

Bees for development Ghana

AN EDUCATIONAL GUIDE FOR BEEKEEPING IN BASIC SCHOOLS



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References: 2006 Encyclopaedia Britannica
British Beekeeping Association

Lesson 1

Why keep bees?

Bees live as a colony, and to survive make honey and wax.

We can eat the honey, and also bottle and sell the honey to earn money. The wax we can also sell.

Collecting honey and wax from bees in the wild is dangerous and can be harmful to the bees.

If we keep bees in a hive we can collect the honey and wax more safely and without harming the bees.

If we are clever we can learn to make candles, lotions and polish using wax and earn more money.

It is important to keep bees in a good hive sat in a good apiary and to take great care of them. This way they will give you lots of honey and wax.

If we keep bees we need hives and protective clothing.



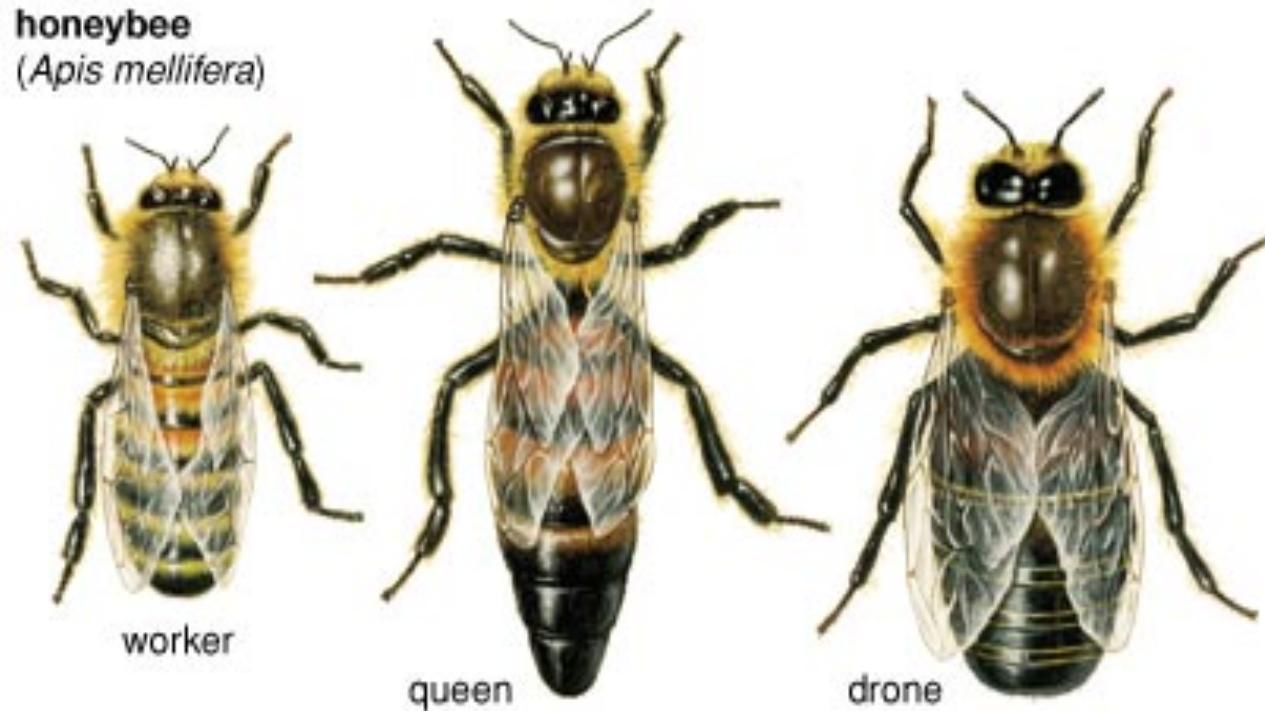
Lesson 2 What is a colony of bees?

Draw a bee

A colony of bees can be as many as 70,000 bees!

There are three castes.

honeybee
(*Apis mellifera*)



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There is only one queen, the rest of the bees are workers and drones.

