requested \$100,000 credit line is available,  
                           interest charged at prime plus 2 percent,  
                           subject to a 7 percent minimum interest rate

Internet banking services? Not currently, but within the next six months

The loan officer assigned to the potential Kicker account had four years of experience with medium to large business banking, none of which pertained to the audio industry.

**RegionalOne Bank Bid:**

Checking accounts: \$5 monthly maintenance fee per account to be waived for Kicker  
                           \$0.20 foreign debit/credit  
                           \$0.30 earned for each deposit  
                           \$3.80 per returned check

Credit card fees: \$0.50 per item

Wire transfers: \$10 to domestic bank accounts, \$55 to foreign bank accounts

Line of credit: Yes, the requested \$100,000 credit line is available,  
                           interest charged at prime plus 2 percent,  
                           subject to a 6.5 percent minimum interest rate

Internet banking services? Yes, full online banking available,  
                                   one-time setup fee for each account waived for Kicker,  
                                   \$20 monthly fee for software module

The loan officer assigned to the potential Kicker account had two years of experience with large business banking. Another branch of the bank had expertise in the audio industry and would be willing to help as needed. This bank was the first one to submit a bid.

**Required:**

1. Calculate the predicted monthly cost of banking with each bank.
2. Suppose Kicker felt that full online Internet banking was critical. How would that affect your analysis from Requirement 1? How would you incorporate the subjective factors (e.g., experience, access to expertise)?

**Cases****Case 23-53 MAKE OR BUY: ETHICAL CONSIDERATIONS****OBJECTIVE** > 1 2

Pamela McDonald, chief management accountant and controller for Murray Manufacturing Inc., was having lunch with Roger Branch, manager of the company's power department. Over the past six months, Pamela and Roger had developed a romantic relationship and were making plans for marriage. To keep company gossip at a minimum, Pamela and Roger had kept the relationship very quiet, and no one in the company was aware of it. The topic of the luncheon conversation centered on a decision concerning the company's power department that Larry Johnson, president of the company, was about to make.

**Pamela:** Roger, in our last executive meeting, we were told that a local utility company offered to supply power and quoted a price per kilowatt-hour that they said would hold for the next three years. They even offered to enter into a contractual agreement with us.

**Roger:** This is news to me. Is the bid price a threat to my area? Can they sell us power cheaper than we make it? And why wasn't I informed about this matter? I should have some input. This burns me. I think I should give Larry a call this afternoon and lodge a strong complaint.

**Pamela:** Calm down, Roger. The last thing I want you to do is call Larry. Larry made us all promise to keep this whole deal quiet until a decision had been made. He did not want you involved because he wanted to make an unbiased decision. You know that the company is struggling somewhat, and they are looking for ways to save money.

**Roger:** Yeah, but at my expense? And at the expense of my department's workers? At my age, I doubt that I could find a job that pays as well and has the same benefits. How much of a threat is this offer?

**Pamela:** Jack Lacy, my assistant controller, prepared an analysis while I was on vacation. It showed that internal production is cheaper than buying, but not by much. Larry asked me to review the findings and submit a final recommendation for next Wednesday's meeting. I've reviewed Jack's analysis, and it's faulty. He overlooked the interactions of your department with other service departments. When these are considered, the analysis is overwhelmingly in favor of purchasing the power. The savings are about \$300,000 per year.

**Roger:** If Larry hears that, my department's gone. Pam, you can't let this happen. I'm three years away from having a vested retirement. And my workers—they have home mortgages, kids in college, families to support. No, it's not right. Pam, just tell him that your assistant's analysis is on target. He'll never know the difference.

**Pamela:** Roger, what you're suggesting doesn't sound right either. Would it be ethical for me to fail to disclose this information?

**Roger:** Ethical? Do you think it's right to lay off employees that have been loyal, faithful workers simply to fatten the pockets of the owners of this company? The Murrays already are so rich that they don't know what to do with their money. I think that it's even more unethical to penalize me and my workers. Why should we have to bear the consequences of some bad marketing decisions? Anyway, the effects

of those decisions are about gone, and the company should be back to normal within a year or so.

**Pamela:** You may be right. Perhaps the well-being of you and your workers is more important than saving \$300,000 for the Murrays.

**Required:**

1. Should Pamela have told Roger about the impending decision concerning the power department? What do you think most corporate codes of ethics would say about this?
2. Should Pamela provide Larry with the correct data concerning the power department? Or should she protect its workers? What would you do if you were Pamela?

**OBJECTIVE** > **1** **2**

**Case 23-54 KEEP OR DROP A DIVISION**

Jan Shumard, president and general manager of Danbury Company, was concerned about the future of one of the company's largest divisions. The division's most recent quarterly income statement follows:

Sales	\$3,751,500
Less: Cost of goods sold	<u>2,722,400</u>
Gross profit	\$1,029,100
Less: Selling and administrative expenses	<u>1,100,000</u>
Operating (loss)	<u>\$ (70,900)</u>

Jan is giving serious consideration to shutting down the division because this is the ninth consecutive quarter that it has shown a loss. To help him in his decision, the following additional information has been gathered:

- The division produces one product at a selling price of \$100 to outside parties.
- The division sells 50 percent of its output to another division within the company for \$83 per unit (full manufacturing cost plus 25 percent). The internal price is set by company policy. If the division is shut down, the user division will buy the part externally for \$100 per unit.
- The fixed overhead assigned per unit is \$20.
- There is no alternative use for the facilities if shut down. The facilities and equipment will be sold and the proceeds invested to produce an annuity of \$100,000 per year. Of the fixed selling and administrative expenses, 30 percent represent allocated expenses from corporate headquarters.
- Variable selling expenses are \$5 per unit sold for units sold externally. These expenses are avoided for internal sales. No variable administrative expenses are incurred.

**Required:**

1. Prepare an income statement that more accurately reflects the division's profit performance.
2. Should the president shut down the division? What will be the effect on the company's profits if the division is closed?

**OBJECTIVE** > **1** **2**

**Case 23-55 INTERNET RESEARCH, GROUP CASE**

Often, websites for major airlines contain news of current special fares and flights. A decision to run a brief "fare special" is an example of a tactical decision. Form a group with one to three other students. Have each member of the group choose one or two airlines and check their websites for recent examples of fare specials. Have the group collaborate in preparing a presentation to the class discussing the types of cost and revenue information that would go into making this type of tactical decision.

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# 24

## Capital Investment Decisions

After studying Chapter 24, you should be able to:

- ▶ **1** Explain the meaning of *capital investment decisions*, and distinguish between independent and mutually exclusive capital investment decisions.
- ▶ **2** Compute the payback period and accounting rate of return for a proposed investment, and explain their roles in capital investment decisions.
- ▶ **3** Use net present value analysis for capital investment decisions involving independent projects.
- ▶ **4** Use the internal rate of return to assess the acceptability of independent projects.
- ▶ **5** Explain the role and value of postaudits.
- ▶ **6** Explain why net present value is better than internal rate of return for capital investment decisions involving mutually exclusive projects.





# **E**xperience Managerial Decisions with **Hard Rock Cafe**

Launched in 1971 in London, England, nearly everyone has visited, or at least seen t-shirts for, one of **Hard Rock International's** 121 world-famous cafe restaurants located in 41 different countries. What visitors likely appreciate most is Hard Rock's impressive collection of rock 'n' roll memorabilia and its tasty fare. However, for Hard Rock's managerial accountants and the readers of this textbook, what is most likely to be appreciated is Hard Rock's masterful use of effective capital budgeting techniques to make decisions on a very big scale that are critical to the company's continued success. One of those decisions concerns the opening of new cafes all over the world from Mumbai, India, to Louisville, Kentucky.

New cafes require advanced planning concerning anticipated cash flows, both for future costs and revenues. Future cost-related cash flow projections for the opening of a proposed cafe include items such as labor and materials from different countries, licensing laws, utilities, kitchen and bar equipment, computers, construction, and audio-visual equipment, which alone total just over \$6 million! Future cash flows for food and beverage sales are even more difficult to project than costs because of uncertainties involving demographics, economic conditions, and competition. Another complicating factor is the challenge of estimating local awareness of the Hard Rock brand. Brand awareness is important because it drives Hard Rock's merchandise sales, which account for over 30 percent of its total revenue.

Estimates of future cash flows for revenues and expenses are combined to calculate a proposed cafe's payback period and net present value (NPV). These metrics then are compared with Hard Rock's decision model requirements to help determine whether or not the proposed cafe is a wise decision. Another capital investment decision for Hard Rock surrounds the buying and selling of its rock 'n' roll memorabilia. Hard Rock uses its memorabilia to generate food and merchandise revenues by attracting more customers into the cafe. The collection has grown from a single Eric Clapton guitar to more than 60,000 instruments, posters, costumes, photographs, platinum and gold LPs, and music and lyric sheets. Finally, Hard Rock uses capital budgeting techniques for its biggest project ever, a rock 'n' roll theme park requiring a \$400 million outlay—that represents the equivalent of approximately 70 new cafes! For this monstrous capital investment, Hard Rock relied heavily on input from a management team with experience and expertise in the theme park industry. Without effective capital budgeting practices, Hard Rock would be forced to “shoot from the hip and hope for the best” for its long-term investments. Such a strategy would not likely produce the impressive capital investment successes that Hard Rock has grown to expect in a very competitive market.



**OBJECTIVE** > 1

Explain the meaning of *capital investment decisions*, and distinguish between independent and mutually exclusive capital investment decisions.

## Types of Capital Investment Decisions

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Organizations often are faced with the opportunity (or need) to invest in assets or projects that represent long-term commitments. New production systems, new plants, new equipment, and new product development are examples of assets and projects that fit this category. Usually, many alternatives are available. For example, an organization may be faced with the decision of whether or not to invest in a new plant, or whether to invest in a flexible manufacturing system or to continue with an existing traditional manufacturing system. These long-range decisions are examples of *capital investment decisions*.

**Capital investment decisions** are concerned with the process of planning, setting goals and priorities, arranging financing, and using certain criteria to select long-term assets. Because capital investment decisions place large amounts of resources at risk for long periods of time and simultaneously affect the future development of the firm, they are among the most important decisions made by managers. Every organization has limited resources, which should be used to maintain or enhance its long-run profitability. Poor capital investment decisions can be disastrous. For example, a failure to invest in automated manufacturing when other competitors do so may result in significant losses in market share because of the inability to compete on the basis of quality, cost, and delivery time. Competitors with more modern facilities may produce more output at lower cost and higher quality. Thus, making the right capital investment decisions is absolutely essential for long-term survival.

The process of making capital investment decisions often is referred to as **capital budgeting**. Two types of capital budgeting projects will be considered: *independent projects* and *mutually exclusive projects*. **Independent projects** are projects that, if accepted or rejected, do not affect the cash flows of other projects. For example, a decision by **General Motors** to build a new plant for production of the Cadillac line is not affected by its decision to build a new plant for the production of its Saturn line. These are independent capital investment decisions. The second type of capital budgeting project requires a firm to choose among competing alternatives that provide the same basic service. Acceptance of one option precludes the acceptance of another. Thus, **mutually exclusive projects** are those projects that, if accepted, preclude the acceptance of all other competing projects. For example, some time ago, **Monsanto's** Fibers Division decided to automate its Pensacola, Florida, plant. Thus, Monsanto was faced with the choice of continuing with its existing manual production operation or replacing it with an automated system. In all likelihood, part of the company's deliberation concerned different types of automated systems. If three different automated systems were being considered, this would produce four alternatives: the current system plus the three potential new systems. Once one system is chosen, the other three are excluded; they are mutually exclusive.

Notice that one of the competing alternatives in the Monsanto example is that of maintaining the status quo (the manual system). This point emphasizes the fact that new investments replacing existing investments must prove to be economically superior. Of course, at times, replacement of the old system is mandatory and not discretionary if the firm wishes to remain in business (e.g., equipment in the old system may be worn out, making the old system not a viable alternative). In such a situation, going out of business could be a viable alternative, especially if none of the new investment alternatives is profitable.

Capital investment decisions often are concerned with investments in long-term capital assets. With the exception of land, these assets depreciate over their lives, and the original investment is used up as the assets are employed. In general terms, a sound capital investment will earn back its original capital outlay over its life and, at the same time, provide a reasonable return on the original investment. Therefore, managers must decide whether or not a capital investment will earn back its original outlay and provide a reasonable return. By making this assessment, a manager can decide on the acceptability of independent projects and compare competing projects on the basis of their economic merits.

But what is meant by reasonable return? It is generally agreed that any new project must cover the opportunity cost of the funds invested. For example, if a company takes money from a money market fund that is earning 6 percent and invests it in a new project, then the project must provide at least a 6 percent return (the return that could have been earned had the money been left in the money market fund). Of course, in reality, funds for investment often come from different sources—each representing a different opportunity cost. The return that must be earned is a blend of the opportunity costs of the different sources. Thus, if a company uses two sources of funds, one with an opportunity cost of 4 percent and the other with an opportunity cost of 6 percent, then the return that must be earned is somewhere between 4 and 6 percent, depending on the relative amounts used from each source. Furthermore, it is usually assumed that managers should select projects that promise to maximize the wealth of the owners of the firm.

To make a capital investment decision, a manager must estimate the quantity and timing of cash flows, assess the risk of the investment, and consider the impact of the project on the firm's profits. One of the most difficult tasks is to estimate the cash flows. Projections must be made years into the future, and forecasting is far from a perfect science. Obviously, as the accuracy of cash flow forecasts increases, the reliability of the decision improves. In making projections, managers must identify and quantify the benefits associated with the proposed project(s). For example, an automated cash deposit system can produce the following benefits (relative to a manual system): bank charge reductions, productivity gains, greater data integrity, lower training costs, and savings in time required to audit and do bank/cash reconciliations. The dollar value of these benefits must be assessed. Although forecasting future cash flows is a critical part of the capital investment process, forecasting methods will not be considered here. Furthermore, the cash flows projected must be *after-tax cash flows*. Taxes have an important role in developing cash flow assessments. However, taxes will not be explicitly considered. Tax effects either are assumed away or the cash flows can be thought of as after-tax cash flows. Forecasting methodologies and tax considerations are issues that are left for more advanced studies. Consequently, after-tax cash flows are assumed to be known; the focus will be on making capital investment decisions *given* these cash flows.

Managers must set goals and priorities for capital investments. They also must identify some basic criteria for the acceptance or rejection of proposed investments. In this chapter, we will study four basic methods to guide managers in accepting or rejecting potential investments. The methods include both nondiscounting and discounting decision approaches (two methods are discussed for each approach). The discounting methods are applied to investment decisions involving both independent and mutually exclusive projects.

## Nondiscounting Models

The basic capital investment decision models can be classified into two major categories: *nondiscounting models* and *discounting models*. **Nondiscounting models** ignore the time value of money, whereas **discounting models** explicitly consider it. Although many accounting theorists disparage the nondiscounting models because they ignore the time value of money, many firms continue to use these models in making capital investment decisions. However, the use of discounting models has increased over the years, and few firms use only one model; indeed, most firms seem to use both types.<sup>1</sup> This pattern suggests that both categories—nondiscounted and

<sup>1</sup> From the mid-1950s to 1988, surveys reveal that the use of discounting models as the primary evaluation method for capital projects went from about 9 to 80 percent. See A. Robichek and J. G. McDonald, "Financial Planning in Transition, Long Range Planning Service," Report No. 268 (Stanford Research Institute, Menlo Park, CA: January 1966); and T. Klammer, B. Koch, and N. Wilner, "Capital Budgeting Practices—A Survey of Corporate Use," published in the Proceedings of Decision Sciences National Meeting, November 21-24, 1988, North Texas State University.

### CONCEPT Q&A

What is the difference between independent and mutually exclusive investments?

Acceptance or rejection of an independent investment does not affect the cash flows of other investments. Acceptance of a mutually exclusive investment precludes the acceptance of any competing project.

Possible Answer:

### OBJECTIVE 2

Compute the payback period and accounting rate of return for a proposed investment, and explain their roles in capital investment decisions.

discounted—supply useful information to managers as they struggle to make a capital investment decision.

## Payback Period

One type of nondiscounting model is the *payback period*. The **payback period** is the time required for a firm to recover its original investment. If the cash flows of a project are an equal amount each period, then the following formula can be used to compute its payback period:

$$\text{Payback Period} = \frac{\text{Original Investment}}{\text{Annual Cash Flow}}$$

If, however, the cash flows are unequal, the payback period is computed by adding the annual cash flows until such time as the original investment is recovered. If a fraction of a year is needed, it is assumed that cash flows occur evenly within each year. **Cornerstone 24-1** shows how payback analysis is done for both even and uneven cash flows.

One way to use the payback period is to set a maximum payback period for all projects and to reject any project that exceeds this level. Why would a firm use the payback period in this way? Some analysts suggest that the payback period can be used as a rough measure of risk, with the notion that the longer it takes for a project to pay for itself, the riskier it is. Also, firms with riskier cash flows in general



### CORNERSTONE 24-1



## HOW TO Calculate Payback

### Information:

Suppose that a new car wash facility requires an investment of \$100,000 and either has:

- Even cash flows of \$50,000 per year or
- The following expected annual cash flows: \$30,000, \$40,000, \$50,000, \$60,000, and \$70,000.

### Required:

Calculate the payback period for each case.

### Solution:

- Even cash flows:

$$\begin{aligned} \text{Payback Period} &= \text{Original Investment} / \text{Annual Cash Flow} \\ &= \$100,000 / \$50,000 = 2 \text{ years} \end{aligned}$$

- Uneven cash flows:

Year	Unrecovered Investment (\$) (beginning of year)	Annual Cash Flow (\$)	Time Needed for Payback (years)
1	100,000	30,000	1.0
2	70,000	40,000	1.0
3	30,000	50,000	0.6*
4	0	60,000	0.0
5	0	70,000	0.0
			<u>2.6</u>

\* At the beginning of year 3, \$30,000 is needed to recover the investment. Since a net cash flow of \$50,000 is expected, only 0.6 year ( $\$30,000 / \$50,000$ ) is needed to recover the remaining \$30,000, assuming a uniform cash inflow throughout the year.

could require a shorter payback period than normal. Additionally, firms with liquidity problems would be more interested in projects with quick paybacks. Another critical concern is obsolescence. In some industries, the risk of obsolescence is high; firms within these industries, such as computer and MP3 player manufacturers, would be interested in recovering funds rapidly.

Another reason, less beneficial to the firm, may also be involved. Many managers in a position to make capital investment decisions may choose investments with quick payback periods out of self-interest. If a manager's performance is measured using such short-run criteria as annual net income, he or she may choose projects with quick paybacks to show improved net income and cash flow as quickly as possible. Consider that divisional managers often are responsible for making capital investment decisions and are evaluated on divisional profit. The tenure of divisional managers, however, is typically short—three to five years on average. Consequently, the incentive for such managers is to shy away from investments that promise healthy long-run returns but relatively meager returns in the short run. New products and services that require time to develop a consumer following fit this description particularly well. Corporate budgeting policies and a budget review committee can eliminate these problems.

The payback period can be used to choose among competing alternatives. Under this approach, the investment with the shortest payback period is preferred over investments with longer payback periods. However, this use of the payback period is less defensible because this measure suffers from two major deficiencies: (1) it ignores the cash flow performance of the investments beyond the payback period, and (2) it ignores the time value of money.

These two significant deficiencies are easily illustrated. Assume that an engineering firm is considering two different types of computer-aided design (CAD) systems: CAD-A and CAD-B. Each system requires an initial outlay of \$150,000, has a five-year life, and displays the following annual cash flows:

Investment	Year 1	Year 2	Year 3	Year 4	Year 5
CAD-A	\$90,000	\$60,000	\$50,000	\$50,000	\$50,000
CAD-B	40,000	110,000	25,000	25,000	25,000

Both investments have payback periods of two years. In other words, if a manager uses the payback period to choose among competing investments, the two investments would be equally desirable. In reality, however, the CAD-A system should be preferred over the CAD-B system for two reasons. First, the CAD-A system provides a much larger dollar return for the years 3, 4, and 5 beyond the payback period (\$150,000 vs. \$75,000). Second, the CAD-A system returns \$90,000 in the first year, while B returns only \$40,000. The extra \$50,000 that the CAD-A system provides in the first year could be put to productive use, such as investing in another project. It is better to have a dollar now than to have it one year from now, because the dollar on hand can be invested to provide a return one year from now.

In summary, the payback period provides information to managers that can be used as follows:

1. To help control the risks associated with the uncertainty of future cash flows.
2. To help minimize the impact of an investment on a firm's liquidity problems.
3. To help control the risk of obsolescence.
4. To help control the effect of the investment on performance measures.

However, the method suffers significant deficiencies: It ignores a project's total profitability and the time value of money. While the computation of the payback period may be useful to a manager, relying on it solely for a capital investment decision would be foolish.

## ANALYTICAL Q&A

Suppose that a project requires an investment of \$30,000 and produces \$8,000 cash per year. What is the payback period?

$$\$30,000 / \$8,000 = 3.75 \text{ years}$$

Answer:

## Accounting Rate of Return

The *accounting rate of return* is the second commonly used nondiscounting model. The **accounting rate of return** (ARR) measures the return on a project in terms of income, as opposed to using a project's cash flow. The accounting rate of return is computed by the following formula:

$$\text{Accounting Rate of Return} = \frac{\text{Average Income}}{\text{Initial Investment}}$$

Income is not equivalent to cash flows because of accruals and deferrals used in its computation. The average income of a project is obtained by adding the net income for each year of the project and then dividing this total by the number of years. **Cornerstone 24-2** shows how to calculate the accounting rate of return.

Unlike the payback period, the accounting rate of return does consider a project's profitability; like the payback period, it ignores the time value of money. Ignoring the time value of money is a critical deficiency in this method as well; it can lead a manager to choose investments that do not maximize profits. The ARR and payback model are referred to as *nondiscounting models* because they ignore the time value of money. Discounting models use **discounted cash flows**, which are future cash flows expressed in terms of their present value. The use of discounting models requires an understanding of the present value concepts. Present value concepts are reviewed in Appendix 3: Time Value of Money, beginning on page 1305. You should review these concepts and make sure that you understand them before studying capital investment discount models. Present value tables (Exhibits A3-8 and A3-10) are presented in Appendix 3 at the end of this text. These tables are referred to and used throughout the rest of this chapter.

In addition to ignoring the time value of money, the ARR has other potential drawbacks because it is dependent upon net income, which is the financial measure most likely to be manipulated by managers. Some of the reasons for manipulating net income include debt contracts (i.e., debt covenants) and bonuses. Often, debt contracts require that a firm maintain certain financial accounting ratios, which can be affected by the income reported and by the level of long-term assets. Accordingly, the accounting



### CORNERSTONE 24-2



## HOW TO Calculate the Accounting Rate of Return

### Information:

An investment requires an initial outlay of \$100,000 and has a five-year life with no salvage value. The yearly cash flows are \$50,000, \$50,000, \$60,000, \$50,000 and \$70,000.

### Required:

1. Calculate the annual net income for each of the five years.
2. Calculate the accounting rate of return.

### Solution:

1. Yearly Depreciation Expense =  $(\$100,000 - 0) / 5 \text{ years} = \$20,000$   
 Annual Net Income = Net Cash Flow – Depreciation Expense  
 Year 1 Net Income =  $\$50,000 - \$20,000 = \$30,000$   
 Year 2 Net Income =  $\$50,000 - \$20,000 = \$30,000$   
 Year 3 Net Income =  $\$60,000 - \$20,000 = \$40,000$   
 Year 4 Net Income =  $\$50,000 - \$20,000 = \$30,000$   
 Year 5 Net Income =  $\$70,000 - \$20,000 = \$50,000$   
 Total Net Income (Five Years) =  $\$180,000$   
 Average Net Income =  $\$180,000 / 5 = \$36,000$
2. Accounting Rate of Return =  $\frac{\$36,000}{\$100,000} = 0.36$

rate of return may be used as a screening measure to ensure that any new investment will not adversely affect these ratios. Additionally, because bonuses to managers often are based on accounting income or return on assets, managers may have a personal interest in seeing that any new investment contributes significantly to net income. A manager seeking to maximize personal income is likely to select investments that return the highest net income per dollar invested, even if the selected investments are not the ones that produce the greatest cash flows and return to the firm in the long-run.

## CONCEPT Q&A

Why would a manager choose only investments that return the highest income per dollar invested?

It might be an action that helps the company to comply with debt covenants. It also might have something to do with the manager's incentive compensation.

Possible Answer:

## Discounting Models: The Net Present Value Method

Discounting models explicitly consider the time value of money and, therefore, incorporate the concept of discounting cash inflows and outflows. Two discounting models will be considered: *net present value* (NPV) and *internal rate of return* (IRR). The NPV method will be discussed first; the IRR method is discussed in the following section.

### Net Present Value Defined

**Net present value** is the difference between the present value of the cash inflows and outflows associated with a project:

$$\begin{aligned} NPV &= \left[ \sum CF_t / (1 + i)^t \right] - I \\ &= \left[ \sum CF_t df_t \right] - I \\ &= P - I \end{aligned}$$

where

- $I$  = The present value of the project's cost (usually the initial cash outlay)
- $CF_t$  = The cash inflow to be received in period  $t$ , with  $t = 1 \dots n$
- $i$  = The required rate of return
- $t$  = The time period
- $P$  = The present value of the project's future cash inflows
- $df_t = 1/(1 + i)^t$ , the discount factor

Net present value measures the profitability of an investment. A positive NPV indicates that the investment increases the firm's wealth. To use the NPV method, a *required rate of return* must be defined. The **required rate of return** is the minimum acceptable rate of return. It also is referred to as the *discount rate*, *hurdle rate*, and *cost of capital*. In theory, if future cash flows are known with certainty, then the correct required rate of return is the firm's **cost of capital**. In practice, future cash flows are uncertain, and managers often choose a discount rate higher than the cost of capital to deal with the uncertainty. However, if the rate chosen is excessively high, it will bias the selection process toward short-term investments. Because of the risk of being overly conservative, it may be better to use the cost of capital as the discount rate and find other approaches to deal with uncertainty.

If the NPV is positive, it signals that (1) the initial investment has been recovered, (2) the required rate of return has been recovered, and (3) a return in excess of (1) and (2) has been received. Thus, if the NPV is greater than zero the investment is profitable and, therefore, acceptable. If the NPV equals zero, the decision maker will find acceptance or rejection of the investment equal. Finally, if the NPV is less than zero, the investment should be rejected. In this case it is earning less than the required rate of return.

## OBJECTIVE > 3

Use net present value analysis for capital investment decisions involving independent projects.

## CONCEPT Q&A

Suppose that the NPV of an investment is \$2,000. Why does this mean that the investment should be accepted?

NPV greater than zero means that the investment recovers its capital while simultaneously earning a return in excess of the required rate.

Possible Answer:

## An Example Illustrating Net Present Value

Brannon Company has developed new earphones for portable MP3 players that it believes are superior to anything on the market. The earphones have a projected product life cycle of five years. Although the marketing manager is excited about the new product's prospects, a decision to manufacture the new product depends on whether it can earn a positive NPV given the company's required rate of return of 12 percent. In order to make a decision regarding the earphones, two steps must be taken: (1) the cash flows for each year must be identified, and (2) the NPV must be computed using the cash flows from step 1. **Cornerstone 24-3** shows how to calculate the NPV. Notice that step 2 offers two approaches for computing NPV. Step 2A computes NPV by using discount factors from Exhibit A3-8 in Appendix 3. Step 2B simplifies the computation by using a single discount factor from A3-10 in Appendix 3 for the even cash flows occurring in years 1 through 4.



### CORNERSTONE 24-3



#### HOW TO Assess Cash Flows and Calculate Net Present Value

##### Information:

A detailed market study revealed expected annual revenues of \$300,000 for new earphones. Equipment to produce the earphones will cost \$320,000. After five years, the equipment can be sold for \$40,000. In addition to equipment, working capital is expected to increase by \$40,000 because of increases in inventories and receivables. The firm expects to recover the investment in working capital at the end of the project's life. Annual cash operating expenses are estimated at \$180,000. The required rate of return is 12 percent.

##### Required:

Estimate the annual cash flows, and calculate the NPV.

#### STEP 1. CASH FLOW IDENTIFICATION

Year	Item	Cash Flow
0	Equipment	\$(320,000)
	Working capital	(40,000)
	Total	<u>\$(360,000)</u>
1-4	Revenues	\$ 300,000
	Operating expenses	(180,000)
	Total	<u>\$ 120,000</u>
5	Revenues	\$ 300,000
	Operating expenses	(180,000)
	Salvage	40,000
	Recovery of working capital	40,000
	Total	<u>\$ 200,000</u>

#### STEP 2A. NPV ANALYSIS

Year	Cash Flow <sup>a</sup>	Discount Factor <sup>b</sup>	Present Value
0	\$(360,000)	1.00000	\$(360,000)
1	120,000	0.89286	107,143
2	120,000	0.79719	95,663
3	120,000	0.71178	85,414
4	120,000	0.63552	76,262
5	200,000	0.56743	113,486
	Net present value		<u>\$ 117,968</u>

STEP 2B. NPV ANALYSIS				CORNERSTONE 24-3 (continued)
Year	Cash Flow	Discount Factor <sup>c</sup>	Present Value	
0	\$(360,000)	1.00000	\$(360,000)	
1–4	120,000	3.03735	364,482	
5	200,000	0.56743	113,486	
Net present value			<u>\$ 117,968</u>	

<sup>a</sup> From step 1.  
<sup>b</sup> From Appendix 3 Exhibit A3-8.  
<sup>c</sup> Years 1–4 from Appendix 3 Exhibit A3-10; year 5 from Appendix 3 Exhibit A3-8.

## Internal Rate of Return

### OBJECTIVE > 4

Use the internal rate of return to assess the acceptability of independent projects.

Another discounting model is the *internal rate of return* method. The **internal rate of return** is defined as the interest rate that sets the present value of a project's cash inflows equal to the present value of the project's cost. In other words, it is the interest rate that sets the project's NPV at zero. The following equation can be used to determine a project's IRR:

$$I = \frac{\sum CF_t}{(1 + i)^t}$$

where  $t = 1, \dots, n$

The right-hand side of this equation is the present value of future cash flows, and the left-hand side is the investment.  $I$ ,  $CF_t$ , and  $t$  are known. Thus, the IRR (the interest rate,  $i$ , in the equation) can be found using trial and error. Once the IRR for a project is computed, it is compared with the firm's required rate of return. If the IRR is greater than the required rate, the project is deemed acceptable; if the IRR is less than the required rate of return, the project is rejected; if the IRR is equal to the required rate of return, the firm is indifferent between accepting or rejecting the investment proposal.

The IRR is the most widely used of the capital investment techniques. One reason for its popularity may be that it is a rate of return, a concept that managers are comfortable with using. Another possibility is that managers may believe (in most cases, incorrectly) that the IRR is the true or actual compounded rate of return being earned by the initial investment. Whatever the reasons for its popularity, a basic understanding of the IRR is necessary.

### Example: Multiple-Period Setting with Uniform Cash Flows

Assume initially that the investment produces a series of uniform cash flows. Since the series of cash flows is uniform, a single discount factor from Exhibit A3-10 can be used to compute the present value of the annuity. Letting  $df$  be this discount factor and  $CF$  be the annual cash flow, the IRR equation assumes the following form:

$$I = CF(df)$$

Solving for  $df$ , we obtain:

$$df = I/CF$$

$$= \frac{\text{Investment}}{\text{Annual Cash Flow}}$$

Assume that the investment ( $I$ ) is \$100 and that it produces a single-period cash flow of \$110. The discount factor is  $I/CF = \$100/\$110 = 0.90909$ . Looking in



## CORNERSTONE 24-4



### HOW TO Calculate Internal Rate of Return with Uniform Cash Flows

#### Information:

Assume that a hospital has the opportunity to invest \$205,570.50 in a new ultrasound system that will produce net cash inflows of \$50,000 at the end of each of the next six years.

#### Required:

Calculate the IRR for the ultrasound system.

#### Solution:

$$\begin{aligned} df &= I/CF \\ &= \$205,570.50/\$50,000 \\ &= 4.11141 \end{aligned}$$

Since the life of the investment is six years, find the sixth row in Appendix 3 Exhibit A3-10 and then move across this row until  $df = 4.11141$  is found. The interest rate corresponding to 4.11141 is 12 percent, which is the IRR.

Appendix 3 Exhibit A3-10, a discount factor of 0.90909 for a single period corresponds to a rate of 10 percent, which is the IRR. In general, once the discount factor is computed, go to Exhibit A3-10 and find the row corresponding to the life of the project, then move across that row until the computed discount factor is found. The interest rate corresponding to this discount factor is the IRR. **Cornerstone 24-4** illustrates how to calculate the IRR for multiple-period uniform cash flows.

Exhibit A3-10 does not provide discount factors for every possible interest rate. To illustrate, assume that the annual cash inflows expected by the hospital (in Cornerstone 24-4) are \$51,000 instead of \$50,000. The new discount factor is 4.03343 ( $\$205,570.50/\$51,000$ ). Going once again to the third row in Exhibit A3-10, it is clear that the discount factor—and thus the IRR—lies between 12 and 14 percent. Although it is possible to approximate the IRR by interpolation, for simplicity, identify the range for the IRR as indicated by the table values. In practice, business calculators or spreadsheet programs like Excel can provide the values of IRR without the use of tables such as Exhibit A3-10.

## ANALYTICAL Q&A

Suppose that an investment of \$169 produces an annual cash flow of \$100 for two years. What is the IRR?

*Answer:*  $df = I/CF = \$169/\$100 = 1.69$ ; from Exhibit A3-10, the IRR is 12 percent.

### Multiple-Period Setting: Uneven Cash Flows

If the cash flows are not uniform, then the IRR equation must be used. For a multiple-period setting, this equation can be solved by trial and error or by using a business calculator or a spreadsheet program. To illustrate solution by trial and error, assume that a \$10,000 investment in a PC system produces clerical savings of \$6,000 and \$7,200, respectively, for the two years. The IRR is the interest rate that sets the present value of these two cash inflows equal to \$10,000:

$$\begin{aligned} P &= \left[ \frac{\$6,000}{(1+i)} \right] + \left[ \frac{\$7,200}{(1+i)^2} \right] \\ &= \$10,000 \end{aligned}$$

To solve this equation by trial and error, start by selecting a possible value for  $i$ . Given this first guess, the present value of the future cash flows is computed and then compared with the initial investment. If the present value is greater than the initial

investment, then the interest rate is too low; if the present value is less than the initial investment, then the interest rate is too high. The next guess is adjusted accordingly.

Assume that the first guess is 18 percent. Using  $i$  equal to 0.18, Appendix 3 Exhibit A3-8 yields the following discount factors: 0.84746 and 0.71818. These discount factors produce the following present value for the two cash inflows:

$$\begin{aligned} P &= (0.84746 \times \$6,000) + (0.71818 \times \$7,200) \\ &= \$10,256 \end{aligned}$$

Since  $P$  is greater than \$10,000, the interest rate selected is too low. A higher guess is needed. If the next guess is 20 percent, we obtain the following:

$$\begin{aligned} P &= (0.83333 \times \$6,000) + (0.69444 \times \$7,200) \\ &= \$9,999.95 \end{aligned}$$

Since this value is very close to \$10,000, we can say that the IRR is 20 percent. (The IRR is, in fact, exactly 20 percent; the present value is slightly less than the investment because the discount factors found in Exhibit A3-8 have been rounded to 5 decimal places.)

## Postaudit of Capital Projects

### OBJECTIVE 5

Explain the role and value of postaudits.

A key element in the capital investment process is a follow-up analysis of a capital project once it is implemented. This analysis is called a *postaudit*. A **postaudit** compares the actual benefits with the estimated benefits and actual operating costs with estimated operating costs; it evaluates the overall outcome of the investment and proposes corrective action if needed. The following real-world case illustrates the usefulness of a postaudit activity.

### Honley Medical Company: An Illustrative Application

Allen Manesfield and Jenny Winters were discussing a persistent and irritating problem present in the process of producing intravenous (IV) needles. Both Allen and Jenny are employed by Honley Medical, which specializes in the production of medical products and has three divisions: the IV Products Division, the Critical Care Monitoring Division, and the Specialty Products Division. Allen and Jenny both are associated with the IV Products Division—Allen as the senior production engineer and Jenny as the marketing manager.

The IV Products Division produces needles of five different sizes. During one stage of the manufacturing process, the needle itself is inserted into a plastic hub and is bonded by using epoxy glue. According to Jenny, the use of epoxy to bond the needles was causing the division all kinds of problems. In many cases, the epoxy wasn't bonding correctly. The rejects were high and the division was receiving a large number of complaints from its customers. Corrective action was needed to avoid losing sales. After some discussion and analysis, a recommendation was made to use induction welding in lieu of epoxy bonding. In induction welding, the needles are inserted into the plastic hub, and an RF generator is used to heat the needles. The RF generator works on the same principle as a microwave oven. As the needles get hot, the plastic melts and the needles are bonded.

Switching to induction welding required an investment in RF generators and the associated tooling; the investment was justified by the IV Products Division based on the savings associated with the new system. Induction welding promised to reduce the cost of direct materials, eliminating the need to buy and use epoxy. Savings of direct labor costs also were predicted because the welding process is much more automated. Adding to these savings were the avoidance of daily cleanup costs and the reduction in rejects. Allen presented a formal NPV analysis showing that the welding system was superior to the epoxy system. Headquarters approved its purchase.

## One Year Later

**Jenny:** Allen, I'm quite pleased with induction welding for bonding needles. In the year since the new process was implemented, we've had virtually no complaints from our customers. The needles are firmly bonded.

**Allen:** I wish that positive experience were true for all other areas as well. Unfortunately, implementing the process has uncovered some rather sticky and expensive problems that I didn't anticipate. The Internal Audit Department recently completed a postaudit of the project, and now my feet are being held to the fire.

**Jenny:** That's too bad. What's the problem?

**Allen:** You mean problems. Let me list a few for you. One is that the RF generators interfered with the operation of other equipment. To eliminate this interference, we had to install filtering equipment. But that's not all. We also discovered that the average maintenance person doesn't know how to maintain the new equipment. Now we are faced with the need to initiate a training program to upgrade the skills of our maintenance people. Upgrading skills also implies higher wages. Although the RF bonding process is less messy, it is more complex. The manufacturing people complained to the internal auditors about that. They maintain that a simple process, even if messy, is to be preferred—especially now that demand for the product is increasing by leaps and bounds.

**Jenny:** What did the internal auditors conclude?

**Allen:** They concluded that many of the predicted savings did take place but that some significant costs were not foreseen. Because of these unforeseen problems, they have recommended that I look carefully at the possibility of moving back to using epoxy. They indicated that NPV analysis using actual data appears to favor that process. With production expanding, the acquisition of additional RF generators and filtering equipment plus the necessary training is simply not as attractive as returning to epoxy bonding. This conclusion is reinforced by the fact that the epoxy process is simpler and by the auditors' conclusion that the mixing of the epoxy can be automated, avoiding the quality problem we had in the first place.

**Jenny:** Well, Allen, you can't really blame yourself. You had a real problem and took action to solve it. It's difficult to foresee all the problems and hidden costs of a new process.

**Allen:** Unfortunately, the internal auditors don't totally agree. In fact, neither do I. I probably jumped too quickly. In the future, I intend to think through new projects more carefully.

## Benefits of a Postaudit

In the case of the RF bonding decision, some of the estimated capital investment benefits did materialize: complaints from customers decreased, rejects were fewer, and direct labor and materials costs decreased. However, the investment was greater than expected because filtering equipment was needed, and actual operating costs were much higher because of the increased maintenance cost and the increased complexity of the process. Overall, the internal auditors concluded that the investment was a poor decision. The corrective action that they recommended was to abandon the new process and return to epoxy bonding. Based on this recommendation, the firm abandoned inductive welding and returned to epoxy bonding, which was improved by automating the mix.

Firms that perform postaudits of capital projects experience a number of benefits. First, by evaluating profitability, postaudits ensure that resources are used wisely. If the project is doing well, it may call for additional funds and additional attention. If the project is not doing well, corrective action may be needed to improve performance or abandon the project.

