



BEEKEEPING LEVEL

Learning Guide #1

**Unit of Competence: - Identify and handling
bee hive and tool**

**Module Title:-Identifying and handling
bee hive and tool**



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LG Code: AGR BKG1 M10 LO1-LG-1

TTLM Code: AGR BKG1 TTLM 0919v1

**Lo1 Extract, process and
store honey**



Instruction Sheet	Learning Guide #1
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Identifying tools and accessories
- Conducting tools and accessories.
- Identifying bee transferring and inspection tools and accessories
- Identifying honey harvesting and extracting tools

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to:**

- Identify tools and accessories according to lists provided
- Conduct tools and accessories .
- Identify bee transferring and inspection tools and accessories insufficient or faulty items are reported to supervisor
- Identify honey harvesting and extracting tools

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.



3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask your teacher for assistance if you have a hard time understanding them.
4. Accomplish the “Self-check 1” **in page -**.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.



Information sheet-1	Identifying tools and accessories
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1.1. Introduction of tools and accessories of bee hive

Beekeeping equipments are materials used in beekeeping and honey production. Besides the hive, there are several pieces of equipment that are indispensable for beekeeping. If a person is to work with bees successfully, there should be some protection from bee stings. Protective clothing worn by the beekeeper prevents most stings. A smoker when properly used allows for some control over the bees, thus minimizing stings. A hive tool allows the beekeeper to pry top bars.

1.2. List of Tools

Table.1. List of tools and accessories

N	Items	N	Items
1.	Smoker	2.	First aid kits and fire extinguisher
3.	Water sprayer	4.	String
5.	Knife	6.	Queen excluder
7.	Casting mould	8.	Honey strainer
9.	Frame wire	10.	Honey jars
11.	Embedded	12.	Refract meter
13.	Hive box	14.	Honey presser
15.	Chisel	16.	Buckets boots
17.	Queen cage	18.	Bee veil
19.	Feeder	20.	Overalls and Gloves
21.	Weighing Scale	22.	Traditional:
23.	Uncapping fork/ knife	24.	Woven basket hive,
25.	Bee brush	26.	Log Hive.
27.	Centrifuge extractor honey	28.	Clay or mud jar and bricks



- | | | | |
|-----|----------------------------|-----|-----------------|
| | settling tank | | (clay hive) |
| 29. | Modern/moveable frame: | 30. | Transitional: |
| 31. | Zander hive | 32. | Kenyan top bar, |
| 33. | Ethio-rebrab(Chefaka) hive | 34. | Mud block |

1.3. Identify, check and report materials, tools and equipment

Bee keeping equipment is material used (necessarily important) for bee keeping and also honey production. Some of the most important bee keeping equipment are: -

1. **Beehive:** - Successful beekeeping means easy manipulation of the frames of brood and honey to provide a surplus of honey beyond that which the bees need to live on and rear their replacements. It is this surplus of honey which the beekeeper removes and marketed for his product.

Components of the Improved (modern) hive

Hive stand → Bottom Board → Brood chamber → Queen Excluder →
 Extracting or bulk comb supers (may be added as needed) Inner Cover →
 Telescoping cover (outer cover)

Hive stand (function): - is keeping the hive off the damp ground & keeping the cluster and combs drier in winter.

Bottom Board: serves as the floor of the beehive and is supplied with various means of reducing or enlarging the entrance to the hive.

Hive Body (Brood chamber)=Full depth super

The first hive body resting on the bottom board will be the brood chamber where the queen lays the eggs & the baby bees are raised.

Queen Excluder: -if used is placed b/n the brood chamber & the supers.

Supers: -are constructed in various depths for different reasons.

Inner Cover: -a rectangular covers & fits B/n the top hive body & the telescoping

cover or roof of the beehive.

Outer cover -is the roof of the beehive & is supplied in beginner kits.



-It is usually metal covering a wooden frame for added protection against the weather and its sides telescope well down over the inner cover & the top super or body for a rainproof fit and extra stabilization in high winds.

2. **Frame wire**- it is used to support the honey comb in the frame
3. **Casting mould**- it is a metal caused with zinc. It is manually operated and used to make artificial comb foundation sheet.
4. **Transformer**-it is of 18-24 volts, it can reduce the 220v down to 18-24v.
This transformer is used for fixing comb foundation sheets on the frame wires but it is not used in areas where electrification is lacking particularly in most places of rural Ethiopia.
5. **Embedded knives**- is used as an alternative or hot iron bar to do the same purpose (as of transformer)
6. **Honey extractor (Centrifugal)**- it can be hand drive or electrically operated
7. **Honey presser**- it is used to extract honey be methods of hand pressing of the honey combs which are not framed

E.g. honeycomb harvested from traditional and Transitional hives.

8. **Uncapping** - fork it is operated manually

This device is mainly used to decamp the cells, of ripened honey before the framed honey combs are placed in the extractor.

9. **Uncapping knife** - is also used for the same purpose, but it is electrically operated.

10. **Queen excluder** (Separating careen)

- Advisee used to form an appropriate partition between the brood and honey chambers so as to prevent the queen bee and drones from interning in to the honey super.

There are three types of queen excluder based on the materials they are made of.

I. Hard metal

II. Metal sheet Queen Excluder

III. Plastic

11. **Honey storage tank** -This is made of stainless steel with a very tight lid, it has a tap



There are at least two types of them-

- The one, which has, get calamity of 50 kg and 30 kg.

12. Honey jars (glass or plastic)

- Each contains 500 gm.