Worker bees are the female bees and they do all the work in the hive.

Drones are the male bees and their job is to mate with new queens to make them fertile and able to lay good eggs.

Lesson 3 The 3 Castes and their functions

• Drone

- Male, develop from unfertilised egg
- 1% of colony population – 60,000 workers to 600 drones
- 24 days to develop
- Lives about 22 days
- Mate with young Queens



• Worker

- Female
- 40-60,000 in strong colony
- 21 days to develop
- Lives about 36 days

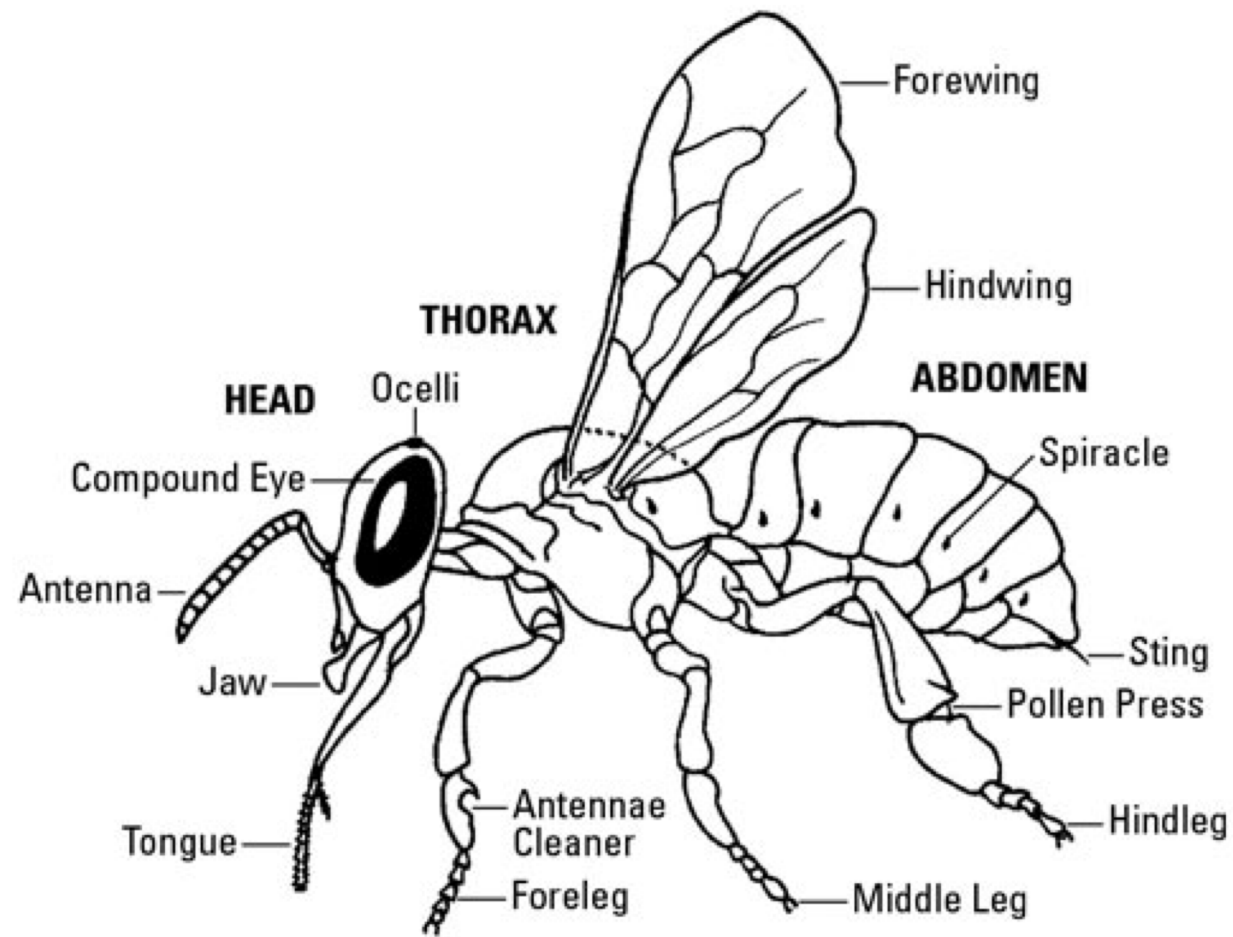


• Queen

- Normally only one in a hive
- 16 days to develop
- Lives 3-4 years
- Several mating flights
- Lays eggs (about 2000 per day)
- Produces queen substance (pheromone)