A second benefit of the postaudit is its impact on the behavior of managers. If managers are held accountable for the results of a capital investment decision, they are more likely to make such decisions in the best interests of the firm. Additionally, postaudits supply feedback to managers that should help to improve future decision making. Consider Allen's reaction to the postaudit of the RF bonding process. Certainly, we would expect him to be more careful and more thorough in making future investment recommendations. In the future, Allen will probably consider more than one alternative, such as automating the mixing of the epoxy. Also, for those alternatives being considered, he will probably be especially alert to the possibility of hidden costs, such as increased training requirements for a new process.

The case also reveals that the postaudit was performed by the internal audit staff. Generally, more objective results are obtainable if the postaudit is done by an independent party. Since considerable effort is expended to ensure as much independence as possible for the internal audit staff, that group is usually the best choice for this task.

Postaudits, however, are costly. Moreover, even though they may provide significant benefits, they have other limitations. Most obvious is the fact that the assumptions driving the original analysis may often be invalidated by changes in the actual operating environment. Accountability must be qualified to some extent by the impossibility of foreseeing every possible eventuality.

## Mutually Exclusive Projects

Up to this point, we have focused on independent projects. Many capital investment decisions deal with mutually exclusive projects. How NPV analysis and IRR are used to choose among competing projects is an interesting question. An even more interesting question to consider is whether NPV and IRR differ in their ability to help managers make wealth-maximizing decisions in the presence of competing alternatives. For example, we already know that the nondiscounting models can produce erroneous choices because they ignore the time value of money. Because of this deficiency, the discounting models are judged superior. Similarly, it can be shown that the NPV model is generally preferred to the IRR model when choosing among mutually exclusive alternatives.

## Net Present Value Compared with Internal Rate of Return

NPV and IRR both yield the same decision for independent projects. For example, if the NPV is greater than zero, then the IRR is also greater than the required rate of return; both models signal the correct decision. However, for competing projects, the two methods can produce different results. Intuitively, we believe that for mutually exclusive projects, the project with the highest NPV or the highest IRR should be chosen. Since it is possible for the two methods to produce different rankings of mutually exclusive projects, the method that consistently reveals the wealth-maximizing project is preferred.

NPV differs from IRR in two major ways. First, NPV assumes that each cash inflow received is reinvested at the required rate of return, whereas the IRR method assumes that each cash inflow is reinvested at the computed IRR. Reinvesting at the required rate of return is more realistic and produces more reliable results when comparing mutually exclusive projects. Second, the NPV method measures profitability in absolute terms, whereas the IRR method measures it in relative terms. NPV measures the amount by which the value of the firm changes. These differences are summarized in Exhibit 24-1.

Since NPV measures the impact that competing projects have on the value of the firm, choosing the project with the largest NPV is consistent with maximizing the wealth

## CONCEPT Q&A

Why do a postaudit?

Postaudits allow a company to assess the quality of capital investment decisions and also produce corrective actions where some of the initial assumptions prove to be wrong. They also encourage managerial accountability and provide useful information for improving future capital budgeting decisions.

Possible Answer:

## OBJECTIVE 6

Explain why net present value is better than internal rate of return for capital investment decisions involving mutually exclusive projects.

## Exhibit 24-1

## Net Present Value Compared with Internal Rate of Return

	NPV	IRR
Type of measure	<i>Absolute</i> dollars	<i>Relative</i> percentage
Cash flow reinvestment assumption	At required rate of return	At internal rate of return

of shareholders. On the other hand, IRR does not consistently result in choices that maximize wealth. IRR, as a relative measure of profitability, has the virtue of measuring accurately the rate of return of funds that remain internally invested. However, maximizing IRR will not necessarily maximize the wealth of firm owners because it cannot, by nature, consider the absolute dollar contributions of projects. In the final analysis, what counts are the total dollars earned—the absolute profits—not the relative profits. Accordingly, NPV, not IRR, should be used for choosing among competing, mutually exclusive projects or competing projects when capital funds are limited.

An independent project is acceptable if its NPV is positive. For mutually exclusive projects, the project with the largest NPV is chosen. There are three steps in selecting the best project from several competing projects: (1) assessing the cash flow pattern for each project, (2) computing the NPV for each project, and (3) identifying the project with the greatest NPV. To illustrate NPV analysis for competing projects, an example is provided.

## CONCEPT Q&amp;A

Why is NPV better than IRR for choosing among competing projects?

**Possible Answer:** NPV uses a more realistic reinvestment assumption, and its signal is consistent with maximizing the wealth of firm owners (IRR does not measure absolute profits).

## Example: Mutually Exclusive Projects

Bintley Corporation has committed to improving its environmental performance. One environmental project identified a manufacturing process as being the source of both liquid and gaseous residues. After six months of research activity, the engineering department announced that it is possible to redesign the process to prevent the production of contaminating residues. Two different process designs (A and B) are being considered that prevent the production of contaminants. Both process designs are more expensive to operate than the current process; however, because the designs prevent production of contaminants, significant annual benefits are created. These benefits stem from eliminating the need to operate and maintain expensive pollution control equipment, treat and dispose of toxic liquid wastes, and pay the annual fines for exceeding allowable contaminant releases. Increased sales to environmentally conscious customers also are factored into the benefit estimates. **Cornerstone 24-5** shows how NPV and IRR analyses are carried out for this setting.

Based on NPV analysis, Design B is more profitable; it has the larger NPV. Accordingly, the company should select Design B over Design A. Interestingly, Designs A and B have identical internal rates of return. As shown by Cornerstone 24-5, both designs have a discount factor of 3.00000. From Exhibit A3-10, it is easily seen that a discount factor of 3.00000 and a life of five years yields an IRR of about 20 percent. Even though both projects have an IRR of 20 percent, the firm should not consider the two designs to be equally desirable. The analysis

## HOW TO Calculate Net Present Value and Internal Rate of Return for Mutually Exclusive Projects

### Information:

Consider two pollution prevention designs: Design A and Design B. Both designs have a project life of five years. Design A requires an initial outlay of \$180,000 and has a net annual after-tax cash inflow of \$60,000 (revenues of \$180,000 minus costs of \$120,000). Design B, with an initial outlay of \$210,000, has a net annual cash inflow of \$70,000 (\$240,000 – \$170,000). The after-tax cash flows are summarized as follows:

### CASH FLOW PATTERN

Year	Design A	Design B
0	\$(180,000)	\$(210,000)
1	60,000	70,000
2	60,000	70,000
3	60,000	70,000
4	60,000	70,000
5	60,000	70,000

The cost of capital for the company is 12 percent.

### Required:

Calculate the NPV and the IRR for each project.

### Solution:

#### DESIGN A: NPV ANALYSIS

Year	Cash Flow	Discount Factor*	Present Value
0	\$(180,000)	1.00000	\$(180,000)
1–5	60,000	3.60478	216,287
Net present value			<u>\$ 36,287</u>

#### DESIGN A: IRR ANALYSIS

$$\begin{aligned} \text{Discount Factor} &= \text{Initial Investment/Annual Cash Flow} \\ &= \$180,000/\$60,000 \\ &= 3.00000 \end{aligned}$$

From Exhibit A3-10,  $df = 3.000$  for five years implies that IRR = 20 percent.

#### DESIGN B: NPV ANALYSIS

Year	Cash Flow	Discount Factor*	Present Value
0	\$(210,000)	1.00000	\$(210,000)
1–5	70,000	3.60478	252,335
Net present value			<u>\$ 42,335</u>

#### DESIGN B: IRR ANALYSIS

$$\begin{aligned} \text{Discount Factor} &= \text{Initial Investment/Annual Cash Flow} \\ &= \$210,000/\$70,000 \\ &= 3.00000 \end{aligned}$$

From Exhibit A3-10,  $df = 3.00000$  for five years implies that IRR = 20 percent.

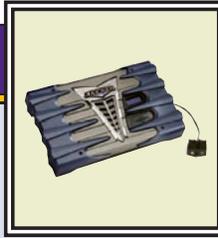
\*From Exhibit A3-10.



**CORNERSTONE**  
**24-5**



## Here's The



## Real Kicker

During the period of 2001–2003, Stillwater Designs experienced high sales of their Kicker products. As a consequence, the levels of inventory filled all storage areas to capacity.

Consequently, Stillwater Designs began plans to add another building on existing property with 50,000 square feet of capacity. This new facility had an estimated construction cost between \$1 and \$1.5 million. During this preliminary planning phase, a shipping strike placed extra storage demands on existing facilities, and Stillwater Designs began looking for a warehousing facility that could be leased on a short-term basis.

They identified a large 250,000-square-foot facility, housed on 22 acres, that was owned by Moore Business Forms. This facility not only was an attractive leasing option, but it also quickly became a competing alternative to adding the 50,000-square-foot facility to Stillwater's current complex of buildings. In fact, the company began looking

at the possibility of buying and renovating the Moore facility and moving all of its operations into the one facility. Renovation required such actions as installing a new HVAC system, bringing

the building up to current fire codes, painting and resealing the floor, and adding a large number of offices. After careful financial analysis, Stillwater Designs decided that the buy-and-renovate option was more profitable than adding the 50,000-square-foot building to its current complex of buildings. Two economic factors affecting the decision were (1) selling the current complex of five buildings would help pay for the needed renovations, and (2) the purchase cost of the nonrenovated Moore facility was less than the cost of building the 50,000-square-foot facility.



demonstrates that Design B produces a larger NPV and, therefore, will increase the value of the firm more than Design A. Design B should be chosen. This illustrates the conceptual superiority of NPV over IRR for analysis of competing projects.

### Special Considerations for the Advanced Manufacturing Environment

**How Investment Differs** Investment in automated manufacturing processes is much more complex than investment in the standard manufacturing equipment of the past. For standard equipment, the direct costs of acquisition represent virtually the entire investment. For automated manufacturing, the direct costs can represent as little as 50 or 60 percent of the total investment; software, engineering, training, and implementation are a significant percentage of the total costs. Thus great care must be exercised to assess the actual cost of an automated system. It is easy to overlook the peripheral costs, which can be substantial.

**How Estimates of Operating Cash Flows Differ** Estimates of operating cash flows from investments in standard equipment typically have relied on directly identifiable tangible benefits, such as direct savings from labor, power, and scrap. However, when investing in automated systems, the intangible and indirect benefits can be material and critical to the viability of the project. Greater quality, more reliability, reduced lead time, improved customer satisfaction, and an enhanced ability to maintain market share all are important intangible benefits of an advanced manufacturing system. Reduction of labor in support areas such as production scheduling and stores are indirect benefits. More effort is needed to measure these intangible and indirect benefits in order to assess more accurately the potential value of investments.

An example can be used to illustrate the importance of considering intangible and indirect benefits. Consider a company that is evaluating a potential investment in a flexible manufacturing system (FMS). The choice facing the company is to continue producing with its traditional equipment, expected to last 10 years, or to switch to the new system, which also is expected to have a useful life of 10 years. The company's discount rate is 12 percent. The data pertaining to the investment are presented in Exhibit 24-2. Notice that for this example, the *incremental cash flows* are used to compare the new project with the old. Instead of calculating the NPV for each alternative and comparing, an equivalent approach is to calculate the NPV of the incremental cash flows of the new system (cash flows of new system less cash flows of old system). If the NPV for the incremental cash flows is positive, then the new equipment is preferred to the old.

## Exhibit 24-2

**Investment Data; Direct, Intangible, and Indirect Benefits**

	FMS	Status Quo
Investment (current outlay):		
Direct costs	\$10,000,000	—
Software, engineering	8,000,000	—
Total current outlay	<u>\$18,000,000</u>	\$ 0
Net after-tax cash flow	\$ 5,000,000	\$1,000,000
Less: After-tax cash flows for status quo	1,000,000	n/a
Incremental benefit	<u>\$ 4,000,000</u>	n/a
<b>Incremental Benefit Explained</b>		
Direct benefits:		
Direct labor	\$ 1,500,000	
Scrap reduction	500,000	
Setups	<u>200,000</u>	\$2,200,000
Intangible benefits (quality savings):		
Rework	\$ 200,000	
Warranties	400,000	
Maintenance of competitive position	<u>1,000,000</u>	1,600,000
Indirect benefits:		
Production scheduling	\$ 110,000	
Payroll	<u>90,000</u>	<u>200,000</u>
Total		<u>\$4,000,000</u>

Using the incremental data in Exhibit 24-2, the NPV of the proposed system can be computed as follows:

Present value ( $\$4,000,000 \times 5.65022^*$ )	\$22,600,880
Investment	<u>18,000,000</u>
NPV	<u>\$ 4,600,880</u>

\* This number is the discount factor for an interest rate of 12 percent and a life of 10 years (see Exhibit A3-10).

The NPV is positive and large in magnitude, and it clearly signals the acceptability of the FMS. This outcome, however, is strongly dependent on explicit recognition of both intangible and indirect benefits. If those benefits are eliminated, then the direct savings total \$2.2 million, and the NPV is negative:

Present value ( $\$2,200,000 \times 5.65022$ )	\$12,430,484
Investment	<u>18,000,000</u>
NPV	<u>\$ (5,569,516)</u>

The rise of activity-based costing has made identifying indirect benefits easier with the use of cost drivers. Once they are identified, they can be included in the analysis if they are material.

Examination of Exhibit 24-2 reveals the importance of intangible benefits. One of the most important intangible benefits is maintaining or improving a firm's competitive position. A key question is what will happen to the cash flows of the firm if the investment is not made. That is, if the company chooses to forego an investment in technologically advanced equipment, will it be able to continue to compete with other firms on the basis of quality, delivery, and cost? (The question becomes especially relevant if competitors choose to invest in advanced equipment.) If the competitive position deteriorates, the company's current cash flows will decrease.

If cash flows will decrease if the investment is not made, this decrease should show up as an incremental benefit for the advanced technology. In Exhibit 24-2,

the company estimates this competitive benefit as \$1,000,000. Estimating this benefit requires some serious strategic planning and analysis, but its effect can be critical. If this benefit had been ignored or overlooked, then the NPV would have been negative and the investment alternative rejected:

Present value ( $\$3,000,000 \times 5.65022$ )	\$16,950,660
Investment	<u>18,000,000</u>
NPV	<u>\$ (1,049,340)</u>

## Summary of Learning Objectives

**LO1. Explain the meaning of *capital investment decisions*, and distinguish between independent and mutually exclusive capital investment decisions.**

- Capital investment decisions are concerned with the acquisition of long-term assets and usually involve a significant outlay of funds.
- The two types of capital investment projects are independent and mutually exclusive.
- Independent projects are projects that, whether accepted or rejected, do not affect the cash flows of other projects.
- Mutually exclusive projects are those projects that, if accepted, preclude the acceptance of all other competing projects.

**LO2. Compute the payback period and accounting rate of return for a proposed investment, and explain their roles in capital investment decisions.**

- Managers make capital investment decisions by using formal models to decide whether to accept or reject proposed projects.
- These decision models are classified as nondiscounting and discounting, depending on whether they address the question of the time value of money.
- The two nondiscounting models are the payback period and the ARR.
- The payback period is the time required for a firm to recover its initial investment. For even cash flows, it is calculated by dividing the investment by the annual cash flow. For uneven cash flows, the cash flows are summed until the investment is recovered. If only a fraction of a year is needed, then it is assumed that the cash flows occur evenly within each year.
- The payback period ignores the time value of money and the profitability of projects because it does not consider the cash inflows available beyond the payback period. However, it does supply some useful information. The payback period is useful for assessing and controlling risk, minimizing the impact of an investment on a firm's liquidity, and controlling the risk of obsolescence.
- The ARR is computed by dividing the average income expected from an investment by either the original or average investment.
- Unlike the payback period, the ARR does consider the profitability of a project; however, it ignores the time value of money.
- The ARR may be useful to managers for screening new investments to ensure that certain accounting ratios are not adversely affected (specifically, accounting ratios that may be monitored to ensure compliance with debt covenants).

**LO3. Use net present value analysis for capital investment decisions involving independent projects.**

- NPV is the difference between the present value of future cash flows and the initial investment outlay.
- To use the NPV model, a required rate of return must be identified (usually the cost of capital). The NPV method uses the required rate of return to compute the present value of a project's cash inflows and outflows.

- If the present value of the inflows is greater than the present value of the outflows, then the NPV is greater than zero, and the project is profitable; if the NPV is less than zero, then the project is not profitable and should be rejected.

**LO4. Use the internal rate of return to assess the acceptability of independent projects.**

- The IRR is computed by finding the interest rate that equates the present value of a project's cash inflows with the present value of its cash outflows.
- If the IRR is greater than the required rate of return (cost of capital), then the project is acceptable; if the IRR is less than the required rate of return, then the project should be rejected.

**LO5. Explain the role and value of postaudits.**

- Postauditing of capital projects is an important step in capital investment.
- Postaudits evaluate the actual performance of a project in relation to its expected performance.
- A postaudit may lead to corrective action to improve the performance of the project or to abandon it.
- Postaudits also serve as an incentive for managers to make capital investment decisions prudently.

**LO6. Explain why net present value is better than internal rate of return for capital investment decisions involving mutually exclusive projects.**

- In evaluating mutually exclusive or competing projects, managers have a choice of using NPV or IRR.
- When choosing among competing projects, the NPV model correctly identifies the best investment alternative.
- IRR, at times, may choose an inferior project. Thus, since NPV always provides the correct signal, it should be used.

## Summary of Important Equations

1. 
$$NPV = \left[ \sum CF_t / (1 + i)^t \right] - I$$

$$= \left[ \sum CF_t df_t^i \right] - I$$

$$= P - I$$
2. 
$$IRR = \sum CF_t / (1 + i)^t$$

**CORNERSTONE 24-1** How to calculate payback, page 1254

**CORNERSTONE 24-2** How to calculate the accounting rate of return, page 1256

**CORNERSTONE 24-3** How to assess cash flows and calculate net present value, page 1258

**CORNERSTONE 24-4** How to calculate internal rate of return with uniform cash flows, page 1260

**CORNERSTONE 24-5** How to calculate net present value and internal rate of return for mutually exclusive projects, page 1265



**CORNERSTONES  
FOR CHAPTER 24**

## Key Terms

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Accounting rate of return, 1256	Internal rate of return, 1259
Capital budgeting, 1252	Mutually exclusive projects, 1252
Capital investment decisions, 1252	Net present value, 1257
Cost of capital, 1257	Nondiscounting models, 1253
Discounted cash flows, 1256	Payback period, 1254
Discounting models, 1253	Postaudit, 1261
Independent projects, 1252	Required rate of return, 1257

## Present Value Tables

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Present value tables are found in Appendix 3 at the end of this text.

## Review Problems

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### I. Basics of Capital Investment

Kenn Day, manager of Day Laboratory, is investigating the possibility of acquiring some new test equipment. To acquire the equipment requires an initial outlay of \$300,000. To raise the capital, Kenn will sell stock valued at \$200,000 (the stock pays dividends of \$24,000 per year) and borrow \$100,000. The loan for \$100,000 would carry an interest rate of 6 percent. Kenn figures that his weighted average cost of capital is 10 percent  $[(2/3 \times 0.12) + (1/3 \times 0.06)]$ . This weighted cost of capital is the discount rate that will be used for capital investment decisions.

Kenn estimates that the new test equipment will produce a cash inflow of \$50,000 per year. Kenn expects the equipment to last for 20 years.

#### Required:

1. Compute the payback period.
2. Assuming that depreciation is \$14,000 per year, compute the ARR (on total investment).
3. Compute the NPV of the test equipment.
4. Compute the IRR of the test equipment.
5. Should Kenn buy the equipment?

#### Solution:

1. The payback period is  $\$300,000/\$50,000$ , or six years.
2. The ARR is  $(\$50,000 - \$14,000)/\$300,000$ , or 12 percent.
3. From Appendix 3 Exhibit A3-10, the discount factor for an annuity with  $i$  at 10 percent and  $n$  at 20 years is 8.51356. Thus, the NPV is  $(8.51356 \times \$50,000) - \$300,000$ , or \$125,678.
4. The discount factor associated with the IRR is 6.00 ( $\$300,000/\$50,000$ ). From Exhibit A3-10, the IRR is between 14 and 16 percent (using the row corresponding to period 20).
5. Since the NPV is positive and the IRR is greater than Kenn's cost of capital, the test equipment is a sound investment. This, of course, assumes that the cash flow projections are accurate.

### II. Capital Investments with Competing Projects

A hospital is considering the possibility of two new purchases: new x-ray equipment and new biopsy equipment. Each project would require an investment of \$750,000. The expected life for each is five years with no expected salvage value. The net cash inflows associated with the two independent projects are as follows:

Year	X-Ray Equipment	Sonogram Equipment
1	\$375,000	\$ 75,000
2	150,000	75,000
3	300,000	525,000
4	150,000	600,000
5	75,000	675,000

**Required:**

1. Compute the net present value of each project, assuming a required rate of 12 percent.
2. Compute the payback period for each project. Assume that the manager of the hospital accepts only projects with a payback period of three years or less. Offer some reasons why this may be a rational strategy even though the NPV computed in Requirement 1 may indicate otherwise.

**Solution:**

1. X-ray equipment:

Year	Cash Flow	Discount Factor	Present Value
0	\$(750,000)	1.00000	\$(750,000)
1	375,000	0.89286	334,823
2	150,000	0.79719	119,579
3	300,000	0.71178	213,534
4	150,000	0.63552	95,328
5	75,000	0.56743	42,557
NPV			<u>\$ 55,821</u>

Biopsy equipment:

Year	Cash Flow	Discount Factor	Present Value
0	\$(750,000)	1.00000	\$(750,000)
1	75,000	0.89286	66,965
2	75,000	0.79719	59,783
3	525,000	0.71178	373,685
4	600,000	0.63552	381,312
5	675,000	0.56743	383,015
NPV			<u>\$ 514,760</u>

2. X-ray equipment:

Payback period = \$375,000	1.00 year
150,000	1.00
<u>225,000</u>	<u>0.75</u> (\$225,000/\$300,000)
<u>\$750,000</u>	<u>2.75</u> years

Biopsy equipment:

Payback period = \$ 75,000	1.00 year
75,000	1.00
525,000	1.00
<u>75,000</u>	<u>0.13</u> (\$75,000/\$600,000)
<u>\$750,000</u>	<u>3.13</u> years

This might be a reasonable strategy because payback is a rough measure of risk. The assumption is that the longer it takes a project to pay for itself, the riskier the project is. Other reasons might be that the firm might have liquidity problems, the cash flows might be risky, or there might be a high risk of obsolescence.

## Discussion Questions

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1. Explain the difference between independent projects and mutually exclusive projects.
2. Explain why the timing and quantity of cash flows are important in capital investment decisions.
3. The time value of money is ignored by the payback period and the ARR. Explain why this is a major deficiency in these two models.
4. What is the payback period? Compute the payback period for an investment requiring an initial outlay of \$80,000 with expected annual cash inflows of \$30,000.
5. Name and discuss three possible reasons that the payback period is used to help make capital investment decisions.
6. What is the accounting rate of return? Compute the ARR for an investment that requires an initial outlay of \$300,000 and promises an average net income of \$100,000.
7. The net present value is the same as the profit of a project expressed in present dollars. Do you agree? Explain.
8. Explain the relationship between NPV and a firm's value.
9. What is the cost of capital? What role does it play in capital investment decisions?
10. What is the role that the required rate of return plays in the NPV model? In the IRR model?
11. Explain how the NPV is used to determine whether a project should be accepted or rejected.
12. The IRR is the true or actual rate of return being earned by the project. Do you agree or disagree? Discuss.
13. Explain what a postaudit is and how it can provide useful input for future capital investment decisions, especially those involving advanced technology.
14. Explain why NPV is generally preferred over IRR when choosing among competing or mutually exclusive projects. Why would managers continue to use IRR to choose among mutually exclusive projects?
15. Suppose that a firm must choose between two mutually exclusive projects, both of which have negative NPVs. Explain how a firm can legitimately choose between two such projects.

## Multiple-Choice Exercises

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### 24-1 Capital investments should:

- a. earn back their original capital outlay.
- b. only be analyzed using the ARR.
- c. always produce an increase in market share.
- d. always be done using a payback criterion.
- e. do none of the above.

### 24-2 To make a capital investment decision, a manager must:

- a. estimate the quantity and timing of cash flows.
- b. assess the risk of the investment.
- c. consider the impact of the investment on the firm's profits.
- d. select investments with a positive NPV.
- e. do all of the above.

### 24-3 Mutually exclusive capital budgeting projects are those that:

- a. if accepted or rejected do not affect the cash flows of other projects.
- b. if accepted will produce a negative NPV.
- c. if accepted preclude the acceptance of all other competing projects.
- d. if rejected preclude the acceptance of all other competing projects.
- e. if rejected imply that all other competing projects have a positive NPV.

**24-4** An investment of \$1,000 produces a net annual cash inflow of \$500 for each of five years. What is the payback period?

- a. Two years
- b. One-half year
- c. Unacceptable
- d. Three years
- e. Cannot be determined

**24-5** An investment of \$1,000 produces a net cash inflow of \$600 in the first year and \$2,000 in the second year. What is the payback period?

- a. 1.67 years
- b. 0.50 year
- c. 2.00 years
- d. 1.20 years
- e. Cannot be determined

**24-6** The payback period suffers from which of the following deficiencies?

- a. It is a rough measure of the uncertainty of future cash flows.
- b. It helps control the risk of obsolescence.
- c. It ignores the time value of money.
- d. It ignores the financial performance of a project beyond the payback period.
- e. Both c and d.

**24-7** The accounting rate of return has one specific advantage not possessed by the payback period in that it:

- a. considers the time value of money.
- b. measures the value added by a project.
- c. considers the profitability of a project beyond the payback period.
- d. is more widely accepted by financial managers.
- e. is always an accurate measure of profitability.

**24-8** An investment of \$1,000 provides an average net income of \$220 with zero salvage value. Depreciation is \$20 per year. The accounting rate of return using the original investment is:

- a. 44 percent.
- b. 22 percent.
- c. 20 percent.
- d. 40 percent.
- e. none of the above.

**24-9** If the net present value is positive, it signals:

- a. that the initial investment has been recovered.
- b. that the required rate of return has been earned.
- c. that the value of the firm has increased.
- d. all of the above.
- e. both a and b.

**24-10** Net present value measures:

- a. the profitability of an investment.
- b. the change in wealth.
- c. the change in firm value.
- d. the difference in present value of cash inflows and outflows.
- e. all of the above.

**24-11 Net present value is calculated by using:**

- accounting income.
- the required rate of return.
- the IRR.
- the future value of cash flows.
- none of the above.

**24-12 Using net present value, a project is rejected if it is:**

- equal to zero.
- positive.
- negative.
- less than the hurdle rate.
- greater than the cost of capital.

**24-13 If the present value of future cash flows is \$1,200 for an investment that requires an outlay of \$1,000, the net present value:**

- is \$200.
- is \$1,000.
- is \$1,200.
- is \$2,200.
- cannot be determined.

**24-14 Assume that an investment of \$1,000 produces a future cash flow of \$1,000. The discount factor for this future cash flow is 0.89. The net present value is:**

- \$0.
- \$110.
- \$2,000.
- \$911.
- none of the above.

**24-15 Which of the following is *not* true regarding the internal rate of return?**

- The IRR is the interest rate that sets the present value of a project's cash inflows equal to the present value of the project's cost.
- The IRR is the interest rate that sets the NPV equal to zero.
- The IRR is the most reliable of the capital budgeting methods.
- If the IRR is greater than the required rate of return, then the project is acceptable.
- The popularity of IRR may be attributable to the fact that it is a rate of return, a concept that is comfortably used by managers.

**24-16 Using internal rate of return, a project is rejected if the IRR:**

- is less than the required rate of return.
- is equal to the required rate of return.
- is greater than the cost of capital.
- is greater than the required rate of return.
- produces an NPV equal to zero.

**24-17 A postaudit:**

- is a follow-up analysis of a capital project, once implemented.
- compares the actual benefits with the estimated benefits.
- evaluates the overall outcome of the investment.
- proposes corrective action, if needed.
- does all of the above.

**24-18 Postaudits of capital projects are useful because:**

- they are not very costly.
- they help to ensure that resources are used wisely.
- the assumptions underlying the original analyses are often invalidated by changes in the actual working environment.
- they have no significant limitations.
- of all of the above.

**24-19 For competing projects, net present value is preferred to internal rate of return because:**

- maximizing IRR may not maximize the wealth of the owners.
- in the final analysis, total dollars earned, not relative profitability, are what count.
- choosing the project with the largest NPV maximizes the wealth of the shareholders.
- assuming that cash flows are reinvested at the required rate of return is more realistic than assuming that cash flows are reinvested at the computed IRR.
- of all of the above.

**24-20 Assume that there are two competing projects, A and B. Project A has a net present value of \$1,000 and an internal rate of return of 15 percent; Project B has an NPV of \$800 and an IRR of 20 percent. Which of the following is true?**

- It is not possible to use NPV or IRR to choose between the two projects.
- Project B should be chosen because it has a higher IRR.
- Project A should be chosen because it has a higher NPV.
- Neither project should be chosen.
- None of the above.

## Cornerstone Exercises

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**Cornerstone Exercise 24-21 PAYBACK PERIOD**

Kilebrew Manufacturing is considering an investment in a new automated manufacturing system. The new system requires an investment of \$2,400,000 and either has:

- Even cash flows of \$600,000 per year or
- The following expected annual cash flows: \$300,000, \$300,000, \$800,000, \$800,000, and \$200,000.

**Required:**

Calculate the payback period for each case.

OBJECTIVE &gt; 2

CORNERSTONE 24-1

**Cornerstone Exercise 24-22 ACCOUNTING RATE OF RETURN**

Eyring Company invested \$10,000,000 in a new product line. The life cycle of the product is projected to be seven years with the following net income stream: \$200,000, \$600,000, \$1,000,000, \$1,200,000, \$1,600,000, \$2,200,000, and \$1,600,000.

**Required:**

Calculate the accounting rate of return.

OBJECTIVE &gt; 2

CORNERSTONE 24-2

**Cornerstone Exercise 24-23 NET PRESENT VALUE**

Oaks, Inc., has just completed development of a new cell phone. The new product is expected to produce annual revenues of \$450,000. To produce the cell phone, an investment requires an investment in new equipment, costing \$480,000. The cell phone has a projected life cycle of five years. After five years, the equipment can be sold for \$60,000. Working capital is also expected to increase by \$60,000, which Oaks will recover by the end of the new product's life cycle. Annual cash operating expenses are estimated at \$270,000. The required rate of return is 8 percent.

OBJECTIVE &gt; 3

CORNERSTONE 24-3

**Required:**

1. Prepare a schedule of the projected annual cash flows.
2. Calculate the NPV using only discount factors from Exhibit A3-8.
3. Calculate the NPV using discount factors from both Exhibit A3-8 and A3-10.

**OBJECTIVE** > **4****CORNERSTONE 24-4****Cornerstone Exercise 24-24 INTERNAL RATE OF RETURN**

Gardner Company produces a variety of gardening tools and aids. The company is examining the possibility of investing in a new production system that will reduce the costs of the current system. The new system will require a cash investment of \$4,607,200 and will produce net cash savings of \$800,000 per year. The system has a projected life of nine years.

**Required:**

Calculate the internal rate of return for the new production system.

**OBJECTIVE** > **6****CORNERSTONE 24-5****Cornerstone Exercise 24-25 NPV AND IRR, MUTUALLY EXCLUSIVE PROJECTS**

Luckinbill Inc. intends to invest in one of two competing types of computer-aided manufacturing equipment, built by two different manufacturers: CAM X and CAM Y. Both CAM X and CAM Y models have a project life of 10 years. The purchase price of the CAM X model is \$1,200,000; and has a net annual after-tax cash inflow of \$300,000. The CAM Y model is more expensive, selling for \$1,400,000, but will produce a net annual after-tax cash inflow of \$350,000. The cost of capital for the company is 10 percent.

**Required:**

1. Calculate the NPV for each project. Which model would you recommend?
2. Calculate the IRR for each project. Which model would you recommend?

## Exercises

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**OBJECTIVE** > **1** **2****Exercise 24-26 PAYBACK PERIOD**

Each of the following situations is independent. Assume that all cash flows are after-tax cash flows.

- a. Emily Hansen has just invested \$320,000 in a book and video store. She expects to receive a cash income of \$96,000 per year from the investment.
- b. Kaylin Day has just invested \$700,000 in a new biomedical technology. She expects to receive the following cash flows over the next five years: \$175,000, \$245,000, \$350,000, \$210,000, and \$140,000.
- c. Kambry Nabors invested in a project that has a payback period of four years. The project brings in \$192,000 per year.
- d. Kenneth Booth invested \$325,000 in a project that pays him an even amount per year for five years. The payback period is 2.5 years.

**Required:**

1. What is the payback period for Emily?
2. What is the payback period for Kaylin?
3. How much did Kambry invest in the project?
4. How much cash does Kenneth receive each year?

**OBJECTIVE** > **1** **2****Exercise 24-27 ACCOUNTING RATE OF RETURN**

Each of the following scenarios is independent. Assume that all cash flows are after-tax cash flows.

- a. Nomander Company is considering the purchase of new equipment that will speed up the process for extracting copper. The equipment will cost \$2,400,000 and have a life of five years with no expected salvage value. The expected cash flows associated with the project are as follows:

Year	Cash Revenues	Cash Expenses
1	\$4,000,000	\$3,200,000
2	4,000,000	3,200,000
3	4,000,000	3,200,000
4	4,000,000	3,200,000
5	4,000,000	3,200,000

- b. Marlene Straithe is considering investing in one of the following two projects. Either project will require an investment of \$30,000. The expected revenues less cash expenses for the two projects follow. Assume each project is depreciable.

Year	Project A	Project B
1	\$ 9,000	\$ 9,000
2	12,000	12,000
3	15,000	18,000
4	30,000	9,000
5	30,000	9,000

- c. Suppose that a project has an accounting rate of return of 40 percent (based on initial investment) and that the average net income of the project is \$160,000.
- d. Suppose that a project has an accounting rate of return of 25 percent and that the investment is \$100,000.

**Required:**

1. Compute the ARR on the new equipment that Nomander Company is considering.
2. Which project should Marlene Straithe choose based on the ARR?
3. How much did the company in scenario (c) invest in the project?
4. What is the average income earned by the project in scenario (d)?

**Exercise 24-28 NET PRESENT VALUE**

**OBJECTIVE** > 1 3

Each of the following scenarios is independent. Assume that all cash flows are after-tax cash flows.

- a. Harrison Manufacturing is considering the purchase of a new welding system. The cash benefits will be \$360,000 per year. The system costs \$2,040,000 and will last 10 years.
- b. Kylie Hepworth is interested in investing in a women's specialty shop. The cost of the investment is \$120,000. She estimates that the return from owning her own shop will be \$36,000 per year. She estimates that the shop will have a useful life of six years.
- c. Larsen Company calculated the NPV of a project and found it to be \$7,100. The project's life was estimated to be eight years. The required rate of return used for the NPV calculation was 10 percent. The project was expected to produce annual after-tax cash flows of \$15,000.

**Required:**

1. Compute the NPV for Harrison Manufacturing, assuming a discount rate of 12 percent. Should the company buy the new welding system?
2. Assuming a required rate of return of 8 percent, calculate the NPV for Kylie Hepworth's investment. Should she invest?
3. What was the required investment for Larsen Company's project?

**Exercise 24-29 INTERNAL RATE OF RETURN**

**OBJECTIVE** > 1 4

Each of the following scenarios is independent. Assume that all cash flows are after-tax cash flows.

- a. Manchester Company is considering the purchase of new equipment that will speed up the process for producing flash drives. The equipment will cost \$6,254,000 and have a life of five years with no expected salvage value. The expected cash flows associated with the project follow:

Year	Cash Revenues	Cash Expenses
1	\$6,000,000	\$4,000,000
2	6,000,000	4,000,000
3	6,000,000	4,000,000
4	6,000,000	4,000,000
5	6,000,000	4,000,000

- b. Kathleen Briggs is evaluating an investment in an information system that will save \$160,000 per year. She estimates that the system will last 10 years. The system will cost \$834,560. Her company's cost of capital is 10 percent.
- c. Castle Dale Enterprises just announced that a new plant would be built in Price, Utah. Castle Dale told its shareholders that the plant has an expected life of 15 years and an expected IRR equal to 25 percent. The cost of building the plant is expected to be \$2,880,000.

**Required:**

1. Calculate the IRR for Manchester Company. The company's cost of capital is 16 percent. Should the new equipment be purchased?
2. Calculate Kathleen Brigg's IRR. Should she acquire the new system?
3. What should be Castle Dale Enterprises' expected annual cash flow from the plant?

**OBJECTIVE** > **1** **6****Exercise 24-30 NET PRESENT VALUE AND COMPETING PROJECTS**

Perry Hospital is investigating the possibility of investing in new dialysis equipment. Two local manufacturers of this equipment are being considered as sources of the equipment. After-tax cash inflows for the two competing projects are as follows:

Year	Limpio Equipment	Salman Equipment
1	\$300,000	\$ 50,000
2	250,000	50,000
3	200,000	300,000
4	100,000	400,000
5	50,000	450,000

Both projects require an initial investment of \$500,000. In both cases, assume that the equipment has a life of five years with no salvage value.

**Required:**

1. Assuming a discount rate of 12 percent, compute the net present value of each piece of equipment.
2. A third option has surfaced for equipment purchased from an out-of-state supplier. The cost is also \$500,000, but this equipment will produce even cash flows over its five-year life. What must the annual cash flow be for this equipment to be selected over the other two? Assume a 12 percent discount rate.

**OBJECTIVE** > **1** **2** **3** **4****Exercise 24-31 PAYBACK, ACCOUNTING RATE OF RETURN, NET PRESENT VALUE, INTERNAL RATE OF RETURN**

Whipple Company wants to buy a numerically controlled (NC) machine to be used in producing specially machined parts for manufacturers of tractors. The outlay required is \$480,000. The NC equipment will last five years with no expected salvage value. The expected after-tax cash flows associated with the project follow:

Year	Cash Revenues	Cash Expenses
1	\$780,000	\$600,000
2	780,000	600,000
3	780,000	600,000
4	780,000	600,000
5	780,000	600,000

**Required:**

1. Compute the payback period for the NC equipment.
2. Compute the NC equipment's ARR.
3. Compute the investment's NPV, assuming a required rate of return of 10 percent.
4. Compute the investment's IRR.

**Exercise 24-32 PAYBACK, ACCOUNTING RATE OF RETURN, PRESENT VALUE, NET PRESENT VALUE, INTERNAL RATE OF RETURN****OBJECTIVE** > 1 2 3 4

All four parts are independent of all other parts. Assume that all cash flows are after-tax cash flows.

- a. Randy Willis is considering investing in one of the following two projects. Either project will require an investment of \$10,000. The expected cash flows for the two projects follow. Assume that each project is depreciable.

Year	Project A	Project B
1	\$ 3,000	\$3,000
2	4,000	4,000
3	5,000	6,000
4	10,000	3,000
5	10,000	3,000

- b. Wilma Golding is retiring and has the option to take her retirement as a lump sum of \$225,000 or to receive \$24,000 per year for 20 years. Wilma's required rate of return is 8 percent.
- c. David Booth is interested in investing in some tools and equipment so that he can do independent drywalling. The cost of the tools and equipment is \$20,000. He estimates that the return from owning his own equipment will be \$6,000 per year. The tools and equipment will last six years.
- d. Patsy Folson is evaluating what appears to be an attractive opportunity. She is currently the owner of a small manufacturing company and has the opportunity to acquire another small company's equipment that would provide production of a part currently purchased externally. She estimates that the savings from internal production will be \$25,000 per year. She estimates that the equipment will last 10 years. The owner is asking \$130,400 for the equipment. Her company's cost of capital is 10 percent.