13. Chisel (bee keeper's tool)

- it is made up of iron metal and has sharp surface on one end.
- It is a hand tool of a beekeeper. One has to use or have in his/her hand before appetizing bee hives.
- It is used to open the hive, clean porpoise and other up necessary materials seen in the hive. It can be made locally.

14. **Bee brush**- a soft bristled used to remove bee from a frame combs.

(to draw bees into the hive)

15. **Smoker**- it is manually exported

- It sub dues the bees and induces them to feed (engorge), Bees full of honey or other feeds are much easier to handle being
- Aggression is at a minimum while the colonies are disrupted in response to smoke.
- It is also believed that the smoke deadens the effect of alarm pheromones produced during the disturbance caused by evening up the hive.

16. Water Sprayer

Used to spray water on bees (especially at lo land areas like Gamble) to reduce-

- ✓ Aggressiveness
- ✓ Immediate evacuation from their nest.

17. Honey weighing scale

- ✓ It is used for weighing honey harvested
- ✓ It is used also to keep production records of honey obtained from a hive and/or from an apiary

18. Honey strainer.

- It is a double course screen



- It is used in the normal processing of honey freshly extracted from the comb to remove the Bits of wax that flow out of the extractor with honey.
- All honey as it comes from the extractor and before it goes into bottles (jars) should be run through a strainer to remove sediments and wax cupping.

1. 4 Handling and transporting Materials, tools and equipment

Whenever we are going to our work area we have to handle and transport our equipment materials and tools safely. And also after completing our task we have to take them back to their place (store) safely without any damage on the equipment and ourselves by cleaning and maintaining if necessary.

1.5. Maintaining Clean and safe work site

Clean and safe work site is maintained while working. Sanitation or clean working area is a must for efficient poultry production because dirty or unclean work area can be possible reason of disease for both animal and stock owner. Due to the reason of this our work must be cleaned on a regular time of interval. Every task must be under taken in accordance with OHS requirements (regulations/codes of practice and enterprise safety policies and procedures) to create safe work area.



Self-Check -1

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. list down the common tools and accessories of hive? (6points)

Note: Satisfactory rating -5 points and above points

Unsatisfactory – below 5

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information sheet-2

Conducting tools and accessories

2.1. Introduction of Conducts Tools and Accessories

Regular bee hive inspection is important in monitoring the progress of your bees. You are able to identify problems early and solve them. Inspecting your bee hive is important for both the beekeeper with a single bee hive and those with apiaries. Different bee hives have their unique inspection and maintenance schedules. Some hives may easily go for a long time without needing inspection while others may require weekly inspections. Bee hives in their first year generally require more frequent inspections. In its second year, the hive will require considerably less inspections.

2.2. What to Look Out for

There are a number of things you can be on the look-out for during a bee hive inspection. Generally, the health of the bee colony and structural integrity of the bee hive are topmost. Watching your bees often and listening to them will help you establish baselines for the easy noticing of problems. Those with great sense of smell may also use it to get a hint of how well things are in their bee hives. Beekeepers should know that good brood health must be assessed every now and then. Take every opportunity to determine brood health during a bee hive inspection. Drops in bee numbers show poor brood health. If you've noticed brood decline in your hive, you may consider using a [brood booster](#) or feeding your bees with [pollen patties](#).

2.3. Planning Ahead

A bee hive inspection allows you to anticipate colony growth. Use the opportunity to decide about the addition of space for your bees. This involves adding more frames or bee hive boxes. Beekeepers should add more space for bees before it becomes absolutely necessary. Larger bee colonies are more capable of surviving harsh weather.

Things to Note:

- A bee colony that gets too big than the space it lives in may splinter or move away from the bee hive.



- There are various methods of controlling bee colony sizes such as splitting a hive. Your bee hive inspection will tell you if it is time to reduce the size of your bee colony.
- [Splitting the colony](#) is one of the methods to control swarming. Queen cups and other preparations to swarming will alert you during bee hive inspections.

2.4. What Not to Wear

During hive inspections, avoid wearing perfumes, colognes or using scented hair sprays. Sweet odors draw the attention of bees more than you want during an inspection. You should also remember to take off jewelry, especially rings. If you get stung on the finger, the swelling will be much tougher for you to deal with when you have on a ring. This is because rings do not expand. Leather and wool are materials that may irk bees. Their smell aggravates bees and the materials retain a significant amount of body odor that is perceptible to bees.

2.5. What to Wear

A bee hive inspection by its nature and goals places you in close proximity to bees. Safety is foremost for beekeepers. You should remember to [wear protective clothing](#) and seal it up well during bee hive inspections and every time you are near a bee hive. It only takes one angry bee stinging you and aggravating the whole lot of worker bees in the hive. In addition to safety equipment, make sure to have a hive tool and a smoker for bee hive inspection.

Safety Tips

- If a bee manages to find its way into your veil or under your beekeeping suit during a bee hive inspection, try not to panic. Walk away from the hive without squeezing the bee.
- Only take off your veil or suit while at a safe distance from any bee hive. At a safe distance, you may address the issue of the bee under your beekeeping suit.
- Thrashing and other panic behavior will lead to more aggravation of the bees. You will also be more likely to make a mistake if you panic.



2.6. How Often should you inspect a Bee Hive

The frequency of opening a bee hive varies from one to the next. Beekeepers too may vary their bee hive inspection schedules based on their availability to carry out said inspection. While beekeepers need to keep tabs on their bee colonies and bee hives, they should also not be bothersome to the bees. The average bee hive should be inspected every 4-6 weeks. Newer bee hives require inspection every 7-10 days for progress monitoring.