Lesson 4 Anatomy of a bee



4 wings.

6 legs.

5 eyes-2 compound eyes and 3 simple eyes called Ocelli.

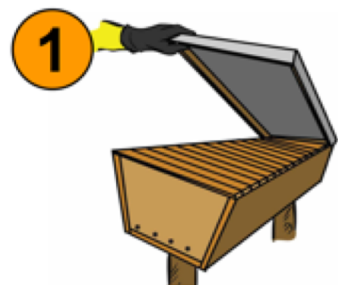
The worker has a sting. She will die after she has stung.

Lesson 5

How do we keep bees?

Take the hive apart and look and handle everything.
Now draw the hive and top bars.

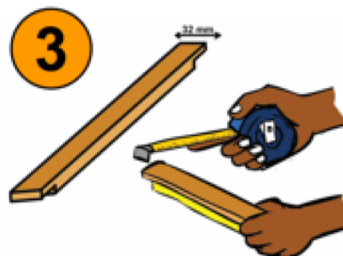
Top-bar hives



Top-bar hives are boxes with a series of parallel top-bars.



The body of the hive can be made from timber, bamboo or basket work.



The top-bars need to be exactly the right width (32mm).



Measure all the top-bars to the same length.



It is possible to lift combs from the hive and to harvest ripe honey.



It is easy to harvest honeycomb from top-bars.

ADVANTAGES Of a top-bar hive

- Honeycombs can be removed without disturbing the brood nest
- Top-bars can be lifted from the hive and replaced, allowing the colony to be examined
- Ripe honey can be harvested while unripe combs can be replaced.

DISADVANTAGES Compared with a local style hive

- Top-bar hives are more expensive
- Greater loss of investment if colony leaves
- More time needed to inspect the colony
- Ants can gain access into the hive
- Attractive to thieves
- Examining the brood nest can encourage the bees to abscond

Lesson 6

Local style hives

Make a woven hive and log hive.
Draw a woven hive and log hive.

Local style hives



There are many local styles of hives in Uganda. They offer advantages to beekeepers.



Local hives can be made from materials which are locally available.



Natural materials insulate the colony and keep it cool in hot weather and warm in cold weather.



Logs, bark, climbers, bamboo, sticks and clay can all be used to make bee hives.



Gently lift the end opposite the entrance to gauge how heavy the hive is. This end is where the honey is stored.



There must be a "honey door" so that honey can be cropped. This must be the opposite end from the bees' entrance.

ADVANTAGES Of a local style hive

- Low cost
- Cheaper to own many colonies and therefore harvest large quantities of honey
- Local hives use local skills and knowledge
- Less attractive to thieves
- No risk of spreading bee diseases because combs are not transferred between hives
- Suitable for tropical African bees

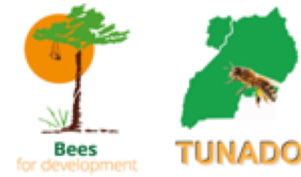
DISADVANTAGES Compared to a top-bar hive

- More difficult to know when honey is ready for harvesting
- Bees and brood are sometimes killed during harvesting
- Combs containing brood, pollen and unripe honey may have to be removed to access ripe honey
- Disturbance during harvesting may cause colony to abscond

Lesson 7 How do we get bees into our hives?