**Required:**

1. What is the payback period for each of Randy Willis's projects? If rapid payback is important, which project should be chosen? Which would you choose?
2. Which of Randy's projects should be chosen based on the ARR?
3. Assuming that Wilma Golding will live for another 20 years, should she take the lump sum or the annuity?
4. Assuming a required rate of return of 8 percent for David Booth, calculate the NPV of the investment. Should David invest?
5. Calculate the IRR for Patsy Folson's project. Should Patsy acquire the equipment?

**Exercise 24-33 NET PRESENT VALUE, BASIC CONCEPTS****OBJECTIVE** > 3

Ge Company is considering an investment that requires an outlay of \$100,000 and promises an after-tax cash inflow one year from now of \$115,500. The company's cost of capital is 10 percent.

**Required:**

1. Break the \$115,500 future cash inflow into three components: (a) the return of the original investment, (b) the cost of capital, and (c) the profit earned on the investment. Now compute the present value of the profit earned on the investment.
2. Compute the NPV of the investment. Compare this with the present value of the profit computed in Requirement 1. What does this tell you about the meaning of NPV?

## OBJECTIVE &gt; 1 3 4

**Exercise 24-34 SOLVING FOR UNKNOWNNS**

Each of the following cases is independent. Assume that all cash flows are after-tax cash flows.

- Thomas Company is investing \$120,000 in a project that will yield a uniform series of cash inflows over the next four years.
- Video Repair has decided to invest in some new electronic equipment. The equipment will have a three-year life and will produce a uniform series of cash savings. The NPV of the equipment is \$1,750, using a discount rate of 8 percent. The IRR is 12 percent.
- A new lathe costing \$60,096 will produce savings of \$12,000 per year.
- The NPV of a project is \$3,927. The project has a life of four years and produces the following cash flows:

Year 1	\$10,000	Year 3	\$15,000
Year 2	\$12,000	Year 4	?

The cost of the project is two times the cash flow produced in year 4. The discount rate is 10 percent.

**Required:**

- If the internal rate of return is 14 percent for Thomas Company, how much cash inflow per year can be expected?
- Determine the investment and the amount of cash savings realized each year for Video Repair.
- For scenario (c), how many years must the lathe last if an IRR of 18 percent is realized?
- For scenario (d), find the cost of the project and the cash flow for year 4.

## OBJECTIVE &gt; 6

**Exercise 24-35 NET PRESENT VALUE VERSUS INTERNAL RATE OF RETURN**

A company is thinking about two different modifications to its current manufacturing process. The after-tax cash flows associated with the two investments follow:

Year	Project I	Project II
0	\$(100,000)	\$(100,000)
1	—	63,857
2	134,560	63,857

The company's cost of capital is 10 percent.

**Required:**

- Compute the NPV and the IRR for each investment.
- Explain why the project with the larger NPV is the correct choice for the company.

## Problems

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## OBJECTIVE &gt; 1 3

**Problem 24-36 BASIC NET PRESENT VALUE ANALYSIS**

Camus Black, process engineer, knows that the acceptance of a new process design will depend on its economic feasibility. The new process is designed to improve environmental performance. On the negative side, the process design requires new equipment and an infusion of working capital. The equipment will cost \$300,000, and its cash operating expenses will total \$60,000 per year. The equipment will last for seven years but will need a major overhaul costing \$30,000 at the end of the fifth year. At the end of seven years, the equipment will be sold for \$24,000. An increase in working capital totaling \$30,000 will also be needed at the beginning. This will be recovered at the end of the seven years.

On the positive side, Camus estimates that the new process will save \$135,000 per year in environmental costs (fines and cleanup costs avoided). The cost of capital is 10 percent.

**Required:**

1. Prepare a schedule of cash flows for the proposed project. Assume that there are no income taxes.
2. Compute the NPV of the project. Should the new process design be accepted?

**Problem 24-37 NET PRESENT VALUE ANALYSIS**

OBJECTIVE > 1 3

Uintah Communications Company is considering the production and marketing of a communications system that will increase the efficiency of messaging for small businesses or branch offices of large companies. Each unit hooked into the system is assigned a mailbox number, which can be matched to a telephone extension number, providing access to messages 24 hours a day. Up to 20 units can be hooked into the system, allowing the delivery of the same message to as many as 20 people. Personal codes can be used to make messages confidential. Furthermore, messages can be reviewed, recorded, cancelled, replied to, or deleted all during the same phone call. Indicators wired to the telephone blink whenever new messages are present.

To produce this product, a \$1.1 million investment in new equipment is required. The equipment will last 10 years but will need major maintenance costing \$100,000 at the end of its sixth year. The salvage value of the equipment at the end of 10 years is estimated to be \$40,000. If this new system is produced, working capital must also be increased by \$50,000. This capital will be restored at the end of the product's life cycle, which is estimated to be 10 years. Revenues from the sale of the product are estimated at \$1.5 million per year; cash operating expenses are estimated at \$1.26 million per year.

**Required:**

1. Prepare a schedule of cash flows for the proposed project. Assume that there are no income taxes.
2. Assuming that Uintah's cost of capital is 12 percent, compute the project's NPV. Should the product be produced?

**Problem 24-38 BASIC INTERNAL RATE OF RETURN ANALYSIS**

OBJECTIVE > 1 4

Lindsey Thompson, owner of Leshow Company, was approached by a local dealer of air-conditioning units. The dealer proposed replacing Leshow's old cooling system with a modern, more efficient system. The cost of the new system was quoted at \$96,660, but it would save \$20,000 per year in energy costs. The estimated life of the new system is 10 years, with no salvage value expected. Excited over the possibility of saving \$20,000 per year and having a more reliable unit, Lindsey requested an analysis of the project's economic viability. All capital projects are required to earn at least the firm's cost of capital, which is 10 percent. There are no income taxes.

**Required:**

1. Calculate the project's IRR. Should the company acquire the new cooling system?
2. Suppose that energy savings are less than claimed. Calculate the minimum annual cash savings that must be realized for the project to earn a rate equal to the firm's cost of capital.
3. Suppose that the life of the new system is overestimated by two years. Repeat Requirements 1 and 2 under this assumption.
4. Explain the implications of the answers from Requirements 1, 2, and 3.

**Problem 24-39 NET PRESENT VALUE, UNCERTAINTY**

OBJECTIVE > 1 3

Eden Airlines is interested in acquiring a new aircraft to service a new route. The route will be from Dallas to El Paso. The aircraft will fly one round-trip daily except for scheduled maintenance days. There are 15 maintenance days scheduled each year. The seating

capacity of the aircraft is 150. Flights are expected to be fully booked. The average revenue per passenger per flight (one-way) is \$200. Annual operating costs of the aircraft follow:

Fuel	\$1,400,000
Flight personnel	500,000
Food and beverages	100,000
Maintenance	400,000
Other	100,000
Total	<u>\$2,500,000</u>

The aircraft will cost \$100,000,000 and has an expected life of 20 years. The company requires a 14 percent return. Assume there are no income taxes.

**Required:**

1. Calculate the NPV for the aircraft. Should the company buy it?
2. In discussing the proposal, the marketing manager for the airline believes that the assumption of 100 percent booking is unrealistic. He believes that the booking rate will be somewhere between 70 and 90 percent, with the most likely rate being 80 percent. Recalculate the NPV by using an 80 percent seating capacity. Should the aircraft be purchased?
3. Calculate the average seating rate that would be needed so that NPV will equal zero.
4. Suppose that the price per passenger could be increased by 10 percent without any effect on demand. What is the average seating rate now needed to achieve a NPV equal to zero? What would you now recommend?

**OBJECTIVE** > 1 2 3 4



**Problem 24-40 REVIEW OF BASIC CAPITAL BUDGETING PROCEDURES**

Dr. Whitley Avard, a plastic surgeon, had just returned from a conference in which she learned of a new surgical procedure for removing wrinkles around eyes, reducing the time to perform the normal procedure by 50 percent. Given her patient-load pressures, Dr. Avard is excited to try out the new technique. By decreasing the time spent on eye treatments or procedures, she can increase her total revenues by performing more services within a work period. Unfortunately, in order to implement the new procedure, special equipment costing \$74,000 is needed. The equipment has an expected life of four years, with a salvage value of \$6,000. Dr. Avard estimates that her cash revenues will increase by the following amounts:

Year	Revenue Increases
1	\$19,800
2	27,000
3	32,400
4	32,400

She also expects additional cash expenses amounting to \$3,000 per year. The cost of capital is 12 percent. Assume that there are no income taxes.

**Required:**

1. Compute the payback period for the new equipment.
2. Compute the ARR.
3. Compute the NPV and IRR for the project. Should Dr. Avard purchase the new equipment? Should she be concerned about payback or the ARR in making this decision?
4. Before finalizing her decision, Dr. Avard decided to call two plastic surgeons who have been using the new procedure for the past six months. The conversations revealed a somewhat less glowing report than she received at the conference. The new procedure reduced the time required by about 25 percent rather than the advertised 50 percent. Dr. Avard estimated that the net operating cash flows of the procedure would be cut by one-third because of the extra time and cost involved

(salvage value would be unaffected). Using this information, recompute the NPV of the project. What would you now recommend?

### Problem 24-41 NET PRESENT VALUE AND COMPETING ALTERNATIVES

OBJECTIVE > 1 6

Stillwater Designs has been rebuilding Model 100, Model 120, and Model 150 Kicker subwoofers that were returned for warranty action. Customers returning the subwoofers receive a new replacement. The warranty returns are then rebuilt and resold (as seconds). Tent sales are often used to sell the rebuilt speakers. As part of the rebuilding process, the speakers are demagnetized so that metal pieces and shavings can be removed. A demagnetizing (demag) machine is used to achieve this objective. A product design change has made the most recent Model 150 speakers too tall for the demag machine. They no longer fit in the demag machine.



Stillwater Designs has two alternatives that it is currently considering. First, a new demag machine can be bought that has a different design, eliminating the fit problem. The cost of this machine is \$600,000, and it will last five years. Second, Stillwater can keep the current machine and sell the 150 speakers for scrap, using the old demag machine for the Model 100 and 120 speakers only. A rebuilt speaker sells for \$295 and costs \$274.65 to rebuild (for materials, labor, and overhead cash outlays). The \$274.65 outlay includes the annual operating cash effects of the new demag machine. If not rebuilt, the Model 150 speakers can be sold for \$4 each as scrap. There are 10,000 Model 150 warranty returns per year. Assume that the required rate of return is 10 percent.

#### Required:

1. Determine which alternative is the best for Stillwater Designs by using NPV analysis.
2. Determine which alternative is best for Stillwater Designs by using an IRR analysis. Explain why NPV analysis is a better approach.

### Problem 24-42 BASIC NET PRESENT VALUE ANALYSIS, COMPETING PROJECTS

OBJECTIVE > 3 6

Kildare Medical Center, a for-profit hospital, has three investment opportunities: (1) adding a wing for in-patient treatment of substance abuse, (2) adding a pathology laboratory, and (3) expanding the outpatient surgery wing. The initial investments and the net present value for the three alternatives are as follows:

	Substance Abuse	Laboratory	Outpatient Surgery
Investment	\$1,500,000	\$500,000	\$1,000,000
NPV	150,000	140,000	135,000

Although the hospital would like to invest in all three alternatives, only \$1.5 million is available.

#### Required:

1. Rank the projects on the basis of NPV, and allocate the funds in order of this ranking. What project or projects were selected? What is the total NPV realized by the medical center using this approach?
2. Assume that the size of the lot on which the hospital is located makes the substance abuse wing and the outpatient surgery wing mutually exclusive. With unlimited capital, which of those two projects would be chosen? With limited capital and the three projects being considered, which projects would be chosen?
3. Form a group with two to four other students, and discuss qualitative considerations that should be considered in capital budgeting evaluations. Identify three such considerations.

### Problem 24-43 PAYBACK, NET PRESENT VALUE, INTERNAL RATE OF RETURN, INTANGIBLE BENEFITS, INFLATION ADJUSTMENT

OBJECTIVE > 1 2 3  
4 6

Foster Company wants to buy a numerically controlled (NC) machine to be used in producing specially machined parts for manufacturers of trenching machines (to replace an existing manual system). The outlay required is \$3,500,000. The NC equipment will last

five years with no expected salvage value. The expected incremental after-tax cash flows (cash flows of the NC equipment less cash flows of the old equipment) associated with the project follow:

Year	Cash Benefits	Cash Expenses
1	\$3,900,000	\$3,000,000
2	3,900,000	3,000,000
3	3,900,000	3,000,000
4	3,900,000	3,000,000
5	3,900,000	3,000,000

Foster has a cost of capital equal to 10 percent. The above cash flows are expressed without any consideration of inflation.

**Required:**

1. Compute the payback period.
2. Calculate the NPV and IRR of the proposed project.
3. Inflation is expected to be 5 percent per year for the next five years. The discount rate of 10 percent is composed of two elements: the real rate and the inflationary element. Since the discount rate has an inflationary component, the projected cash flows should also be adjusted to account for inflation. Make this adjustment, and recalculate the NPV. Comment on the importance of adjusting cash flows for inflationary effects.

**OBJECTIVE** > **3** **Problem 24-44 COST OF CAPITAL, NET PRESENT VALUE**

Leakam Company's product engineering department has developed a new product that has a three-year life cycle. Production of the product requires development of a new process that requires a current \$100,000 capital outlay. The \$100,000 will be raised by issuing \$60,000 of bonds and by selling new stock for \$40,000. The \$60,000 in bonds will have net (after-tax) interest payments of \$3,000 at the end of each of the three years, with the principal being repaid at the end of year 3. The stock issue carries with it an expectation of a 17.5 percent return, expressed in the form of dividends at the end of each year (\$7,000 in dividends is expected for each of the next three years). The sources of capital for this investment represent the same proportion and costs that the company typically has. Finally, the project will produce after-tax cash inflows of \$50,000 per year for the next three years.

**Required:**

1. Compute the cost of capital for the project. (Hint: The cost of capital is a weighted average of the two sources of capital where the weights are the proportion of capital from each source.)
2. Compute the NPV for the project. Explain why it is not necessary to subtract the interest payments and the dividend payments and appreciation from the inflow of \$50,000 in carrying out this computation.

**OBJECTIVE** > **1** **6** **Problem 24-45 CAPITAL INVESTMENT, ADVANCED MANUFACTURING ENVIRONMENT**

"I know that it's the thing to do," insisted Pamela Kincaid, vice president of finance for Colgate Manufacturing. "If we are going to be competitive, we need to build this completely automated plant."

"I'm not so sure," replied Bill Thomas, CEO of Colgate. "The savings from labor reductions and increased productivity are only \$4 million per year. The price tag for this factory—and it's a small one—is \$45 million. That gives a payback period of more than 11 years. That's a long time to put the company's money at risk."

"Yeah, but you're overlooking the savings that we'll get from the increase in quality," interjected John Simpson, production manager. "With this system, we can decrease

our waste and our rework time significantly. Those savings are worth another million dollars per year.”

“Another million will only cut the payback to about nine years,” retorted Bill. “Ron, you’re the marketing manager—do you have any insights?”

“Well, there are other factors to consider, such as service quality and market share. I think that increasing our product quality and improving our delivery service will make us a lot more competitive. I know for a fact that two of our competitors have decided against automation. That’ll give us a shot at their customers, provided our product is of higher quality and we can deliver it faster. I estimate that it’ll increase our net cash benefits by another \$2.4 million.”

“Wow! Now that’s impressive,” Bill exclaimed, nearly convinced. “The payback is now getting down to a reasonable level.”

“I agree,” said Pamela, “but we do need to be sure that it’s a sound investment. I know that estimates for construction of the facility have gone as high as \$48 million. I also know that the expected residual value, after the 20 years of service we expect to get, is \$5 million. I think I had better see if this project can cover our 14 percent cost of capital.”

“Now wait a minute, Pamela,” Bill demanded. “You know that I usually insist on a 20 percent rate of return, especially for a project of this magnitude.”

#### Required:

1. Compute the NPV of the project by using the original savings and investment figures. Calculate by using discount rates of 14 percent and 20 percent. Include salvage value in the computation.
2. Compute the NPV of the project using the additional benefits noted by the production and marketing managers. Also, use the original cost estimate of \$45 million. Again, calculate for both possible discount rates.
3. Compute the NPV of the project using all estimates of cash flows, including the possible initial outlay of \$48 million. Calculate by using discount rates of 14 percent and 20 percent.
4. If you were making the decision, what would you do? Explain.

#### Problem 24-46 POSTAUDIT, SENSITIVITY ANALYSIS

#### OBJECTIVE > 5 6

Newmarge Products Inc. is evaluating a new design for one of its manufacturing processes. The new design will eliminate the production of a toxic solid residue. The initial cost of the system is estimated at \$860,000 and includes computerized equipment, software, and installation. There is no expected salvage value. The new system has a useful life of eight years and is projected to produce cash operating savings of \$225,000 per year over the old system (reducing labor costs and costs of processing and disposing of toxic waste). The cost of capital is 16 percent.

#### Required:

1. Compute the NPV of the new system.
2. One year after implementation, the internal audit staff noted the following about the new system: (1) the cost of acquiring the system was \$60,000 more than expected due to higher installation costs, and (2) the annual cost savings were \$20,000 less than expected because more labor cost was needed than anticipated. Using the changes in expected costs and benefits, compute the NPV as if this information had been available one year ago. Did the company make the right decision?
3. Upon reporting the results mentioned in the postaudit, the marketing manager responded in a memo to the internal auditing department indicating that revenues had increased by \$60,000 per year because of increased purchases by environmentally sensitive customers. Describe the effect that this has on the analysis in Requirement 2.
4. Why is a postaudit beneficial to a firm?

**OBJECTIVE** > **6** **Problem 24-47 DISCOUNT RATES, AUTOMATED MANUFACTURING, COMPETING INVESTMENTS**

A company is considering two competing investments. The first is for a standard piece of production equipment; the second is for computer-aided manufacturing (CAM) equipment. The investment and after-tax operating cash flows follow:

Year	Standard Equipment	CAM Equipment
0	\$(500,000)	\$(2,000,000)
1	300,000	100,000
2	200,000	200,000
3	100,000	300,000
4	100,000	400,000
5	100,000	400,000
6	100,000	400,000
7	100,000	500,000
8	100,000	1,000,000
9	100,000	1,000,000
10	100,000	1,000,000

The company uses a discount rate of 18 percent for all of its investments. The company's cost of capital is 10 percent.

**Required:**

1. Calculate the NPV for each investment by using a discount rate of 18 percent.
2. Calculate the NPV for each investment by using a discount rate of 10 percent.
3. Which rate should the company use to compute the NPV? Explain.

**OBJECTIVE** > **6** **Problem 24-48 QUALITY, MARKET SHARE, AUTOMATED MANUFACTURING ENVIRONMENT**

A company is considering two competing investments. The first is for a standard piece of production equipment; the second is for computer-aided manufacturing (CAM) equipment. The investment and after-tax operating cash flows follow:

Year	Standard Equipment	CAM Equipment
0	\$(500,000)	\$(2,000,000)
1	300,000	100,000
2	200,000	200,000
3	100,000	300,000
4	100,000	400,000
5	100,000	400,000
6	100,000	400,000
7	100,000	500,000
8	100,000	1,000,000
9	100,000	1,000,000
10	100,000	1,000,000

Assume that the company's cost of capital is 14 percent.

**Required:**

1. Calculate the NPV of each alternative by using the 14 percent rate.
2. Now assume that if the standard equipment is purchased, the competitive position of the firm will deteriorate because of lower quality (relative to competitors who did automate). Marketing estimates that the loss in market share will decrease the projected net cash inflows by 50 percent for years 3 through 10. Recalculate the NPV of the standard equipment given this outcome. What is the decision now? Discuss the importance of assessing the effect of intangible benefits.

## Cases

### Case 24-49 CAPITAL INVESTMENT AND ETHICAL BEHAVIOR

OBJECTIVE > 3

Manny Carson, certified management accountant and controller of Wakeman Enterprises, had been given permission to acquire a new computer and software for the company's accounting system. The capital investment analysis showed an NPV of \$100,000; however, the initial estimates of acquisition and installation costs were made on the basis of tentative costs without any formal bids. Manny now has two formal bids, one that would allow the firm to meet or beat the original projected NPV and one that would reduce the projected NPV by \$50,000. The second bid involves a system that would increase both the initial cost and the operating cost.

Normally, Manny would take the first bid without hesitation. However, Todd Downing, the owner of the firm presenting the second bid, was a close friend. Manny had called Todd and explained the situation, offering Todd an opportunity to alter his bid and win the job. Todd thanked Manny and then made a counteroffer.

**Todd:** Listen, Manny, this job at the original price is the key to a successful year for me. The revenues will help me gain approval for the loan I need for renovation and expansion. If I don't get that loan, I see hard times ahead. The financial stats for loan approval are so marginal that reducing the bid price may blow my chances.

**Manny:** Losing the bid altogether would be even worse, don't you think?

**Todd:** True. However, I have a suggestion. If you grant me the job, I will have the capability of adding personnel. I know that your son is looking for a job, and I can offer him a good salary and a promising future. Additionally, I'll be able to take you and your wife on that vacation to Hawaii that we have been talking about.

**Manny:** Well, you have a point. My son is having an awful time finding a job, and he has a wife and three kids to support. My wife is tired of having them live with us. She and I could use a vacation. I doubt that the other bidder would make any fuss if we turned it down. Its offices are out of state, after all.

**Todd:** Out of state? All the more reason to turn it down. Given the state's economy, it seems almost criminal to take business outside. Those are the kind of business decisions that cause problems for people like your son.

#### Required:

Evaluate the ethical behavior of Manny. Should Manny have called Todd in the first place? What if Todd had agreed to meet the lower bid price—would there have been any problems? Identify the standards of ethical conduct listed in the Institute of Management Accountants "Statement of Ethical Professional Practice" found at [https://www.imanet.org/about\\_ethics\\_statement.asp](https://www.imanet.org/about_ethics_statement.asp) that Manny may be violating, if any.

### Case 24-50 PAYBACK, NET PRESENT VALUE, INTERNAL RATE OF RETURN, EFFECTS OF DIFFERENCES IN SALES ON PROJECT VIABILITY

OBJECTIVE > 2 3 4

Shaftel Ready Mix is a processor and supplier of concrete, aggregate, and rock products. The company operates in the intermountain western United States. Currently, Shaftel has 14 cement-processing plants and a labor force of more than 375 employees. With the exception of cement powder, all materials (e.g., aggregates and sand) are produced internally by the company. The demand for concrete and aggregates has been growing steadily nationally, and in the West, the growth rate has been above the national average. Because of this growth, Shaftel has more than tripled its gross revenues over the past 10 years.

Of the intermountain states, Arizona has been experiencing the most growth. Processing plants have been added over the past several years, and the company is considering the addition of yet another plant to be located in Scottsdale. A major advantage of another plant in Arizona is the ability to operate year round, a feature not found in states such as Utah and Wyoming.

In setting up the new plant, land would have to be purchased and a small building constructed. Equipment and furniture would not need to be purchased; these items would be transferred from a plant that opened in Wyoming during the oil boom period and closed a few years after the end of that boom. However, the equipment needs some repair and modifications before it can be used. It has a book value of \$200,000, and the furniture has a book value of \$30,000. Neither has any outside market value. Other costs, such as the installation of a silo, well, electrical hookups, and so on, will be incurred. No salvage value is expected. The summary of the initial investment costs by category is as follows:

Land	\$ 20,000
Building	135,000
Equipment:	
Book value	200,000
Modifications	20,000
Furniture (book value)	30,000
Silo	20,000
Well	80,000
Electrical hookups	27,000
General setup	<u>50,000</u>
Total	<u>\$582,000</u>

Estimates concerning the operation of the Scottsdale plant follow:

Life of plant and equipment	10 years
Expected annual sales (in cubic yards of cement)	35,000
Selling price (per cubic yard of cement)	\$45.00
Variable costs (per cubic yard of cement):	
Cement	\$12.94
Sand/gravel	6.42
Fly ash	1.13
Admixture	1.53
Driver labor	3.24
Mechanics	1.43
Plant operations (batching and cleanup)	1.39
Loader operator	0.50
Truck parts	1.75
Fuel	1.48
Other	<u>3.27</u>
Total variable costs	<u>\$35.08</u>
Fixed costs (annual):	
Salaries	\$135,000
Insurance	75,000
Telephone	5,000
Depreciation	58,200*
Utilities	<u>25,000</u>
Total fixed costs	<u>\$298,200</u>

\* Straight-line depreciation is calculated by using all initial investment costs over a 10-year period assuming no salvage value.

After reviewing these data, Karl Flemming, vice president of operations, argued against the proposed plant. Karl was concerned because the plant would earn significantly less than the normal 8.3 percent return on sales. All other plants in the company were earning between 7.5 and 8.5 percent on sales. Karl also noted that it would take more than five years to recover the total initial outlay of \$582,000. In the past, the company had always insisted that payback be no more than four years. The company's cost of capital is 10 percent. Assume that there are no income taxes.

**Required:**

1. Prepare a variable-costing income statement for the proposed plant. Compute the ratio of net income to sales. Is Karl correct that the return on sales is significantly lower than the company average?
2. Compute the payback period for the proposed plant. Is Karl right that the payback period is greater than four years? Explain. Suppose you were told that the equipment being transferred from Wyoming could be sold for its book value. Would this affect your answer?
3. Compute the NPV and the IRR for the proposed plant. Would your answer be affected if you were told that the furniture and equipment could be sold for their book values? If so, repeat the analysis with this effect considered.
4. Compute the cubic yards of cement that must be sold for the new plant to break even. Using this break-even volume, compute the NPV and the IRR. Would the investment be acceptable? If so, explain why an investment that promises to do nothing more than break even can be viewed as acceptable.
5. Compute the volume of cement that must be sold for the IRR to equal the firm's cost of capital. Using this volume, compute the firm's expected annual income. Explain this result.

# M

## Making the Connection: Integrative Multi-Chapter Exercise



### Relevant Costing, Cost-Based Pricing, Cost Behavior, and Net Present Value Analysis for NoFat

Chapters	Objectives	Cornerstones
14	14-1	18-2
18	18-1	23-2
23	23-2	23-8
24	23-4	24-3
	24-1	24-5
	24-3	
	24-6	

The purpose of this integrated exercise is to demonstrate how a special sales-relevant decision analysis relies on knowledge of cost behavior (including variable, fixed, and batch costs) and how the adoption of a long-term time horizon can affect the final decision.

#### Special Sales Offer Relevant Analysis

NoFat manufactures one product, olestra, and sells it to large potato chip manufacturers as the key ingredient in nonfat snack foods, including Ruffles, Lays, Doritos, and Tostitos brand products.<sup>1</sup> For each of the past three years, sales of olestra have been far less than the expected annual volume of 125,000 pounds. Therefore, the company has ended each year with significant unused capacity. Due to a short shelf life, NoFat must sell every pound of olestra that it produces each year. As a result, NoFat's controller, Allyson Ashley, has decided to seek out potential special sales offers from other companies. One company, Patterson Union (PU)—a toxic waste cleanup company—offered to buy 10,000 pounds of olestra from NoFat during December for a price of \$2.20 per pound. PU discovered through its research that olestra has proven to be very effective in cleaning up toxic waste locations designated as Superfund Sites by the U.S. Environmental Protection Agency.<sup>2</sup> Allyson was excited, noting that "This is another way to use our expensive olestra plant!"

The annual costs incurred by NoFat to produce and sell 100,000 pounds of olestra are as follows:

Variable costs per pound:	
Direct materials	\$1.00
Variable manufacturing overhead	\$0.75
Sales commissions	\$0.50
Direct manufacturing labor	\$0.25
Total fixed costs:	
Advertising	\$3,000
Customer hotline service	\$4,000
Machine set-ups	\$40,000
Plant machinery lease	\$12,000

In addition, Allyson met with several of NoFat's key production managers and discovered the following information:

- The special order could be produced without incurring any additional marketing or customer service costs.
- NoFat owns the aging plant facility that it uses to manufacture olestra.

<sup>1</sup>Over 4 billion servings of Olean (the Procter & Gamble brand name for olestra) have been consumed. See further information at the Procter & Gamble website: <http://www.olean.com/default.asp?p=products&id=fl>.

<sup>2</sup>This exercise is based on facts reported in the business press (e.g., Nanci Hellmich and Bruce Horovitz, "Fat Substitute Olestra Eyed as Hazardous Waste Cleaner: Potato Chips Sales Fall Short, USA TODAY (May 31, 2001): 1A).

- NoFat incurs costs to set up and clean its machines for each production run, or batch, of olestra that it produces. The total set-up costs shown in the previous table represent the production of 20 batches during the year.
- NoFat leases its plant machinery. The lease agreement is negotiated and signed on the first day of each year. NoFat currently leases enough machinery to produce 125,000 pounds of olestra.
- PU requires that an independent quality team inspects any facility from which it makes purchases. The terms of the special sales offer would require NoFat to bear the \$1,000 cost of the inspection team.

**Required:**

1. Conduct a relevant analysis of the special sales offer by calculating:
  - a. The relevant revenues associated with the special sales offer
  - b. The relevant costs associated with the special sales offer
  - c. The relevant profit associated with the special sales offer
2. Based solely on financial factors, explain why NoFat should accept or reject PU's special sales offer.
3. Describe at least one qualitative factor that NoFat should consider, in addition to the financial factors, in making its final decision regarding the acceptance or rejection of the special sales offer.

**Cost-Based Pricing**

Assume for this question that NoFat rejected PU's special sales offer because the \$2.20 price suggested by PU was too low. In response to the rejection, PU asked NoFat to determine the price at which it would be willing to accept the special sales offer. For its regular sales, NoFat sets prices by marking up *variable costs* by 10 percent.

4. If Allyson decides to use NoFat's 10 percent mark-up pricing method to set the price for PU's special sales offer,
  - a. Calculate the price that NoFat would charge PU for each pound of olestra.
  - b. Calculate the relevant profit that NoFat would earn if it set the special sales price by using its mark-up pricing method. (*Hint: Use the estimate of relevant costs that you calculated in response to Requirement 1b.*)
  - c. Explain why NoFat should accept or reject the special sales offer if it uses its mark-up pricing method to set the special sales price.

**Incorporating a Long-Term Horizon into the Decision Analysis**

Assume for this question that Allyson's relevant analysis reveals that NoFat would earn a positive relevant profit of \$10,000 from the special sale (i.e., the special sales alternative). However, after conducting this traditional, short-term relevant analysis, Allyson wonders whether it might be more profitable over the long-term to downsize the company by reducing its manufacturing capacity (i.e., its plant machinery and plant facility). She is aware that downsizing requires a multiyear time horizon because companies usually cannot increase or decrease fixed plant assets every year. Therefore, Allyson has decided to use a five-year time horizon in her long-term decision analysis. She has identified the following information regarding capacity downsizing (i.e., the downsizing alternative):

- 1) The plant facility consists of several buildings. If it chooses to downsize its capacity, NoFat can immediately sell one of the buildings to an adjacent business for \$30,000.
- 2) If it chooses to downsize its capacity, NoFat's annual lease cost for plant machinery will decrease to \$9,000.

Therefore, Allyson must choose between these two alternatives: Accept the special sales offer each year and earn a \$10,000 relevant profit for each of the next five years or reject the special sales offer and downsize as described in (1) and (2).

5. Assume that NoFat pays for all costs with cash. Also, assume a 10-percent discount rate, a five-year time horizon, and that all cash flows occur at the end of the year. Using an NPV approach to discount future cash flows to present value,
  - a. Calculate the NPV of accepting the special sale with the assumed positive relevant profit of \$10,000 per year (i.e., the special sales alternative).
  - b. Calculate the NPV of downsizing capacity as previously described (i.e., the downsizing alternative).
  - c. Based on the NPV of parts a and b, identify and explain which of these two alternatives is best for NoFat to pursue in the long-term.

Appendix

1

# Financial Statement Information: Abercrombie & Fitch

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UNITED STATES SECURITIES AND EXCHANGE COMMISSION  
Washington, D. C. 20549

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## FORM 10-K

(Mark One)

- ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended February 3, 2007

OR

- TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number 1-12107

**ABERCROMBIE & FITCH CO.**

(Exact name of registrant as specified in its charter)

ABERCROMBIE &amp; FITCH CO. 10-K

## ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA.

ABERCROMBIE & FITCH  
CONSOLIDATED STATEMENTS OF NET INCOME AND COMPREHENSIVE INCOME

(Thousands, except per share amounts)

	2006 *	2005	2004
NET SALES	\$3,318,158	\$2,784,711	\$2,021,253
Cost of Goods Sold	<u>1,109,152</u>	<u>933,295</u>	<u>680,029</u>
GROSS PROFIT	2,209,006	1,851,416	1,341,224
Stores and Distribution Expense	1,187,071	1,000,755	738,244
Marketing, General & Administrative Expense	373,828	313,457	259,835
Other Operating Income, Net	<u>(9,983)</u>	<u>(5,534)</u>	<u>(4,490)</u>
OPERATING INCOME	658,090	542,738	347,635
Interest Income, Net	<u>(13,896)</u>	<u>(6,674)</u>	<u>(5,218)</u>
INCOME BEFORE INCOME TAXES	671,986	549,412	352,853
Provision for Income Taxes	<u>249,800</u>	<u>215,426</u>	<u>136,477</u>
NET INCOME	<u>\$ 422,186</u>	<u>\$ 333,986</u>	<u>\$ 216,376</u>
NET INCOME PER SHARE:			
BASIC	<u>\$ 4.79</u>	<u>\$ 3.83</u>	<u>\$ 2.33</u>
DILUTED	<u>\$ 4.59</u>	<u>\$ 3.66</u>	<u>\$ 2.28</u>
WEIGHTED-AVERAGE SHARES OUTSTANDING:			
BASIC	<u>88,052</u>	<u>87,161</u>	<u>92,777</u>
DILUTED	<u>92,010</u>	<u>91,221</u>	<u>95,110</u>
DIVIDENDS DECLARED PER SHARE	<u>\$ 0.70</u>	<u>\$ 0.60</u>	<u>\$ 0.50</u>
OTHER COMPREHENSIVE INCOME			
Cumulative Foreign Currency Translation Adjustments	\$ (239)	\$ (78)	—
Unrealized Gains (Losses) on Marketable Securities, net of taxes of \$20 and \$0 for Fiscal 2006 and Fiscal 2005, respectively	<u>41</u>	<u>(718)</u>	<u>—</u>
Other Comprehensive Loss	<u>\$ (198)</u>	<u>\$ (796)</u>	<u>—</u>
COMPREHENSIVE INCOME	<u>\$ 421,988</u>	<u>\$ 333,190</u>	<u>\$ 216,376</u>

\* Fiscal 2006 is a fifty-three week year.

The accompanying Notes are an integral part of these Consolidated Financial Statements.

ABERCROMBIE &amp; FITCH CO. 10-K

ABERCROMBIE & FITCH  
 CONSOLIDATED BALANCE SHEETS  
 (Thousands, except share amounts)

	February 3, 2007	January 28, 2006
<b>ASSETS</b>		
<b>CURRENT ASSETS:</b>		
Cash and Equivalents	\$ 81,959	\$ 50,687
Marketable Securities	447,793	411,167
Receivables	43,240	41,855
Inventories	427,447	362,536
Deferred Income Taxes	33,170	29,654
Other Current Assets	58,469	51,185
<b>TOTAL CURRENT ASSETS</b>	<b>1,092,078</b>	<b>947,084</b>
PROPERTY AND EQUIPMENT, NET	1,092,282	813,603
<b>OTHER ASSETS</b>	<b>63,707</b>	<b>29,031</b>
<b>TOTAL ASSETS</b>	<b><u>\$2,248,067</u></b>	<b><u>\$1,789,718</u></b>
<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>		
<b>CURRENT LIABILITIES:</b>		
Accounts Payable	\$ 100,919	\$ 86,572
Outstanding Checks	27,391	58,741
Accrued Expenses	260,219	215,034
Deferred Lease Credits	35,423	31,727
Income Taxes Payable	86,675	99,480
<b>TOTAL CURRENT LIABILITIES</b>	<b>510,627</b>	<b>491,554</b>
<b>LONG TERM LIABILITIES:</b>		
Deferred Income Taxes	30,394	38,496
Deferred Lease Credits	203,943	191,225
Commitments	—	—
Other Liabilities	97,806	73,326
<b>TOTAL LONG TERM LIABILITIES</b>		
<b>SHAREHOLDERS' EQUITY:</b>		
Class A Common Stock — \$.01 par value: 150,000,000 shares authorized and 103,300,000 shares issued at February 3, 2007 and January 28, 2006, respectively	1,033	1,033
Paid-In Capital	289,732	229,261
Retained Earnings	1,646,290	1,290,208
Accumulated Other Comprehensive Income	(994)	(796)
Deferred Compensation	—	26,206
Treasury Stock, at Average Cost 14,999,945 and 15,573,789 shares at February 3, 2007 and January 28, 2006, respectively	(530,764)	(550,795)
<b>TOTAL SHAREHOLDERS' EQUITY</b>	<b>1,405,297</b>	<b>995,117</b>
<b>TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY</b>	<b><u>\$2,248,067</u></b>	<b><u>\$1,789,718</u></b>

The accompanying Notes are an integral part of these Consolidated Financial Statements.

ABERCROMBIE &amp; FITCH CO. 10-K

ABERCROMBIE & FITCH  
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY

(Thousands)

	Common Stock		Paid-In Capital	Retained Earnings	Deferred Compensation	Other Comprehensive Income	Treasury Stock		Total Shareholders' Equity
	Shares Outstanding	Par Value					Shares	At Average Cost	
<i>Balance, January 31, 2004</i>	94,607	\$ 1,033	\$159,244	\$ 885,980	\$ 6,265	\$ —	8,692	\$(194,758)	\$ 857,764
Purchase of Treasury Stock	(11,151)	—	—	—	—	—	11,151	(434,658)	(434,658)
Net Income	—	—	—	216,376	—	—	—	—	216,376
Restricted Stock Unit Issuance	24	—	—	108	(1,578)	—	(24)	542	(928)
Restricted Stock Unit Expense	—	—	—	—	10,361	—	—	—	10,361
Stock Option Exercises	2,556	—	—	(16,304)	—	—	(2,556)	65,845	49,541
Dividends (\$0.50 per share)	—	—	—	(46,438)	—	—	—	—	(46,438)
Tax Benefit from Exercise of Stock Options and Issuance of Restricted Stock Units	—	—	17,308	—	—	—	—	—	17,308
<i>Balance, January 29, 2005</i>	<u>86,036</u>	<u>\$ 1,033</u>	<u>\$176,552</u>	<u>\$1,039,722</u>	<u>\$ 15,048</u>	<u>\$ —</u>	<u>17,263</u>	<u>\$(563,029)</u>	<u>\$ 669,326</u>
Purchase of Treasury Stock	(1,765)	—	—	—	—	—	1,765	(103,296)	(103,296)
Net Income	—	—	—	333,986	—	—	—	—	333,986
Restricted Stock Unit Issuance	166	—	—	(4,297)	(12,966)	—	(166)	5,650	(11,613)
Restricted Stock Unit Expense	—	—	—	—	24,124	—	—	—	24,124
Stock Option Exercises	3,289	—	—	(26,985)	—	—	(3,289)	109,880	82,895
Dividends (\$0.60 per share)	—	—	—	(52,218)	—	—	—	—	(52,218)
Unrealized Gains (Losses) on Marketable Securities	—	—	—	—	—	(718)	—	—	(718)
Cumulative Foreign Currency Translation Adjustments	—	—	—	—	—	(78)	—	—	(78)
Tax Benefit from Exercise of Stock Options and Issuance of Restricted Stock Units	—	—	52,709	—	—	—	—	—	52,709

ABERCROMBIE &amp; FITCH CO. 10-K

Balance, January 28, 2006	87,726	\$ 1,033	\$229,261	\$1,290,208	\$ 26,206	\$ (796)	15,574	\$(550,795)	\$ 995,117
Deferred Compensation Reclassification	—	—	26,206	—	(26,206)	—	—	—	—
Net Income	—	—	—	422,186	—	—	—	—	422,186
Restricted Stock Unit Issuance	145	—	(7,710)	(1,011)	—	—	(145)	4,302	(4,419)
Restricted Stock Unit Expense	—	—	19,964	—	—	—	—	—	19,964
Stock Option Exercises	429	—	1,384	(3,470)	—	—	(429)	15,729	13,643
Stock Option Expense	—	—	15,155	—	—	—	—	—	15,155
Dividends (\$0.70 per share)	—	—	—	(61,623)	—	—	—	—	(61,623)
Unrealized Gains (Losses) on Marketable Securities	—	—	—	—	—	41	—	—	41
Cumulative Foreign Currency Translation Adjustments	—	—	\$ —	—	—	(239)	—	—	(239)
Tax Benefit from Exercise of Stock Options and Issuance of Restricted Stock Units	—	—	5,472	—	—	—	—	—	5,472
Balance, February 3, 2007	88,300	\$1,033	\$289,732	\$1,646,290	\$ —	\$ (994)	15,000	\$(530,764)	\$1,405,297

The accompanying Notes are an integral part of these Consolidated Financial Statements.