As the bee hive stays longer with bees in it, beekeepers gradually increase the time between hive inspections from days to weeks. Consider that every intrusion into the bee hive takes the bees a day to recover. This means wasted time that would be better spent collecting nectar and pollen for use in the hive. This applies even to newly installed bee colonies. If you take to disturbing them too much, they may decide to leave the bee hive and go live elsewhere.

Beginner beekeepers may be anxious about how well their bee colony is faring. In their inexperience, they may end up opening up their bee hives too often. Very frequent bee hive inspections may lead to colony stress. Bees do not consider it normal to have intrusions around and into bee hives. The effects of colony stress are not good for beekeeping. Bees may leave the hive or kill off their queen. Others have been observed to change queens with higher frequency. It is right to inspect a bee hive, but do not overdo it. Every time you are carrying out a bee hive inspection, be sure you have a valid reason for it.



Self-Check -2

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. During inspection of hive What to Wear and What Not to Wear?

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



Information sheet-3	Identifying bee transferring and inspection tools and accessories
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3.1. Bee transferring tools and accessories

Table 2. Tools and accessories

Clothing	Tools	
<ul style="list-style-type: none"> ✚ Overalls ✚ Hat & Veil ✚ Sweat Band ✚ Gloves & Ankle Bands 	<ul style="list-style-type: none"> - Grip-type frame lifter - Bee brush - Sting relief stick - Grass trimmer - Spray bottles for water and sugar water - Frame bottom scraper - Covered plastic sweater box for tools 	<ul style="list-style-type: none"> - Hive-side hanging frame rest - 9-frame spacer tools (2) - Heavy 3" wide scraper - Pruning shears - Scraping tray - Covered plastic sweater box for - Scrapings - Big tub for everything

3.2. Bee hive inspection tools and accessories

A hive tool is a handheld multipurpose tool used in maintaining and inspecting beehives. Hive tools come in multiple variants and styles, and is intended as an all-in-one tool for beekeepers.

1. Protective Gear

The first equipment that beekeepers should consider purchasing is protective clothing. But for some beekeepers, the barriers of large, billowy bee suits can interfere with their ability to connect with the bees. It all depends on your personality and how you use the equipment.

Thankfully, many available wardrobe choices are available. On one end of the spectrum, full bee suits cover every inch of skin from head to toe. However, they are more costly than smaller items of protective clothing, averaging about \$95 for a traditional suit because they often include



everything: beekeeper's veil, jacket and pants, either in separate pieces or in a jumper-style suit. Coveralls, which are protective jumpers that omit the veil, are often less, averaging around \$75.

Protective gear is also available in individual pieces: Some beekeepers choose to only wear a veil or, my preference, a veil-and-jacket combo. Jackets are available in ventilated or solid cotton-blend styles and can range from \$60 to \$80. Pants are available separately from the jacket, and coordinating styles may zipper together or simply have elastic around the hems for a tight, bee-safe fit. These britches cost around \$35 and, like the cuffs of their jacket counterparts, have elastic at the ankle. Gloves, which often cost about \$25, are often ventilated with long sleeves and have elastic around the cuff for a secure fit.

Many natural beekeepers omit gloves because they prefer the dexterity that bare hands afford them. Some prefer not to use protective clothing at all. If you pass on every other piece of protective gear, at the very least, consider using a veil. Despite our best efforts to be sensitive, gentle and considerate, stings are an inevitable part of [keeping bees](#), and it would be prudent to protect the delicate tissues of the face. Veils range in price between \$30 and \$60, depending on the style, but are priceless when it comes to safety and comfort.

While clothing options are a personal choice, remember that the bees respond most to the energy you put out during an inspection. If you are at ease around them and feel comfortable, they'll respond in kind. If you're feeling clumsy, apprehensive or generally afraid, they'll pick up on this, as well. So, choose your clothing choices based purely on your needs of safety and comfort—not what other beekeepers say or do.

2. The Smoker

Of all the tools in the beekeeper's shed, the smoker is the most used and the most iconic. Smoke acts as a buffer to the honeybee's pheromone alarm system: When smoke is present in a hive of bees, it renders their ability to communicate inactive, temporarily placating the bees. Without messages of danger spreading through the hive, the beekeeper can more easily go about the tasks of hive inspections, frame removals, splits and honey extractions.

The smoker is often made of high-quality stainless steel with a solid chimney, metal guards to protect the beekeeper's hands and bellows made of wood and leather. Once lit, the smoke gently floats out through a small opening at the top.



There are few variations on the traditional beekeeper's smoker, and any that you find in a beekeeping catalog will likely be suitable for your needs, big and small. A smoker typically costs between \$30 to \$40 and is a wise investment.

3. The Hive Tool

While not strictly necessary for inspections, some beekeepers would argue that, without a hive tool, inspecting some hives is nearly impossible. The hive tool is a solid, flat, metal tool, often about 1/4 inch thick, 2 inches wide and 7 inches long. Hive tools have one tapered sharp end and one tapered curved end. They're often manufactured in bright colors, such as bold red and lemon yellow, so they're easy to find in the bee yard.

The hive tool's roles are nearly endless; mainly, they help the beekeeper pry up and remove frames heavy with propolis—a sticky substance made from tree resin, affectionately known by beekeepers as bee glue—that may be literally glued in place. The hive tool can be used to scrape away propolis, cut open honeycomb, squash unwanted intruders, such as hive beetles, and much more. Hive tools are an easy purchase and worth having around, especially at the \$7 price tag.