Draw a swam box in a tree

Four ways to get bees



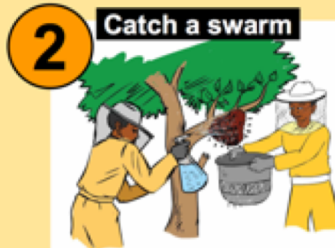
1 Attract a swarm
Clean the hive and melt beeswax or propolis inside to give an attractive scent.



Hives must be placed a few weeks before the swarming season. This gives scout bees a chance to find it.



Swarms that enter are likely to stay in the hive. This is the easiest way to get bees.



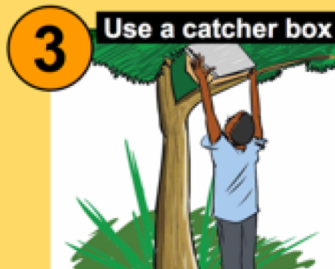
2 Catch a swarm
Put a container under the swarm. Give the branch one strong tap so they all fall into the container.



Carry the swarm to the hive.



Tip the swarm into the hive and close. Do not disturb for three days or they might leave.



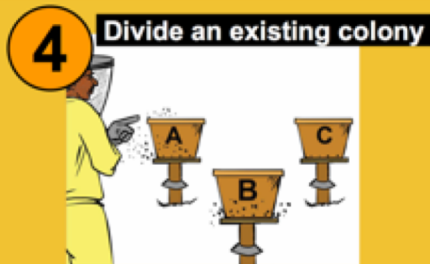
3 Use a catcher box
A catcher box can be smaller than a hive. Use bait to give an attractive scent and put in a high location.



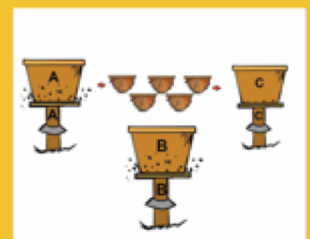
Check every day to see if there are bees.



Do not leave the bees in the box for too long, or they will not move to a new site.



4 Divide an existing colony
Find a strong colony to divide, and prepare an empty hive. Transfer four or five combs with brood and newly laid eggs, from the old hive into the new hive.



Do not remove bees from the combs. Transfer also two combs of honey and pollen.

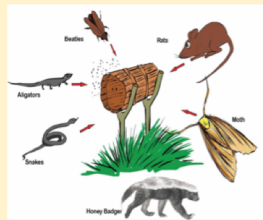


Close both hives carefully. Place the new hive where the old hive was, with the entrance facing the same way. Place original hive one metre away.

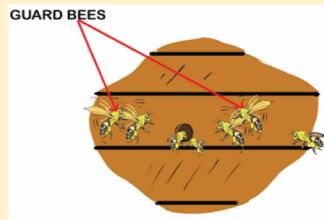
Lesson 8

Managing the Apiary.

Protecting bees from pests and predators



Pests are normal. You cannot avoid them completely. You can reduce their impact.



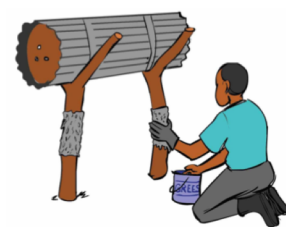
Bees are prepared to protect their nests from pests.



Beekeepers can help by putting hives in safe places, and sealing holes.



Add barriers made from iron sheets to stop mice and rats from climbing the stands.



Apply grease to the stands to prevent ants from climbing hive stands.



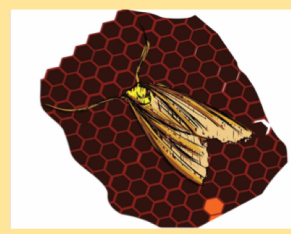
To deter honey badgers, use wire to hang hives in trees.



Chase away animals nesting in empty hives before the swarming season.



Cut grass short around the hives.



Strong colonies will repel wax moth themselves.



Leave some colonies without harvesting honey. They will produce more swarms which will quickly replace weak colonies.

Other Dangers.

Fire. How do we protect from fire?

Theft. How do we protect from theft?