ABERCROMBIE &amp; FITCH CO. 10-K

ABERCROMBIE & FITCH  
CONSOLIDATED STATEMENTS OF CASH FLOWS

	2006*	(Thousands) 2005	2004
<b>OPERATING ACTIVITIES:</b>			
Net Income	\$ 422,186	\$ 333,986	\$ 216,376
<b>Impact of Other Operating Activities on Cash Flows:</b>			
Depreciation and Amortization	146,156	124,206	105,814
Amortization of Deferred Lease Credits	(34,485)	(32,527)	(32,794)
Share-Based Compensation	35,119	24,124	10,372
Tax Benefit from Share-Based Compensation	5,472	52,709	17,308
Excess Tax Benefit from Share-Based Compensation	(3,382)	—	—
Deferred Taxes	(11,638)	(2,099)	3,942
Non-Cash Charge for Asset Impairment	298	272	1,190
Loss on Disposal of Assets	6,261	7,386	4,664
Lessor Construction Allowances	49,387	42,336	55,009
<b>Changes in Assets and Liabilities:</b>			
Inventories	(61,940)	(146,314)	(34,445)
Accounts Payable and Accrued Expenses	24,579	(2,912)	99,388
Income Taxes	(12,805)	43,893	1,659
Other Assets and Liabilities	16,963	8,530	(24,699)
<b>NET CASH PROVIDED BY OPERATING ACTIVITIES</b>	<b><u>582,171</u></b>	<b><u>453,590</u></b>	<b><u>423,784</u></b>
<b>INVESTING ACTIVITIES:</b>			
Capital Expenditures	(403,476)	(256,422)	(185,065)
Purchases of Trust Owned Life Insurance Policies	(15,258)	—	—
Purchases of Marketable Securities	(1,459,835)	(1,016,986)	(4,314,070)
Proceeds from Sales of Marketable Securities	1,404,805	605,101	4,778,770
<b>NET CASH (USED FOR) PROVIDED BY INVESTING ACTIVITIES</b>	<b><u>(473,764)</u></b>	<b><u>(668,307)</u></b>	<b><u>(668,307)</u></b>
<b>FINANCING ACTIVITIES:</b>			
Dividends Paid	(61,623)	(52,218)	(46,438)
Change in Outstanding Checks and Other	(31,770)	8,467	19,383
Proceeds from Share-Based Compensation	12,876	73,716	49,948
Excess Tax Benefit from Share-Based Compensation	3,382	—	—
Purchase of Treasury Stock	—	(103,296)	(434,658)
<b>NET CASH USED FOR FINANCING ACTIVITIES</b>	<b><u>(77,135)</u></b>	<b><u>(73,331)</u></b>	<b><u>(411,765)</u></b>
<b>NET INCREASE (DECREASE) IN CASH AND EQUIVALENTS</b>			
	31,272	(288,048)	291,654
Cash and Equivalents, Beginning of Year	50,687	338,735	47,081
<b>CASH AND EQUIVALENTS, END OF YEAR</b>	<b><u>\$ 81,959</u></b>	<b><u>\$ 50,687</u></b>	<b><u>\$ 338,735</u></b>
<b>SIGNIFICANT NON-CASH INVESTING ACTIVITIES:</b>			
Change in Accrual for Construction in Progress	\$ 28,455	\$ 3,754	(\$15,513)

\* Fiscal 2006 is a fifty-three week year.

The accompanying Notes are an integral part of these Consolidated Financial Statements.

The complete 10-K report with notes is provided on the text website [www.cengage.com/accounting/rich](http://www.cengage.com/accounting/rich)

Appendix

2

# Financial Statement Information: Aeropostale

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UNITED STATES SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

## Form 10-K

(Mark One)

- ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

For the Fiscal Year Ended February 3, 2007

or

- TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

Commission File Number: 001-31314

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**AÉROPOSTALE, INC.**

*(Exact name of registrant as specified in its charter)*

**AÉROPOSTALE, INC.**  
**CONSOLIDATED BALANCE SHEETS**

	February 3, 2007	January 28, 2006
(In thousands)		
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 200,064	\$ 205,235
Short-term investments	76,223	20,037
Merchandise inventory	101,476	91,908
Prepaid expenses	12,175	12,314
Deferred income taxes	1,185	—
Other current assets	7,670	9,845
Total current assets	398,793	339,339
Fixtures, equipment and improvements — net	175,591	160,229
Intangible assets	1,400	2,455
Deferred income taxes	3,784	—
Other assets	1,596	1,928
Total assets	<u>\$ 581,164</u>	<u>\$ 503,951</u>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Accounts payable	\$ 63,918	\$ 57,165
Deferred income taxes	—	5,195
Accrued expenses	100,880	63,993
Total current liabilities	164,798	126,353
Deferred rent and tenant allowances	88,344	81,499
Retirement benefit plan liabilities	15,906	8,654
Deferred income taxes	—	2,655
Commitments and contingent liabilities		
Stockholders' equity		
Common stock — par value, \$0.01 per share; 200,000 shares authorized, 59,332 and 58,598 shares issued	593	586
Preferred stock — par value, \$0.01 per share; 5,000 shares authorized, no shares issued or outstanding	—	—
Additional paid-in capital	101,429	88,213
Other comprehensive loss	(5,274)	(1,557)
Deferred compensation	—	(2,577)
Retained earnings	414,916	308,269
Treasury stock at cost (7,687 and 4,548 shares)	(199,548)	(108,144)
Total stockholders' equity	312,116	284,790
Total liabilities and stockholders' equity	<u>\$ 581,164</u>	<u>\$ 503,951</u>

See Notes to Consolidated Financial Statements.

**AÉROPOSTALE, INC.**  
**CONSOLIDATED STATEMENTS OF INCOME**

	Fiscal Year Ended		
	February 3, 2007	January 28, 2006	January 29, 2005
	(In thousands, except per share data)		
Net sales	\$1,413,208	\$1,204,347	\$ 964,212
Cost of sales (includes certain buying, occupancy and warehousing expenses)	957,791	841,872	644,305
Gross profit	455,417	362,475	319,907
Selling, general and administrative expenses	289,736	227,044	183,977
Other income	2,085	—	—
Income from operations	167,766	135,431	135,930
Interest income	7,064	3,670	1,438
Income before income taxes	174,830	139,101	137,368
Income taxes	68,183	55,147	53,256
Net income	<u>\$ 106,647</u>	<u>\$ 83,954</u>	<u>\$ 84,112</u>
Basic earnings per common share	<u>\$ 2.00</u>	<u>\$ 1.53</u>	<u>\$ 1.51</u>
Diluted earnings per common share	<u>\$ 1.98</u>	<u>\$ 1.50</u>	<u>\$ 1.47</u>
Weighted average basic shares	<u>53,285</u>	<u>54,994</u>	<u>55,735</u>
Weighted average diluted shares	<u>53,758</u>	<u>55,937</u>	<u>57,255</u>

**CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME**

	Fiscal Year Ended		
	February 3, 2007	January 28, 2006	January 29, 2005
	(In thousands)		
Net income	\$ 106,647	\$ 83,954	\$ 84,112
Minimum pension liability (net of tax of \$69, \$494, and \$92)	110	(740)	(145)
Comprehensive income	<u>\$ 106,757</u>	<u>\$ 83,214</u>	<u>\$ 83,967</u>

See Notes to Consolidated Financial Statements.

## AÉROPOSTALE, INC.

## CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Common Stock		Additional Paid-in Capital	Deferred Compensation	Treasury Stock, at Cost		Accumulated Other Comprehensive Loss	Retained Earnings	Total
	Shares	Amount			Shares	Amount			
(In thousands)									
BALANCE, JANUARY 31, 2004	56,795	\$ 568	\$ 63,289	\$ —	(945)	\$ (17,695)	\$ (672)	\$140,203	\$185,693
Net income	—	—	—	—	—	—	—	84,112	84,112
Stock options exercised	1,320	13	1,016	—	—	—	—	—	1,029
Excess tax benefit from									
Stock-based compensation	—	—	12,893	—	—	—	—	—	12,893
Repurchase of common stock	—	—	—	—	(1,804)	(45,931)	—	—	(45,931)
Issuance of non-vested stock	—	—	1,871	(1,871)	—	—	—	—	—
Stock-based compensation	—	—	—	600	—	—	—	—	600
Minimum pension liability (net of tax of \$92)	—	—	—	—	—	—	(145)	—	(145)
BALANCE, JANUARY 29, 2005	58,115	581	79,069	(1,271)	(2,749)	(63,626)	(817)	224,315	238,251
Net income	—	—	—	—	—	—	—	83,954	83,954
Stock options exercised	477	5	1,338	—	—	—	—	—	1,343
Excess tax benefit from									
Stock-based compensation	—	—	4,759	—	—	—	—	—	4,759
Repurchase of common stock	—	—	—	—	(1,799)	(44,518)	—	—	(44,518)
Net issuance of non-vested stock	—	—	3,047	(3,047)	—	—	—	—	—
Stock-based compensation	—	—	—	1,741	—	—	—	—	1,741
Vesting of stock	6	—	—	—	—	—	—	—	—
Minimum pension liability (net of tax of \$494)	—	—	—	—	—	—	(740)	—	(740)
BALANCE, JANUARY 28, 2006	58,598	586	88,213	(2,577)	(4,548)	(108,144)	(1,557)	308,269	284,790
Net income	—	—	—	—	—	—	—	106,647	106,647
Stock options exercised	719	7	2,347	—	—	—	—	—	2,354
Minimum pension liability (net of tax of \$69)	—	—	—	—	—	—	110	—	110
Adoption of SFAS No. 123 (R)	—	—	(2,577)	2,577	—	—	—	—	—
Excess tax benefit from									
Stock-based compensation	—	—	7,568	—	—	—	—	—	7,568
Adoption of SFAS No. 158 (net of tax of \$2,413)	—	—	—	—	—	—	(3,827)	—	(3,827)
Repurchase of common stock	—	—	—	—	(3,139)	(91,404)	—	—	(91,404)
Stock-based compensation	—	—	5,878	—	—	—	—	—	5,878
Vesting of stock	15	—	—	—	—	—	—	—	—
BALANCE, FEBRUARY 3, 2007	59,332	\$ 593	\$ 101,429	\$ —	(7,687)	\$ (199,548)	\$ (5,274)	\$414,916	\$312,116

See Notes to Consolidated Financial Statements.

## AÉROPOSTALE, INC.

## CONSOLIDATED STATEMENTS OF CASH FLOWS

	Fiscal Year Ended		
	February 3, 2007	January 28, 2006	January 29, 2005
	(In thousands)		
<b>Cash Flows Provided By Operating Activities</b>			
Net income	\$ 106,647	\$ 83,954	\$ 84,112
Adjustments to reconcile net income to net cash from operating activities:			
Depreciation and amortization	30,029	22,347	16,635
Stock-based compensation	5,878	1,741	600
Amortization of tenant allowances and above market leases	(9,195)	(7,756)	(6,717)
Amortization of deferred rent expense	2,333	3,716	7,474
Pension expense	2,246	1,672	3,008
Deferred income taxes	(10,474)	6,100	2,409
Excess tax benefits from stock-based compensation	(7,568)	—	—
Other	—	—	(1,197)
Changes in operating assets and liabilities:			
Merchandise inventory	(9,568)	(10,670)	(19,431)
Prepaid expenses and other assets	2,646	(7,059)	(3,741)
Accounts payable	6,753	12,307	14,381
Accrued expenses and other liabilities	57,718	38,032	39,442
<i>Net cash provided by operating activities</i>	<u>177,445</u>	<u>144,384</u>	<u>136,975</u>
<b>Cash Flows Used For Investing Activities</b>			
Purchase of fixtures, equipment and improvements	(44,949)	(58,289)	(46,677)
Purchase of short-term investments	(513,909)	(310,901)	(441,386)
Sale of short-term investments	457,723	367,088	365,162
Purchase of intangible assets	—	—	(1,400)
<i>Net cash used for investing activities</i>	<u>(101,135)</u>	<u>(2,102)</u>	<u>(124,301)</u>
<b>Cash Flows Used For Financing Activities</b>			
Purchase of treasury stock	(91,403)	(44,518)	(45,931)
Proceeds from stock options exercised	2,354	1,343	1,029
Excess tax benefits from stock-based compensation	7,568	—	—
<i>Net cash used for financing activities</i>	<u>(81,481)</u>	<u>(43,175)</u>	<u>(44,902)</u>
<b>Net (Decrease) Increase In Cash And Cash Equivalents</b>	<u>(5,171)</u>	<u>99,107</u>	<u>(32,228)</u>
<b>Cash And Cash Equivalents, Beginning Of Year</b>	<u>205,235</u>	<u>106,128</u>	<u>138,356</u>
<b>Cash And Cash Equivalents, End Of Year</b>	<u>\$ 200,064</u>	<u>\$ 205,235</u>	<u>\$ 106,128</u>
<b>Supplemental Disclosures Of Cash Flow Information</b>			
Income taxes paid	\$ 48,352	\$ 37,274	\$ 36,456
Excess tax benefit from stock-based compensation included in change in accrued expenses and other liabilities	\$ —	\$ 4,759	\$ 12,893
Non-cash operating and investing activities	\$ 1,984	\$ 1,541	\$ —

See Notes to Consolidated Financial Statements.

The complete 10-K report with notes is provided on the text website [www.cengage.com/accounting/rich](http://www.cengage.com/accounting/rich)

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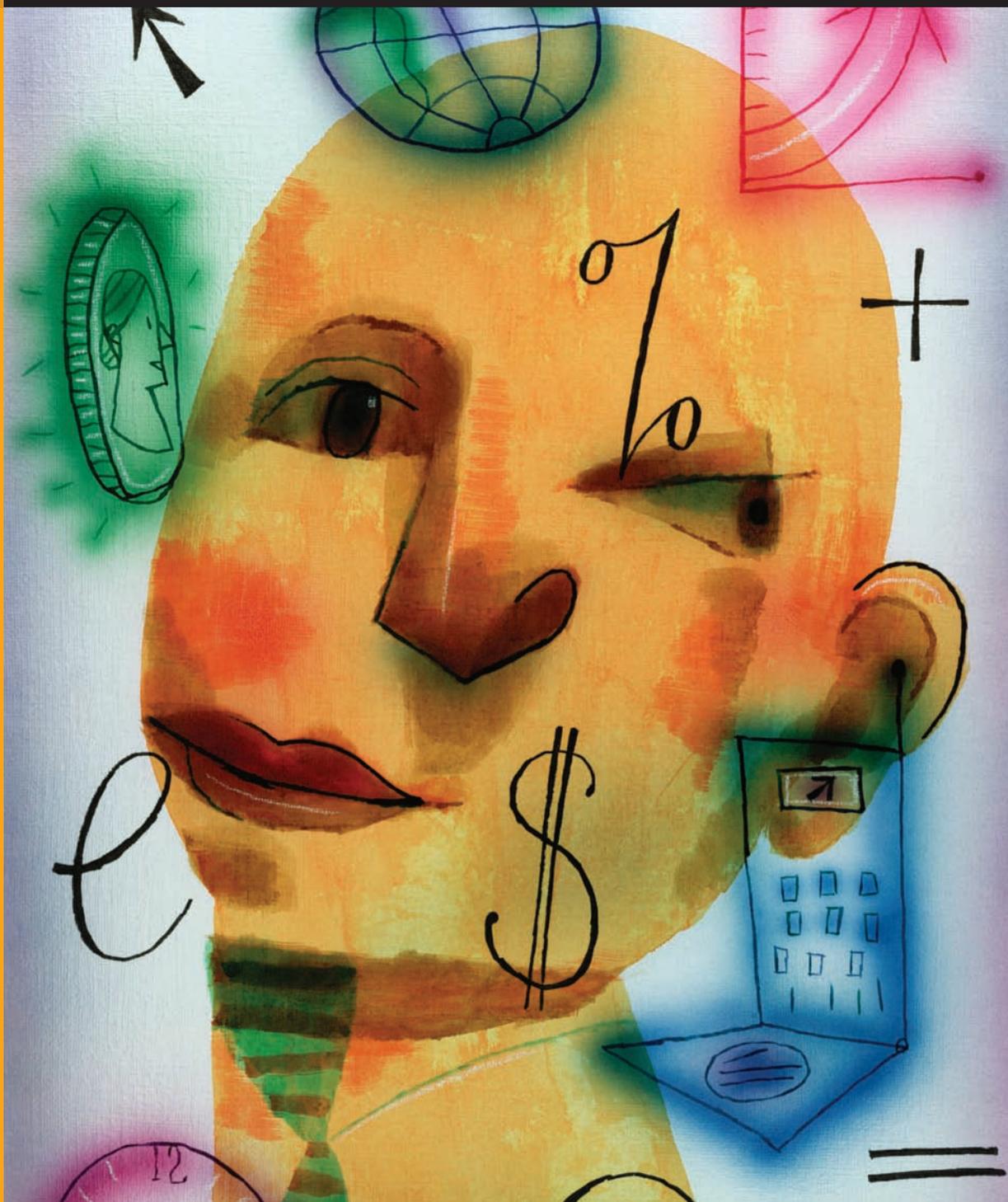
## Appendix

# 3

# Time Value of Money

After studying Appendix 3, you should be able to:

- **1** Explain how compound interest works.
- **2** Use future value and present value tables to apply compound interest to accounting transactions.



This appendix explains the time value of money. Time value of money is widely used in business to measure today's value of future cash outflows or inflows and the amount to which liabilities (or assets) will grow when compound interest accumulates.

In transactions involving the borrowing and lending of money, it is customary for the borrower to pay *interest*. In effect, interest is the **time value of money**. The amount of interest paid is determined by the length of the loan and the interest rate.

Interest is not restricted to loans made to borrowers by financial institutions. It also arises on investments (particularly, investments in debt securities and savings accounts), on installment sales, and on a variety of other contractual arrangements. In all cases, the arrangement between the two parties—the note, security, or purchase agreement—creates an asset in the accounting records of one party and a corresponding liability in the accounting records of the other. All such assets and liabilities increase as interest is earned by the asset holder and decrease as payments are made by the liability holder.

Our purpose here is to explain the basic time-value-of-money calculations using compound interest procedures. We will do that using several simple financial arrangements.

**OBJECTIVE** > 1  
Explain how compound interest works.

## Compound Interest Calculations

**Compound interest** is a method of calculating the time value of money in which interest is earned on the previous periods' interest. That is, interest for the period is added to the account balance and interest is earned on this new balance in the next period. Compound interest calculations require careful specification of the interest period and the interest rate. The **interest period** is the time interval between interest calculations. The **interest rate** is the percentage that is multiplied by the beginning-of-period balance to yield the amount of interest for that period. The interest rate must agree with the interest period. For example, if the interest period is one month, then the interest rate used to calculate interest must be stated as a percentage “per month.”

When an interest rate is stated in terms of a time period that differs from the interest period, the rate must be adjusted before interest can be calculated. Suppose, for example, that a bank advertises interest at a rate of 12 percent per year compounded monthly. The words *compounded monthly* indicate that the interest period is one month. Since there are 12 interest periods in one year, the interest rate for one month is one-twelfth the annual rate, or 1 percent. In general, if the *rate statement period* differs from the *interest period*, the stated rate must be divided by the number of interest periods included in the rate statement period.

Consider the following examples of stated rates and the corresponding adjusted rates required for interest computations:

Stated Rate	Adjusted Rate for Computations
12% per year compounded semiannually	6% per six-month period (12%/2)
12% per year compounded quarterly	3% per quarter (12%/4)
12% per year compounded monthly	1% per month (12%/12)

Whenever an interest rate is stated without reference to a rate statement period or an interest period, assume that the unmentioned period is one year. For example, both “12 percent” and “12 percent per year” should be interpreted as 12 percent per year compounded annually.

The term compound interest refers to the fact that interest is computed on the original amount plus undistributed interest earned in previous periods. The simplest compound interest calculation involves putting a single amount into an account and adding interest to it at the end of each period.

Students new to compound interest often see a calculation like the one shown in **Cornerstone A3-1** and wonder why compounding is so important if it only amounts

to 25¢. One of the reasons is time. If the investment period is sufficiently long, the amount of compound interest grows large even at relatively small interest rates. For example, suppose your parents invested \$1,000 at  $\frac{1}{2}$  percent per month when you were born with the objective of giving you a college graduation present at age 21. How much would that investment be worth after 21 years? The answer is \$3,514. In 21 years the compound interest is \$2,514—more than  $2\frac{1}{2}$  times the original principal. Without compounding, interest over the same period would have been only \$1,260.

## HOW TO Compute Future Values Using Compound Interest

### Concept:

When deposits earn compound interest, interest is earned on the interest.

### Information:

An investor deposits \$20,000 in a savings account on January 1, 2009. The bank pays interest of 6 percent per year compounded monthly.

### Required:

Assuming that the only activity to the account is the deposit of interest at the end of each month, how much money will be in the account after the interest payment on March 31, 2009?

### Solution:

Monthly interest will be  $\frac{1}{2}\%$  (6% per year/12 months)

Account balance, 1/1/09	\$20,000.00
January interest ( $\$20,000.00 \times \frac{1}{2}\%$ )	100.00
Account balance, 1/31/09	\$20,100.00
February interest ( $\$20,100.00 \times \frac{1}{2}\%$ )	100.50
Account balance, 2/28/09	\$20,200.50
March interest ( $\$20,200.50 \times \frac{1}{2}\%$ )	101.00
Account balance, 3/31/09	<u>\$20,301.50</u>

As long as the investor does not withdraw money from the account, its balance continues to grow each month by an increasing amount of interest. The amount of monthly interest increases because interest is *compounded*; that is, interest is computed on accumulated interest as well as on principal. For example, February interest of \$100.50 consists of \$100 interest on the \$20,000 principal and 50¢ interest on the \$100 January interest ( $\$100 \times 0.005 = 50¢$ ).



## CORNERSTONE A3-1



In Cornerstone 3-1, interest was the only factor that altered the account balance after the initial deposit. In more complex situations, the account balance is changed by subsequent deposits and withdrawals as well as by interest. Withdrawals reduce the balance and therefore, the amount of interest in subsequent periods. Additional deposits have the opposite effect, increasing the balance and the amount of interest earned.

The amount to which an account will grow when interest is compounded is the **future value** of the account. (Later in this appendix, we will explain how to use mathematical tables as a shortcut for the calculation of future values.) Compound interest calculations can assume two fundamentally different forms: (1) calculations of future values and (2) calculations of present values. As we have just seen, calculations of future values are projections of future balances based on past and future cash flows and interest payments. In contrast, calculations of present values, to which we now turn, are determinations of present amounts based on expected future cash flows.

## Present Value of Future Cash Flows

Whenever a contract establishes a relationship between an initial amount borrowed or loaned and one or more future cash flows, the initial amount borrowed or loaned is the **present value** of those future cash flows. The present value can be interpreted in two ways. From the borrower's viewpoint, it is the liability that will be exactly paid by the future payments. From the lender's viewpoint, it is the receivable balance that will be exactly satisfied by the future receipts.

To illustrate, suppose that the Hilliard Corporation borrows \$100,000 from Citizens Bank of New Hope on January 1, 2010. The note requires three \$38,803.35 payments, one each at the end of 2010, 2011, and 2012, and includes interest at 8 percent per year. The cash flows for Hilliard are shown in Exhibit A3-1.

Cash flow diagrams that display both the amounts and the times of the cash flows specified by a contract are extremely helpful in the solution of time-value-of-money exercises and problems. It is customary in these diagrams to use a time line that runs from left to right. Inflows are represented as arrows pointing upward and outflows as arrows pointing downward.

The calculation that follows shows, from the borrower's perspective, the relationship between the amount borrowed (*the present value*) and the future payments (*future cash flows*) required by Hilliard's note. Observe that this *reverse* compound interest calculation results in a zero balance after the last payment. The three payments of \$38,803.35 exactly pay off the liability created by the note.

Amount borrowed, 1/1/10	\$100,000.00
Add: 2010 interest ( $\$100,000.00 \times 0.08$ )	8,000.00
Subtract payment on 12/31/10	<u>(38,803.35)</u>
Liability at 12/31/10	\$ 69,196.65
Add: 2011 interest ( $\$69,196.65 \times 0.08$ )	5,535.73
Subtract payment on 12/31/11	<u>(38,803.35)</u>
Liability at 12/31/11	\$ 35,929.03
Add: 2012 interest ( $\$35,929.03 \times 0.08$ )	2,874.32
Subtract payment on 12/31/12	<u>(38,803.35)</u>
Liability at 12/31/12	<u>\$ 0.00</u>

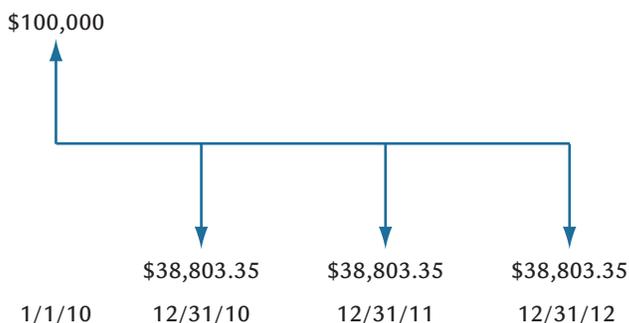
Present value calculations like this one, are future value calculations in reverse. Since the reversal of future value calculations can present a burdensome and sometimes difficult algebraic problem, shortcut methods using tables have been developed. In the next section, we will examine the application of tables to the calculation of both present values and future values.

## Interest and the Frequency of Compounding

Before we end our discussion of the mechanics of compound interest calculations, there is one more point we need to make. The number of interest periods into which

### Exhibit A3-1

#### Cash Flow Diagram



## Exhibit A3-2

**Effect of Interest Periods on Compound Interest**

Investment	Interest Period	<i>I</i>	<i>N</i>	Calculation of Future Amount In One Year*
A	1 year	12%	1	$(\$10,000 \times 1.12000) = \$11,200$
B	6 months	6%	2	$(\$10,000 \times 1.12360) = 11,236$
C	1 quarter	3%	4	$(\$10,000 \times 1.12551) = 11,255$
D	1 month	1%	12	$(\$10,000 \times 1.12683) = 11,268$

\*The multipliers (1.12 for Investment A, 1.12360 for investment B, and so on) are taken from the present and future value tables that are discussed below.

a compound interest problem is divided can make a significant difference in the amount of compound interest.

To illustrate, assume that you are evaluating four 1-year investments, each of which requires an initial \$10,000 deposit. All four investments earn interest at a rate of 12 percent per year, but they have different compounding periods. The data in Exhibit A3-2 demonstrate the impact of compounding frequency on future value. Observe that investment D, which offers monthly compounding, accumulates \$68 more interest by the end of the year than investment A, which offers only annual compounding.

## Four Basic Compound Interest Problems

### OBJECTIVE > 2

Use future value and present value tables to apply compound interest to accounting transactions.

The four problems presented here are called basic because any present value or future value problem can be broken down into one or more of these four problems. The basic problems can be solved with the aid of the present value and future value tables provided at the end of this appendix (pages 1325-1328). Solutions to the basic problems then can be combined to derive the solution to more complex problems.

## Future Value of a Single Amount

The first basic problem is determining the future value of a single amount. The problem has four symbolic elements.

- $f$  represents the cash flow
- $FV$  the future value
- $n$  the number of periods between the cash flow and the future value
- $i$  the interest rate per period

The future value of a single amount can be found simply by establishing an account for  $f$  dollars and adding compound interest at  $i$  percent to that account for  $n$  periods. The balance of the account after  $n$  periods is the future value and can be found with the following formula:

$$FV = (f)(1 + i)^n$$

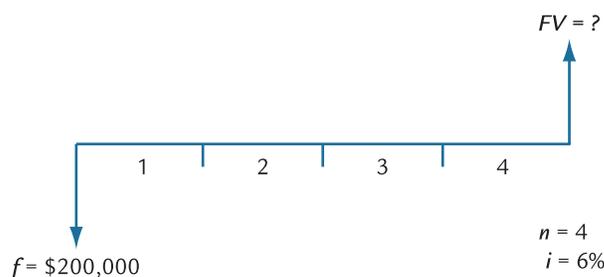
An alternative and easier solution technique makes use of the Future Value of a Single Amount table (see p. 1325) where  $M_f$  is the multiple from Exhibit A3-7 that corresponds to the appropriate values of  $n$  and  $i$ .

$$FV = (f)(M_f)$$

The following example illustrates a different solution technique. Suppose **General Motors Acceptance Corporation (GMAC)** loans \$200,000 at a rate of 6 percent per year compounded annually to a Pontiac dealer for four years. The basic problem of finding the future value (FV) at the end of the four years—the amount that will

## Exhibit A3-3

## Future Value of a Single Amount: An Example



be repaid—is diagrammed in Exhibit A3-3. We assume GMAC’s viewpoint (the lender’s). Using a compound interest calculation, the unknown future value (FV) is found as follows:

Amount loaned	\$200,000.00
First year’s interest ( $\$200,000.00 \times 0.06$ )	12,000.00
Loan receivable at end of first year	<u>\$212,000.00</u>
Second year’s interest ( $\$212,000.00 \times 0.06$ )	12,720.00
Loan receivable at end of second year	<u>\$224,720.00</u>
Third year’s interest ( $\$224,720.00 \times 0.06$ )	13,483.20
Loan receivable at end of third year	<u>\$238,203.20</u>
Fourth year’s interest ( $\$238,203.20 \times 0.06$ )	14,292.19
Loan receivable at end of the fourth year	<u><u>\$252,495.39</u></u>

Observe that the amount of interest increases each year. This growth is the effect of computing interest for each year based on an amount that includes the interest earned in prior years.

The shortcut calculation, using the table in Exhibit A3-7, is made as follows:

$$\begin{aligned}
 FV &= (F)(M_1) \\
 &= (\$200,000)(1.26248) \\
 &= \$252,496
 \end{aligned}$$

The multiple 1.26248 is found at the intersection of the 6 percent column ( $i = 6\%$ ) and the fourth row ( $n = 4$ ) or by calculating  $1.06^4$ . The multiple can be interpreted as the future value of the single amount after having been borrowed (or invested) for four years at 6 percent interest. The future value of \$200,000 is 200,000 times the multiple.

Note, the difference between the answer of \$252,495.39 developed in the compound interest calculation and the \$252,496 determined using the multiple from the table. The discrepancy is due to the fact that the figures in the table are rounded off to five decimal places. If they were taken to eight digits ( $1.06^4 = 1.26247696$ ), then the two answers would be equal. **Cornerstone A3-2** provides another illustration of how to compute the future value of a single amount.



### CORNERSTONE A3-2



## HOW TO Compute the Future Value of a Single Amount

### Concept:

The future value of a single amount is the original cash flow plus compound interest as of a specific future date.

### Information:

The Kitchner Company sells an unneeded factory site for \$200,000 on July 1, 2009. Kitchner expects to purchase a different site in 18 months so that it can expand into a new market. Meanwhile, Kitchner decides to invest the \$200,000

in a money market fund that is guaranteed to earn 6 percent per year compounded semiannually (3 percent per six-month period).

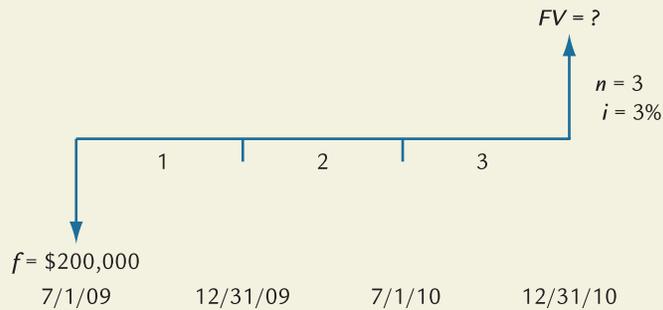
**CORNERSTONE**  
**A3-2**  
*(continued)*

**Required:**

1. Draw a cash flow diagram for this investment from Kitchner’s perspective.
2. Calculate the amount of money in the money market fund on December 31, 2009, and provide the journal entry to recognize interest revenue.
3. Calculate the amount of money in the money market fund on December 31, 2010, and provide the journal entry to recognize interest revenue.

**Solution:**

1.



2. Because we are calculating the value at 12/31/09, we only have one period.

$$\begin{aligned}
 FV &= (f) \text{ (FV of a Single Amount, 1 period, 3\%)} \\
 &= (\$200,000)(1.03) \\
 &= \$206,000
 \end{aligned}$$

The excess of the amount of money over the original deposit is the interest earned from July 1 through December 31, 2009.

Cash	6,000	
Interest Revenue		6,000

<b>Assets = Liabilities +</b>	<b>Stockholders' Equity</b>
+6,000	+6,000

3. To calculate the amount of money in the money market fund at December 31, 2009, perform the following calculation:

$$\begin{aligned}
 FV &= (f)(FV \text{ of a Single Amount, 3 periods, 3\%)} \\
 &= (\$200,000)(1.09273) \\
 &= \$218,546
 \end{aligned}$$

The interest revenue for the year is the increase in the amount of money during 2009, which is \$12,546 (\$218,546 – \$206,000). This leads to the following journal entry:

Cash	12,546	
Interest Revenue		12,546

<b>Assets = Liabilities +</b>	<b>Stockholders' Equity</b>
+12,546	+12,546

## Present Value of a Single Amount

The second basic problem is to find the present value of a single amount. This problem also has four symbolic elements.

- $f$  represents the future cash flow
- $PV$  the present value
- $n$  the number of periods between the present time and the future cash flow
- $i$  the interest rate per period

In present value problems, the interest rate is sometimes called the *discount rate*. Problems of this form can be solved with the following formula:

$$PV = \frac{f}{(1 + i)^n}$$

You can also use the Present Value of a Single Amount table (see p. 1326) where  $M_2$  is the multiple, or discount factor, from Exhibit A3-8 that corresponds to the appropriate values of  $n$  and  $i$ .

$$PV = (f)(M_2)$$

We will use this solution technique to determine the present value of a single cash flow from the borrower's viewpoint. Suppose **Marathon Oil** has purchased property on which it plans to develop oil wells. The seller has agreed to accept a single \$150,000,000 payment three years from now when Marathon expects to be selling oil from the field. Also assume that the appropriate interest rate is 7 percent per year. This basic problem is diagrammed in Exhibit A3-4. The present value can be calculated using the table in Exhibit A3-8:

$$\begin{aligned} PV &= (f)(M_2) \\ &= (\$150,000,000)(.81630) \\ &= \$122,445,000 \end{aligned}$$

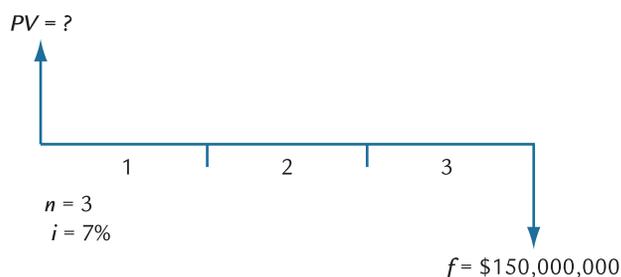
The multiple 0.81630 is found at the intersection of the 7 percent column ( $i = 7\%$ ) and the third row ( $n = 3$ ) in Exhibit A3-8 or by calculating  $[1/(1.07)^3]$ . The multiple can be interpreted as the present value of a \$1 cash inflow or outflow in three years at 7 percent. Thus the present value of \$150,000,000 is 150,000,000 times as much as the multiple.

Although the future value calculation cannot be used to determine the present value, it can be used to verify that the present value calculated by using the table is correct. The following calculation is proof for the present value problem at hand:

Calculated present value ( $PV$ )	\$122,445,000
First year's interest ( $\$122,445,000 \times 0.07$ )	8,571,150
Loan payable at end of first year	\$131,016,150
Second year's interest ( $\$131,016,150 \times 0.07$ )	9,171,131
Loan payable at end of second year	\$140,187,281
Third year's interest ( $\$140,187,281 \times 0.07$ )	9,813,110
Loan payable at end of the third year ( $f$ )	<u>\$150,000,391</u>

Exhibit A3-4

### Present Value of a Single Amount: An Example



Note the \$391 difference between the amount developed in this calculation and the assumed \$150,000,000 cash flow. The discrepancy is due to the fact that the multiples in the table are rounded off to five decimal places. We can therefore ignore the difference.

When interest is compounded on the calculated present value of \$122,445,000, then the present value calculation is reversed and we return to the future cash flow of \$150,000,000. This reversal proves that \$122,445,000 is the correct present value.

**Cornerstone A3-3** provides another illustration of how to compute the present value of a single amount.

### HOW TO Compute Present Value of a Single Amount

**Concept:**

The present value of a single cash flow is the original cash flow that must be invested to produce a known value at a specific future date.

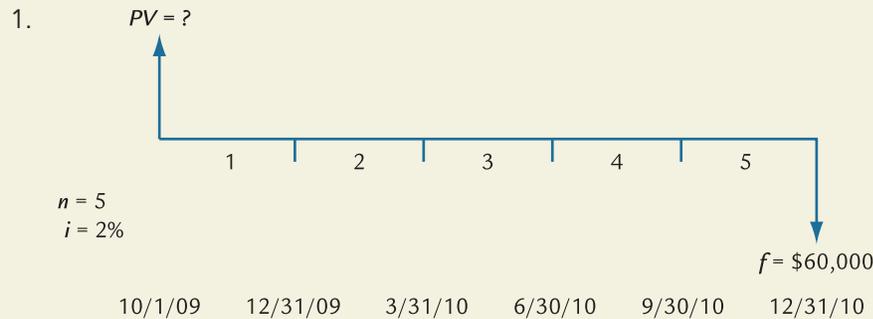
**Information:**

On October 1, 2009, Adelsman Manufacturing Company sold a new machine to Randell, Inc. The machine represented a new design that Randell was eager to place in service. Since Randell was unable to pay for the machine on the date of purchase, Adelsman agreed to defer the \$60,000 payment for 15 months. The appropriate rate of interest in such transactions is 8 percent per year compounded quarterly (2 percent per three-month period).

**Required:**

1. Draw the cash flow diagram for this deferred-payment purchase from Randell's (the borrower's) perspective.
2. Calculate the present value of this deferred-payment purchase.
3. Provide the journal entry to record the acquisition of the machine.

**Solution:**



2. The present value of the \$60,000 payment.

$$\begin{aligned}
 PV &= (f)(PV \text{ of a Single Amount, 5 periods, } 2\%) \\
 &= (\$60,000)(0.90573) \\
 &= \$54,344
 \end{aligned}$$

3.

Equipment	54,344	
Note Payable		54,344

		<b>Stockholders'</b>
<b>Assets =</b>	<b>Liabilities +</b>	<b>Equity</b>
+54,344	+54,344	



**CORNERSTONE  
A3-3**



Both the first and the second basic problems involve a single cash flow. We turn now to problems involving multiple cash flows one period apart.

### Future Value of an Annuity

The third and fourth basic problems involve series of cash flows called *annuities*. An **annuity** is a number of equal cash flows; one to each interest period. For example, an investment in a security that pays \$1,000 to an investor every December 31 for 10 consecutive years is an annuity. A loan repayment schedule that calls for a payment of \$367.29 on the first day of each month can also be considered an annuity. (Although the number of days in a month varies from 28 to 31, the interest period is defined as one month without regard to the number of days in each month.)