4. The Bee Brush

This tool is a very soft bristled brush used to gently remove bees from frames, honey supers or another area where they may be congregating in the beekeeper's way. Of course, just how gentle a bee brush actually can be is determined by the force used by the person wielding it.

Some beekeepers have mixed feelings about using a bee brush with frequency; though the bristles are soft, a forceful brush can damage tiny and delicate bee parts, such as legs and wings. It may also anger and frustrate bees, leading to increased alarm pheromones, higher chances of stings, and an overall more stressful beekeeping experience for both the humans and the bees. Other beekeepers feel the brush has its place, especially when it comes to honey extractions. For the \$6 cost, it doesn't hurt to have one in your bee basket to see if it works for you.

5. Extracting Equipment

Whether manual or electric, small-scale or commercial, most extractors work the same way: Within their large, stainless-steel cylindrical bodies are several baskets that hold honey frames. Centrifugal force, either manual or electric, pulls the honey from the frames, where it drips down



the inside walls of the extractor toward a spigot at the bottom. From there, honey runs through a food-grade strainer, is allowed to rest in bottling buckets for about 24 hours and is then bottled.

Honey extracting and bottling equipment is by no means a necessity for most beekeepers, even if you plan on [harvesting honey](#) several times per year. In fact, in most established beekeeping communities, local clubs will have several honey extractors available for rent by the club. In my local club, the nominal fee to rent all of the extracting equipment for a long weekend is only \$25.

With that said, there's no need to deny yourself the ease and convenience of having your own extracting equipment if it's important to you. A spontaneous extraction of a certain honey varietal after an especially good honey flow is part of the fun of keeping bees. I'll never forget the year we managed to pull a beautiful little harvest of pure, coveted sourwood honey and were able to harvest it before the bees included other varietals because we had our own equipment handy.

As with most hobbies, newcomers to beekeeping can invest a pretty penny on all of the gadgets and gizmos that the catalogs have to offer or simply make do with what's around. Over the years of keeping bees myself, I've found it easy to strike a balance with just a few necessary tools. But that's just me. The truth of the matter is that every beekeeper is different in his or her style and physical needs, be it a bad back, arthritis or poor eyesight, so what might not work for me might be a lifesaver for you, or vice versa.



Self-Check -3

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write and discuss important bee hive inspection tools and accessories?

Note: Satisfactory rating - 5 points

Unsatisfactory - below 5 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date:

Short Answer Questions



Information sheet - 4

Identifying honey harvesting and extracting tools

4.1. Honey harvesting and extracting tools

This instructs able features honey harvest and extraction. While it is less likely that anyone would do this on their own if they are not a beekeeper, this might be useful for those who aspire to become one. Bees are really great and easy to keep, even in the urban environment! As Novella Carpenter calls them, bees are "gateway animal for urban farmers". All you need is some space in the backyard/deck. The process of honey harvesting and extraction most likely happens on a separate days. These are the tools required

Honey Harvest

1. Beekeepers suite - mesh helmet and folding veil would do it, with some layers of clothe
2. Smoker with fuel (dry branches, leaves, etc.) and a lighter
3. Frame super - where frames with honey combs will be put for transportation
4. Sting resistant gloves
- 5) hive tool - to move the frames, scrape wax, etc.

Honey Extraction

1. Heated knife - to unseal honey cells
2. Uncapping fork - to unseal honey cells missed by the heated knife
3. Tub for wax/honey
4. Extractor! - Fancy cylindrical piece of equipment, used to extract honey
5. Food-grade bucket - to catch honey out of the extractor
6. Double sieve - catches wax and impurities as honey is poured from extractor
7. Containers - final destination of honey before consumption



Self-Check -4

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write and discuss important honey harvesting and extracting tools?

Note: Satisfactory rating - 5 points

Unsatisfactory - below 5 points

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date:

Short Answer Questions



LAP Test	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished:

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within --- hour.

Task 1. Identifying tools and accessories

Task 2. Conducting tools and accessories.

Task 3. Identifying bee transferring and inspection tools and accessories

Task 4. Identifying honey harvesting and extracting tools



List of Reference Materials

- 1- **BOOKS**
- 2- **WEB ADDRESSES (PUTTING LINKS)**



(BEEKEEPING LEVEL I)

NTQF Level I

Learning Guide #2

**Unit of Competence: - Identify and Handle Bee
Hive and Tools**

**Module Title:- Identifying and Handle Bee
Hive and Tools**

LG Code: AGR BKG1 M10 LO2-LG-2

TTLM Code: AGR BKG1 TTLM 0919v1



Lo2 : Identify different type of bee hives

Instruction Sheet	Learning Guide #2
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Identifying different bee hives.
- Describing advantage and disadvantage of bee hives

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to:**

- Identify different bee hives.
- Describe advantage and disadvantage of bee hives

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” **in page -.**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.



Information sheet 1

Identifying different bee hives.

1.1. Bee hive

A **beehive** is an enclosed, man-made structure in which some honey bee species of the subgenus *Apis* live and raise their young. Though the word beehive is commonly used to describe the nest of any bee colony, scientific and professional literature distinguishes *nest* from *hive*. *Nest* is used to discuss colonies which house themselves in natural or artificial cavities or are hanging and exposed. *Hive* is used to describe an artificial, man-made structure to house a honey bee nest. Several species of *Apis* live in colonies, but for honey production the western honey bee (*Apis mellifera*) and the eastern honey bee (*Apis cerana*) are the main species kept in hives.