Poison. Farmers often use pesticide to kill pests. But pesticide also kills bees.

Bad Beekeepers. Bees are small insects and need to be treated carefully and with respect. Aggressive behavior can kill bees and you will get stung.

Lesson 9 Equipment needed for beekeeping

Staying safe from the bees

As we know bees sting and it hurts. We do not want to be stung and so we wear protective clothing.

Boots

Beekeeping suit

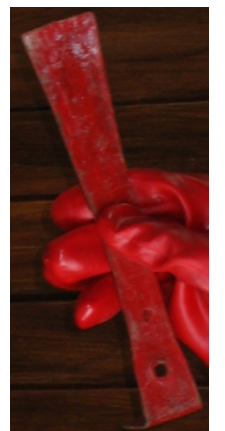
Gloves

We also need some equipment

Hive tool

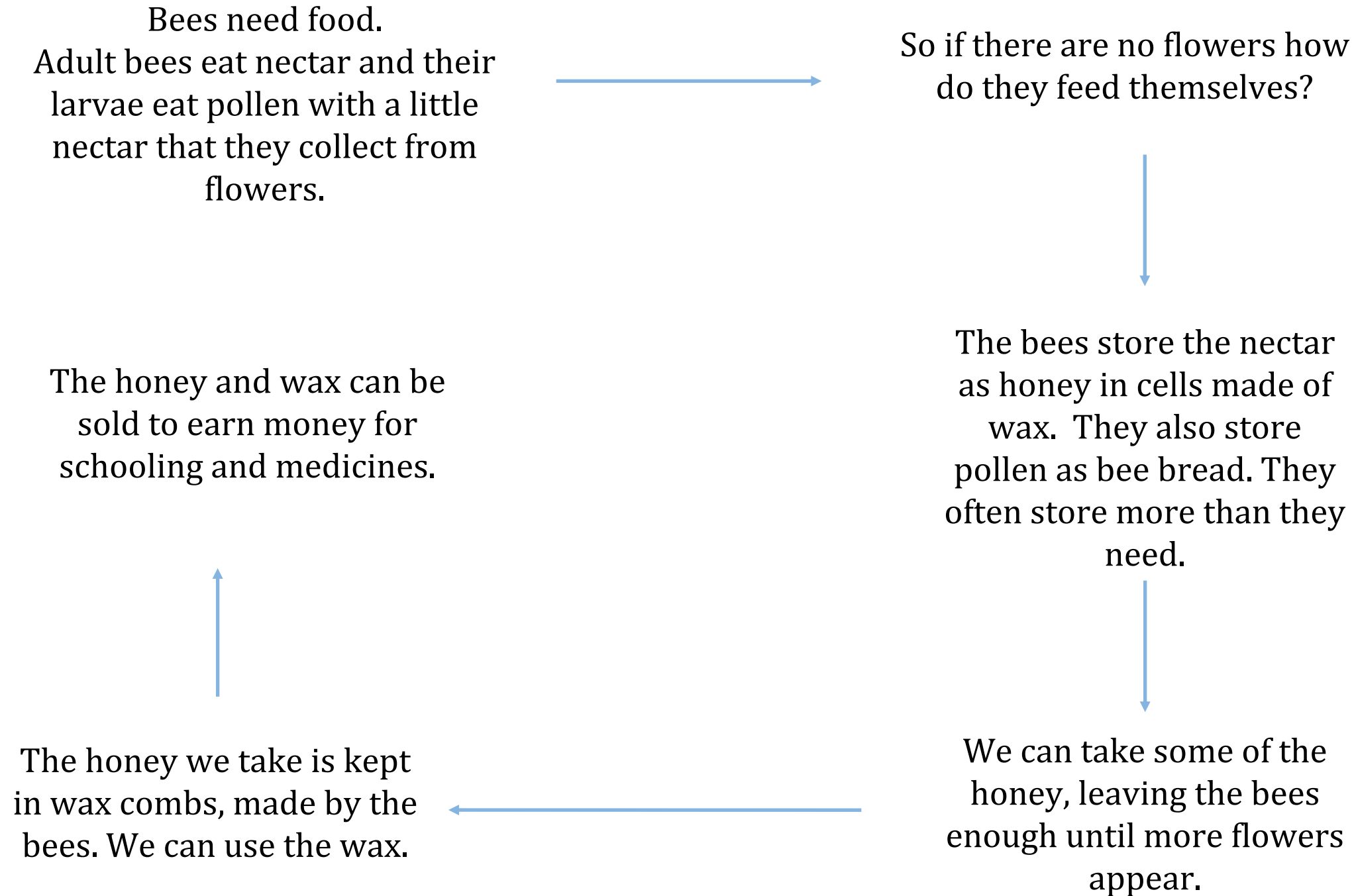
Smoker

Honey buckets



Lesson 10

How do bees make honey and wax?



Lesson 11

Pollination

Pollination is the fertilisation of a flower that allows the flower to grow into a fruit or nut that we can eat or grow another plant.