The third problem is to find the future value of an annuity. In this problem.

- $f$  represents the amount of each repeating cash flow
- $FV$  the future value after the last ( $n$ th) cash flow
- $n$  is the number of cash flows
- $i$  the interest rate per period

Problems of this kind can be solved by the following formula:

$$FV = (f) \left[ \frac{(1 + i)^n - 1}{i} \right]$$

You can also use the Future Value of an Annuity table (see p. 1327) where  $M_3$  is the multiple from Exhibit A3-9 that corresponds to the appropriate values of  $n$  and  $i$  compound interest calculations:

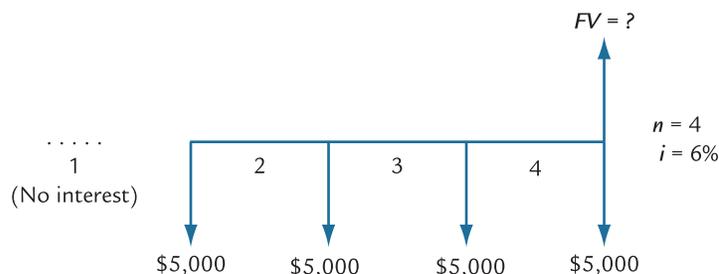
$$FV = (f)(M_3)$$

The following example demonstrates the computation of the future value of an annuity. Assume that **Bank One** wants to advertise a new savings program to its customers. The savings program requires the customers to make four annual payments of \$5,000 each, with the first payment due three years before the program ends. Bank One advertises a 6 percent interest rate compounded annually. Find the future value of this annuity immediately after the fourth cash payment. This problem is diagrammed in Exhibit A3-5 from the investor's perspective.

Note that the first period in Exhibit A3-5 is drawn with a dotted line. When using annuities, the time-value-of-money model assumes that all cash flows occur at the end of a period. Therefore, the first cash flow in the future value of an annuity occurs at the end of the first period. However, since interest cannot be earned until the first deposit has been made, the first period is identified as a no-interest period.

#### Exhibit A3-5

#### Future Value of An Annuity: An Example



Let us find the future value (FV) using a detailed compound interest calculation:

Interest for first period ( $\$0 \times 6\%$ )	\$ 0.00
First deposit	<u>5,000.00</u>
Investment balance at end of first year	\$ 5,000.00
Second year's interest ( $\$5,000.00 \times 0.06$ )	300.00
Second deposit	<u>5,000.00</u>
Investment balance at end of second year	\$10,300.00
Third year's interest ( $\$10,300.00 \times 0.06$ )	618.00
Third deposit	<u>5,000.00</u>
Investment balance at end of third year	\$15,918.00
Fourth year's interest ( $\$15,918.00 \times 0.06$ )	955.08
Fourth deposit	<u>5,000.00</u>
Investment at end of the fourth year	<u><u>\$21,873.08</u></u>

This calculation shows that the lender has accumulated a future value (FV) of \$21,873.08 by the end of the fourth period, immediately after the fourth cash investment.

An easier way of computing the future value is to use the table shown in Exhibit A3-9, as follows:

$$\begin{aligned}
 FV &= (f)(M_3) \\
 &= (\$5,000)(4.37462) \\
 &= \$21,873
 \end{aligned}$$

The multiple 4.3746 is found at the intersection of the 6 percent column ( $i = 6\%$ ) and the fourth row ( $n = 4$ ) in the Future Value of an Annuity table or by calculating  $(1.06^4 - 1)/0.06$ . The multiple can be interpreted as the future value of an annuity of four cash flows of \$1 each at 6 percent. The future value of an annuity of \$5,000 cash flows is 5,000 times the multiple. Thus, the table enables us to calculate the future value of an annuity by a single multiplication, no matter how many cash flows are involved. **Cornerstone A3-4** provides another illustration of how to compute the future value of an annuity.

## HOW TO Compute Future Value of an Annuity

### Concept:

The future value of an annuity is the value of a series of equal cash flows made at regular intervals with compound interest at some specific future date.

### Information:

Greg Smith is a lawyer and CPA specializing in retirement and estate planning. One of Greg's clients, the owner of a large farm, wants to retire in five years. To provide funds to purchase a retirement annuity from New York Life at the date of retirement, Greg asks the client to give him annual payments of \$170,000 which Greg will deposit in a special fund that will earn 7 percent per year.

### Required:

1. Draw the cash flow diagram for the fund from Greg's client's perspective.
2. Calculate the future value of the fund immediately after the fifth deposit.
3. If Greg's client needs \$1,000,000 to purchase the annuity, how much must be deposited every year?



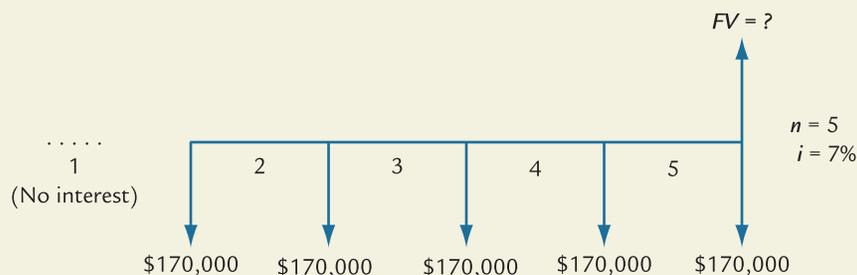
## CORNERSTONE A3-4



**CORNERSTONE**  
**A3-4**  
(continued)

**Solution:**

1.



2.  $FV = (f)(FV \text{ of an Annuity, } 5 \text{ periods, } 7\%)$   
 $= (\$170,000)(5.75074)$   
 $= \$977,626$

3. In this case, the future value is known, but the annuity amount ( $f$ ) is not:  
 $1,000,000 = (f)(FV \text{ of an Annuity, } 5 \text{ periods, } 7\%)$   
 $1,000,000 = (f)(5.75074)$   
 $f = 1,000,000/5.75074$   
 $f = \$173,890.66$

## Present Value of an Annuity

The fourth and final basic problem is to find the present value of an annuity. In this problem.

- $f$  represents the amount of each repeating cash flow
- $PV$  the present value of the  $n$  future cash flows
- $n$  the number of cash flows and periods
- $i$  the interest (or discount) rate per period

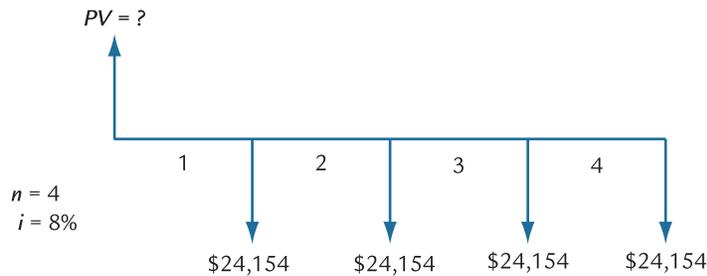
Problems of this form can be solved by using the following formula:

$$PV = (f) \frac{1 - \frac{1}{(1+i)^n}}{i}$$

You can also use the Present Value of an Annuity table (see p. 1328) where  $M_4$  is the multiple from Exhibit A3-10 that corresponds to the appropriate values of  $n$  and  $i$ .

$$PV = (f)(M_4)$$

The following example illustrates this type of problem and its solution. Assume that **Xerox Corporation** purchased a new machine for its manufacturing operations. The purchase agreement requires Xerox to make four equally-spaced payments of \$24,154 each. The interest rate is 8 percent compounded annually and the first cash flow occurs one year after the purchase. Determine the present value of this annuity. This problem, as diagrammed in Exhibit A3-6, assumes Xerox's (the borrower's) perspective. Bear in mind that the same solution techniques are applicable to both the lender's and borrower's perspectives.

**Present Value of An Annuity: An Example**

The present value can be found using the table in Exhibit A3-10, as follows:

$$\begin{aligned}
 PV &= (f)(M_4) \\
 &= (\$24,154)(3.31213) \\
 &= \$80,001.19
 \end{aligned}$$

The multiple 3.31213 is found at the intersection of the 8 percent column ( $i = 8\%$ ) and the fourth row ( $n = 4$ ) in Exhibit A3-10 or by solving for  $[1 - (1/1.08^4)]/0.08$ . The multiple can be interpreted as the present value of an annuity of four cash flows of \$1 each at 8 percent. The present value of an annuity of four \$24,154 cash flows is 24,154 times the multiple.

Again, although the compound interest calculation is not used to determine the present value, it can be used to prove that the present value found using the table is correct. The following calculation verifies the present value in the problem at hand:

Calculated present value (PV)	\$ 80,001.19
Interest for first year ( $\$80,001.19 \times 0.08$ )	6,400.10
Less: First cash flow	(24,154.00)
Balance at end of first year	\$ 62,247.29
Interest for second year ( $\$62,247.29 \times 0.08$ )	4,979.78
Less: Second cash flow	(24,154.00)
Balance at end of second year	\$ 43,073.07
Interest for third year ( $\$43,073.07 \times 0.08$ )	3,445.85
Less: Third cash flow	(24,154.00)
Balance at end of third year	\$ 22,364.92
Interest for fourth year ( $\$22,364.92 \times 0.08$ )	1,789.19
Less: Fourth cash flow	(24,154.00)
Balance at end of fourth year	\$ 0.11

This proof uses a compound interest calculation that is the reverse of the present value formula. If the present value (PV) calculated with the formula is correct, then the proof should end with a balance of zero immediately after the last cash flow. This proof ends with a balance of \$.11 because of rounding in the proof itself and in the table in Exhibit A3-10. **Cornerstone A3-5** provides another illustration of how to compute the present value of an annuity.

**HOW TO Compute Present Value of an Annuity****Concept:**

The present value of an annuity is the value of a series of equal future cash flows made at regular intervals with compound interest discounted back to today.

**Information:**

Bates Builders purchased a subdivision site from the Second National Bank and Trust Co. on January 1, 2009. Bates gave the bank an installment note. The note



**CORNERSTONE  
A3-5**



**CORNERSTONE**  
**A3-5**  
*(continued)*

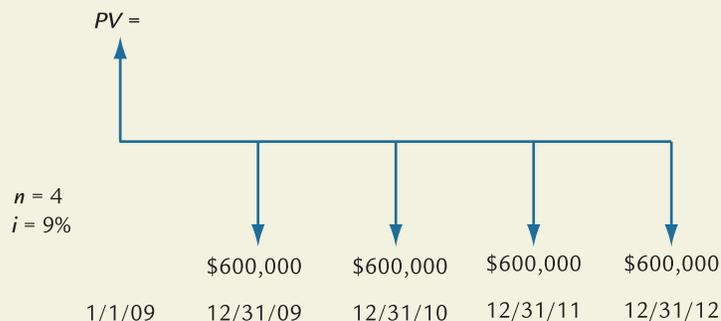
requires Bates to make four annual payments of \$600,000 each on December 31 of each year, beginning in 2009. Interest is computed at 9 percent.

**Required:**

1. Draw the cash flow diagram for this purchase from Bates' perspective.
2. Calculate the cost of the land as recorded by Bates on January 1, 2009.
3. Provide the journal entry that Bates will make to record the purchase of the land.

**Solution:**

1.



2.  $PV = (f)(PV \text{ of an Annuity, 4 periods, 9\%})$

$$= (\$600,000)(3.23972)$$

$$= \$1,943,832$$

3.

Land	1,943,832	
Notes Payable		1,943,832

<b>Assets =</b>	<b>Liabilities +</b>	<b>Stockholders' Equity</b>
+1,943,832	+1,943,832	

## Summary

This appendix covers the elements of compound interest (time value of money), a measurement technique used to account for cash flows that extend over more than one period. The time value of money is based on a simple idea: A cash flow in the future is less valuable than a cash flow at present. We explained four basic compound interest problems: (1) the future value of a single amount, (2) the present value of a single amount, (3) the future value of an annuity, and (4) the present value of an annuity. We also demonstrated how to use tables to solve these basic problems. We strongly recommend the use of cash flow diagrams for analyzing time-value-of-money problems.

## Summary of Learning Objectives

**LO1. Explain how compound interest works.**

- In transactions involving the borrowing and lending of money, it is customary for the borrower to pay interest.
- With compound interest, interest for the period is added to the account and interest is earned on the total balance in the next period.
- Compound interest calculations require careful specification of the interest period and the interest rate.

**LO2. Use future value and present value tables to apply compound interest to accounting transactions.**

- Cash flows are described as either
  - single cash flows, or
  - annuities.
- An annuity is a number of equal cash flows made at regular intervals.
- All other cash flows are a series of one or more single cash flows.
- Accounting for such cash flows may require
  - calculation of the amount to which a series of cash flows will grow when interest is compounded (i.e., the future value) or
  - the amount a series of future cash flows is worth today after taking into account compound interest (i.e., the present value).

**CORNERSTONE A3-1** How to compute future values using compound interest, page 1307

**CORNERSTONE A3-2** How to compute future value of a single amount, page 1310

**CORNERSTONE A3-3** How to compute present value of a single amount, page 1313

**CORNERSTONE A3-4** How to compute future value of an annuity, page 1315



**CORNERSTONES  
FOR APPENDIX 3**

## Key Terms

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Annuity, 1314

Compound interest, 1306

Future value, 1307

Interest period, 1306

Interest rate, 1306

Present value, 1308

Time value of money, 1306

## Discussion Questions

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1. Why does money have a time value?
2. Describe the four basic time-value-of-money problems.
3. How is compound interest computed? What is a future value? What is a present value?
4. Define an annuity in general terms. Describe the cash flows related to an annuity from the viewpoint of the lender in terms of receipts and payments.
5. Explain how to use time-value-of-money calculations to measure an installment note liability.

## Cornerstone Exercises

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**Cornerstone Exercise A3-1 EXPLAIN HOW COMPOUND INTEREST WORKS**

Assume you have \$6,000.

**Required:**

Calculate the future value of the \$6,000 at 12 percent compounded quarterly for five years.

**OBJECTIVE** > **1**  
**CORNERSTONE A3-1**

**Cornerstone Exercise A3-2 USE FUTURE VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**

Effingham Lumber makes annual deposits of \$500 at 6 percent compounded annually for three years.

**OBJECTIVE** > **2**  
**CORNERSTONE A3-4**

**Required:**

What is the future value of these deposits?

**OBJECTIVE** > **2** **Cornerstone Exercise A3-3 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**  
**CORNERSTONE A3-2**

Lisa inherited \$140,000 from an aunt.

**Required:**

If Lisa decides not to spend her inheritance but to leave the money in her savings account until she retires in 15 years, how much money will she have assuming an annual interest rate of 8 percent, compounded semiannually?

**OBJECTIVE** > **2** **Cornerstone Exercise A3-4 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**  
**CORNERSTONE A3-4**

Tim wants to save some money so that he can make a down payment of \$3,000 on a car when he graduates from college in four years.

**Required:**

If he opens a savings account and earns 3 percent on his money, compounded annually, how much will he have to invest now?

**OBJECTIVE** > **2** **Cornerstone Exercise A3-5 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**  
**CORNERSTONE A3-4**

Joe makes equal deposits of \$500 semiannually for four years.

**Required:**

What is the future value at 8 percent?

**OBJECTIVE** > **2** **Cornerstone Exercise A3-6 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**  
**CORNERSTONE A3-4**

Curtis, a high school math teacher, wants to set up an IRA account into which he will deposit \$2,000 per year. He plans to teach for 20 more years and then retire.

**Required:**

If the interest on his account is 7 percent compounded annually, how much will be in his account when he retires?

**OBJECTIVE** > **2** **Cornerstone Exercise A3-7 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**  
**CORNERSTONE A3-3**

Joan will receive \$7,000 in seven years.

**Required:**

What is the present value at 7 percent compounded annually?

**OBJECTIVE** > **2** **Cornerstone Exercise A3-8 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**  
**CORNERSTONE A3-3**

A bank is willing to lend money at 6 percent interest, compounded annually.

**Required:**

How much would the bank be willing to loan you in exchange for a payment of \$600 four years from now?

**Cornerstone Exercise A3-9 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**

**OBJECTIVE** > **2**  
**CORNERSTONE A3-5**

Bill can earn 6 percent.

**Required:**

How much would have to be deposited in a savings account in order for Bill to be able to make equal annual withdrawals of \$200 at the end of each of 10 years? The balance at the end of the last year would be zero.

**Cornerstone Exercise A3-10 USE FUTURE VALUE AND PRESENT VALUE TABLES TO APPLY COMPOUND INTEREST TO ACCOUNTING TRANSACTIONS**

**OBJECTIVE** > **2**  
**CORNERSTONE A3-5**

Justice wins the lottery. He wins \$20,000 per year to be paid to him for 10 years. The state offers him the choice of a cash settlement now instead of the annual payments for 10 years.

**Required:**

If the interest rate is 6 percent, what is the amount the state will offer for a settlement today?

## Exercises

---

**Exercise A3-11 PRACTICE WITH TABLES**

**OBJECTIVE** > **2**

Using the appropriate tables in the text,

**Required:**

Determine:

- the future value of a single cash flow of \$5,000 that earns 7 percent interest compounded annually for 10 years.
- the future value of an annual annuity of 10 cash flows of \$500 each that earns 7 percent compounded annually.
- The present value of \$5,000 to be received 10 years from now, assuming that the interest (discount) rate is 7 percent per year.
- The present value of an annuity of \$500 per year for 10 years for which the interest (discount) rate is 7 percent per year and the first cash flow occurs one year from now.

**Exercise A3-12 PRACTICE WITH TABLES**

**OBJECTIVE** > **2**

Using the appropriate tables in the text,

**Required:**

Determine:

- the present value of \$1,200 to be received in seven years, assuming that the interest (discount) rate is 8 percent per year.
- the present value of an annuity of seven cash flows of \$1,200 each (one at the end of each of the next seven years) for which the interest (discount) rate is 8 percent per year.
- the future value of a single cash flow of \$1,200 that earns 8 percent per year for seven years.
- the future value of an annuity of seven cash flows of \$1,200 each (one at the end of each of the next seven years), assuming that the interest rate is 8 percent per year.

**Exercise A3-13 FUTURE VALUES**

**OBJECTIVE** > **2**

Using the appropriate tables in the text,

**Required:**

Determine:

- the future value of a single deposit of \$15,000 that earns compound interest for four years at an interest rate of 10 percent per year.

- b. the annual interest rate that will produce a future value of \$13,416.80 in six years from a single deposit of \$8,000.
- c. the size of annual cash flows for an annuity of nine cash flows that will produce a future value of \$79,428.10 at an interest rate of 9 percent per year.
- d. the number of periods required to produce a future value of \$17,755.50 from an initial deposit of \$7,500 if the annual interest rate is 9 percent.

**OBJECTIVE** > **2** **Exercise A3-14 FUTURE VALUES AND LONG-TERM INVESTMENTS**

Pueblo Pottery, Inc., engaged in the following transactions during 2009:

- a. On January 1, 2009, Pueblo deposited \$12,000 in a certificate of deposit paying 6 percent interest compounded semiannually (3 percent per six-month period). The certificate will mature on December 31, 2012.
- b. On January 1, 2009, Pueblo established an account with Durango Investment Management. Pueblo will make quarterly payments of \$2,500 to Durango beginning on March 31, 2009, and ending on December 31, 2010. Durango guarantees an interest rate of 8 percent compounded quarterly (2 percent per three-month period).

**Required:**

1. Prepare the cash flow diagram for each of these two investments.
2. Calculate the amount to which each of these investments will accumulate at maturity.

**OBJECTIVE** > **2** **Exercise A3-15 FUTURE VALUES**

On January 1, you make a single deposit of \$8,000 in an investment account that earns 8 percent interest.

**Required:**

1. Calculate the balance in the account in five years assuming the interest is compounded annually.
2. Determine how much interest will be earned on the account in seven years if interest is compounded annually.
3. Calculate the balance in the account in five years assuming the 8 percent interest is compounded quarterly.

**OBJECTIVE** > **2** **Exercise A3-16 FUTURE VALUES**

Fargo Transit Company invested \$70,000 in a tax-anticipation note on June 30, 2009. The note earns 12 percent interest compounded monthly (1 percent per month) and matures on March 31, 2010.

**Required:**

1. Prepare the cash flow diagram for this investment.
2. Determine the amount Fargo will receive when the note matures.
3. Determine how much interest Fargo will earn on this investment from June 30, 2009, through December 31, 2009.

**OBJECTIVE** > **2** **Exercise A3-17 PRESENT VALUES**

Using the appropriate tables in the text,

**Required:**

Determine:

- a. the present value of a single \$14,000 cash flow in seven years if the interest (discount) rate is 8 percent per year.
- b. the number of periods for which \$5,820 must be invested at an annual interest (discount) rate of 7 percent to produce an investment balance of \$10,000.
- c. the size of the annual cash flow for a 25-year annuity with a present value of \$49,113 and an annual interest rate of 9 percent. One payment is made at the end of each year.
- d. the annual interest rate at which an investment of \$2,542 will provide for a single \$4,000 cash flow in four years.
- e. the annual interest rate earned by an annuity that costs \$17,119 and provides 15 payments of \$2,000 each, one at the end of each of the next 15 years.

**Exercise A3-18 PRESENT VALUES**

OBJECTIVE &gt; 2

Ramon Company signed notes to make the following two purchases on January 1, 2009:

- a new truck for \$60,000, with payment deferred until December 31, 2010. The appropriate interest rate is 9 percent compounded annually.
- a small building from Wandrow Builders. The terms of the purchase require a \$75,000 payment at the end of each quarter, beginning March 31, 2009, and ending June 30, 2011. The appropriate interest rate is 2 percent per quarter.

**Required:**

- Prepare the cash flow diagrams for these two purchases.
- Prepare the entries to record these purchases in Ramon's journal.
- Prepare the cash payment and interest expense entries for purchase *b* at March 31, 2009, and June 30, 2009.
- Prepare the adjusting entry for purchase *a* at December 31, 2009.

**Exercise A3-19 PRESENT VALUES**

OBJECTIVE &gt; 2

You have an opportunity to purchase a government security that will pay \$200,000 in five years.

**Required:**

- Calculate what you would pay for the security if the appropriate interest (discount) rate is 6 percent compounded annually.
- Calculate what you would pay for the security if the appropriate interest (discount) rate is 10 percent compounded annually.
- Calculate what you would pay for the security if the appropriate interest (discount) rate is 6 percent compounded semiannually.

**Exercise A3-20 FUTURE VALUES OF AN ANNUITY**

OBJECTIVE &gt; 2

On December 31, 2009, you sign a contract to make annual deposits of \$4,200 in an investment account that earns 10 percent. The first deposit is made on December 31, 2009.

**Required:**

- Calculate what the balance in this investment account will be just after the seventh deposit has been made if interest is compounded annually.
- Determine how much interest will have been earned on this investment account just after the seventh deposit has been made if interest is compounded annually.

**Exercise A3-21 FUTURE VALUES OF AN ANNUITY**

OBJECTIVE &gt; 2

Purdue Savings Bank pays 8 percent interest compounded weekly (0.154 percent per week) on savings accounts. The bank has asked your help in preparing a table to show potential customers the number of dollars that will be available at the end of 10-, 20-, 30-, and 40-week periods during which there are weekly deposits of \$1, \$5, \$10, or \$50. The following data are available:

Length of Annuity	Future Value of Annuity at an Interest Rate of 0.154% per Week
10 weeks	10.0696
20 weeks	20.2953
30 weeks	30.6796
40 weeks	41.2250

**Required:**

Prepare and complete a table similar to the one below.

Number of Deposits	Amount of Each Deposit			
	\$1	\$5	\$10	\$50
10				
20				
30				
40				

**OBJECTIVE** > **2** **Exercise A3-22 FUTURE VALUE OF A SINGLE CASH FLOW**

Shubert Products has just been paid \$25,000 by Apex Enterprises, which has owed Shubert this amount for 30 months but been unable to pay because of financial difficulties. Had it been able to invest this cash, Shubert assumes that it would have earned an interest rate of 12 percent compounded monthly (1 percent per month).

**Required:**

1. Prepare a cash flow diagram for the investment that could have been made if Apex had paid 30 months ago.
2. Determine how much Shubert has lost by not receiving the \$25,000 when it was due 30 months ago.
3. Indicate whether Shubert would make an entry to account for this loss. Why, or why not?

**OBJECTIVE** > **2** **Exercise A3-23 INSTALLMENT SALE**

Johnson Properties owns land on which natural gas wells are located. Columbus Gas Company signs a note to buy this land from Johnson on January 1, 2009. The note requires Columbus to pay Johnson \$775,000 per year for 25 years. The first payment is to be made on December 31, 2009. The appropriate interest rate is 9 percent compounded annually.

**Required:**

1. Prepare a diagram of the appropriate cash flows from Columbus Gas Company's perspective.
2. Determine the present value of the payments.
3. Indicate what entry Columbus Gas should make at January 1, 2009.

**OBJECTIVE** > **2** **Exercise A3-24 INSTALLMENT SALE**

Jeffrey's Billiards sold a pool table to C. Cobbs on October 31, 2009. The terms of the sale are no money down and payments of \$50 per month for 30 months, with the first payment due on November 30, 2009. The table they sold to Cobbs cost Jeffrey's \$800. Jeffrey's uses an interest rate of 12 percent compounded monthly (1 percent per month).

**Required:**

1. Prepare the cash flow diagram for this sale.
2. Calculate the amount of revenue Jeffrey's should record on October 31, 2009.
3. Prepare the entry to record the sale on October 31. Assume that Jeffrey's records cost of goods sold at the time of the sale (perpetual inventory accounting).
4. Determine how much interest revenue Jeffrey's will record from October 31, 2009, through December 31, 2009.
5. Determine how much Jeffrey's 2009 income before taxes increased by this sale.

**Exhibit A3-7**

**Future Value of a Single Amount**

$$FV = 1 (1 + i)^n$$

n/i	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	16%	18%	20%	25%	30%
1	1.01000	1.02000	1.03000	1.04000	1.05000	1.06000	1.07000	1.08000	1.09000	1.10000	1.12000	1.14000	1.16000	1.18000	1.20000	1.25000	1.30000
2	1.02010	1.04040	1.06090	1.08160	1.10250	1.12360	1.14490	1.16640	1.18810	1.21000	1.25440	1.29960	1.34560	1.39240	1.44000	1.56250	1.69000
3	1.03030	1.06121	1.09273	1.12486	1.15763	1.19102	1.22504	1.25971	1.29503	1.33100	1.40493	1.48154	1.56090	1.64303	1.72800	1.95313	2.19700
4	1.04060	1.08243	1.12551	1.16986	1.21551	1.26248	1.31080	1.36049	1.41158	1.46410	1.57352	1.68896	1.81064	1.93878	2.07360	2.44141	2.85610
5	1.05101	1.10408	1.15927	1.21665	1.27628	1.33823	1.40255	1.46933	1.53862	1.61051	1.76234	1.92541	2.10034	2.28776	2.48832	3.05176	3.71293
6	1.06152	1.12616	1.19405	1.26532	1.34010	1.41852	1.50073	1.58687	1.67710	1.77156	1.97382	2.19497	2.43640	2.69955	2.98598	3.81470	4.82681
7	1.07214	1.14869	1.22987	1.31593	1.40710	1.50363	1.60578	1.71382	1.82804	1.94872	2.21068	2.50227	2.82622	3.18547	3.58318	4.76837	6.27485
8	1.08286	1.17166	1.26677	1.36857	1.47746	1.59385	1.71819	1.85093	1.99256	2.14359	2.47596	2.85259	3.27841	3.75886	4.29982	5.96046	8.15731
9	1.09369	1.19509	1.30477	1.42331	1.55133	1.68948	1.83846	1.99900	2.17189	2.35795	2.77308	3.25195	3.80296	4.43545	5.15978	7.45058	10.60450
10	1.10462	1.21899	1.34392	1.48024	1.62889	1.79085	1.96715	2.15892	2.36736	2.59374	3.10585	3.70722	4.41144	5.23384	6.19174	9.31323	13.78585
11	1.11567	1.24337	1.38423	1.53945	1.71034	1.89830	2.10485	2.33164	2.58043	2.85312	3.47855	4.22623	5.11726	6.17593	7.43008	11.64153	17.92160
12	1.12683	1.26824	1.42576	1.60103	1.79586	2.01220	2.25219	2.51817	2.81266	3.13843	3.89598	4.81790	5.93603	7.28759	8.91610	14.55192	23.29809
13	1.13809	1.29361	1.46853	1.66507	1.88565	2.13293	2.40985	2.71962	3.06580	3.45227	4.36349	5.49241	6.88579	8.59936	10.69932	18.18989	30.28751
14	1.14947	1.31948	1.51259	1.73168	1.97993	2.26090	2.57853	2.93719	3.34173	3.79750	4.88711	6.26135	7.98752	10.14724	12.83918	22.73737	39.37376
15	1.16097	1.34587	1.55797	1.80094	2.07893	2.39656	2.75903	3.17217	3.64248	4.17725	5.47357	7.13794	9.26552	11.97375	15.40702	28.42171	51.18589
16	1.17258	1.37279	1.60471	1.87298	2.18287	2.54035	2.95216	3.42594	3.97031	4.59497	6.13039	8.13725	10.74800	14.12902	18.48843	35.52714	66.54166
17	1.18430	1.40024	1.65285	1.94790	2.29202	2.69277	3.15882	3.70002	4.32763	5.05447	6.86604	9.27646	12.46768	16.67225	22.18611	44.40892	86.50416
18	1.19615	1.42825	1.70243	2.02582	2.40662	2.85434	3.37993	3.99602	4.71712	5.55992	7.68997	10.57517	14.46251	19.67325	26.62333	55.51115	112.45541
19	1.20811	1.45681	1.75351	2.10685	2.52695	3.02560	3.61653	4.31570	5.14166	6.11591	8.61276	12.05569	16.77652	23.21444	31.94800	69.38894	146.19203
20	1.22019	1.48595	1.80611	2.19112	2.65330	3.20714	3.86968	4.66096	5.60441	6.72750	9.64629	13.74349	19.46076	27.39303	38.33760	86.73617	190.04964
21	1.23239	1.51567	1.86029	2.27877	2.78596	3.39956	4.14056	5.03383	6.10881	7.40025	10.80385	15.66758	22.57448	32.32378	46.00512	108.42022	247.06453
22	1.24472	1.54598	1.91610	2.36992	2.92526	3.60354	4.43040	5.43654	6.65860	8.14027	12.10031	17.86104	26.18640	38.14206	55.20614	135.52527	321.18389
23	1.25716	1.57690	1.97359	2.46472	3.07152	3.81975	4.74053	5.87146	7.25787	8.95430	13.55235	20.36158	30.37622	45.00763	66.24737	169.40659	417.53905
24	1.26973	1.60844	2.03279	2.56330	3.22510	4.04893	5.07237	6.34118	7.91108	9.84973	15.17863	23.21221	35.23642	53.10901	79.49685	211.75824	542.80077
25	1.28243	1.64061	2.09378	2.66584	3.38635	4.29187	5.42743	6.84848	8.62308	10.83471	17.00006	26.46192	40.87424	62.66863	95.39622	264.69780	705.64100
26	1.29526	1.67342	2.15659	2.77247	3.55567	4.54938	5.80735	7.39635	9.39916	11.91818	19.04007	30.16658	47.41412	73.94898	114.47546	330.87225	917.33330
27	1.30821	1.70689	2.22129	2.88337	3.73346	4.82235	6.21387	7.98806	10.24508	13.10999	21.32488	34.38991	55.00038	87.25980	137.37055	413.59031	1192.53329
28	1.32129	1.74102	2.28793	2.99870	3.92013	5.11169	6.64884	8.62711	11.16714	14.42099	23.88387	39.20449	63.80044	102.96656	164.84466	516.98788	1550.29328
29	1.33450	1.77584	2.35657	3.11865	4.11614	5.41839	7.11426	9.31727	12.17218	15.86309	26.74993	44.69312	74.00851	121.50054	197.81359	646.23485	2015.38126
30	1.34785	1.81136	2.42726	3.24340	4.32194	5.74349	7.61226	10.06266	13.26768	17.44940	29.95992	50.95016	85.84988	143.37064	237.37631	807.79357	2619.99564

Present Value of a Single Amount

$$PV = \frac{1}{(1 + i)^n}$$

n/i	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	16%	18%	20%	25%	30%
1	0.99010	0.98039	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593	0.91743	0.90909	0.89286	0.87719	0.86207	0.84746	0.83333	0.80000	0.76923
2	0.98030	0.96117	0.94260	0.92456	0.90703	0.89000	0.87344	0.85734	0.84168	0.82645	0.79719	0.76947	0.74316	0.71818	0.69444	0.64000	0.59172
3	0.97059	0.94232	0.91514	0.88900	0.86384	0.83962	0.81630	0.79383	0.77218	0.75131	0.71178	0.67497	0.64066	0.60863	0.57870	0.51200	0.45517
4	0.96098	0.92385	0.88849	0.85480	0.82270	0.79209	0.76290	0.73503	0.70843	0.68301	0.63552	0.59208	0.55229	0.51579	0.48225	0.40960	0.35013
5	0.95147	0.90573	0.86261	0.82193	0.78353	0.74726	0.71299	0.68058	0.64993	0.62092	0.56743	0.51937	0.47611	0.43711	0.40188	0.32768	0.26933
6	0.94205	0.88797	0.83748	0.79031	0.74622	0.70496	0.66634	0.63017	0.59627	0.56447	0.50663	0.45559	0.41044	0.37043	0.33490	0.26214	0.20718
7	0.93272	0.87056	0.81309	0.75992	0.71068	0.66506	0.62275	0.58349	0.54703	0.51316	0.45235	0.39964	0.35383	0.31393	0.27908	0.20972	0.15937
8	0.92348	0.85349	0.78941	0.73069	0.67684	0.62741	0.58201	0.54027	0.50187	0.46651	0.40388	0.35056	0.30503	0.26604	0.23257	0.16777	0.12259
9	0.91434	0.83676	0.76642	0.70259	0.64461	0.59190	0.54393	0.50025	0.46043	0.42410	0.36061	0.30751	0.26295	0.22546	0.19381	0.13422	0.09430
10	0.90529	0.82035	0.74409	0.67556	0.61391	0.55839	0.50835	0.46319	0.42241	0.38554	0.32197	0.26974	0.22668	0.19106	0.16151	0.10737	0.07254
11	0.89632	0.80426	0.72242	0.64958	0.58468	0.52679	0.47509	0.42888	0.38753	0.35049	0.28748	0.23662	0.19542	0.16192	0.13459	0.08590	0.05580
12	0.88745	0.78849	0.70138	0.62460	0.55684	0.49697	0.44401	0.39711	0.35553	0.31863	0.25668	0.20756	0.16846	0.13722	0.11216	0.06872	0.04292
13	0.87866	0.77303	0.68095	0.60057	0.53032	0.46884	0.41496	0.36770	0.32618	0.28966	0.22917	0.18207	0.14523	0.11629	0.09346	0.05498	0.03302
14	0.86996	0.75788	0.66112	0.57748	0.50507	0.44230	0.38782	0.34046	0.29925	0.26333	0.20462	0.15971	0.12520	0.09855	0.07789	0.04398	0.02540
15	0.86135	0.74301	0.64186	0.55526	0.48102	0.41727	0.36245	0.31524	0.27454	0.23939	0.18270	0.14010	0.10793	0.08352	0.06491	0.03518	0.01954
16	0.85282	0.72845	0.62317	0.53391	0.45811	0.39365	0.33873	0.29189	0.25187	0.21763	0.16312	0.12289	0.09304	0.07078	0.05409	0.02815	0.01503
17	0.84438	0.71416	0.60502	0.51337	0.43630	0.37136	0.31657	0.27027	0.23107	0.19784	0.14564	0.10780	0.08021	0.05998	0.04507	0.02252	0.01156
18	0.83602	0.70016	0.58739	0.49363	0.41552	0.35034	0.29586	0.25025	0.21199	0.17986	0.13004	0.09456	0.06914	0.05083	0.03756	0.01801	0.00889
19	0.82774	0.68643	0.57029	0.47464	0.39573	0.33051	0.27651	0.23171	0.19449	0.16351	0.11611	0.08295	0.05961	0.04308	0.03130	0.01441	0.00684
20	0.81954	0.67297	0.55368	0.45639	0.37689	0.31180	0.25842	0.21455	0.17843	0.14864	0.10367	0.07276	0.05139	0.03651	0.02608	0.01153	0.00526
21	0.81143	0.65978	0.53755	0.43883	0.35894	0.29416	0.24151	0.19866	0.16370	0.13513	0.09256	0.06383	0.04430	0.03094	0.02174	0.00922	0.00405
22	0.80340	0.64684	0.52189	0.42196	0.34185	0.27751	0.22571	0.18394	0.15018	0.12285	0.08264	0.05599	0.03819	0.02622	0.01811	0.00738	0.00311
23	0.79544	0.63416	0.50669	0.40573	0.32557	0.26180	0.21095	0.17032	0.13778	0.11168	0.07379	0.04911	0.03292	0.02222	0.01509	0.00590	0.00239
24	0.78757	0.62172	0.49193	0.39012	0.31007	0.24698	0.19715	0.15770	0.12640	0.10153	0.06588	0.04308	0.02838	0.01883	0.01258	0.00472	0.00184
25	0.77977	0.60953	0.47761	0.37512	0.29530	0.23300	0.18425	0.14602	0.11597	0.09230	0.05882	0.03779	0.02447	0.01596	0.01048	0.00378	0.00142
26	0.77205	0.59758	0.46369	0.36069	0.28124	0.21981	0.17220	0.13520	0.10639	0.08391	0.05252	0.03315	0.02109	0.01352	0.00874	0.00302	0.00109
27	0.76440	0.58586	0.45019	0.34682	0.26785	0.20737	0.16093	0.12519	0.09761	0.07628	0.04689	0.02908	0.01818	0.01146	0.00728	0.00242	0.00084
28	0.75684	0.57437	0.43708	0.33348	0.25509	0.19563	0.15040	0.11591	0.08955	0.06934	0.04187	0.02551	0.01567	0.00971	0.00607	0.00193	0.00065
29	0.74934	0.56311	0.42435	0.32065	0.24295	0.18456	0.14056	0.10733	0.08215	0.06304	0.03738	0.02237	0.01351	0.00823	0.00506	0.00155	0.00050
30	0.74192	0.55207	0.41199	0.30832	0.23138	0.17411	0.13137	0.09938	0.07537	0.05731	0.03338	0.01963	0.01165	0.00697	0.00421	0.00124	0.00038