1.2. Types beehive

1.2.1. Traditional hive

The farmers in order to produce their bee baskets use cheap local materials like clay, straw, bamboo, false banana leaves, and bark of trees, logs and animal dung. Like in other branches of agriculture, they do not need to invest and they use very few tools, mostly knife. Almost all methods are based on the concept of minimal management. They fix up the beehives and hung them on certain trees. For harvesting they have to climb up the trees to reach the baskets, which were placed in the upper branches, then use a flaming torch to clear the baskets and allow the honey to be collected. During harvesting, the colony will often be destroyed or at least damaged because the honeycomb together with the brood and the pollen is cut out with a knife.

Fixed-comb hives are no more than man-made cavities. These can be hollowed-out logs, bark cylinders, clay pots, wooden boxes, baskets of straw, bamboo, mud-plastered wicker containers, or discarded metal cans or drums. In some areas, cavities for bees are carved in the mud walls of houses or in nearby earthen embankments. The bees attach the combs directly to the upper surfaces of the hive and usually to the sides. The bees naturally leave the bee space between the combs as they construct them. Combs can be removed from such hives only by cutting them out, and it is not practical to replace them. Thus beekeeping is impossible with fixed-comb hives. These hives allow only for bee killing or bee hiving.



1.2.2. Transitional (Intermediate) hive

Intermediate technology hives give small farmers an affordable opportunity to learn about bees and beekeeping and to develop the needed expertise and capital to make use of a moveable-frame system later.

The use of an intermediate technology system in a beekeeping development program is not incompatible with “high-tech” beekeeping. Both have their place. It is the job of the program planner to determine the nature of the bee-human relationship and the cultural and economic realities of the area. From this the planner can suggest the type of equipment to use in the program. In some areas, the use of both types may be justified. The beekeepers themselves should make the final decision.

Types of transitional hives:

A. **Kenyan top bar hive:** Is a popular type of intermediate technology hive. It was developed in Kenya in the 1970s and has been extensively used in beekeeping development projects. This is a practical hive to use in small-scale beekeeping projects. When compared to other intermediate technology hives, this hive offers a relatively large number of management options. Its simple design also allows for the use of a wide range of materials: each top bar hive accommodates 27-30 top bars where bees attach their combs. . For African races of the western hive bee, the width should be 32 mm; for European races, it should be 35 mm .It is important that the width of the top bar hive be correct so that the bees will construct only one comb per bar. The sides of the hive should be inclined at an angle of 120 degrees to the bottom. This minimizes the combs being stuck to the sides as it follows the similar form in which bees naturally construct their comb.

Advantages of the Kenyan top bar hive system over the modern (Langstroth hive) system for small-scale beekeeping include:

- __The number of critical dimension areas in the KTBH is far less than in a Langstroth system. Thus, the hive is easy to construct with local level carpentry skills and equipment.
- __The wood used in the construction of the KTBH does not have to be of high quality. The KTBH can even be built of reed matting, straw, or old oil barrels.
- __An extractor is not needed for the KTB system.
- __Sheets of pressed foundation wax are not needed.
- __Because of its low cost and design, it is economical to use with simple management techniques to achieve moderate increases in honey yield.
- __This system produces more wax.



- __Queen excluder is not needed.

B. Tanzanian top bar hive: this is a variation of the Kenyan top bar hive.

Mud block (chika) hive: It is completely a prototype of Kenyan top bar hive but it is made of block of mud with mould.

1.2.3. Improved (modern) hive

The rapid development of modern beekeeping is attributed to four very important discoveries:

- a. The discovery of moveable frame hive in 1806.
- b. The application of bee space by Langstroth in 1851 and the subsequent development of modern moveable frame hive.

The bee space is the crawl space needed by a bee to pass easily between two structures (7.5 mm for the western hive bee, less for the eastern hive bee). If the space between any two surfaces in the hive is too small for a bee to pass through easily, the bees will seal it with propolis. If the space is larger than a bee needs to pass through easily, the bees will construct comb in the area. When the space between two surfaces in the hive is the right size, the bees will leave it free as a crawl space. If the bee space is considered and respected in the construction of a hive, a hive that allows for easy comb removal and replacement will result.

Lorenzo Langstroth was the first person to make use of the bee space in hive construction. He constructed the first modern hive in 1851, using moveable frames to contain the comb within the hive. The modern frame hive currently used for “high-tech” beekeeping is still sometimes referred to as the Langstroth hive.

- c. The discovery of equipments such as casting mould, queen excluder and honey extractors.

The moveable-frame system (improved) beekeeping system is the ultimate in beekeeping development. Nevertheless, such a system will remain economically out of reach of many people who might like to improve their methods of honey or wax production. Until they accrue the necessary capital and expertise to engage in beekeeping with moveable-frame equipment, an intermediate technology system can serve their needs.

This system uses moveable frames in several boxes. This system allows for easy manipulation of combs. Both frames (containing combs) and boxes can be easily interchanged for management. Frames containing honey are removed from the hive, the capping of the cells cut off with a heated knife, and extractor. The empty combs are then returned to the colony for the bees to refill.



Honey production is maximized at the expense of wax production with moveable-frame hives. Bees need to produce about eight kilograms of honey to produce one kilogram of wax. Because the empty combs are returned for refilling, honey production is enhanced.