Find a flower remove the petals.

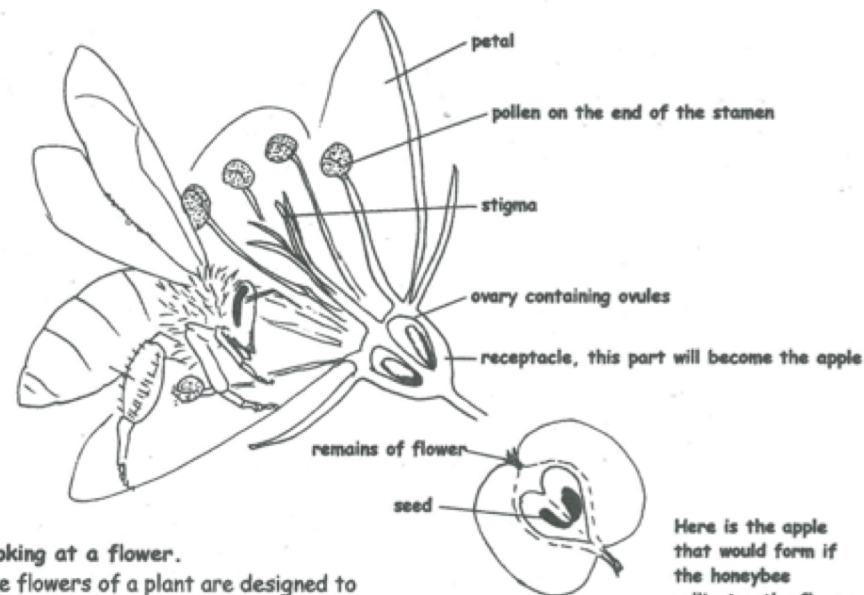
Can you find the stamens, the stigma and the ovary?

BEEES IN THE CURRICULUM Key stages 1 and 2

Pollination - sheet C

How seeds are made

Honeybee lands on apple flower



Looking at a flower.

The flowers of a plant are designed to produce the seeds which can grow into the next generation of the plant.

If you remove the petals on one side and look carefully with a magnifying glass you can see the ovary which contains one or more ovules which are the unfertilised seeds.

Each ovule contains a female sex cell. You might be able to find the ovules if you slice the front off the ovary with your finger nail.