**Exhibit A3-9**

**Future Value of an Annuity**

$$FVA = \frac{(1 + i)^n - 1}{i}$$

n/i	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	16%	18%	20%	25%	30%
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	2.01000	2.02000	2.03000	2.04000	2.05000	2.06000	2.07000	2.08000	2.09000	2.10000	2.12000	2.14000	2.16000	2.18000	2.20000	2.25000	2.30000
3	3.03010	3.06040	3.09090	3.12160	3.15250	3.18360	3.21490	3.24640	3.27810	3.31000	3.37440	3.43960	3.50560	3.57240	3.64000	3.81250	3.99000
4	4.06040	4.12161	4.18363	4.24646	4.31013	4.37462	4.43994	4.50611	4.57313	4.64100	4.77933	4.92114	5.06650	5.21543	5.36800	5.76563	6.18700
5	5.10101	5.20404	5.30914	5.41632	5.52563	5.63709	5.75074	5.86660	5.98471	6.10510	6.35285	6.61010	6.87714	7.15421	7.44160	8.20703	9.04310
6	6.15202	6.30812	6.46841	6.63298	6.80191	6.97532	7.15329	7.33593	7.52333	7.71561	8.11519	8.53552	8.97748	9.44197	9.92992	11.25879	12.75603
7	7.21354	7.43428	7.66246	7.89829	8.14201	8.39384	8.65402	8.92280	9.20043	9.48717	10.08901	10.73049	11.41387	12.14152	12.91590	15.07349	17.58284
8	8.28567	8.58297	8.89234	9.21423	9.54911	9.89747	10.25980	10.63663	11.02847	11.43589	12.29969	13.23276	14.24009	15.32700	16.49908	19.84186	23.85769
9	9.36853	9.75463	10.15911	10.58280	11.02656	11.49132	11.97799	12.48756	13.02104	13.57948	14.77566	16.08535	17.51851	19.08585	20.79890	25.80232	32.01500
10	10.46221	10.94972	11.46388	12.00611	12.57789	13.18079	13.81645	14.48656	15.19293	15.93742	17.54874	19.33730	21.32147	23.52131	25.95868	33.25290	42.61950
11	11.56683	12.16872	12.80780	13.48635	14.20679	14.97164	15.78360	16.64549	17.56029	18.53117	20.65458	23.04452	25.73290	28.75514	32.15042	42.56613	56.40535
12	12.68250	13.41209	14.19203	15.02581	15.91713	16.86994	17.88845	18.97713	20.14072	21.38428	24.13313	27.27075	30.85017	34.93107	39.58050	54.20766	74.32695
13	13.80933	14.68033	15.61779	16.62684	17.71298	18.88214	20.14064	21.49530	22.95338	24.52271	28.02911	32.08865	36.78620	42.21866	48.49660	68.75958	97.62504
14	14.94742	15.97394	17.08632	18.29191	19.59863	21.01507	22.55049	24.21492	26.01919	27.97498	32.39260	37.58107	43.67199	50.81802	59.19592	86.94947	127.91255
15	16.09690	17.29342	18.59891	20.02359	21.57856	23.27597	25.12902	27.15211	29.36092	31.77248	37.27971	43.84241	51.65951	60.96527	72.03511	109.68684	167.28631
16	17.25786	18.63929	20.15688	21.82453	23.65749	25.67253	27.88805	30.32428	33.00340	35.94973	42.75328	50.98035	60.92503	72.93901	87.44213	138.10855	218.47220
17	18.43044	20.01207	21.76159	23.69751	25.84037	28.21288	30.84022	33.75023	36.97370	40.54470	48.88367	59.11760	71.67303	87.06804	105.93056	173.63568	285.01386
18	19.61475	21.41231	23.41444	25.64541	28.13238	30.90565	33.99903	37.45024	41.30134	45.59917	55.74971	68.39407	84.14072	103.74028	128.11667	218.04460	371.51802
19	20.81090	22.84056	25.11687	27.67123	30.53900	33.75999	37.37896	41.44626	46.01846	51.15909	63.43968	78.96923	98.60323	123.41353	154.74000	273.55576	483.97343
20	22.01900	24.29737	26.87037	29.77808	33.06595	36.78559	40.99549	45.76196	51.16012	57.27500	72.05244	91.02493	115.37975	146.62797	186.68800	342.94470	630.16546
21	23.23919	25.78332	28.67649	31.96920	35.71925	39.99273	44.86518	50.42292	56.76453	64.00250	81.69874	104.76842	134.84051	174.02100	225.02560	429.68087	820.21510
22	24.47159	27.29898	30.53678	34.24797	38.50521	43.39229	49.00574	55.45676	62.87334	71.40275	92.50258	120.43600	157.41499	206.34479	271.03072	538.10109	1067.27963
23	25.71630	28.84496	32.45288	36.61789	41.43048	46.99583	53.43614	60.89330	69.53194	79.54302	104.60289	138.29704	183.60138	244.48685	326.23686	673.62636	1388.46351
24	26.97346	30.42186	34.42647	39.08260	44.50200	50.81558	58.17667	66.76476	76.78981	88.49733	118.15524	158.65862	213.97761	289.49448	392.48424	843.03295	1806.00257
25	28.24320	32.03030	36.45926	41.64591	47.72710	54.86451	63.24904	73.10594	84.70090	98.34706	133.33387	181.87083	249.21402	342.60349	471.98108	1054.79118	2348.80334
26	29.52563	33.67091	38.55304	44.31174	51.11345	59.15638	68.67647	79.95442	93.32398	109.18177	150.33393	208.33274	290.08827	405.27211	567.37730	1319.48898	3054.44434
27	30.82089	35.34432	40.70963	47.08421	54.66913	63.70577	74.48382	87.35077	102.72313	121.09994	169.37401	238.49933	337.50239	479.22109	681.85276	1650.36123	3971.77764
28	32.12910	37.05121	42.93092	49.96758	58.40258	68.52811	80.69769	95.33883	112.96822	134.20994	190.69889	272.88923	392.50277	566.48089	819.22331	2063.95153	5164.31093
29	33.45039	38.79223	45.21885	52.96629	62.32271	73.63980	87.34653	103.96594	124.13536	148.63093	214.58275	312.09373	456.30322	669.44745	984.06797	2580.93941	6714.60421
30	34.78489	40.56808	47.57542	56.08494	66.43885	79.05819	94.46079	113.28321	136.30754	164.49402	241.33268	356.78685	530.31173	790.94799	1181.88157	3227.17427	8729.98548

Present Value of an Annuity

$$PVA = \frac{1 - \frac{1}{(1+i)^n}}{i}$$

n/i	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	16%	18%	20%	25%	30%
1	0.99010	0.98039	0.97087	0.96154	0.95238	0.94340	0.93458	0.92593	0.91743	0.90909	0.89286	0.87719	0.86207	0.84746	0.83333	0.80000	0.76923
2	1.97040	1.94156	1.91347	1.88609	1.85941	1.83339	1.80802	1.78326	1.75911	1.73554	1.69005	1.64666	1.60523	1.56564	1.52778	1.44000	1.36095
3	2.94099	2.88388	2.82861	2.77509	2.72325	2.67301	2.62432	2.57710	2.53129	2.48685	2.40183	2.32163	2.24589	2.17427	2.10648	1.95200	1.81611
4	3.90197	3.80773	3.71710	3.62990	3.54595	3.46511	3.38721	3.31213	3.23972	3.16987	3.03735	2.91371	2.79818	2.69006	2.58873	2.36160	2.16624
5	4.85343	4.71346	4.57971	4.45182	4.32948	4.21236	4.10020	3.99271	3.88965	3.79079	3.60478	3.43308	3.27429	3.12717	2.99061	2.68928	2.43557
6	5.79548	5.60143	5.41719	5.24214	5.07569	4.91732	4.76654	4.62288	4.48592	4.35526	4.11141	3.88867	3.68474	3.49760	3.32551	2.95142	2.64275
7	6.72819	6.47199	6.23028	6.00205	5.78637	5.58238	5.38929	5.20637	5.03295	4.86842	4.56376	4.28830	4.03857	3.81153	3.60459	3.16114	2.80211
8	7.65168	7.32548	7.01969	6.73274	6.46321	6.20979	5.97130	5.74664	5.53482	5.33493	4.96764	4.63886	4.34359	4.07757	3.83716	3.32891	2.92470
9	8.56602	8.16224	7.78611	7.43533	7.10782	6.80169	6.51523	6.24689	5.99525	5.75902	5.32825	4.94637	4.60654	4.30302	4.03097	3.46313	3.01900
10	9.47130	8.98259	8.53020	8.11090	7.72173	7.36009	7.02358	6.71008	6.41766	6.14457	5.65022	5.21612	4.83323	4.49409	4.19247	3.57050	3.09154
11	10.36763	9.78685	9.25262	8.76048	8.30641	7.88687	7.49867	7.13896	6.80519	6.49506	5.93770	5.45273	5.02864	4.65601	4.32706	3.65640	3.14734
12	11.25508	10.57534	9.95400	9.38507	8.86325	8.38384	7.94269	7.53608	7.16073	6.81369	6.19437	5.66029	5.19711	4.79322	4.43922	3.72512	3.19026
13	12.13374	11.34837	10.63496	9.98565	9.39357	8.85268	8.35765	7.90378	7.48690	7.10336	6.42355	5.84236	5.34233	4.90951	4.53268	3.78010	3.22328
14	13.00370	12.10625	11.29607	10.56312	9.89864	9.29498	8.74547	8.24424	7.78615	7.36669	6.62817	6.00207	5.46753	5.00806	4.61057	3.82408	3.24867
15	13.86505	12.84926	11.93794	11.11839	10.37966	9.71225	9.10791	8.55948	8.06069	7.60608	6.81086	6.14217	5.57546	5.09158	4.67547	3.85926	3.26821
16	14.71787	13.57771	12.56110	11.65230	10.83777	10.10590	9.44665	8.85137	8.31256	7.82371	6.97399	6.26506	5.66850	5.16235	4.72956	3.88741	3.28324
17	15.56225	14.29187	13.16612	12.16567	11.27407	10.47726	9.76322	9.12164	8.54363	8.02155	7.11963	6.37286	5.74870	5.22233	4.77463	3.90993	3.29480
18	16.39827	14.99203	13.75351	12.65930	11.68959	10.82760	10.05909	9.37189	8.75563	8.20141	7.24967	6.46742	5.81785	5.27316	4.81219	3.92794	3.30369
19	17.22601	15.67846	14.32380	13.13394	12.08532	11.15812	10.33560	9.60360	8.95011	8.36492	7.36578	6.55037	5.87746	5.31624	4.84350	3.94235	3.31053
20	18.04555	16.35143	14.87747	13.59033	12.46221	11.46992	10.59401	9.81815	9.12855	8.51356	7.46944	6.62313	5.92884	5.35275	4.86958	3.95388	3.31579
21	18.85698	17.01121	15.41502	14.02916	12.82115	11.76408	10.83553	10.01680	9.29224	8.64869	7.56200	6.68696	5.97314	5.38368	4.89132	3.96311	3.31984
22	19.66038	17.65805	15.93692	14.45112	13.16300	12.04158	11.06124	10.20074	9.44243	8.77154	7.64465	6.74294	6.01133	5.40990	4.90943	3.97049	3.32296
23	20.45582	18.29220	16.44361	14.85684	13.48857	12.30338	11.27219	10.37106	9.58021	8.88322	7.71843	6.79206	6.04425	5.43212	4.92453	3.97639	3.32535
24	21.24339	18.91393	16.93554	15.24696	13.79864	12.55036	11.46933	10.52876	9.70661	8.98474	7.78432	6.83514	6.07263	5.45095	4.93710	3.98111	3.32719
25	22.02316	19.52346	17.41315	15.62208	14.09394	12.78336	11.65358	10.67478	9.82258	9.07704	7.84314	6.87293	6.09709	5.46691	4.94759	3.98489	3.32861
26	22.79520	20.12104	17.87684	15.98277	14.37519	13.00317	11.82578	10.80998	9.92897	9.16095	7.89566	6.90608	6.11818	5.48043	4.95632	3.98791	3.32970
27	23.55961	20.70690	18.32703	16.32959	14.64303	13.21053	11.98671	10.93516	10.02658	9.23722	7.94255	6.93515	6.13636	5.49189	4.96360	3.99033	3.33054
28	24.31644	21.28127	18.76411	16.66306	14.89813	13.40616	12.13711	11.05108	10.11613	9.30657	7.98442	6.96066	6.15204	5.50160	4.96967	3.99226	3.33118
29	25.06579	21.84438	19.18845	16.98371	15.14107	13.59072	12.27767	11.15841	10.19828	9.36961	8.02181	6.98304	6.16555	5.50983	4.97472	3.99381	3.33168
30	25.80771	22.39646	19.60044	17.29203	15.37245	13.76483	12.40904	11.25778	10.27365	9.42691	8.05518	7.00266	6.17720	5.51681	4.97894	3.99505	3.33206

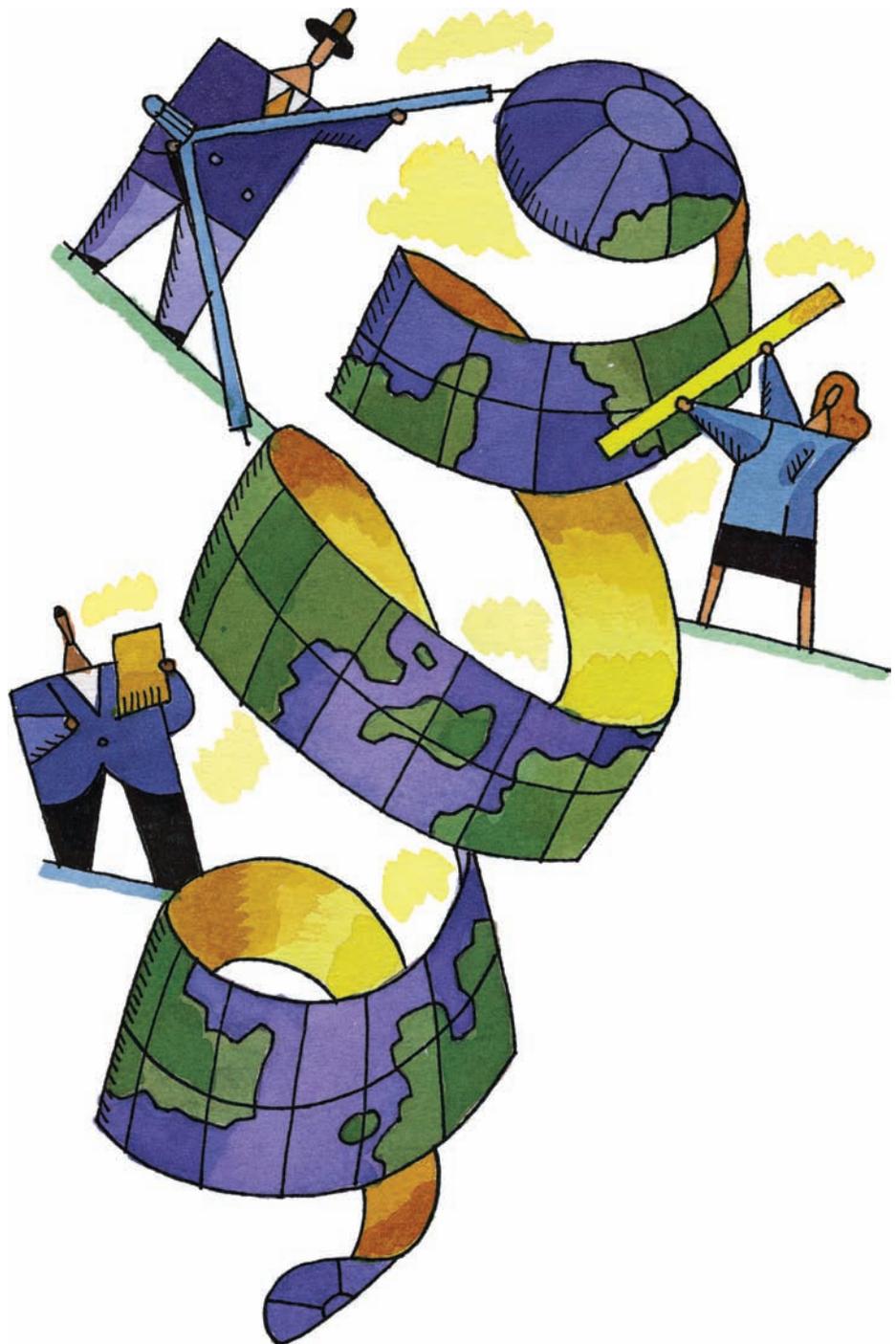
## Appendix

# 4

# International Financial Reporting Standards

After studying Appendix 4, you should be able to:

- 1 Understand and describe some of the important aspects of international financial reporting standards.



**OBJECTIVE** > 1

Understand and describe some of the important aspects of international financial reporting standards.

## International Financial Reporting

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Business is becoming an increasingly global activity as companies conduct operations across national boundaries. Not only are companies engaging in international transactions, companies are increasingly seeking capital from foreign stock exchanges. Due to a variety of factors (e.g., cultural differences, differences in legal systems, differences in business environments), the historical development of accounting standards on a country-by-country basis has led to considerable diversity in financial accounting practices. To facilitate the conduct of business in an international environment, there has been increasing interest in the development of international accounting standards. The purpose of this appendix is to address some of the more frequently asked questions with regard to *international financial reporting standards (IFRS)*.

### What Are IFRS?

IFRS is a general term that describes an international set of generally accepted accounting standards. IFRS encompasses both international accounting standards (IAS) issued prior to 2001 and international financial reporting standards issued after 2001. In addition, IFRS includes interpretations of these standards. IFRS are generally considered less detailed and more concept-based than U.S. GAAP. These international financial reporting standards are quickly gaining global acceptance. IFRS are currently used by over 100 countries, including European Union countries and Australia. Countries such as Israel, Chile, Korea, Brazil, and Canada are expected to transition to IFRS by 2011. Over the last several years, IFRS have assumed the role as the common language of financial reporting in much of the world.

### When Are IFRS Expected to Be Used in the United States?

The United States currently allows foreign companies who trade on U.S. stock exchanges to use IFRS without a reconciliation to U.S. GAAP. The Securities and Exchange Commission (SEC) has proposed a “roadmap” for the mandatory adoption of IFRS by U.S. companies. Under this roadmap, adoption of IFRS in the United States is targeted to begin in 2014; however, several milestones (e.g., continued improvement in IFRS accounting standards and progress in IFRS education and training in the United States) would have to be achieved prior to the SEC mandating the use of IFRS for all U.S. companies. Early adoption of IFRS will be allowed for a small number of U.S. companies (about 110 companies) beginning in December 2009. Clearly, the use of IFRS for U.S. companies is not a matter of “if” it will occur but “when” it will occur.

### Who Develops IFRS?

IFRS are developed by the *International Accounting Standards Board (IASB)*. The IASB is an independent, privately-funded accounting standard-setting body which consists of 14 members from nine countries.<sup>1</sup> The goal of the IASB is to develop a single set of high-quality accounting standards that result in transparent and comparable information reported in general purpose financial statements. The IASB is overseen by the International Accounting Standards Committee (IASC) Foundation. The IASC Foundation funds, appoints the members of, and oversees the IASB. In addition to the IASB, the International Financial Reporting Interpretations Committee (IFRIC) reviews and interprets IFRS that are developed by the IASB. Finally, the Standards Advisory Council (SAC) advises the IASB on a number of issues, such as items which should be on the IASB agenda, input on the timetable of the various IASB projects, and advice on various aspects of these projects.

<sup>1</sup>The IASB is considering increasing the number of members from 14 to 16. If this is approved, the change is not expected to take plus until 2012.

## How Long Has the IASB Been Issuing Standards?

International standard setting actually began in 1973 with the formation of the IASC. Between 1973 and 1988, the IASC completed a set of core standards, which began to gain global acceptance. In all, the IASC issued 41 International Accounting Standards (IAS). In 2001, the IASB was established as the successor organization of the IASC and assumed the standard-setting responsibilities from the IASC. The IASB endorsed the standards of the IASC and began issuing its own standards, which are called International Financial Reporting Standards (IFRS). At this point, with support from the Securities and Exchange Commission (SEC), the Financial Accounting Standards Board (FASB), the European Union (EU), and others, the movement to a single set of high-quality international accounting standards began to pick up considerable momentum. Therefore, IFRS represent a relatively young body of accounting literature.

## What Organizations Have Played a Role in the Development of IFRS?

In 2002, the FASB and the IASB reached an agreement, known as the Norwalk Agreement, in which both standard setters formalized their commitment to develop “as quickly as practicable” a common set of accounting standards. This process, commonly referred to as *convergence* or *harmonization* of U.S. GAAP and IFRS, involves removing existing differences between the two sets of accounting standards and working together on future accounting standards. The FASB and the IASB are currently involved in several joint standard setting projects aimed at reducing the differences between U.S. GAAP and IFRS. The FASB chairman has publicly stated that convergence may take until 2013 to 2018.

The SEC has long supported (as long ago as 1988) the development of an internationally acceptable set of accounting standards, and it publicly supported the Norwalk Agreement. In 2005, SEC Chief Accountant Don Nicolaison established a plan for the use of IFRS in the United States. In 2007, the SEC allowed foreign companies who trade on U.S. stock exchanges to use IFRS without a reconciliation to U.S. GAAP. The SEC is currently considering allowing domestic companies to use IFRS.

The EU has been instrumental to the global acceptance of IFRS. In 2002, the EU decided to require its member countries to use IFRS by 2005. With the EU adoption of IFRS, the number of countries using IFRS more than doubled between 2003 and 2006. The EU adoption of IFRS was a pivotal event in the use of IFRS.

## Why Do We Need IFRS? What Are the Advantages of IFRS?

Proponents of IFRS cite four major advantages. First, the use of IFRS should increase the comparability and transparency of financial information between companies that operate in different countries. Second, IFRS will allow companies and investors to more easily access foreign capital markets. This ease of access is expected to be a stimulus for economic growth. Third, IFRS should allow for a more efficient use of company resources as companies streamline their financial reporting processes. Finally, IFRS generally require more judgments than the strict application of rules. The use of judgment is seen as a means of preventing the financial abuses that have occurred under U.S. GAAP. Overall, the reduction in complexities from the use of a single, high-quality standard is expected to have major benefits for investors, companies, and the capital markets in general.

## Are There Potential Problems with Adopting IFRS?

The movement toward IFRS presents many challenges as well as opportunities. First, many view U.S. GAAP as the best accounting standards in the world that have stood the test of time. Adopting the relatively new IFRS could be viewed as adopting a lower quality standard. Second, integrating world-wide cultural differences to ensure that

IFRS are applied and interpreted consistently is sure to be a difficult task. Third, companies will incur significant costs in creating new accounting policies, modifying their accounting systems, and training their employees with regard to IFRS. Fourth, IFRS generally require more judgment and less reliance on rules than U.S. GAAP. While this exercise of judgment can be a positive aspect of IFRS, many see the potential abuses of judgment as a key problem with IFRS. Finally, not all countries will use the same version of IFRS. Many countries that currently use IFRS have selectively modified (or carved out) certain standards with which they did not agree. Such modification will reduce comparability and increase complexity in financial reporting.

## How Will IFRS Impact My Study of Accounting?

To aid in understanding the impact of IFRS on the cornerstones of financial accounting, review Exhibit A4-1. As you can see, while IFRS is expected to have far-reaching impacts on financial accounting, the cornerstones of accounting covered in this text will still provide you with a solid foundation for your study of accounting.

### Exhibit A4-1

#### Effect of IFRS on Cornerstones of Financial Accounting

Chapter	Cornerstones Affected	Comments
1	Cornerstone 1-2: How to Prepare a Classified Balance Sheet Cornerstone 1-3: How to Prepare an Income Statement Cornerstone 1-4: How to Prepare a Statement of Retained Earnings	<ul style="list-style-type: none"> <li>• The fundamental accounting equation (Assets = Liabilities + Stockholders' Equity) is the same under IFRS as under U.S. GAAP.</li> <li>• Terminology differences do exist. For example, on the balance sheet, stockholders' equity may be called "capital and reserves," and retained earnings may be called "accumulated profits and losses." On the income statement, sales may be referred to as "turnover."</li> <li>• The elements of the balance sheet are the same as under U.S. GAAP; however, IFRS do not specify a particular format. Therefore, the balance sheet classifications are often listed in the reverse order as compared to U.S. GAAP. For example, IFRS classify assets as either noncurrent or current. Noncurrent assets are typically presented first, followed by current assets. Additionally, stockholders' equity is often presented, followed by noncurrent liabilities and, then, current liabilities.</li> <li>• With regard to the income statement, IFRS do not prescribe a specific format (e.g., single-step or multiple-step). In addition, IFRS allow income statement items to be classified either by their nature or their function. U.S. GAAP classifies income statement items by their function (e.g., cost of goods sold).</li> <li>• IFRS do not specify the statement of retained earnings as a required financial statement. Instead, IFRS require the change in retained earnings be shown on the statement of changes in equity.</li> </ul>
2	No Cornerstones Affected	<ul style="list-style-type: none"> <li>• The IASB and the FASB are currently working on a joint conceptual framework that can serve to guide standard setters and help determine GAAP when more specific standards are not available. The outcome of this project is likely to change the existing conceptual framework found in U.S. GAAP.</li> <li>• Under IFRS, transactions are analyzed, journalized, and posted in the same manner as under U.S. GAAP.</li> </ul>

(Continued)

Chapter	Cornerstones Affected	Comments
3	No Cornerstones Affected	<ul style="list-style-type: none"> <li>The adjustment process under IFRS is the same as the adjustment process under U.S. GAAP.</li> <li>While revenue recognition concepts under IFRS are similar to U.S. GAAP, U.S. GAAP contains much more specific rules and guidance.</li> </ul>
4	No Cornerstones Affected	<ul style="list-style-type: none"> <li>Internal control issues are company and financial accounting system-specific, and the issues would be similar in an international environment. However, the documentation and assessment requirements of Section 404 of the Sarbanes-Oxley Act (SOX) impose a much greater burden on U.S. companies compared to international companies.</li> <li>The management, control, and accounting for cash are the same under IFRS as under U.S. GAAP.</li> </ul>
5	No Cornerstones Affected	<ul style="list-style-type: none"> <li>The recognition of sales revenue under IFRS is generally similar to U.S. GAAP. However, the amount of guidance provided by IFRS as to when revenue should be recognized is considerably less and more principles-based than the amount of guidance provided by U.S. GAAP.</li> </ul>
6	Cornerstone 6-6: How to Apply the LIFO Inventory Costing Method Cornerstone 6-8: How to Value Inventory at Lower of Cost or Market	<ul style="list-style-type: none"> <li>The purchase and sale of inventory is generally the same under IFRS as under U.S. GAAP.</li> <li>IFRS do not allow the use of LIFO for determining the cost of inventory.</li> <li>IFRS require the use of the lower of cost or market method, but it defines market value as net realizable value (the estimated selling price less costs of completion and disposal) instead of replacement cost.</li> </ul>
7	Cornerstone 7-5: How to Record an Impairment of Property, Plant, and Equipment	<ul style="list-style-type: none"> <li>The impairment model under IFRS is a single-step process rather than the two-step process that is used in U.S. GAAP.</li> <li>IFRS allow for companies to increase the value of their property, plant, equipment, and intangible assets up to fair value. This is not permitted under U.S. GAAP.</li> <li>Under IFRS, research costs are expensed while development costs are capitalized if it is probable that the asset will generate future benefits.</li> </ul>
8	No Cornerstones Affected	<ul style="list-style-type: none"> <li>IFRS refer to loss contingencies that are recognized in the financial statements as "provisions." Loss contingencies that are not recognized in the financial statements are referred to as "contingencies."</li> <li>Similar to U.S. GAAP, IFRS recognize provisions when the contingent event is probable. However, IFRS define probable as "more likely than not" while U.S. GAAP defines probable as "likely." Therefore, more events will be recognized as provisions under IFRS.</li> </ul>
9	No Cornerstones Affected	<ul style="list-style-type: none"> <li>The accounting for bonds payable is generally the same under IFRS as under U.S. GAAP.</li> </ul>
10	No Cornerstones Affected	<ul style="list-style-type: none"> <li>Under IFRS, stockholders' equity is typically called "capital and reserves." The use of the term "reserves" has generally been discouraged under U.S. GAAP.</li> </ul>
11	Cornerstone 11-1: How to Classify Business Activities	<ul style="list-style-type: none"> <li>The classification of certain business activities does differ under IFRS relative to U.S. GAAP. For example, IFRS allow companies to report the payment of dividends and interest as either an operating cash outflow or a financing cash outflow. In addition, the payment of income taxes can be reported as an investing or financing transaction if it can be identified with an investing or financing activity.</li> </ul>
12	No Cornerstones Affected	<ul style="list-style-type: none"> <li>The analysis of financial statements is the same under IFRS as it is under U.S. GAAP.</li> </ul>

## Where Can I Go to Find Out More About IFRS?

IASB website:

[www.iasb.org](http://www.iasb.org)

American Institute of Certified Public Accountants' (AICPA) website for IFRS Resources:

[www.IFRS.com](http://www.IFRS.com)

Ernst & Young IFRS page:

[http://www.ey.com/GLOBAL/content.nsf/International/Assurance\\_-\\_IAS\\_Overview](http://www.ey.com/GLOBAL/content.nsf/International/Assurance_-_IAS_Overview)

Deloitte & Touch IFRS page:

<http://www.iasplus.com>

International Association for Accounting Education and Research:

<http://www.iaaer.org/resources>

PricewaterhouseCoopers IFRS page:

<http://www.pwc.com/Extweb/service.nsf/docid/8E714A79E0DD6C9980256BBC00382351>

KPMG IFRS page:

<http://www.kpmgifrg.com>

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## Multiple-Choice Exercises

**A4-1** Which of the following best describes international financial reporting standards?

- IFRS describes the generally accepted accounting principles that are currently used by all companies in the United States.
- IFRS consist only of standards that have been issued since the IASB was formed in 2001.
- IFRS are considered to be more concept-based than U.S. GAAP.
- IFRS will be required to be used in the United States beginning in 2014.

**A4-2** Which of the following statements is true?

- The FASB has consistently resisted the adoption of IFRS in the United States for fear that it will lose its standard-setting authority.
- The requirement to use IFRS by the European Union led to a significant increase in the global acceptance of IFRS.
- IFRS has existed for nearly as long as U.S. GAAP; however, it only recently began to gain acceptance as a body of high-quality accounting standards.
- The SEC is considering allowing foreign companies who trade stock on the U.S. stock exchanges to use IFRS.

**A4-3** Convergence of U.S. GAAP and IFRS is best described as:

- The replacement of U.S. GAAP by IFRS.
- The replacement of IFRS by U.S. GAAP.
- Changing existing U.S. GAAP so that any differences in IFRS will be insignificant.
- Changing both existing U.S. GAAP and IFRS to reduce differences and developing new GAAP through a joint standard-setting process.

**A4-4** Which of the following organizations has the responsibility to create IFRS?

- Financial Accounting Standards Board
- International Accounting Standards Committee
- International Accounting Standards Board
- Securities and Exchange Commission

**A4-5 Which of the following is not an advantage of IFRS?**

- a. The use of IFRS should increase the comparability and transparency of financial information.
- b. The use of IFRS will make it easier to access foreign capital markets.
- c. IFRS requires more judgments than U.S. GAAP.
- d. IFRS is less conservative than U.S. GAAP so net income under IFRS will generally be higher than net income under U.S. GAAP.

**A4-6 Which of the following is not a disadvantage of IFRS?**

- a. IFRS will require significantly more training and education than required for U.S. GAAP.
- b. The use of IFRS could be viewed as adopting a lower quality standard.
- c. Due to cultural differences among countries, it will be difficult to ensure consistent application and interpretation of IFRS.
- d. Different versions of IFRS exist that may cause confusion for users of financial statements.

**A4-7 With regard to the presentation of financial information under IFRS, which of the following is true?**

- a. The terminology on the balance sheet and the income statement is the same under IFRS and U.S. GAAP.
- b. Under IFRS, the element of the balance sheet are often presented in reverse order relative to U.S. GAAP, with noncurrent assets presented before current assets and stockholders' equity presented before liabilities.
- c. Under IFRS, the elements of the income statement are often presented in reverse order, with expenses presented first followed by revenues.
- d. IFRS do not require the presentation of a statement of cash flows.

**A4-8 Which of the following inventory costing methods is not allowed under IFRS?**

- a. FIFO
- b. Specific Identification
- c. Average Cost
- d. LIFO

**A4-9 Which of the following is true?**

- a. IFRS allows property, plant, and equipment to be revalued upward if fair value is higher than historical cost.
- b. IFRS contains more extensive guidance on revenue recognition than U.S. GAAP.
- c. IFRS has a much more broad definition of cash than U.S. GAAP.
- d. The accounting for research and development costs is identical under IFRS and U.S. GAAP.

**A4-10 Which of the following is true with regard to contingent liabilities?**

- a. IFRS and U.S. GAAP use the same terminology to refer to contingent liabilities.
- b. A contingent liability is recognized under IFRS when it is more likely than not that the contingent event will occur.
- c. Fewer events will be recognized as contingent liabilities under IFRS than under U.S. GAAP.
- d. Provisions are contingent liabilities that are not recognized in the financial statements.

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# Current Trends in Accounting

Accounting, like all of business, operates in a rapidly changing environment. As a student of accounting and a future business leader, you have a professional responsibility to be aware of these changes and their potential impact on your company. To assist you in this process, we have supplied a brief summary of four “current trends” in accounting that may greatly impact not only the accounting profession, but also the general business environment. We encourage you to follow developments in these areas through your own research in the financial media.

## The Codification

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Generally accepted accounting principles (GAAP) are the common set of rules and conventions that have been developed by several different organizations over many years to guide the preparation of financial statements. As an accountant, it is critical that you have a good understanding of and the ability to research GAAP to determine an appropriate solution to an accounting issue. However, the documents that comprise GAAP vary in format, completeness, structure and, in some cases, are inconsistent with each other. Because of the lack of a consistent and logical structure for GAAP, determining the “right” answer to an accounting issue is often a difficult and time-consuming task. In response to these concerns, the Financial Accounting Standards Board (FASB) developed the Accounting Standards Codification (or simply, the *Codification*).

The Codification is an electronic database that integrates and topically organizes the more than 2,000 documents that comprise GAAP. For the first time, all of the authoritative literature that makes up GAAP will be located in one place. The Codification does not change GAAP; instead, it restructures GAAP and changes the way that it is documented, presented, and updated. As you study accounting and attempt to learn the intricacies of GAAP, the Codification will prove an invaluable resource. The Codification is expected to become authoritative in July 2009 and can be accessed at <http://asc.fasb.org/home>.

## Conceptual Framework

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GAAP rests on a conceptual framework that provides a logical structure and direction to financial accounting and reporting and supports the development of a consistent set of accounting standards. However, the conceptual framework has often been criticized as being internally inconsistent and as providing incomplete recognition and measurement guidance. Given these criticisms, the FASB and the International Accounting Standards Board (IASB) have decided to revisit the framework. Their goal is to refine and update the

conceptual framework so that it can serve as a fundamental basis for future accounting standards. In addition, these efforts should also promote the convergence or harmonization of U.S. GAAP and international financial reporting standards (IFRS). A final document relating to the first phase of this conceptual framework project is expected to be issued in the second half of 2009.

In the revised conceptual framework, the FASB and the IASB have identified two fundamental characteristics that useful information should possess—relevance and faithful representation. The application of these criteria determines which economic events should be shown in the financial statements and how best to record these events. *Relevant* accounting information is capable of making a difference in user decisions by helping the user predict future events (predictive value) or by providing feedback about prior expectations (confirmatory value). Accounting information should also be a *faithful representation* of the real-world economic event that it represents. While faithful representation encompasses many of the qualities that the previous conceptual framework included as aspects of reliability (e.g., neutrality), the importance of accounting in faithfully representing real-world phenomena, regardless of its form, has been elevated. (This is often referred to as “substance over form.”) It should be noted that the increased emphasis on relevance and faithful representation is viewed by some as opening the door to the increased use of fair value measurements in accounting.

In addition to the fundamental characteristics, four enhancing characteristics—comparability, verifiability, timeliness, and understandability—have been identified. These enhancing characteristics are considered complementary to the fundamental characteristics, and their presence should help determine the degree of the information’s usefulness. The first enhancing characteristic is *comparability*, which includes consistency. Comparability is normally achieved when different companies use the same accounting methods; it is considered to be a goal of useful information. Consistency—the application of the same accounting principles by a single company over time—is seen as a means of achieving comparability. Second, *verifiability* (when independent parties agree that the information is free from error or bias) enhances the fundamental characteristic of faithful representation. That is, when multiple independent observers can reach a general consensus, there is an implication that the information faithfully represents the economic event being measured. A third enhancing characteristic is *timeliness*. Information is timely if it is available to users before it loses its ability to influence decisions. Finally, *understandability* presumes that users have a reasonable knowledge of accounting and business activities.

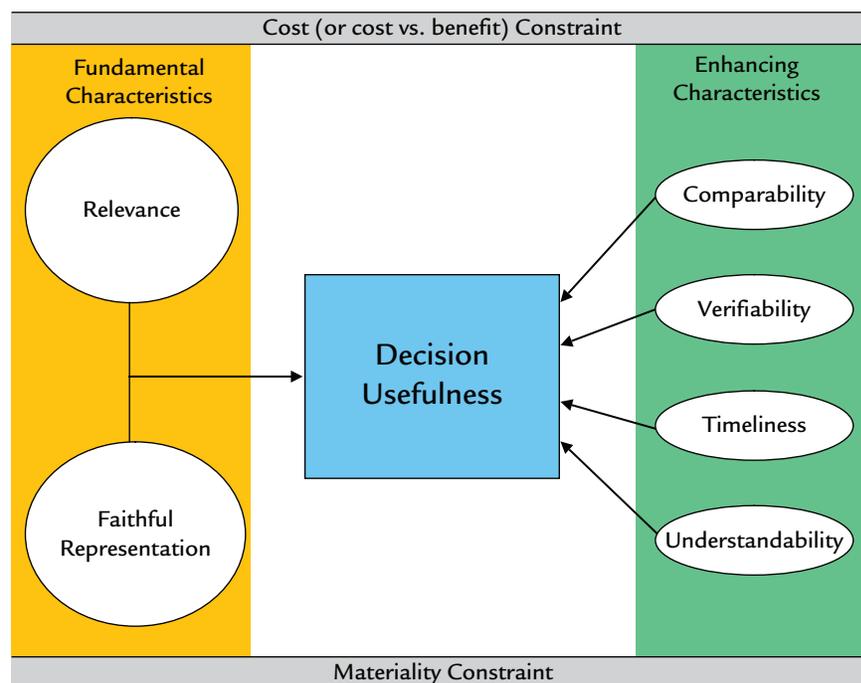
Two constraints to these qualitative characteristics help to further clarify what accounting information should be disclosed in the financial statements. First, the benefit received from accounting information should be greater than the cost of providing that information. This is known as the *cost constraint* or the *cost vs. benefit constraint*. Second, useful information should be *material*; that is, the information should be capable of influencing a decision. Exhibit A5-1 illustrates this revised conceptual framework.

## Use of Fair Values

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A fundamental principle used in the measurement and recording of business activities is the historical cost principle (see Chapter 2). It should be noted that the financial statements contain various other measurement bases as well (e.g., fair value, net realizable value, and amortized cost). The advantage of historical cost over these alternative measurement methods was that historical cost produces relatively more objective and verifiable measurements. While fair value measurements have existed in GAAP for quite some time, the use of fair value measurements has received increasing emphasis over the last several years. In many areas (e.g., the accounting for investments as discussed in Chapter 4), fair values have become the primary means by which to measure and report certain assets and liabilities as users seek a more relevant and faithful representation of economic events. With the recent economic troubles, considerable media attention has been focused on how the use of fair value (often

## Qualitative Characteristics of Accounting Information



referred to as *mark-to-market accounting*) exacerbated the problems in the credit markets. Therefore, a fundamental understanding of fair value is important in both the current economic debate as well as the future development of accounting standards.

Fair value accounting is a way to measure assets and liabilities using current market prices (which are generally considered to be more relevant) instead of historical transaction prices. The objective of fair value accounting for assets and liabilities is to determine a price that would be received if an asset were sold or paid if a liability was settled (commonly referred to as an *exit price*). However, the determination of fair value is not always straightforward and can rest on various assumptions, or inputs. To increase consistency and comparability in these various fair value measurements, the FASB developed a “fair value hierarchy” that encourages the use of quoted market prices in *active* markets for *identical* assets or liabilities (referred to as *Level 1* inputs). In the absence of Level 1 inputs, the fair value hierarchy permits the application of valuation techniques that use either quoted prices in *active* or *inactive* markets for *identical* or *similar* assets and liabilities or observable inputs other than quoted prices (Level 2 inputs). Finally, if Level 1 and Level 2 inputs are both unavailable, unobservable inputs, such as the company’s own economic analysis of the asset or liability, may be used (Level 3 inputs). Notice that the subjectivity of the fair value measurement increases (and the objectivity decreases) as one progresses through the fair value hierarchy.