Comb foundation, or sheets of beeswax embossed with the dimensions of worker cells are used in the frames. The main function of this is to produce strong comb centered in the frame. Comb foundation also reduces the amount of wax that the bees have to produce, which also increases honey production.

Since the combs are attached to the frame on four sides, and the frame usually contains several strands of thin wire to reinforce the comb, hives can be easily moved with little chance of breakage. Therefore, migratory beekeeping can be carried out with moveable-frame hives.

In migratory beekeeping, colonies are moved to take advantage of the variations in nectar flow between regions. This effectively increases the period of honey flow for the beekeeper.

A moveable-frame beekeeping system also gives beekeepers the option to produce pollen, royal jelly, or queens in large numbers.

The lack of understanding of how to construct and use the inputs is the factor that prevents the economic use of a “high-tech” beekeeping system in most small-scale development situations. The principles of hive management are the same for high-tech beekeeping as for intermediate technology beekeeping. High-tech beekeeping provides for more ease in manipulations and gives more options to the beekeeper. It also calls for a greater investment.

High-tech beekeeping will give greater return for the investment in most beekeeping situations. However, the options of a high-tech system must be fully used to realize such a return. The combination of lack of capital for investment and lack of understanding of timing, organization and bee biology often makes the success of high-tech beekeeping difficult for small farmers



Self-Check -1

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. write down the different types beehive? (6points)

Note: Satisfactory rating -5 points and above points

Unsatisfactory – below 5

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date:

Short Answer Questions



Information sheet-2

Describing advantage and disadvantage of bee hives

2.1. Advantage of bee hives

2.1.1 Advantage Traditional hive

- Materials for their construction are usually readily available and they are cheap
- Beeswax production is relatively high. (There is a ready local market for beeswax).
- They are traditional, and methods are established for working with them.

2.1.2. Advantages of transitional (intermediate) hive

- a) This hive is cheaper and easier to produce than a frame hive. Any semi-skilled carpenter can make it. Only a few simple carpentry tools are required.
- b) There is little or no need to import anything. All materials required can be obtained locally.
- c) The hive can be opened easily and quickly. There is little or no need to employ a hive tool. Top-bars can be constructed to overlap the sides of the hive body slightly, and this makes it possible to use the thumb to pry up the top-bar.
- d) Top-bars occupied by combs can easily be detected, so that the hive is opened from the empty side. This avoids crushing the bees between the top-bars when lifting the first comb.
- e) Bees in the top-bar hive can easily be controlled when harvesting or inspecting the combs. The smoker puffs smoke through the opening created by the removal of one top-bar. Few bees can attack, since the beekeeper drives them away with smoke. When the top cover is removed from the transitional long hive, all the frames' 7-mm spaces are exposed, which permits numerous attackers to fly out and attack the beekeeper.
- f) The top-bar hive is lighter to carry, even when the colony is inside.
- g) More beeswax can be produced. Sales of beeswax increase the beekeeper's earnings and solve a great national problem. Beeswax is a multi-purpose industrial raw material required by factories and craftsmen.
- h) There is no need to employ a queen excluder, which at the moment is not available. In practice, the bees keep their brood chamber separate from the honeycombs. Clean honey can be taken away, leaving brood combs undisturbed.
- i) Honey production can be high. A well-managed hive with a good strong colony can produce between 50 and 120 kg of honey annually.
- j) Honeycombs adulterated with pollen can be of high value. Pollen is a nutritious food supplement; the only way the nutrition is passed on is through honey harvested from such combs.



k) Only a few extra top-bars need be held in stock to replace worn-out or damaged bars.

2.2.3. Advantage modern or frame hive

a) The comb is fixed firmly to the four sides of the frame. This facilitates easy harvesting, and the beekeeper has little fear of damaging the comb.

b) The strength of the built-in comb also allows easy transportation, even over bad roads. It also affords easy control of a colony of bees without fear of breakage before the arrival at the new destination.

c) Honey is extracted by means of the centrifugal honey extractor, which makes it possible to remove the honey without damaging the comb. Empty combs are returned to the hive for the bees to refill with new honey, thus saving the insects from wasting time and energy to construct a replacement comb. Honey harvests are maximized, as the beekeeper can obtain several honey crops within the year. In Canada, for instance, a frame hive with a strong colony of bees may produce over 200 kg of honey per year. Thus, it is ideal for a serious large-scale honey production programme.

d) During hive manipulations, very few bees are crushed between frames, whereas dozens of bees can easily be killed by careless handling of top-bars.

e) The hive is so designed (with queen excluder and supers) that the queen and brood are confined to the lower chamber. Supers contain only honey, and the lower brood chamber is undisturbed when honey is harvested.

f) Stealing a double- or triple-storey hive with a colony is a difficult feat for a thief. The Kenyan top-bar hive, on the contrary, can be carried away easily.

g) A swarm of bees can be hived with ease. Bees can easily pass through the numerous spaces between the frame and at the top of the hive.

h) Hive boxes can be stacked easily. This makes it easy to expand and contract the hive to meet the needs of the bee colony.

i) Drugs can be applied with ease through the openings.



2.2. Disadvantage of bee hives

2.2.1. Disadvantage traditional of bee hives

- It is impossible to remove combs and replace them, thus examination of the colony condition and hive manipulations are impossible.
- Swarming is often common because of limited space.
- Brood is often lost in harvesting honey.
- Honey production is hindered.
- Honey quality is usually low because it comes from old comb or is mixed with pollen, brood, or ash.