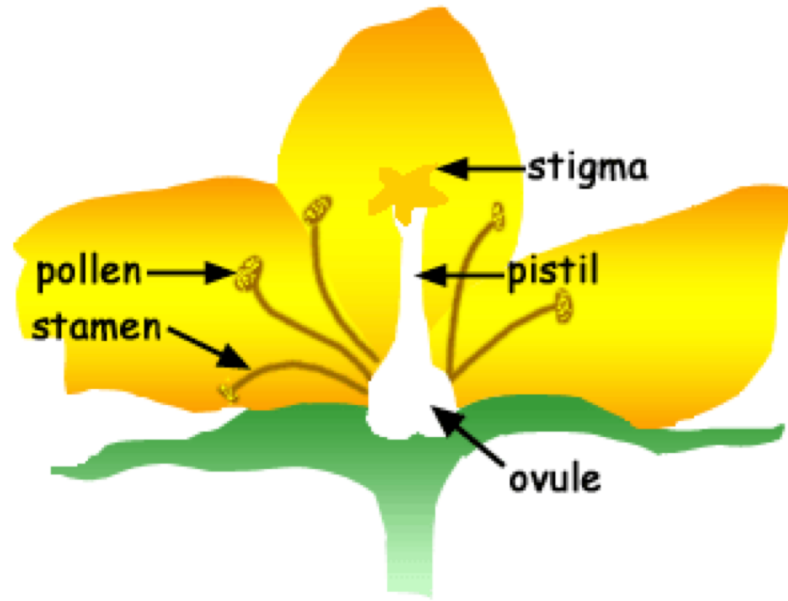
Surrounding the ovary you should easily see the little stalks of the stamens, each has a blob of pollen on the end. Different sorts of flowers have different colours of pollen. When the pollen is ripe it becomes powdery and can be easily brushed off. The pollen grains contain the male sex cells.

How seeds are made.

Sticking up from the ovary you should see the stigma which is slightly sticky in order to catch any pollen grains that fall on to it. Putting pollen on to the stigma is called pollination.

When this happens the nuclei of the male sex cells from the pollen can move down into the ovary and join with the nuclei of the female sex cells in the ovules. The joining of a male and a female nucleus makes a seed form and is called fertilization. Fertilization can only take place if the pollen is from a flower of the same sort. In apple plants, after fertilization the receptacle and ovary grow to become a fruit. If you cut open any fruit you will normally find the seeds.

Lesson 12 How are flowers pollinated?



Find a flower, carefully, remove the petals and discover how the pollen grains can get to the ovary where the seeds grow

Name all pollinating agents and say how the ovary is pollinated by each.

Flowers have several different parts that are important in pollination. Flowers have male parts called stamens that produce a sticky powder called pollen.

Flowers also have a female part called the pistil. The top of the pistil is called the stigma, and is often sticky.

Seeds are made at the base of the pistil, in the ovary.