With the high profile failure of Lehman Brothers and the large bank bailouts around the world, media attention has focused on fair value accounting as a reason for the severity of this credit crisis. Many have even called for the suspension of fair value accounting! So, what is the proper role of fair value in the credit crisis? In short, with the depressed stock market, many financial institutions have been left with assets (securities) that have declined sharply in value. In many cases, the most recent market price for these assets was not from an “orderly” transaction but from a forced “fire-sale” at greatly reduced prices. However, using Level 1 inputs, these financial institutions have been forced to write down these assets and take large losses based on information that they believe is not truly representative of the assets’ fair values. Because of such write-downs, financial institutions have less capital available to lend,

which leads to more business failures and further write-downs. Therefore, fair value measurements are blamed for causing a downward spiral in the credit markets and the overall economy.

The accounting response to public outcry over the deepening credit crisis has been to allow more subjective fair value measurements based on Level 3 inputs. The underlying basis for this action is that the market for many of these assets is inactive and, therefore, the current observable transaction price was not indicative of a true transaction price. This action opens the door for greater use of unobservable inputs, and, all things being equal, higher fair value measurements of assets. The hope is that these higher asset valuations will help stop the downward spiral in the credit markets. Whether or not the use of these unobservable (Level 3) inputs will increase the relevance and usefulness of the accounting information remains an open question.

## **U.S. Adoption of International Financial Reporting Standards**

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As discussed in Appendix 4, international financial reporting standards are quickly gaining global acceptance, and under the Securities and Exchange Commission (SEC) “roadmap” issued in 2008, U.S. adoption of IFRS is targeted to begin in 2014. However, considerable uncertainty exists as to whether the United States will adopt IFRS according to this plan. For example, SEC Chair Mary Schapiro’s comments during her confirmation hearings that she would “not necessarily feel bound by the existing roadmap” have been viewed by many that the move to IFRS may be slower than expected. In addition, FASB Chairman Robert Herz has indicated that convergence of U.S. GAAP with IFRS would not occur for 10 to 15 years, which considerably lengthens the timeframe initially set by the SEC. However, Chairman Herz has indicated that full convergence should not delay the United States from adopting IFRS in the next three to five years. Clearly, U.S. progress toward adoption of IFRS will certainly be a major issue worth tracking for some time to come.



# Glossary

## A

**Absorption costing** A product-costing method that assigns all manufacturing costs to units of product: direct materials, direct labor, variable overhead, and fixed overhead.

**Accelerated depreciation** A generic term to describe depreciation computed using one of several depreciation methods (e.g., declining balance depreciation method) that allocate a larger amount of an asset's cost to the early years of its life.

**Account** A record of increases and decreases in each of the basic elements of the financial statements (each of the company's asset, liability, stockholders' equity, revenue, expense, gain, and loss items).

**Account payable** An obligation that arises when a business purchases goods or services on credit.

**Account receivable** Money due from another business or individual as payment for services performed or goods delivered. Payment is typically due in 30 to 60 days and does not involve a formal note between the parties nor does it include interest.

**Accounting** The process of identifying, measuring, recording, and communicating financial information about a company's activities so decision makers can make informed decisions.

**Accounting cycle** The procedures that a company uses to transform the results of its business activities into financial statements.

**Accounting entity** An organization that has an identity separate and apart from that of its owners and managers and for which accounting records are kept and financial statements are issued.

**Accounting rate of return** The rate of return obtained by dividing the average accounting net income by the original investment (or by average investment).

**Accounting system** The methods and records used to identify, measure, record, and communicate financial information about a business.

**Accounts receivable turnover ratio** A ratio that measures the liquidity of receivables. It is computed by dividing net sales by average accounts receivable.

**Accrual accounting** See *accrual-basis accounting*

**Accrual-basis accounting** A method of accounting in which revenues are generally recorded when earned (rather than when cash is received) and expenses are matched to the periods in which they help produce revenues (rather than when cash is paid).

**Accrued expenses** Previously unrecorded expenses that have been incurred, but not yet paid in cash.

**Accrued payables** A type of payable that represents the completed portion of activities that are in process at the end of a period and that is recognized by an adjusting entry rather than when goods or services change hands.

**Accrued revenues** Previously unrecorded revenues that have been earned but for which no cash has yet been received.

**Accumulated depreciation** The total amount of depreciation expense that has been recorded for an asset since the asset was acquired. It is reported on the balance sheet as a contra-asset.

**Accumulating costs** The way that costs are measured and recorded.

**Acquisition cost** Any expenditure necessary to acquire a fixed asset and to prepare the asset for use.

**Activity analysis** The process of identifying, describing, and evaluating the activities an organization performs.

**Activity attributes** Nonfinancial and financial information items that describe individual activities.

**Activity dictionary** A list of activities described by specific attributes such as name, definition, classification as primary or secondary, and activity driver.

**Activity drivers** Factors that measure the consumption of activities by products and other cost objects.

**Activity elimination** The process of eliminating nonvalue-added activities.

**Activity flexible budgeting** Predicting what activity costs will be as activity usage changes.

**Activity format** A format for the statement of cash flows that reports cash flows for three categories: (1) cash flows from operating activities, (2) cash flows from investing activities, and (3) cash flows from financing activities.

**Activity inputs** The resources consumed by an activity in producing its output (they are the factors that enable the activity to be performed).

**Activity output measure** The number of times an activity is performed. It is the quantifiable measure of the output.

**Activity output** The result or product of an activity.

**Activity reduction** Decreasing the time and resources required by an activity.

**Activity selection** The process of choosing among sets of activities caused by competing strategies.

**Activity sharing** Increasing the efficiency of necessary activities by using economies of scale.

**Activity-based budgeting system (ABB)** A budget system that focuses on estimating the costs of activities rather than the costs of departments and plants and the use of multiple drivers, both unit-based and nonunit-based.

**Activity-based costing (ABC) system** A cost assignment approach that first uses direct and driver tracing to assign costs to activities and then uses drivers to assign costs to cost objects.

**Activity-based management** A systemwide, integrated approach that focuses management's attention on activities with the objective of improving customer value and the profit achieved by providing this value. It includes driver analysis, activity analysis, and performance evaluation, and draws on activity-based costing as a major source of information.

**Actual cost system** An approach that assigns actual costs of direct materials, direct labor, and overhead to products.

**Adjusted cost of goods sold** The cost of goods sold after all adjustments for overhead variances are made.

**Adjusted trial balance** An updated trial balance that reflects the changes to account balances as the result of adjusting entries.

**Adjusting entries** Journal entries that are made at the end of an accounting period to record the completed portion of partially completed transactions.

**Administrative costs** All costs associated with research, development, and general administration of the organization that cannot reasonably be assigned to either selling or production.

**Aging method** A method in which bad debt expense is estimated indirectly by determining the ending balance desired in the allowance for doubtful accounts and then computing the necessary adjusting entry to achieve this balance; the amount of this adjusting entry is also the amount of bad debt expense.

**Allocation** When an indirect cost is assigned to a cost object using a reasonable and convenient method.

**Allowance for Doubtful Accounts** A contra-asset account that is established to "store" the estimate of uncollectible accounts until specific accounts are identified as uncollectible.

**Amortization** The process whereby companies systematically allocate the cost of their intangible operating assets as an expense among the accounting periods in which the asset is used and the benefits are received.

**Annuity** A series of equal cash flows at regular intervals.

**Applied overhead** Overhead assigned to production using predetermined rates.

**Appraisal costs** Cost incurred to determine whether products and services are conforming to requirements.

**Articles of incorporation** A document that authorizes the creation of the corporation, setting forth its name, purpose, and the names of the incorporators.

**Asset efficiency ratios (operating ratios)** Ratios that measure how efficiently a company uses its assets.

**Asset turnover ratio** A ratio that measures the efficiency with which a corporation's assets (usually accounts receivable or inventory) are used to produce sales revenues.

**Assets** Economic resources representing expected future economic benefits controlled by the business (e.g., cash, accounts

receivable, inventory, land, buildings, equipment, and intangible assets).

**Assigning costs** The way that a cost is linked to some cost object.

**Audit report** The auditor's opinion as to whether the company's financial statements are fairly stated in accordance with generally accepted accounting principles (GAAP).

**Authorized shares** The maximum number of shares a company may issue in each class of stock.

**Available-for-sale securities** Investments in equity and debt securities of other companies that management intends to sell in the future, but not necessarily in the near term.

**Average age of fixed assets** A rough estimate of the age of fixed assets that can be computed by dividing accumulated depreciation by depreciation expense.

**Average cost method** An inventory costing method that allocates the cost of goods available for sale between ending inventory and cost of goods sold based on a weighted average cost per unit.

**Average days to sell inventory** An estimate of the number of days it takes a company to sell its inventory. It is found by dividing 365 days by the inventory turnover ratio.

## B

**Bad debt expense** The expense that results from receivables that are not paid.

**Balance sheet** A financial statement that reports the resources (assets) owned by a company and the claims against those resources (liabilities and stockholders' equity) at a specific point in time.

**Balanced Scorecard** A strategic management system that defines a strategic-based responsibility accounting system. The Balanced Scorecard translates an organization's mission and strategy into operational objectives and performance measures for four different perspectives: the financial perspective, the customer perspective, the internal business process perspective, and the learning and growth (infrastructure) perspective.

**Bank reconciliation** The process of reconciling any differences between a company's accounting records and the bank's accounting records.

**Bond** A type of note that requires the issuing entity to pay the face value of the bond to the holder when it matures and, usually, periodic interest at a specified rate.

**Book value (carrying value)** The value of an asset or liability as it appears on the balance sheet. Book value is calculated as the cost of the asset or liability minus the balance in its related contra-account (e.g., cost of equipment less accumulated depreciation; notes payable less discount on notes payable).

**Break-even point** The point where total sales revenue equals total cost; at this point, neither profit nor loss is earned.

**Budget committee** A committee responsible for setting budgetary policies and goals, reviewing and approving the budget, and resolving any differences that may arise in the budgetary process.

**Budget director** The individual responsible for coordination and directing the overall budgeting process.

**Budgetary slack** The process of padding the budget by overestimating costs and underestimating revenues.

**Budgets** Plans of action expressed in financial terms.

**Business process risks** Threats to the internal processes of a company.

**C**

**Callable bonds** Bonds that give the borrower the right to pay off (or call) the bonds prior to their due date. The borrower typically “calls” debt when the interest rate being paid is much higher than the current market conditions.

**Capital** A company’s assets less its liabilities. Capital is also known as stockholders’ equity.

**Capital budgeting** The process of making capital investment decisions.

**Capital expenditures** Expenditures to acquire long-term assets or extend the life, expand the productive capacity, increase the efficiency, or improve the quality of existing long-term assets.

**Capital investment decisions** The process of planning, setting goals and priorities, arranging financing, and identifying criteria for making long-term investments.

**Capital lease** A noncancelable agreement that is in substance a purchase of the leased asset.

**Carrying costs** The costs of holding inventory.

**Cash budget** A detailed plan that outlines all sources and uses of cash.

**Cash equivalents** Short-term, highly liquid investments that are readily convertible to cash and have original maturities of three months or less; examples are Treasury bills, money market funds, and commercial paper.

**Cash flow adequacy ratio** The cash flow adequacy ratio provides a measure of the company’s ability to meet its debt obligations and is calculated as:  $\text{Cash Flow Adequacy} = \text{Free Cash Flow} \div \text{Average Amount of Debt Maturing over the Next Five Years}$ .

**Cash flows from financing activities** Any cash flow related to obtaining resources from creditors or owners, which includes the issuance and repayment of debt, common and preferred stock transactions, and the payment of dividends.

**Cash flows from investing activities** The cash inflows and outflows that relate to acquiring and disposing of operating assets, acquiring and selling investments (current and long-term), and lending money and collecting loans.

**Cash flows from operating activities** Any cash flows directly related to earning income, including cash sales and collections of accounts receivable as well as cash payments for goods, services, salaries, and interest.

**Cash inflows** Activities that increase cash and are sources of cash.

**Cash outflows** Activities that decrease cash and are uses of cash.

**Cash over and short** An account that records the discrepancies between deposited amounts of actual cash received and the total of the cash register tape.

**Cash ratio** A short-term liquidity ratio that is calculated as:  $(\text{Cash} + \text{Short-Term Investments}) \div \text{Current Liabilities}$ .

**Cash-basis accounting** A method of accounting in which revenue is recorded when cash is received, regardless of when it is actually earned. Similarly, an expense is recorded when cash is paid, regardless of when it is actually incurred. Cash-basis accounting does not tie recognition of revenues and expenses to the actual business activity but rather to the exchange of cash.

**Causal factors** Activities or variables that invoke service costs. Generally, it is desirable to use causal factors as the basis for allocating service costs.

**Certified Internal Auditor (CIA)** The CIA has passed a comprehensive examination designed to ensure technical competence and has two years’ experience.

**Certified Management Accountant (CMA)** A certified management accountant has passed a rigorous qualifying examination, met an experience requirement, and participates in continuing education.

**Certified Public Accountant (CPA)** A certified accountant who is permitted (by law) to serve as an external auditor. CPAs must pass a national examination and be licensed by the state in which they practice.

**Chart of accounts** The list of accounts used by a company.

**Closing entries** The final step of the accounting cycle that transfers the effects of revenues, expenses, and dividends to the stockholders’ equity account, Retained Earnings. Closing entries also serve to reduce the balances in revenues, expenses, and dividends to zero so that these accounts are ready to accumulate the business activities of the next accounting period.

**Coefficient of determination ( $R^2$ )** The percentage of total variability in a dependent variable that is explained by an independent variable. It assumes a value between 0 and 1.

**Committed fixed cost** A fixed cost that cannot be easily changed.

**Common costs** The costs of resources used in the output of two or more services or products.

**Common fixed expenses** Fixed expenses that cannot be directly traced to individual segments and that are unaffected by the elimination of any one segment.

**Common stock** The basic ownership interest in a corporation. Owners of common stock have the right to vote in the election of the board of directors, share in the profits and dividends of the company, keep the same percentage of ownership if new stock is issued (preemptive right), and share in the assets in liquidation in proportion to their holdings.

**Common-size analysis** A type of analysis that expresses line items or accounts in the financial statements as percentages.

**Common-size statements** Financial statements that express each financial statement line item in percentage terms.

**Comparability** One of the four qualitative characteristics that useful information should possess. Information has comparability if it allows comparisons to be made between companies.

**Compound interest** A method of calculating the time value of money in which interest is earned on the previous periods’ interest.

**Compounding of interest** Paying interest on interest.

**Conservatism principle** A principle which states that when more than one equally acceptable accounting method exists, the method that results in the lower assets and revenues or higher liabilities and expenses should be selected.

**Consistency** One of the four qualitative characteristics that useful information should possess. Consistency refers to the application of the same accounting principles by a single company over time.

**Constraints** Mathematical expressions that express resource limitations.

**Consumption ratio** The proportion of an overhead activity consumed by a product.

**Contingent liability** An obligation whose amount or timing is uncertain and depends on future events. For example, a firm may

be contingently liable for damages under a lawsuit that has yet to be decided by the courts.

**Continuity (or going concern) assumption** One of the four basic assumptions that underlie accounting that assumes a company will continue to operate long enough to carry out its existing commitments.

**Continuous budget** A moving 12-month budget with a future month added as the current month expires.

**Continuous improvement** Searching for ways to increase the overall efficiency and productivity of activities by reducing waste, increasing quality, and reducing costs.

**Contra accounts** Accounts that have a balance that is opposite of the balance in the related account.

**Contract rate** See *interest rate*

**Contribution margin income statement** The income statement format that is based on the separation of costs into fixed and variable components.

**Contribution margin ratio** Contribution margin divided by sales revenue. It is the proportion of each sales dollar available to cover fixed costs and provide for profit.

**Contribution margin** Sales revenue minus total variable cost or price minus unit variable cost.

**Control** The process of setting standards, receiving feedback on actual performance, and taking corrective action whenever actual performance deviates significantly from planned performance.

**Control activities** Activities performed by an organization to prevent or detect poor quality (because poor quality may exist); the policies and procedures that top management establishes to help insure that its objectives are met

**Control costs** Costs incurred from performing control activities.

**Control environment** The collection of environmental factors that influence the effectiveness of control procedures such as the philosophy and operating style of management, the personnel policies and practices of the business, and the overall integrity, attitude, awareness, and actions of everyone in the business concerning the importance of control.

**Control limits** The maximum allowable deviation from a standard.

**Controllable costs** Costs that managers have the power to influence.

**Controller** The chief accounting officer in an organization.

**Controlling** The managerial activity of monitoring a plan's implementation and taking corrective action as needed.

**Conversion cost** The sum of direct labor cost and overhead cost.

**Convertible bonds** Bonds that allow the bondholder to convert the bond into another security—typically common stock.

**Copyright** An intangible asset that grants the holder the right to publish, sell, or control a literary or artistic work. The legal life is the life of author plus 70 years.

**Core objectives and measures** Those objectives and measures common to most organizations.

**Corporate charter** See *articles of incorporation*

**Corporation** A company chartered by the state to conduct business as an "artificial person" and owned by one or more stockholders.

**Cost** The amount of cash or cash equivalent sacrificed for goods and/or services that are expected to bring a current or future benefit to the organization.

**Cost behavior** The way in which a cost changes when the level of output changes.

**Cost center** A division of a company that is evaluated on the basis of cost.

**Cost object** Any item such as products, customers, departments, projects, and so on, for which costs are measured and assigned.

**Cost of capital** The cost of investment funds, usually viewed as a weighted average of the costs of funds from all sources.

**Cost of goods available for sale** The sum of the cost of beginning inventory and the cost of purchases.

**Cost of goods manufactured** The total product cost of goods completed during the current period.

**Cost of goods sold** An expense that represents the outflow of resources caused by the sale of inventory. This is often computed as the cost of goods available for sale less the cost of ending inventory. The total product cost of goods sold during the period.

**Cost of goods sold budget** The estimated costs for the units sold.

**Cost reconciliation** The final section of the production report that compares the costs to account for with the costs accounted for to ensure that they are equal.

**Cost structure** A company's mix of fixed costs relative to variable costs.

**Cost vs. benefit** A constraint on the qualities that useful information should possess which encompasses the idea that the benefit received from accounting information should be greater than the costs of providing the information.

**Costs of quality** Costs incurred because poor quality may exist or because poor quality does exist.

**Cost-volume-profit graph** A graph that depicts the relationships among costs, volume, and profits. It consists of a total revenue line and a total cost line.

**Coupon rate** See *interest rate*

**Credit** The right side of a T account; alternatively, credit may refer to the act of entering an amount on the right side of an account.

**Credit cards** A card that authorizes the holder to make purchases up to some limit from specified retailers. Credits cards are a special form of factoring in which the issuer of the credit card pays the seller the amount of each sale less a service charge and then collects the full amount of the sale from the buyer at some later date.

**Credit sales method** A method for determining bad debt expense directly by multiplying credit sales by an estimate of the percentage of the current period's credit sales that will eventually become uncollectible.

**Creditor** The person to whom money is owed.

**Cross sectional analysis** A type of analysis that compares one corporation to another corporation and to industry averages.

**Cumulative dividend preference** A provision that requires the eventual payment of all preferred dividends—both dividends in arrears and current dividends—to preferred stockholders before any dividends are paid to common stockholders.

**Current assets** Cash and other assets that are reasonably expected to be converted into cash within one year or one operating cycle, whichever is longer.

**Current dividend preference** A provision that requires that current dividends must be paid to preferred stockholders before any dividends are paid to common stockholders.

**Current liabilities** Obligations that require a firm to pay cash or another current asset, create a new current liability, or provide goods or services within one year or one operating cycle, whichever is longer.

**Current ratio** A measure of the ability of a company to pay its short-term liabilities out of short-term assets; a measure of liquidity that is computed as:  $\text{Current Assets} \div \text{Current Liabilities}$ .

**Currently attainable standards** Standards that reflect an efficient operating state; they are rigorous but achievable.

**Customer perspective** A Balanced Scorecard viewpoint that defines the customer and market segments in which the business will compete.

**Customer value** Realization less sacrifice, where realization is what the customer receives and sacrifice is what is given up.

**Cycle time** The length of time required to produce one unit of a product.

## D

**Date of record** The date on which a stockholder must own one or more shares of stock in order to receive the dividend.

**Debenture bonds** Another name for unsecured bonds.

**Debit** The left side of a T account; alternatively, debit may refer to the act of entering an amount on the left side of an account.

**Debit card** A card that authorizes a bank to make an immediate electronic withdrawal (debit) from the holder's bank account and a corresponding deposit to another party's account.

**Debt management ratios** A type of ratio that provides information on two aspects of debt: (1) the relative mix of debt and equity financing (often referred to as its capital structure) and (2) the corporation's ability to meet its debt obligations through operations because interest and principal payments must be made as scheduled, or a company can be declared bankrupt.

**Debt ratio** The ratio that measures the percentage of a company's risk as the percentage of its assets financed by creditors increases. It is computed by dividing a company's total liabilities by its total assets.

**Debt-to-equity ratio** A measure of the proportion of capital provided by creditors relative to that provided by stockholders. This ratio is calculated as:  $\text{Total Liabilities} \div \text{Total Equity}$ .

**Debt-to-total assets ratio** A measure of the proportion of capital provided by creditors. This ratio is calculated as:  $\text{Total Liabilities} \div \text{Total Assets}$ .

**Decentralization** The granting of decision-making freedom to lower operating levels.

**Decision making** The process of choosing among competing alternatives.

**Decision model** A specific set of procedures that, when followed, produces a decision.

**Declaration date** The date on which a corporation announces its intention to pay a dividend on common stock.

**Declining balance depreciation method** An accelerated depreciation method that produces a declining amount of depreciation expense each period by multiplying the declining book value of an asset by a constant depreciation rate. Declining balance depreciation expense for each period of an asset's useful life equals the declining balance rate times the asset's book value (cost less accumulated depreciation) at the beginning of the period.

**Deferred (or prepaid) expenses** Asset arising from the payment of cash which has not been used or consumed by the end of the period.

**Deferred (or unearned) revenues** Liability arising from the receipt of cash for which revenue has not yet been earned.

**Degree of operating leverage (DOL)** A measure of the sensitivity of profit changes to changes in sales volume. It measures the percentage change in profits resulting from a percentage change in sales.

**Departmental overhead rate** Estimated overhead for a single department divided by the estimated activity level for that same department.

**Dependent variable** A variable whose value depends on the value of another variable.

**Depletion** The process of allocating the cost of a natural resource to each period in which the resource is removed from the earth.

**Deposit in transit** An amount received and recorded by a company but which has not been recorded by the bank in time to appear on the current bank statement.

**Depreciable cost** Depreciable cost is calculated as the cost of the asset less its residual (or salvage) value. This amount will be depreciated (expensed) over the asset's useful life.

**Depreciation expense** The amount of depreciation recorded on the income statement.

**Depreciation method** A standardized calculation for determining periodic depreciation expense.

**Depreciation** The process whereby companies systematically allocate the cost of their tangible operating assets (other than land) as an expense in each period in which the asset is used.

**Differential cost** The difference in total cost between the alternatives in a decision.

**Direct costs** Costs that can be easily and accurately traced to a cost object.

**Direct fixed expenses** Fixed costs that are directly traceable to a given segment and, consequently, disappear if the segment is eliminated.

**Direct labor budget** A budget showing the total direct labor hours needed and the associated cost for the number of units in the production budget.

**Direct labor** The labor that can be directly traced to the goods or services being produced.

**Direct materials** Materials that are a part of the final product and can be directly traced to the goods or services being produced.

**Direct materials purchases budget** A budget that outlines the expected usage of materials production and purchases of the direct materials required.

**Direct method** A method of computing net cash flow from operating activities by adjusting each item on the income statement by the changes in the related current asset or liability accounts. Typical cash flow categories reported are cash collected from customers, cash paid to suppliers, cash paid to employees, cash paid for interest, and cash paid for taxes. A method that allocates service costs directly to producing departments. This method ignores any interactions that may exist among support departments.

**Discount factor** The factor used to convert a future cash flow to its present value.

**Discount period** The reduced payment period associated with purchase discounts.

**Discount rate** The rate of return used to compute the present value of future cash flows.

**Discounted cash flows** Future cash flows expressed in present-value terms.

**Discounting** The act of finding the present value of future cash flows.

**Discounting models** Capital investment models that explicitly consider the time value of money in identifying criteria for accepting and rejecting proposed projects.

**Discretionary fixed costs** Fixed costs that can be changed relatively easily at management discretion.

**Dividend** Amounts paid periodically by a corporation to its stockholders as a return of their invested capital. Dividends represent a distribution of retained earnings, not an expense.

**Dividend payout ratio** A ratio that is computed by dividing the total common dividends by the earnings available to common stockholders.

**Dividend payout ratio** A ratio that measures the proportion of a corporation's profits that are returned to the stockholders immediately as dividends. It is calculated as:  $\text{Common Dividends} \div \text{Net Income}$ .

**Dividend yield** A profitability measure that is computed by dividing the dividends received per unit of common share by the market price per common share.

**Dividend yield ratio** A ratio that measures the rate at which dividends provide a return to stockholders, by comparing dividends with the market price of a share of stock. It is calculated as:  $\text{Dividends per Common Share} \div \text{Closing Market Price per Share for the Year}$ .

**Dividends in arrears** Cumulative preferred stock dividends remaining unpaid for one or more years are considered to be in arrears.

**Double-entry accounting** A type of accounting in which the two-sided effect that every transaction has on the accounting equation is recorded in the accounting system.

**Double-loop feedback** Information about both the effectiveness of strategy implementation and the validity of assumptions underlying the strategy.

**Driver** A factor that causes or leads to a change in a cost or an activity; a driver is an output measure.

**Driver analysis** The effort expended to identify those factors that are the root causes of activity costs.

**Dupont analysis** A type of analysis that recognizes that ROE can be broken down into three important components—net profit margin, asset turnover, and leverage.

**Dysfunctional behavior** Individual behavior that conflicts with the goals of the organization.

## E

**Earned** One of two requirements for the recognition of revenue. Revenues are considered “earned” when the earnings process is substantially complete. This typically happens when the goods are delivered or the service is provided.

**Earnings per share (EPS)** A ratio that measures the income available for common stockholders on a per-share basis. EPS is calculated as net income less preferred dividends divided by the average number of common shares outstanding during the period.

**Economic entity assumption** One of the four basic assumptions that underlie accounting that assumes each company is accounted for separately from its owners.

**Economic order quantity (EOQ)** The amount that should be ordered (or produced) to minimize the total ordering (or setup) and carrying costs.

**Economic value added (EVA)** A performance measure that is calculated by taking the after-tax operating profit minus the total annual cost of capital.

**Effective interest rate method** A method of interest amortization that is based on compound interest calculations.

**Effective interest rate** See *market rate*

**Ending finished goods inventory budget** A budget that describes planned ending inventory of finished goods in units and dollars.

**Environmental costs** Costs that are incurred because poor environmental quality exists or may exist.

**Environmental detection costs** Costs incurred to detect poor environmental performance.

**Environmental external failure costs** Costs incurred after contaminants are introduced into the environment.

**Environmental internal failure costs** Costs incurred after contaminants are produced but before they are introduced into the environment.

**Environmental prevention costs** Costs incurred to prevent damage to the environment.

**Equity** See *stockholders' equity*

**Equivalent units of output** Complete units that could have been produced given the total amount of manufacturing effort expended during the period.

**Ethical behavior** Choosing actions that are right, proper, and just.

**Events** Events make up the multitude of activities in which companies engage. External events result from exchange between the company and another outside entity, and internal events result from a company's own actions that do not involve other companies.

**Expenses** Costs that are used up (expired) in the production of revenue; the cost of assets used, or the liabilities created, in the operation of the business.

**External failure costs** Costs incurred because products fail to conform to requirements after being sold to outside parties.

## F

**F.O.B. destination** A shipping arrangement in which ownership of inventory passes when the goods are delivered to the buyer.

**F.O.B. shipping point** A shipping arrangement in which ownership of inventory passes from the seller to the buyer at the shipping point.

**Face value** The amount of money that a borrower must repay at maturity; also called par value or principal.

**Factor** A method of handling receivables in which the seller receives an immediate cash payment reduced by the factor's fees. The factor, the buyer of the receivables, acquires the right to collect the receivables and the risk of uncollectibility. In a typical factoring arrangement, the sellers of the receivables have no continuing responsibility for their collection.

**Failure activities** Activities performed by an organization or its customers in response to poor quality (poor quality does exist).

**Failure costs** The costs incurred by an organization because failure activities are performed.

**Favorable (*F*) variances** Variances produced whenever the actual amounts are less than the budgeted or standard allowances.

**FIFO costing method** A process-costing method that separates units in beginning inventory from those produced during the current period. Unit costs include only current-period costs and production.

**Financial accounting** A type of accounting that is primarily concerned with producing information for external users.

**Financial accounting** Accounting and reporting to satisfy the outside demand (primarily investors and creditors) for accounting information.

**Financial Accounting Standards Board (FASB)** The primary accounting standard-setter in the United States which has been granted this power to set standards by the Securities and Exchange Commission.

**Financial budgets** The portions of the master budget that include the cash budget, the budgeted balance sheet, the budgeted statement of cash flows, and the capital budget.

**Financial perspective** A Balanced Scorecard viewpoint that describes the financial consequences of actions taken in the other three perspectives.

**Financial statements** A set of standardized reports in which the detailed transactions of a company's activities are reported and summarized so they can be communicated to decision-makers.

**Financing activities** Those activities that raise (provide) cash from (to) creditors and owners.

**Financing cycle** The elapsed time between the receipt of financial resources from owners and creditors and the repayment of the original amounts received.

**First-in, first-out (FIFO) method** An inventory costing system in which the earliest (oldest) purchases (the first in) are assumed to be the first sold (the first out) and the more recent purchases are in ending inventory.

**Fiscal year** An accounting period that runs for one year.

**Fixed asset turnover ratio** A ratio that indicates how efficiently a company uses its fixed assets. This ratio is calculated by dividing net sales by average fixed assets.

**Fixed costs** Costs that, in total, are constant within the relevant range as the level of output increases or decreases.

**Fixed overhead spending variance** The difference between actual fixed overhead and applied fixed overhead.

**Fixed overhead volume variance** The difference between budgeted fixed overhead and applied fixed overhead; it is a measure of capacity utilization.

**Flexible budget** A budget that can specify costs for a range of activity.

**Flexible budget variance** The sum of price variances and efficiency variances in a performance report comparing actual costs to expected costs predicted by a flexible budget.

**Form 10-K** The annual report on Form 10-K provides a comprehensive overview of the corporation's business and financial

condition and includes *audited* financial statements. Although similarly named, the annual report on Form 10-K is distinct from the "annual report to shareholders," which a corporation must send to its shareholders when it holds an annual meeting to elect directors. For larger filers the 10-K must be filed within 60 days of their fiscal year end.

**Form 10-Q** The Form 10-Q includes *unaudited* financial statements and provides a continuing view of the corporation's financial position during the year. The report must be filed for each of the first three fiscal quarters of the corporation's fiscal year. For larger filers this must be done within 40 days of the end of the quarter.

**Form 8-K** The "current report" companies must file with the SEC to announce major events that are important to investors and creditors.

**Franchise** An exclusive right to conduct a certain type of business in some particular geographic area.

**Free cash flow** The cash flow that a company is able to generate after considering the maintenance or expansion of its assets (capital expenditures) and the payment of dividends. Free cash flow is calculated as: Net Cash Flow from Operating Activities – Capital Expenditures – Cash Dividends.

**Freight-in** The transportation costs that are normally paid by the buyer under F.O.B. shipping point terms.

**Freight-out** The transportation costs that the seller is usually responsible for paying under F.O.B. destination shipping terms.

**Full disclosure** A policy that requires any information that would make a difference to financial statement users to be revealed.

**Fundamental accounting equation** Assets = Liabilities + Stockholders' Equity. The left side of the accounting equation shows the assets, or economic resources of a company. The right side of the accounting equation indicates who has a claim on the company's assets.

**Future value** Projections of future balances based on past and future cash flows and interest payments; the value that will accumulate by the end of an investment's life if the investment earns a specified compounded return.

## G

**GAAP** See *generally accepted accounting principles*

**General ledger** A collection of all the individual financial statement accounts that a company uses in its financial statements.

**Generally accepted accounting principles (GAAP)** A common set of rules and conventions that have been developed to guide the preparation of financial statements.

**Goal congruence** The alignment of a manager's personal goals with those of the organization.

**Goodwill** An unidentifiable intangible asset that arises from factors such as customer satisfaction, quality products, skilled employees, and business location.

**Gross margin (gross profit)** A key performance measure that is computed as sales revenue less cost of goods sold.

**Gross profit ratio** A measurement of the proportion of each sales dollar that is available to pay other expenses and provide profit for owners; it is computed by dividing gross margin by net sales.

**H**

**High-low method** A method for separating mixed costs into fixed and variable components by using just the high and low data points. [*Note:* The high (low) data point corresponds to the high (low) output level.]

**Historical cost principle** A principle that requires the activities of a company to be initially measured at their cost—the exchange price at the time the activity occurs.

**Horizontal analysis** Also called trend analysis, this type of analysis expresses a line item as a percentage of some prior-period amount such as the base year (typically the first year shown).

**I**

**Ideal standards** Standards that reflect perfect operating conditions.

**Impairment** A permanent decline in the future benefits or service potential of an asset.

**Incentives** The positive or negative measures taken by an organization to induce a manager to exert effort toward achieving the organization's goals.

**Income before taxes** Income from operations plus the amount of other revenues and gains less the amount of other expenses and losses.

**Income from operations** Gross margin less operating expenses. This represents the results of the core operations of the business.

**Income statement** A financial statement that reports the profitability of a business over a specific period of time.

**Income summary** A temporary account to which all revenues and expenses are closed and which is itself closed to retained earnings.

**Independent projects** Projects that, if accepted or rejected, will not affect the cash flows of another project.

**Independent variable** A variable whose value does not depend on the value of another variable.

**Indifference point** The quantity at which two systems produce the same operating income.

**Indirect costs** Costs that cannot be easily and accurately traced to a cost object.

**Indirect method** A method that computes operating cash flows by adjusting net income for items that do not affect cash flows.

**Innovation process** A process that anticipates the emerging and potential needs of customers and creates new products and services to satisfy those needs.

**Intangible assets** Assets that provide a benefit to a company over a number of years but lack physical substance. Examples of intangible assets include patents, copyrights, trademarks, and goodwill.

**Intercept** The fixed cost, representing the point where the cost formula intercepts the vertical axis.

**Interest** The excess of the total amount of money paid to a lender over the amount borrowed.

**Interest amortization** The process used to determine the amount of interest to be recorded in each of the periods a liability is outstanding.

**Interest period** is the time interval between interest calculations.

**Interest rate** A percentage of the principal that must be paid in order to have use of the principal. It is multiplied by the

beginning-of-period balance to yield the amount of interest for the period.

**Internal business process perspective** A Balanced Scorecard viewpoint that describes the internal processes needed to provide value for customers and owners.

**Internal control system** The policies and procedures established by top management and the board of directors to provide reasonable assurance that the company's objectives are being met in three areas: (1) effectiveness and efficiency of operations, (2) reliability of financial reporting, and (3) compliance with applicable laws and regulations.

**Internal failure costs** Costs incurred because products and services fail to conform to requirements where lack of conformity is discovered prior to external sale.

**Internal rate of return** The rate of return that equates the present value of a project's cash inflows with the present value of its cash outflows (i.e., it sets the NPV equal to zero). Also, the rate of return being earned on funds that remain internally invested in a project.

**International Accounting Standards Board (IASB)** An independent, privately-funded accounting standard-setting body with the goal of developing a single set of high-quality accounting standards that result in transparent and comparable information reported in general purpose financial statements.

**International Financial Reporting Standards (IFRS)** A general term that describes an international set of generally accepted accounting standards.

**Inventory** Products held for resale that are classified as current assets on the balance sheet.

**Inventory costing methods** Various systematic methods of determining the cost of ending inventory, each based on a different assumption about the composition of the ending inventory in terms of the different prices paid for goods over time.

**Inventory turnover ratio** A ratio that describes how quickly inventory is purchased (or produced) and sold. It is calculated as cost of goods sold divided by average inventory.

**Investing activities** Those activities that involve the acquisition or sale of long-term assets.

**Investment center** A division of a company that is evaluated on the basis of return on investment.

**Involuntary disposal** A type of disposal that occurs when assets are lost or destroyed through theft, acts of nature, or by accident.

**Issued shares** The number of shares actually sold to stockholders.

**J**

**Job** One distinct unit or set of units for which the costs of production must be assigned.

**Job-order cost sheet** A subsidiary account to the work-in-process account on which the total costs of materials, labor, and overhead for a single job are accumulated.

**Job-order costing system** A costing system in which costs are collected and assigned to units of production for each individual job.

**Joint products** Products that are inseparable prior to a split-off point. All manufacturing costs up to the split-off point are joint costs.

**Journal** A chronological record showing the debit and credit effects of transactions on a company.

**Journal entry** A record of a transaction that is made in a journal so that the entire effect of the transaction is contained in one place.

**Junk bonds** Unsecured bonds where the risk of the borrower failing to make the payments is relatively high.

**Just-in-time (JIT)** A demand-pull system whose objective is to eliminate waste by producing a product only when it is needed and only in the quantities demanded by customers.

## K

**Keep-or-drop decisions** Relevant costing analyses that focus on keeping or dropping a segment of a business.

## L

**Labor efficiency variance (LEV)** The difference between the actual direct labor hours used and the standard direct labor hours allowed multiplied by the standard hourly wage rate.

**Labor rate variance (LRV)** The difference between the actual hourly rate paid and the standard hourly rate multiplied by the actual hours worked.

**Last-in, first-out (LIFO) method** An inventory costing system that allocates the cost of goods available for sale between ending inventory and cost of goods sold based on the assumption that the most recent purchases (the last in) are the first to be sold (the first out).

**Lead time** The time required to receive the economic order quantity once an order is placed or a setup is started.

**Lean accounting** An accounting practice that organizes costs according to the value chain by focusing primarily on the elimination of waste. The objective is to provide information to managers that support this effort and to provide financial statements that better reflect overall performance, using financial and nonfinancial information.

**Learning and growth (infrastructure) perspective** A Balanced Scorecard viewpoint that defines the capabilities that an organization needs to create long-term growth and improvement.

**Lease** An agreement that enables a company to use property without legally owning it.

**Ledger** See *general ledger*

**Leverage ratios** Ratios that measure the ability of a company to meet its long- and short-term obligations. These ratios provide a measure of the degree of protection provided to a company's creditors.

**Leverage** The use of borrowed capital to produce more income than needed to pay the interest on a debt.

**Liabilities** Probable future sacrifices of economic benefits; liabilities usually require the payment of cash, the transfer of assets other than cash, or the performance of services.

**LIFO reserve** The amount that inventory would increase (or decrease) if the company had used FIFO.

**Line positions** Positions that have direct responsibility for the basic objectives of an organization.

**Liquidating dividends** Dividends that return paid-in capital to stockholders; liquidating dividends occur when retained earnings has been reduced to zero.

**Liquidity** A company's ability to pay obligations as they become due.

**Liquidity ratios** Ratios that measure the ability of a company to meet its current obligations.

**Long-term debt-to-equity ratio** A ratio that provides information on the proportion of capital provided by this type of debt and by stockholders. It is calculated as: Long-Term Debt (including current portion) ÷ Total Equity.

**Long-term debt-to-total assets ratio** A measure of the proportion of capital provided by long-term creditors which is calculated as: Long-Term Debt (including current portion) ÷ Total Assets.

**Long-term investments** Investments that the company expects to hold for longer than one year. This includes land or buildings that a company is not currently using in operations, as well as debt and equity securities.

**Long-term liabilities** The obligations of the company that will require payment beyond one year or the operating cycle, whichever is longer.

**Lower of cost or market (LCM) rule** A rule that requires a company to reduce the carrying value of its inventory to its market value if the market value is lower than its cost.

## M

**Make-or-buy decisions** Relevant costing analyses that focus on whether a component should be made internally or purchased externally.