2.2.2. Disadvantages of the transitional (intermediate) hive

- a) A newly-constructed comb and all combs filled with honey must be handled with the utmost care. It is not advisable to move a top-bar hive, occupied by bees and combs, on lorries along bad roads full of potholes.
- b) Honey can only be extracted by destroying honeycombs, either by using the solar wax melter to dissolve the comb cells or by crushing them and squeezing out the honey. Bees have to build up new ones in their place, and this involves time, material and resources of the honeybees.
- c) Bees are often crushed between top-bars as the beekeeper rearranges the bars after removing them from the hive body. This problem can be serious when colonies are manipulated at night. When bees are crushed in this way, it is difficult to fix the last top-bar into place. Crushing bees is usually not a serious problem with frame hives.
- d) A top-bar hive is relatively easy to steal, as it is light and compactly designed. It is more difficult to steal hives and supers arranged one above the other.

2.2.3. Disadvantages of the Modern (frame) hive in tropical Africa

- a) Frame hive with two supers costs three times as much as a Kenyan 27-top-bar hive.
- b) A high degree of craftsmanship is required to build the hive. Frame dimensions must be precise. Local village carpenters are not usually skilled enough for the job, and suitable tools for large-scale production of frame parts may not be available. Even if they are, it is never certain that the craftsmen have the patience to construct the hive correctly. Hives ordered for use in Ghana by the



Technology Consultancy Centre failed to achieve the desired goals due to lack of precision in construction.

c) Wood for frame construction must be seasoned for at least a year. Very few carpenters or entrepreneurs can tie up their capital in this way.

d) The need to keep a stock of frames to replace those removed during the honey harvest creates an additional cost.

e) The need to import centrifugal honey extractors, decapping-knives, trays and other sophisticated equipment cannot be ruled out. In many countries, currency to order these from abroad cannot be obtained easily by local beekeepers.

f) If frames are unguided, honeybees find it difficult to start the combs correctly on the frame. The beekeeper has to install a wired comb foundation which is not available. The only foundations that can be ordered from abroad cannot be successfully used by the tropical honeybee, because the African bee is smaller than the European bee, and the cell size on imported foundation is too large for African bees.

g) A hive with supers is heavy and difficult to carry as a head-load; therefore, a vehicle may be required to move colonies if the need arises.

h) Because the frames do not fit together as the top-bars do, it is very difficult for the beekeeper to control the numerous bees which pass through the spaces between the frames and the top of the hive. This problem is very serious with the transitional long hive, which has as many as 30 frames arranged in a single-storey rectangular box. Such a beehive needs a special large smoker, and even such a smoker may not be able to produce enough smoke to "cool" the aggressive bees. The new beekeeper, upon seeing hordes of bees escaping, may run away, leaving the hive uncovered.



Self-Check -2

Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Write down the advantage and disadvantage of frame beehive (6points)

Note: Satisfactory rating -5 points and above points

Unsatisfactory – below 5

Answer Sheet

Score = _____

Rating: _____

Name: _____

Date: _____

Short Answer Questions



(BEEKEEPING LEVEL I)

NTQF Level I

Learning Guide #3

**Unit of Competence: - Identify and Handle Bee
Hive and Tools**

**Module Title:- Identifying and Handle
Bee Hive and Tools**

LG Code: AGR BKG1 M10 LO3-LG-3

TTLM Code: AGR BKG1 TTLM 0919v1

**Lo3 Handle bee keeping tools and
accessories**



Instruction Sheet	Learning Guide #3
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Handling waste material.
- Checking different Beekeeping tools and accessories.
- Cleaning and storing beekeeping tools and accessories.
- Maintaining clean and safe work site.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to:**

- Handle waste material.
- Check different Beekeeping tools and accessories.
- Clean and store beekeeping tools and accessories.
- Maintain clean and safe work site.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” **in page -.**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).



6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.

7. Submit your accomplished Self-check. This will form part of your training portfolio.

Information sheet 1	Handling waste material.
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1.1. Handling Waste material produced

There are different waste material or product which will be produced in work place but the main waste material which will produced at the apiary site are the following

- broken components
- plant debris
- plastic
- metal and paper-based
- Comb attacked by wax moth
- dead broad

These waste materials which are produced at apiary have to be removed from the site on regularly.

1. 2 Handling and transporting Materials, tools and equipment

Whenever we are going to our work area we have to handle and transport our equipment materials and tools safely. And also after completing our task we have to take them back to their place (store) safely without any damage on the equipment and ourselves by cleaning and maintaining if necessary.

1.3. Maintaining Clean and safe work site

Clean and safe work site is maintained while working. Sanitation or clean working area is a must for efficient poultry production because dirty or unclean work area can be possible reason of disease for both animal and stock owner. Due to the reason of this our work must be cleaned on a regular time of interval. Every task must be under taken in accordance with OHS requirements (regulations/codes of practice and enterprise safety policies and procedures) to create safe work area.



2.1. Different Beekeeping tools and accessories

Essential Equipment

Hive

The first piece of equipment required for beekeeping is the hive. It's basically a home where bees live and work. There are plenty of options you can choose from, and I have explained the most popular types of hives in my other post .

But, if you are going for regular honey harvests, it's not enough to have just the hive. You need other stuff to perform hive-related tasks. You see, the hive is not a single item, it consists of boxes and frames, cover boards, hive stands, ventilation mesh boards, feeders, etc. And getting just the hive without spare frames can get the job done, but ideally, you want to take it a step further. So, when I say hive, what I actually mean are these components.