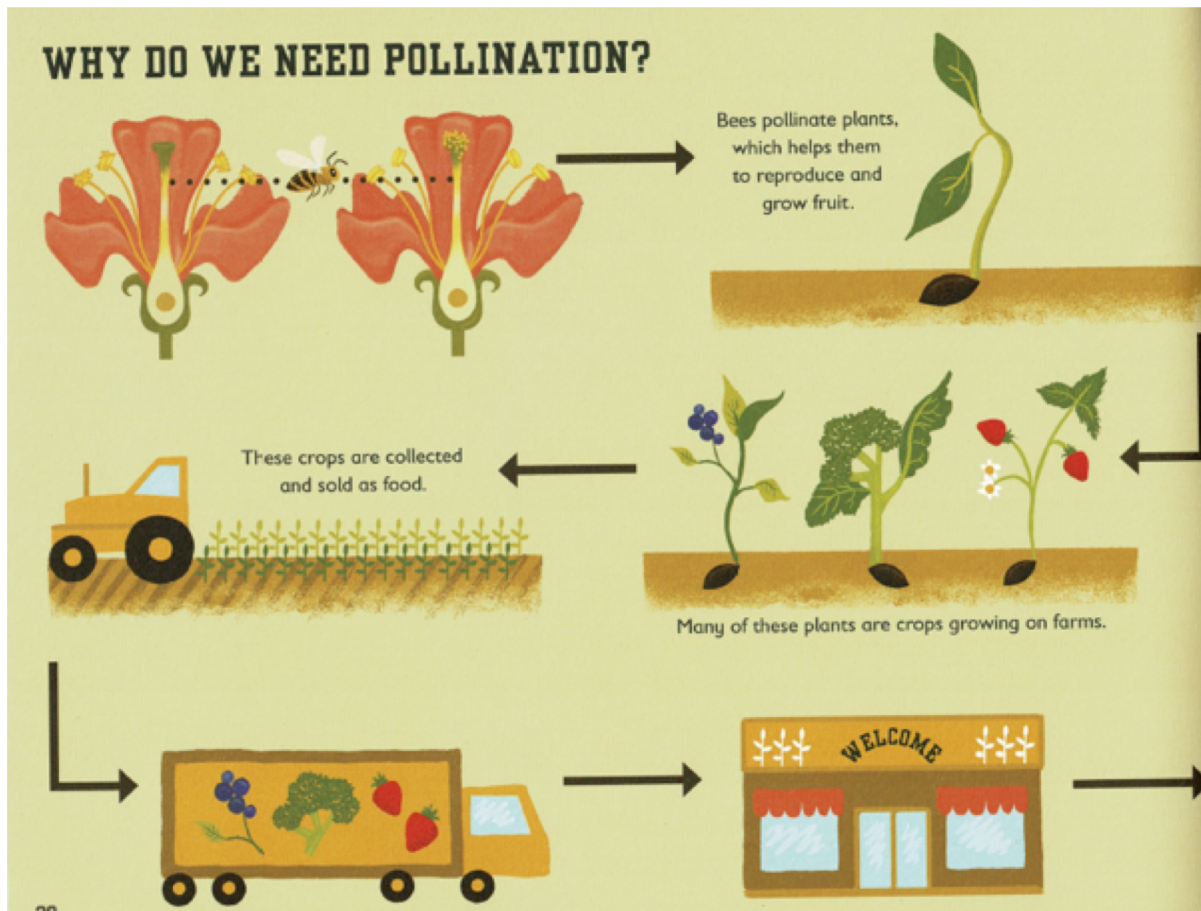
To be pollinated, pollen must be moved from a stamen to a stigma.

Nectar is found at the base of the pistil, around the ovary.

Bees pollinate flowers while collecting their food, this we call foraging.

Lesson 13 Why is pollination important?

List all the foods that you think rely on pollination.



Lesson 14


Colour in this flower with a honey bee
collecting pollen

Find a flower. Draw it. How will it be pollinated?

BEES IN THE CURRICULUM Key stages 1 and 2

Looking at minibeasts - sheet G

Name _____



Colour

the bees' eyes in black,
the head in grey,
the thorax in brown,
the abdomen in brown and yellow stripes,
the legs and antennae in black

the leaves in green
the pollen yellow,
don't forget the pollen in the pollen basket,
choose your own colour for the petals,
leave the wings white.

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Lesson 15

Revision

You have learnt all about bees and beekeeping.

Now write why beekeeping is good.

Why bees are good.

Write to a friend and say how and where to set up an apiary.

Explain the difference between a top bar hive, woven hive and a log hive.

Explain how to catch bees.

Draw a bee and label its parts.

Lesson 16

Setting up business

Describe how you would set up business.

Enterprise analysis for beekeeping business



Beekeeping can be an important source of income.

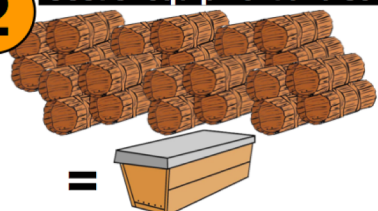


It is necessary to approach beekeeping as a business.



Develop a beekeeping cost and income plan.

2 Cost of equipment and services



Consider the cost of bee hives.



Consider the cost of harvesting gear.



Consider the cost of transport.

3 Work out your predicted income



Income is earned from selling honey, beeswax and propolis.



In Uganda, a beekeeper can harvest 5 - 20kg of honey per colony per season.



When predicting income, it is wise to take into account that not all hives have bees all the time. This is normal.

4 Growing business



With the same investment, it is possible to buy more local style than top-bar hives. More colonies mean more honey and beeswax.



It is important to re-invest some of the profit in beekeeping to keep the business growing.



Keeping records is essential so that you know your costs.