**Management's Discussion and Analysis (MD&A)** A section of the annual report that provides a discussion and explanation of various items reported in the financial statements. Management uses this section to highlight favorable and unfavorable trends and significant risks facing the company.

**Managerial accounting** The provision of accounting information for a company's internal users.

**Manufacturing cycle efficiency (MCE)** Measured as value-added time divided by total time. The result tells the company what percentage of total time spent is devoted to actual production.

**Manufacturing organization** An organization that produces tangible products.

**Manufacturing overhead** All product costs other than direct materials and direct labor. In a manufacturing firm, manufacturing overhead also is known as *factory burden* or *indirect* manufacturing costs. Costs are included as manufacturing overhead if they cannot be traced to the cost object of interest (e.g., unit of product).

**Margin** The ratio of net operating income to sales.

**Margin of safety** The units sold, or expected to be sold, or sales revenue earned, or expected to be earned, above the break-even volume.

**Market rate** The market rate of interest demanded by creditors.

**Markup** The percentage applied to a base cost; it includes desired profit and any costs not included in the base cost.

**Master budget** The collection of all area and activity budgets representing a firm's comprehensive plan of action.

**Matching principle** A principle that requires an expense to be recorded and reported in the same period as the revenue that it helped generate.

**Material** The idea that accounting information included in financial statements should be capable of influencing a decision.

**Materials price variance (MPV)** The difference between the actual price paid per unit of materials and the standard price allowed per unit multiplied by the actual quantity of materials purchased.

**Materials requisition form** A source document that records the type, quantity, and unit price of the direct materials issued to each job.

**Materials usage variance (MUV)** The difference between the direct materials actually used and the direct materials allowed for the actual output multiplied by the standard price.

**Maturity** The date on which a borrower agrees to pay the creditor the face (or par) value.

**Merchandise inventory** The inventory held by merchandisers.

**Method of least squares (regression)** A statistical method to find the best-fitting line through a set of data points. It is used to break out the fixed and variable components of a mixed cost.

**Mixed costs** Costs that have both a fixed and a variable component.

**Monetary incentives** The use of economic rewards to motivate managers.

**Monetary unit assumption** One of the four basic assumptions that underlie accounting that requires that a company account for and report its financial results in monetary terms (e.g., U.S. dollar, euro, Japanese yen).

**Mortgage bonds** Bonds that are secured by real estate.

**Mutually exclusive projects** Projects that, if accepted, preclude the acceptance of competing projects.

## N

**Natural resources** Resources, such as coal deposits, oil reserves, and mineral deposits, that are physically consumed as they are used by a company and that can generally be replaced or restored only by an act of nature.

**Net income** The excess of a company's revenue over its expenses during a period of time.

**Net loss** The excess of a company's expenses over its revenues during a period of time.

**Net present value** The difference between the present value of a project's cash inflows and the present value of its cash outflows.

**Net profit margin percentage** A measure of the proportion of each sales dollar that is profit, determined by dividing net income by net sales.

**Net sales revenue** Computed as gross sales revenue minus sales returns and allowances, as well as sales discounts.

**Noncash investing and financing activities** Investing and financing activities that take place without affecting cash. For example, a company may choose to acquire an operating asset (e.g., building) by issuing long-term debt.

**Noncash investing and financing activities** Investing and financing activities that take place without affecting cash.

**Nondiscounting models** Capital investment models that identify criteria for accepting or rejecting projects without considering the time value of money.

**Nonmonetary incentives** The use of psychological and social rewards to motivate managers.

**Non-Sufficient Funds (NSF) check** A check that has been returned to the depositor because funds in the issuer's account are not sufficient to pay the check (also called a "bounced" check).

**Nontrade receivables** Receivables that arise from transactions not involving inventory (e.g., interest receivable or cash advances to employees).

**Nonunit-level activity drivers** Factors that measure the consumption of nonunit-level activities by products and other cost objects.

**Nonvalue-added activities** All activities other than those that are absolutely essential to remain in business.

**Nonvalue-added costs** Costs that are caused either by nonvalue-added activities or by the inefficient performance of value-added activities.

**No-par stock** Stock without a par value.

**Normal balance** The type of balance expected of an account based on its effect on the fundamental accounting equation. Assets, expenses and dividends have normal debit balances while liabilities, stockholders' equity, and revenues have normal credit balances.

**Normal cost of goods sold** The cost of goods sold before adjustment for any overhead variance.

**Normal cost system** An approach that assigns the actual costs of direct materials and direct labor to products but uses a predetermined rate to assign overhead costs.

**Note(s) payable** A payable that arises when a business borrows money or purchases goods or services from a company that requires a formal agreement or contract.

**Notes receivable** Receivables that generally specify an interest rate and a maturity date at which any interest and principal must be repaid.

**Notes to the financial statements (or footnotes)** Notes that clarify and expand upon the information presented in the financial statements.

## O

**Operating activities** The ongoing, day-to-day, revenue-generating activities of an organization.

**Operating assets** Assets used to generate operating income, consisting usually of cash, inventories, receivables, and property, plant, and equipment. Average operating assets are found by adding together beginning operating assets and ending operating assets, and dividing the result by 2.

**Operating assets** The long-lived assets that are used by the company in the normal course of operations.

**Operating budgets** Budgets associated with the income-producing activities of an organization.

**Operating cash flow ratio** A ratio that looks at the ability of operations to generate cash, which recognizes the more general concept that current obligations will be paid through operations (after all, selling inventory and collecting receivables is a big part of operations). This ratio is calculated as: Cash Flows from Operating Activities ÷ Current Liabilities.

**Operating cycle** The average time that it takes a company to purchase goods, resell the goods, and collect the cash from customers.

**Operating expenses** The expenses a company incurs in selling goods or providing services and in managing the business.

**Operating income** Revenues minus operating expenses from the firm's normal operations. Operating income is before-tax income.

**Operating lease** The most common form of lease in which the lessor (the legal owner of the asset) retains the risks and obligations of ownership, while the lessee uses the asset during the term of the lease.

**Operating leverage** The use of fixed costs to extract higher percentage changes in profits as sales activity changes. Leverage is achieved by increasing fixed costs while lowering variable costs.

**Operating margin percentage** A measure of the profitability of a company's operations in relation to its sales that is calculated as:  $\text{Income from Operations} \div \text{Net Sales}$ .

**Operations process** A process that produces and delivers existing products and services to customers.

**Opportunity cost** The benefit given up or sacrificed when one alternative is chosen over another.

**Ordering costs** The costs of placing and receiving an order.

**Organizational costs** Significant costs such as legal fees, stock issue costs, accounting fees, and promotional fees that a company may incur when it is formed.

**Outstanding check** A check that has been issued and recorded by the business but that has not been "cash"ed" by the recipient of the check.

**Outstanding shares** The number of issued shares actually in the hands of stockholders.

**Overapplied overhead** The amount by which applied overhead exceeds actual overhead.

**Overhead budget** A budget that reveals the planned expenditures for all indirect manufacturing items.

**Overhead variance** The difference between actual overhead and applied overhead.

## P

**Paid-in capital in excess of par** The excess of the total amount paid for common or preferred stock over its par value.

**Par value** For stock, it is an arbitrary monetary amount printed on each share of stock that establishes a minimum price for the stock when issued, but does not determine its market value. For debt, par value is the amount of money the borrower agrees to repay at maturity.

**Parallel processing** A processing pattern in which two or more sequential processes are required to produce a finished good.

**Participating dividend preference** A provision that stockholders of participating preferred shares receive, in addition to the stated dividend, a share of amounts available for distribution as dividends to other classes of stock.

**Participative budgeting** An approach to budgeting that allows managers who will be held accountable for budgetary performance to participate in the budget's development.

**Partnership** A business owned jointly by two or more individuals.

**Patent** A type of intangible asset that grants the holder the right to manufacture, sell, or use a product. The legal life is 20 years from the date of the grant.

**Payback period** The time required for a project to return its investment.

**Payment date** The date on which the dividend will actually be paid.

**Payroll taxes** Taxes that businesses must pay based on employee payrolls; these amounts are not withheld from employee pay; rather, they are additional amounts that must be paid over and above gross pay.

**Performance report** A report that compares the actual data with planned data.

**Period costs** Costs that are expensed in the period in which they are incurred; they are not inventoried.

**Periodic inventory system** An inventory system that records the cost of purchases as they occur (in an account separate from the inventory account), takes a physical count of inventory at the end of the period, and applies the cost of goods sold model to determine the balances of ending inventory and cost of goods sold. The inventory account reflects the correct inventory balance only at the end of each accounting period.

**Permanent accounts** Accounts of asset, liability, and stockholders' equity items whose balances are carried forward from the current accounting period to future accounting periods.

**Perpetual inventory system** An inventory system in which balances for inventory and cost of goods sold are continually (perpetually) updated with each sale or purchase of inventory. The accounts reflect the correct inventory and cost of goods sold balances throughout the period.

**Petty cash** A fund used to pay for small dollar amounts.

**Physical flow schedule** A schedule that reconciles units to account for with units accounted for. The physical units are not adjusted for percent of completion.

**Planning** A management activity that involves the detailed formulation of action to achieve a particular end.

**Plantwide overhead rate** A single overhead rate calculated using all estimated overhead for a factory divided by the estimated activity level across the entire factory.

**Postaudit** A follow-up analysis of an investment decision, comparing actual benefits and costs with expected benefits and costs.

**Posting** The process of transferring information from journalized transactions to the general ledger.

**Postpurchase costs** The costs of using, maintaining, and disposing of the product.

**Postsales service process** A process that provides critical and responsive service to customers after the product or service has been delivered.

**Predetermined overhead rate** An overhead rate computed using estimated data.

**Preferred stock** A class of stock that generally does not give voting rights, but grants specific guarantees and dividend preferences.

**Present value** The current value of a future cash flow. It represents the amount that must be invested now if the future cash flow is to be received assuming compounding at a given rate of interest.

**Prevention costs** Cost incurred to prevent defects in products or services being produced.

**Price** The revenue per unit.

**Price (rate) variance** The difference between standard price and actual price multiplied by the actual quantity of inputs used.

**Price standards** The price that should be paid per unit of input.

**Price-earnings ratio** The price-earnings ratio is found by dividing the market price per share by the earnings per share.

**Prime cost** The sum of direct materials cost and direct labor cost.

**Principal** The amount of money borrowed and promised to be repaid (usually with interest).

**Prior period adjustment** The correction of an error made in the financial statements of a prior period. The adjustment is entered as a direct adjustment to retained earnings.

**Process value chain** The innovation, operations, and postsales service processes.

**Process-costing system** A costing system that accumulates production costs by process or by department for a given period of time.

**Process-value analysis** An approach that focuses on processes and activities and emphasizes systemwide performance instead of individual performance.

**Producing departments** Units within an organization responsible for producing the products or services that are sold to customers.

**Product (manufacturing) costs** Costs associated with the manufacture of goods or the provision of services. Product costs include direct materials, direct labor, and overhead.

**Product diversity** The situation present when products consume overhead in different proportions.

**Production budget** A budget that shows how many units must be produced to meet sales needs and satisfy ending inventory requirements.

**Production report** A document that summarizes the manufacturing activity that takes place in a process department for a given period of time.

**Products** Goods produced by converting raw materials through the use of labor and indirect manufacturing resources, such as the manufacturing plant, land, and machinery.

**Profit center** A division of a company that is evaluated on the basis of operating income or profit.

**Profitability ratios** Ratios that measure two aspects of a corporation's profits: (1) those elements of operations that contribute to profit and (2) the relationship of profit to total investment and investment by stockholders. These ratios allow investors, creditors, and managers to evaluate the extent to which invested funds are being used efficiently.

**Profit-volume graph** A graphical portrayal of the relationship between profits and sales activity in units.

**Property, plant, and equipment** The tangible, long-lived, productive assets used by a company in its operations to produce revenue. This includes land, buildings, machinery, manufacturing equipment, office equipment, and furniture.

**Pseudoparticipation** A budgetary system in which top management solicits inputs from lower-level managers and then ignores those inputs. Thus, in reality, budgets are dictated from above.

**Publicly traded companies** Companies that issue stock traded on U.S. stock exchanges to which the Sarbanes-Oxley Act applies.

**Purchase allowance** A situation in which the purchaser chooses to keep the merchandise if the seller is willing to grant a deduction (allowance) from the purchase price.

**Purchase discounts** Price reductions (usually expressed as a percentage of the purchase price) that companies offer their customers to encourage prompt payment.

**Purchase returns** The cost of merchandise returned to suppliers.

**Purchases** The cost of merchandise acquired for resale during the accounting period.

## Q

**Quantity standards** The quantity of input allowed per unit of output.

**Quick or acid-test ratio** A measure of liquidity that compares only the most liquid assets to current liabilities. A measure of a company's short-term liquidity that is calculated as follows:  $(\text{Cash} + \text{Short-Term Investments} + \text{Receivables}) \div \text{Current Liabilities}$ .

## R

**Ratio analysis** An examination of financial statements conducted by preparing and evaluating a series of ratios.

**Realized external failure costs** Environmental costs caused by environmental degradation and paid for by the responsible organization.

**Realized/realizable** One of two requirements for revenue to be recognized. An item is realized, or realizable, if noncash resources (e.g., inventory) have been exchanged for cash or near cash (e.g., accounts receivable).

**Receivable turnover ratio** A ratio that indicates how many times accounts receivable is turned over each year. It is calculated as:  $\text{Net Sales} \div \text{Average Accounts Receivable}$ .

**Reciprocal method** A method that simultaneously allocates service costs to all user departments. It gives full consideration to interactions among support departments.

**Recognition** The act of recording transactions in the accounting system that involves determination of which events qualify to be recorded and, if they do, when they should be recorded.

**Relevant** One of the four qualitative characteristics that useful information should possess. Accounting information is said to be relevant if it is capable of making a difference in a business decision by helping users predict future events or by providing feedback about prior expectations. Relevant information must also be provided in a timely manner.

**Relevant costs** Future costs that change across alternatives.

**Relevant range** The range of output over which an assumed cost relationship is valid for the normal operations of a firm.

**Reliable** One of the four qualitative characteristics that useful information should possess. To be reliable, information should be verifiable (independent parties agree that the information is free from error or bias), representationally faithful (the information accurately portrays what it is intended to portray), and neutral (free from bias).

**Reorder point** The point in time when a new order should be placed (or setup started).

**Required rate of return** The minimum rate of return that a project must earn in order to be acceptable. Usually corresponds to the cost of capital.

**Research and development (R&D) expense** The cost of internal development of intangible assets that is expensed as incurred.

**Residual income** The difference between operating income and the minimum dollar return required on a company's operating assets.

**Residual value (salvage value)** The amount of cash or trade-in consideration that the company expects to receive when an asset is retired from service.

**Resource drivers** Factors that measure the consumption of resources by activities.

**Responsibility center** A segment of the business whose manager is accountable for specified sets of activities.

**Retained earnings (or deficit)** The accumulated earnings (or losses) over the entire life of the corporation that have not been paid out in dividends.

**Return on assets** A ratio that measures the profit earned by a corporation through use of all its capital, or the total of the investment by both creditors and owners. Return on assets is calculated as:  $[\text{Net Income} + \text{Interest} (1 - \text{Tax Rate})] / \text{Average Total Assets}$ .

**Return on common equity ratio** A ratio that is basically the same as the return on equity ratio. It is calculated as:  $\text{Net Income} / (\text{Total Equity} + \text{Preferred Stock} + \text{Paid-In Capital} - \text{Preferred Stock})$ .

**Return on equity** A ratio that measures the profit earned by a firm through the use of capital supplied by stockholders. Return on equity is computed as net income divided by average equity.

**Return on investment (ROI)** The ratio of operating income to average operating assets.

**Return on sales** A measure of the efficiency of a firm that is computed by dividing net income by sales.

**Return on stockholders' equity** A measure that can be used to compare against other return measures (e.g., preferred dividend rates and bond rates). It is computed by dividing net income less preferred dividends by the average common stockholders' equity.

**Return on total assets** The result of dividing net income plus the after-tax cost of interest by the average total assets.

**Revenue** The increase in assets that results from the sale of products or services.

**Revenue center** A segment of the business that is evaluated on the basis of sales.

**Revenue expenditures** Expenditures that do not increase the future economic benefits of the asset. These expenditures are expensed as they are incurred.

**Revenue recognition principle** A principle that requires revenue to be recognized or recorded in the period in which it is earned and the collection of cash is reasonably assured.

## S

**Safeguarding** The physical protection of assets through, for example, fireproof vaults, locked storage facilities, keycard access, and anti-theft tags on merchandise.

**Safety stock** Extra inventory carried to serve as insurance against changes in demand. Safety stock is computed by multiplying the lead time by the difference between the maximum rate of usage and the average rate of usage.

**Sales allowance** A price reduction offered by the seller to induce the buyer to keep the goods when the goods are only slightly defective, are shipped late, or in some other way are rendered less valuable.

**Sales budget** A budget that describes expected sales in units and dollars for the coming period.

**Sales discount** A price reduction (usually expressed as a percentage of the selling price) that companies may offer to encourage prompt payment.

**Sales mix** The relative combination of products (or services) being sold by an organization.

**Sales returns** Merchandise or goods returned by the customer to the seller.

**Sales revenue** Revenue resulting from the sale of goods or services.

**Sales taxes** Money collected from the customer for the governmental unit levying the tax.

**Salvage value** See *residual value*

**Sarbanes-Oxley Act (SOX)** Passed in 2002 in response to revelations of misconduct and fraud by several well-known firms, this legislation established stronger governmental control and regulation of public companies in the United States, from enhanced oversight (PCAOB), to increased auditor independence and tightened regulation of corporate governance.

**Scattergraph method** A method to fit a line to a set of data using two points that are selected by judgment. It is used to break out the fixed and variable components of a mixed cost.

**Secured** A term used for a bond that has some collateral pledged against the corporation's ability to pay.

**Securities and Exchange Commission (SEC)** The federal agency established by Congress to regulate securities markets and ensure effective public disclosure of accounting information. The SEC has the power to set accounting rules for publicly traded companies.

**Securitization** A process in which large businesses and financial institutions frequently package factored receivables as financial instruments or securities and sell them to investors.

**Segment** A subunit of a company of sufficient importance to warrant the production of performance reports.

**Segment margin** The contribution a segment makes to cover common fixed costs and provide for profit after direct fixed costs and variable costs are deducted from the segment's sales revenue.

**Segregation of duties** The idea that accounting and administrative duties should be performed by different individuals, so that no one person has access to the asset and prepares all the documents and records for an activity.

**Selling and administrative expenses budget** A budget that outlines planned expenditures for nonmanufacturing activities.

**Selling costs** Those costs necessary to market, distribute, and service a product or service.

**Sell-or-process-further decision** Relevant costing analysis that focuses on whether a product should be processed beyond the split-off point.

**Semi-variable** A type of cost behavior where the true total cost function is increasing at a decreasing rate.

**Sensitivity analysis** The "what-if" process of altering certain key variables to assess the effect on the original outcome.

**Sequential (or step) method** A method that allocates service costs to user departments in a sequential manner. It gives partial consideration to interactions among support departments.

**Sequential processing** A processing pattern in which units pass from one process to another in a set order.

**Service charges** Fees charged by the bank for checking account services.

**Service organization** An organization that produces intangible products.

**Services** Tasks or activities performed for a customer or an activity performed by a customer using an organization's products or facilities.

**Shareholders** See *stockholders*

**Short-term liquidity ratios** A type of ratio that compares some combination of current assets or operations to current liabilities.

**Single-loop feedback** Information about the effectiveness of strategy implementation.

**Slope** The variable cost per unit of activity usage.

**Societal costs** (See Unrealized external failure costs.)

**Sole proprietorship** A business owned by one person.

**Special-order decisions** Relevant costing analyses that focus on whether a specially priced order should be accepted or rejected.

**Specific identification method** An inventory costing method that determines the cost of ending inventory and the cost of goods sold based on the identification of the actual units sold and in inventory. This method does not require an assumption about the flow of costs but actually assigns cost based on the specific flow of inventory.

**Split-off point** The point at which products become distinguishable after passing through a common process.

**Staff positions** Positions that are supportive in nature and have only indirect responsibility for an organization's basic objectives.

**Standard cost per unit** The per-unit cost that should be achieved given materials, labor, and overhead standards.

**Standard cost sheet** A listing of the standard costs and standard quantities of direct materials, direct labor, and overhead that should apply to a single product.

**Standard hours allowed (SH)** The direct labor hours that should have been used to produce the actual output (Unit labor standard  $\times$  Actual output).

**Standard quantity of materials allowed (SQ)** The quantity of materials that should have been used to produce the actual output (Unit materials standard  $\times$  Actual output).

**Stated capital (legal capital)** The amount of capital that, under law, cannot be returned to the corporation's owners unless the corporation is liquidated.

**Stated rate** See *interest rate*

**Statement of cash flows** A financial statement that provides relevant information about a company's cash receipts (inflows of cash) and cash payments (outflows of cash) during an accounting period.

**Statement of retained earnings** A financial statement that reports how much of the company's income was retained in the business and how much was distributed to owners for a period of time.

**Static budget** A budget for a particular level of activity.

**Step cost** A cost that displays a constant level of cost for a range of output and then jumps to a higher level of cost at some point, where it remains for a similar range of output.

**Stock dividend** A dividend paid to stockholders in the form of additional shares of stock (instead of cash).

**Stock repurchase payout ratio** A ratio that addresses the distribution of company value and can be calculated directly as: Common Stock Repurchase  $\div$  Net Income, or indirectly as Stock Repurchase Payout Ratio = Total Payout Ratio  $-$  Dividend Payout Ratio.

**Stock split** A stock issue that increases the number of outstanding shares of a corporation without changing the balances of its equity accounts.

**Stock warrant** The right granted by a corporation to purchase a specified number of shares of its capital stock at a stated price and within a stated time period.

**Stockholder ratios** Ratios such as earnings per share and return on common equity that provide information about the creation of value for shareholders.

**Stockholders** The owners of a corporation who own its shares in varying numbers.

**Stockholders' equity** The owners' claims against the assets of a corporation after all liabilities have been deducted.

**Stockout costs** The costs of insufficient inventory.

**Straight-line depreciation** A depreciation method that allocates an equal amount of an asset's cost to depreciation expense for each year of the asset's useful life. Straight-line depreciation expense for each period is calculated by dividing the depreciable cost of an asset by the asset's useful life.

**Strategic plan** The long-term plan for future activities and operations, usually involving at least five years.

**Strategic risks** Possible threats to the organization's success in accomplishing its objectives that are external to the organization.

**Strategy** The process of choosing a business's market and customer segments, identifying its critical internal business processes, and selecting the individual and organizational capabilities needed to meet internal, customer, and financial objectives.

**Sunk costs** Costs for which the outlay has already been made and that cannot be affected by a future decision.

**Support departments** Units within an organization that provide essential support services for producing departments.

## T

**T-account** A graphical representation of an account that gets its name because it resembles the capital letter T. A T-account is a two-column record that consists of an account title and two sides divided by a vertical line—the left side is called the debit side and the right side is called the credit side.

**Target cost** The difference between the sales price needed to achieve a projected market share and the desired per-unit profit.

**Target costing** A method of determining the cost of a product or service based on the price (target price) that customers are willing to pay.

**Temporary accounts** The accounts of revenue, expense, and dividend items that are used to collect the activities of only one period.

**Testable strategy** A set of linked objectives aimed at an overall goal that can be restated into a sequence of cause-and-effect hypotheses.

**Time period assumption** One of the four basic assumptions that underlie accounting that allows the life of a company to be divided into artificial time periods so net income can be measured for a specific period of time (e.g., monthly, quarterly, annually).

**Time series (or trend) analysis** A type of analysis that compares a single corporation across time.

**Time ticket** A source document by which direct labor costs are assigned to individual jobs.

**Time value of money** The idea that a cash flow in the future is less valuable than a cash flow at present.

**Times-interest-earned ratio** A leverage ratio that uses the income statement to assess a company's ability to service its debt. It is computed by dividing net income before taxes and interest by interest expense.

**Total budget variance** The difference between the actual cost of an input and its planned cost.

**Total payout ratio** A ratio that adds stock repurchases to common dividends and compares this to net income. It is calculated as: Total Payout Ratio = (Common Dividends + Common Stock Repurchases)/Net Income.

**Total quality management** A management philosophy in which manufacturers strive to create an environment that will enable workers to manufacture perfect (zero-defect) products.

**Trade receivable** An account receivable that is due from a customer purchasing inventory in the ordinary course of business.

**Trademark** An intangible asset that grants the holder the right to the exclusive use of a distinctive name, phrase, or symbol. The legal life is 20 years, but it can be renewed indefinitely.

**Trading securities** Investments in equity or debt securities of other companies that management intends to sell in the near term. Trading securities are bought and sold frequently and typically are owned for under one month.

**Transaction** Any event, external or internal, that is recognized in the financial statements.

**Transaction analysis** The process of determining the economic effects of a transaction on the elements of the accounting equation.

**Transfer price** The price charged for goods transferred from one division to another.

**Transferred-in costs** Costs transferred from a prior process to a subsequent process.

**Transportation-in** See *freight-in*

**Treasurer** The individual responsible for the finance function; raises capital and manages cash and investments.

**Treasury stock** Previously issued stock that is repurchased by the issuing corporation.

**Trial balance** A list of all active accounts and each account's debit or credit balance.

**Turnover** The average length of time required for assets to be consumed or replaced; the ratio of sales to average operating assets.

## U

**Underapplied overhead** The amount by which actual overhead exceeds applied overhead.

**Unearned revenue** A liability that occurs when a company receives payment for goods that will be delivered or services that will be performed in the future.

**Unfavorable (U) variances** Variances produced whenever the actual input amounts are greater than the budgeted or standard allowances.

**Unit-level activities** Activities that are performed each time a unit is produced.

**Unit-level activity drivers** Factors that measure the consumption of unit-level activities by products and other cost objects.

**Units-of-production method** A depreciation method that allocates the cost of an asset over its expected life in direct proportion to the actual use of the asset; depreciation expense is computed by multiplying an asset's depreciable cost by a usage ratio.

**Unrealized external failure costs** Environmental costs caused by an organization but paid for by society.

**Unsecured** A term used for bonds in which the lender is relying on the general credit of the borrowing corporation rather than on collateral.

**Usage (efficiency) variance** The difference between standard quantities and actual quantities multiplied by standard price.

**Useful life** The period of time over which the company anticipates deriving benefit from the use of the asset.

## V

**Value chain** The set of activities required to design, develop, produce, market, and deliver products and services to customers.

**Value-added activities** Activities that are necessary for a business to achieve corporate objectives and remain in business.

**Value-added costs** Costs caused by value-added activities.

**Variable budgets** See *flexible budget*

**Variable cost ratio** Variable costs divided by sales revenues. It is the proportion of each sales dollar needed to cover variable costs.

**Variable costing** A product-costing method that assigns only variable manufacturing costs to production: direct materials, direct labor, and variable overhead. Fixed overhead is treated as a period cost.

**Variable costs** Costs that, in total, vary in direct proportion to changes in output within the relevant range.

**Variable overhead efficiency variance** The difference between the actual direct labor hours used and the standard hours allowed multiplied by the standard variable overhead rate.

**Variable overhead spending variance** The difference between the actual variable overhead and the budgeted variable overhead based on actual hours used to produce the actual output.

**Velocity** The number of units that can be produced in a given period of time (e.g., output per hour).

**Vertical analysis** A type of analysis that expresses each financial statement line item as a percent of the largest amount on the statement.

**Voluntary disposal** A type of disposal that occurs when a company determines that the asset is no longer useful; the disposal may occur at the end of the asset's useful life or at some other time.

## W

**Warranty** A warranty is a guarantee to repair or replace defective goods during a period (ranging from a few days to several years) following the sale.

**Weighted average costing method** A process-costing method that combines beginning inventory costs with current-period costs to compute unit costs. Costs and output from the current period and the previous period are averaged to compute unit costs.

**Withholding** Businesses are required to withhold taxes from employees' earnings; standard withholdings include federal, state, and possibly city or county income taxes, as well as Social Security and Medicare. Employees may also have amounts withheld for such things as retirement accounts and health insurance.

**Work in process (WIP)** The cost of the partially completed goods that are still being worked on at the end of a time period.

**Working capital** A measure of liquidity computed as: Current Assets – Current Liabilities.

**Worksheet** An informal schedule that accountants use to assist them in organizing and preparing the information necessary to perform the end-of-period steps in the accounting cycle—namely, the preparation of adjusting entries, financial statements, and closing entries.

**Y**

**Yield** The market rate of interest demanded by creditors; yield may differ from stated rate because the underwriter disagrees with the borrower as to the correct yield or because of changes in the economy or creditworthiness of the borrower between the setting of the stated rate and the date of issue.



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## G A A P—Conceptual Framework (ch 2)

Qualitative Characteristics	Assumptions	Principles
<ul style="list-style-type: none"> <li>• Relevance</li> <li>• Reliability</li> <li>• Comparability</li> <li>• Consistency</li> </ul>	<ul style="list-style-type: none"> <li>• Economic Entity</li> <li>• Continuity</li> <li>• Time Period</li> <li>• Monetary Unit</li> </ul>	<ul style="list-style-type: none"> <li>• Historical Cost</li> <li>• Revenue Recognition</li> <li>• Matching</li> <li>• Conservatism</li> </ul>

ACCOUNTING CYCLE (ch 2, 3)	
During the period	<ol style="list-style-type: none"> <li>1. Analyze transactions</li> <li>2. Journalize transactions</li> <li>3. Post to the ledger</li> </ol>
End of the period	<ol style="list-style-type: none"> <li>4. Prepare a trial balance</li> <li>5. Adjust the accounts</li> <li>6. Prepare financial statements</li> <li>7. Close the accounts</li> </ol>

Beginning of the Period → End of the Period

Hightower Inc. Balance Sheet Dec. 31, 2008	
Assets:	
Cash	\$ 2,030
Other assets	32,360
Total assets	<u>\$34,390</u>
Total Liabilities:	\$10,500
Stockholders' Equity:	
Common stock	14,450
Retained Earnings	9,440
Total Liabilities & Stockholders' Equity	<u>\$34,390</u>

Hightower Inc. Income Statement For the Year Ended Dec. 31, 2009	
Revenues	\$51,800
Expenses	46,940
Net Income	<u>\$ 4,860</u>

Hightower Inc. Statement of Retained Earnings For the Year Ended Dec. 31, 2009	
Retained Earnings, 1/1	\$ 9,440
Add: Net income	4,860
Less: Dividends	(3,000)
Retained Earnings, 12/31	<u>\$11,300</u>

Hightower Inc. Statement of Cash Flows For the Year Ended Dec. 31, 2009	
Net cash provided from operating activities	\$3,470
Net cash used by investing activities	(4,800)
Net cash provided from financing activities	1,800
Net change in cash	\$ 470
Cash, 1/1/2009	2,030
Cash 12/31/2009	<u>\$2,500</u>

Hightower Inc. Balance Sheet Dec. 31, 2009	
Assets:	
Cash	\$ 2,500
Other assets	36,300
Total assets	<u>\$38,800</u>
Total Liabilities:	\$13,050
Stockholders' Equity:	
Common stock	14,450
Retained Earnings	11,300
Total Liabilities & Stockholders' Equity	<u>\$38,800</u>

## TYPICAL CHART OF ACCOUNTS

ASSETS	LIABILITIES	STOCKHOLDERS' EQUITY	EXPENSES/LOSSES
Cash	Accounts Payable	Common Stock	Cost of Goods Sold
Investments—Available-for-Sale Securities	Short-Term Notes Payable	Preferred Stock	Amortization Expense
Investments—Trading Securities	Unearned Revenue	Retained Earnings	Bad Debt Expense
Accounts Receivable	Interest Payable		Depletion Expense
Allowance for Doubtful Accounts	Income Tax Payable		Depreciation Expense
Notes Receivable	Sales Tax Payable		Factoring Fee Expense
Rent Receivable	Salaries/Wages Payable		Income Tax Expense
Interest Receivable	Federal Income Tax Payable		Insurance Expense
Merchandise Inventory	State Income Tax Payable		Interest Expense
Supplies	Social Security Tax Payable		Rent Expense
Prepaid Insurance	Medicare Tax Payable		Service Charge Expense
Prepaid Rent	Employer Medicare Tax Payable		Supplies Expense
Other Assets	Employer Social Security Tax Payable		Utilities Expense
Office Furniture	Federal Unemployment Tax Payable		Warranty Expense
Equipment	State Unemployment Tax Payable		Miscellaneous Expense
Building	Long-Term Notes Payable		Salaries/Wages Expense
Accumulated Depreciation	Bonds Payable		Employer Medicare Tax Expense
Patents, Trademarks, Copyrights	Discount (Premium) on Bonds Payable		Employer Social Security Tax Expense
Accumulated Depletion	Estimated Warranty Liability		Federal Unemployment Tax Expense
			State Unemployment Tax Expense
			Loss on Disposal of Assets
			Loss from Impairment
			Unrealized Loss on Trading Securities

## ACCOUNTING EQUATION (ch 2):

$$\text{ASSETS} = \text{LIABILITIES} + \text{STOCKHOLDERS' EQUITY}$$

Dr.↑	Cr.↓	Dr.↓	Cr.↑	Contributed Capital		Retained Earnings	
				Dr.↓	Cr.↑	Dr.↓	Cr.↑
				Revenues			
				Dr.↓	Cr.↑		
				Expenses		Dividends	
				Dr.↑	Cr.↓	Dr.↑	Cr.↓

## ADJUSTING ENTRIES (ch 3)

Type	Debit	Credit
Accruals	Revenues	Asset
	Expenses	Revenue
Deferrals	Revenues	Expense
	Expenses	Liability
	Revenue	Asset

## CLOSING ENTRIES (ch 3)

Transfers net income (loss) and dividends to retained earnings and sets temporary accounts to zero balance

Step 1	Close revenues to income summary
Step 2	Close expenses to income summary
Step 3	Close income summary to retained earnings
Step 4	Close dividends to retained earnings

ELEMENTS OF INTERNAL CONTROL (ch 4)
Control environment
Risk assessment
Control activities
Information & communication
Monitoring

PRINCIPLES OF CASH MANAGEMENT (ch 4)
Keep inventory levels low
Timing of payment of liabilities
Speed up collection of receivables
Invest idle cash

BANK RECONCILIATION (ch 4)	
Cash Balance (Bank Statement)	Cash Balance (Company Records)
Add: Deposits in transit	Add: Bank credits on bank statement
Less: Outstanding checks	Less: Bank debits on bank statement
Adjusted Cash Balance	Adjusted Cash Balance
Adjusted Cash Balance should be equal	

CALCULATION OF INTEREST (ch 4, 8) (REVENUE OR EXPENSE)
Interest = Face value × Interest rate × Fraction of one year

NET ACCOUNTS RECEIVABLE (ch 5)
Bad debt expense must be estimated to be recorded in the period of the sale. This results in an allowance for doubtful accounts balance until specific uncollectible accounts can be identified and removed from accounts receivable.
Percentage of credit sales method: Estimate bad debt expense as a percentage of net credit sales. Also known as the income statement approach because the amount for the income statement account is determined first.
Aging method: Analyze accounts receivable to determine the value of net accounts receivable. Adjust allowance for doubtful accounts accordingly. Also known as the balance sheet approach because the amount for the balance sheet account is determined first.
Adjusting entry under either method: Bad Debt Expense xxx Allowance for Doubtful Accounts xxx

NET SALES (ch 5)
Sales
– Sales discounts
– Sales returns & allowances
Net sales

OPERATING ASSETS—Depreciation (ch 7)	
Depreciation Expense	xxx
Accumulated Depreciation	xxx
Methods to calculate periodic depreciation expense:	
Straight-line	$\frac{\text{Cost} - \text{Residual Value}}{\text{Expected Useful Life}}$
Declining-balance	Declining balance rate × book value
Units-of-Production	$\frac{\text{Actual Usage of Asset}}{\text{Expected Usage of Asset}} \times \text{Depreciable Cost}$

DISPOSAL OF ASSETS (ch 7)
Proceeds from sale
Less: Book value of asset
Gain (Loss) on sale of asset

BONDS (ch 9)		
Bonds Sold at	Yield Compared to Stated Rate	Interest Over the Life of the Bonds
Premium (above Par)	Yield < Stated Rate	Interest Expense < Interest Paid
Par	Yield = Stated Rate	Interest Expense = Interest Paid
Discount (below Par)	Yield > Stated Rate	Interest Expense > Interest Paid
Bond interest paid = Face amount of bonds × Stated interest rate		
Bond interest expense = Interest paid + Discount amortization OR Interest paid – Premium amortization		
<b>Premium amortization calculations:</b>		
Straight-line method	$\frac{\text{Bond discount (premium)}}{\text{Number of interest periods}}$	
Effective interest method	Carrying value × effective interest rate × fraction of year	

INSTALLMENT NOTES: INTEREST CALCULATION (ch 9)
Note Payable Balance at the Beginning of the Period × Interest Rate × Fraction of year

STOCKHOLDERS' EQUITY (ch 10)	
Capital stock	Common stock; Add'l PIC on common stock Preferred stock; Add'l PIC on preferred stock
+ Retained earnings	
– Treasury stock	
Total stockholders' equity	

STATEMENT OF CASH FLOWS (ch 11)
<b>Operating activities</b>
Net income
Add: Amortization, depreciation, losses on asset disposal, decreases in current assets, increases in current liabilities
Deduct: Gains on disposal of assets increases in current assets, decreases in current liabilities
<b>Investing activities</b>
<b>Financing Activities</b>
Net change in cash
Cash balance, beginning of year
Cash balance, end of year

COST OF GOODS SOLD MODEL (ch 6)
Beginning inventory
+ Net purchases
Cost of goods available for sale
– Ending inventory
Cost of goods sold

INVENTORY COSTING METHODS (ch 6)		
Allocates of cost of goods available for sale to ending inventory and cost of goods sold		
Method	Costs in ending inventory	Cost of goods sold
Specific ID	Actual units in inventory	Actual units sold
FIFO	Most recent purchases	Earliest purchases
LIFO	Earliest purchases	Most recent purchases
Avg. cost	Weighted average of goods available	Weighted average of goods available

FINANCIAL STATEMENT ANALYSIS (ch 12)	
Cross-sectional, Time-series analysis	
Horizontal analysis, Vertical analysis	
Ratio analysis	Liquidity ratios
	Debt management ratios
	Asset efficiency ratios
	Profitability ratios
Stockholder ratios	
DuPont analysis	



# Cornerstones Videos

Each "Cornerstone" in the book is accompanied by a short video clip that students may view online or download onto portable video players. The clips provide clear, step-by-step examples that are consistently presented for today's visual learners. They walk students through each step of every "Cornerstone."

**CORNERSTONE 6-5**

**HOW TO Apply the FIFO Inventory Costing Method**

**Concept:**  
The cost of the earliest purchases that make up cost of goods available for sale is allocated to cost of goods sold, and the cost of the most recent purchases are allocated to ending inventory.

**Information:**  
Tampico Beachwear, a retail store specializing in beach apparel, has the following information related to purchases and sales of one of its more popular products, Crocs brand shoes. (Each inventory layer is a different color.)

Date	Description	Units Purchased at Cost	Units Sold at Retail
Oct. 1	Beginning Inventory	300 units @ \$16 = \$ 4,800	
3	Purchase 1	600 units @ \$18 = \$10,800	
8	Sale 1	250	800 units @ \$30

80% of students surveyed wanted access to video presentations to help explain the concepts.

70% of instructors who reviewed these videos indicated they would recommend or require students to use them.

"The video is excellent for students who prefer a visual presentation of the example and the concepts. It is also useful for students who missed class or don't remember class. I like this feature very much."

—Professor Michael E. Yampuler, University of Houston

"I think this series of videos will be a wonderful addition to the text. Today's generation of students appears to put much more emphasis on a 'visual' approach to learning, and this will help respond to that style."

—Professor Douglas Larson, Salem State University

To view these videos, visit the **Cornerstones Website:**

[www.cengage.com/accounting/jones/videos](http://www.cengage.com/accounting/jones/videos)

Password: **jonesfinman**

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