Body and Covers

Body of the hive is basically the outer layer of the hive, or the box as we like to call it. The shape and size, as well as the requirement for spare parts, depends on the type of hive you choose. For example, if you are using a Langstroth or a Warre hive, having spare boxes can be quite beneficial for expanding the colony or harvesting honey. In a top-bar system, extra bodies are not a prerequisite. The same goes for covers. Spare mesh covers and bottom boards can come in handy if there is a need for better ventilation or traffic control.

Frames and Top Bars

Frames and top bars are the essential parts of a hive. It's where the bees build combs used for everything within the colony. So, both of these are essential parts of the hive. Now, depending on the type of a hive you pick, you would like to get extra frames or top bars. It's the same deal as hive bodies. While harvesting honey, it's easier to take out a stacked frame and put in a spare one, allowing you to extract the honey away from the hive and at the time of your choosing, but also allowing bees to continue working and storing new honey. It's not absolutely essential to have the spare frames, but it does make things a lot easier for both you and the bees.



Hive Stand and Additional Hive Equipment

Hive stand is neither here nor there in terms of being an essential part of the hive, but I consider it really important. A hive stand elevates the hive away from the ground and first and foremost, away from natural predators. It limits the amount of moisture coming in from the soil and enables better hive ventilation, especially if the surrounding grass is tall and thick. Additional equipment is just a footnote and it touches on specialized tools for cutting and modifying the boxes and frames, hammers, nails, tools of all sorts and stuff like that. Non-essential, but still worth mentioning as you will notice every beekeeper has at least a couple of specialized tools for hive maintenance.



Information sheet 3

Cleaning and storing beekeeping tools and accessories..

3.1. Clean up on completion of work

3.1.1. Return materials to store or dispose

Materials are returned to store or disposed of according to supervisor instructions. Tools and equipment are cleaned, maintained and stored according to manufacturer

Specifications and supervisor instructions.

Disposing waste

- Clean debris regularly and dispose in a dedicated pit.
- Clean and disinfect equipments contaminated by wastes

3.1.2. Repair and Clean, maintain and store tools and equipment

Whenever we are going to our work area we have to take our equipment materials and tools safely. And also after completing our task we have to replace them to their place (store) safely without any damage on the equipment and our selves by cleaning and maintaining if necessary. Before starting beekeeping work, clean all tools and equipments. Wash both hands thoroughly first and then rinse in an effective antiseptic solution before beekeeping work.

3.1.3. Report and record work outcomes and seek feedback

After completing any work directed by supervisor any work outcome and work problem have to be reported to supervisor. Beekeeping activity should be reported daily, weekly, monthly and yearly to the concerned body as well as for documentation. It is important source of information and advice from someone who has collected and studied the farm profitability, in order to make decisions and take actions. Reports should be clear, understandable, and meaningful. The outcome measurement process have gone well, poorly reported information will discourage use or provide misleading information.



Information sheet 4

Maintaining clean and safe work site

4.1. The importance of a clean workplace

The workplace environment influences employees' productivity, performance and well-being. No matter the industry, maintaining a clean workplace may help keep staff members safe, healthy and efficient. However, busy production schedules and increasing workloads may cause standards to dip.

While it may be tempting to put off dusting or other types of cleaning around the office or worksite, doing so may put employees at risk of suffering an injury or illness and may even impact performance levels. Maintaining a clean workplace is vital for employers to reduce their workers compensation claims and keep efficiency high.

Essential **to** **safety**

When employees work in a messy environment, they may not notice all hazards, which increases the risk of an accident. According to the Occupational Safety and Health Administration (OSHA), an occupational hazard is anything in the workplace that may cause harm. An occupational hazard is commonly caused by neglect on the part of the employer or a lack of awareness by workers. When the office or worksite isn't clean, it may increase the chance that a hazard will go unnoticed by a supervisor and staff members.

For example, if equipment is placed along an emergency route, workers may become injured if they trip or fall over it because it is out of place. If boxes aren't stacked properly, they may fall on a worker and cause an injury. Employers may want to remember to keep the workplace free of debris and remind workers to put all equipment, such as personal protective equipment (PPE), in designated places to prevent an accident.

Crucial to health

Flu season is rapidly approaching and workplaces may see an increase in the number of employees using sick days if they become ill. According to Kimberly-Clark Professional, germs can spread quickly through the workplace if supervisors and employees don't adequately sanitize their hands and their workspaces. Commonly used spaces, such as break rooms, can be hot spots for germs to accumulate.



According to Kimberly-Clark, break rooms have been found to have approximately 20,951 germs per square inch. Parts of the break room that tend to be touched the most, such as doorknobs, microwave oven handles and sinks, can be ripe with germs. Employers may want to clean these places on a frequent basis, and daily during flu season.

Another common health hazard of unclean workplaces is the germination of mold. According to OSHA, mold can cause adverse health effects for employees who are exposed to mold spores. Mold is a fungi that can release millions of spores into the air and can cause respiratory illnesses. Because of this, OSHA has strict standards employers are asked to follow to prevent the growth of mold in the workplace. According to OSHA, mold germination occurs in warm and humid conditions, making it essential that employers regularly clean worksite facilities, such as bathrooms, to reduce the chance of mold growth. Employers also may want to replace or clean indoor air filtration systems frequently to ensure any mold spores that are released into the air don't reach workers.

As a result, a messy or unhygienic workplace may influence worker productivity. If employees receive an injury or illness at work, they may not be able to perform their tasks as well as when they were healthy. This decrease in efficiency may cause deadlines to be missed and additional errors to occur.

Self-Check -1

Written Test