



Bee Society

Busy As a Bee

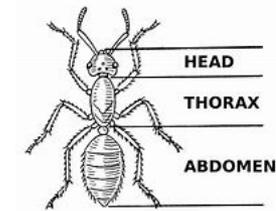




Bees are insects
and insects are
arthropods.

- Arthropods include insects like ants and bees, arachnids like spiders, myriapods like centipedes, and crustaceans like pill bugs.
- Tap your forehead, elbow, knee. Can you feel the hard bone under your soft skin? Those bones are part of our skeletons that give structure to our bodies. Our skeletons are inside our skin.

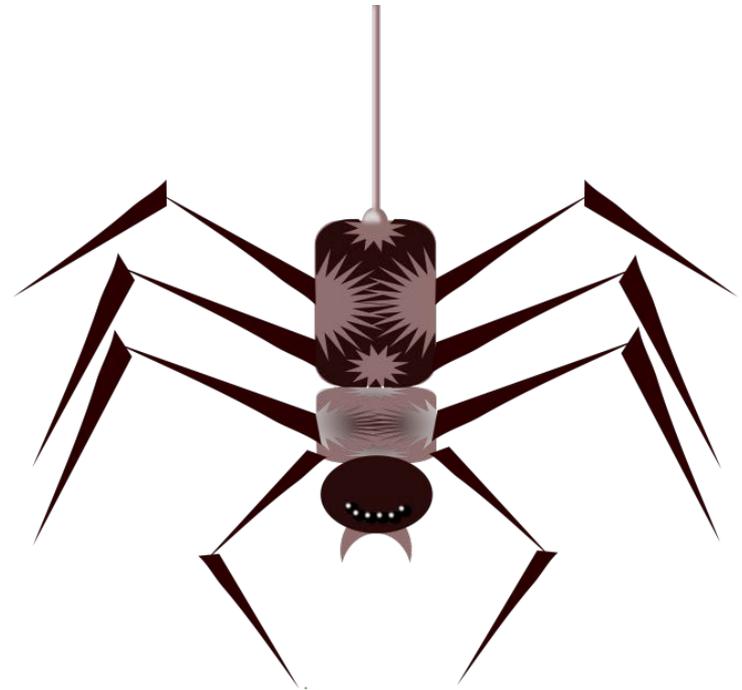
Arthropods have (big word alert!) exoskeletons; that means that their skeletons (hard structures) are outside their bodies like a suit of armor. Their exoskeletons are made of a cellulose like material, chitin, and minerals.



They also have bodies in segments (parts) and jointed (like our knee or shoulder) legs. There are appendages (like our legs and arms) or body parts, attached to the segments.

Arthropods

- Exoskeleton=skeleton outside so they moult to grow,
- no backbone,
- jointed legs,
- segments=body divided,
- appendages=parts attached,
- cuticle made from chitin.



Bee anatomy

Bees are insects.

They have three body parts—head (touching head), thorax (touching chest, and abdomen (touching tummy).

The wings (flapping hands) and 6 (3 fingers each hand) legs are attached to the thorax where the muscles are.



Bees have two big eyes (2 fists) called compound eyes made up of lots of little eyes called ommatidia, and 3 small simple eyes (three fingertips) called ocelli.

Bees have 2 antennae (2 fingers by forehead).



Bees have an exoskeleton—a skeleton on the outside (tapping forehead elbow, knee).





- 2 antenna

- 1 head

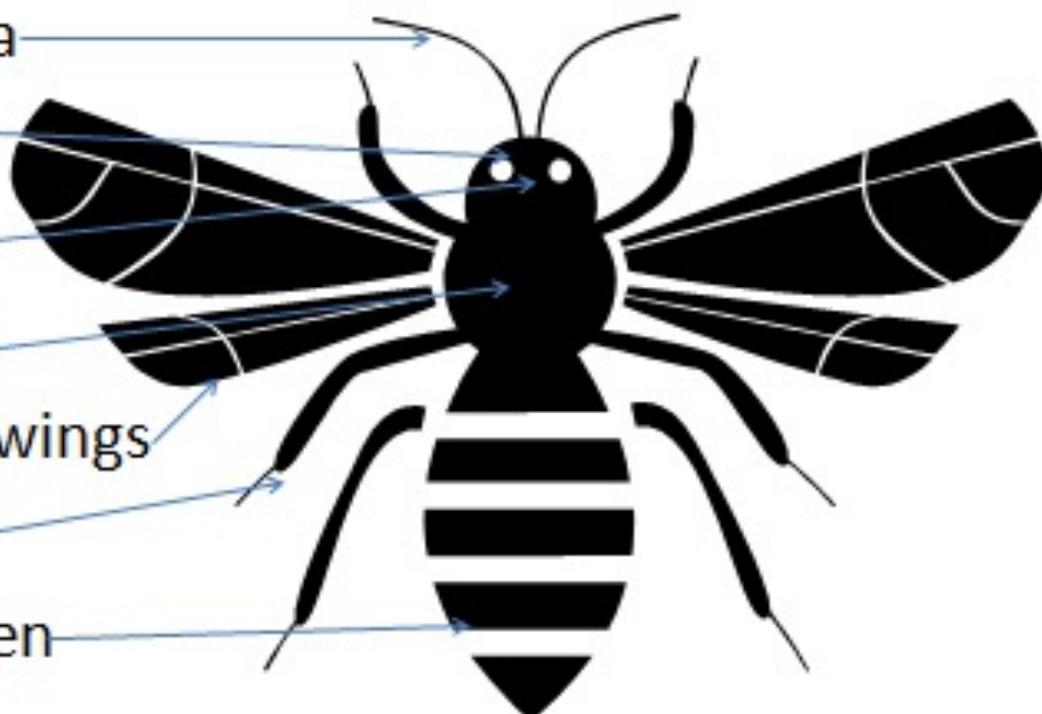
- 2 eyes

- 1 thorax

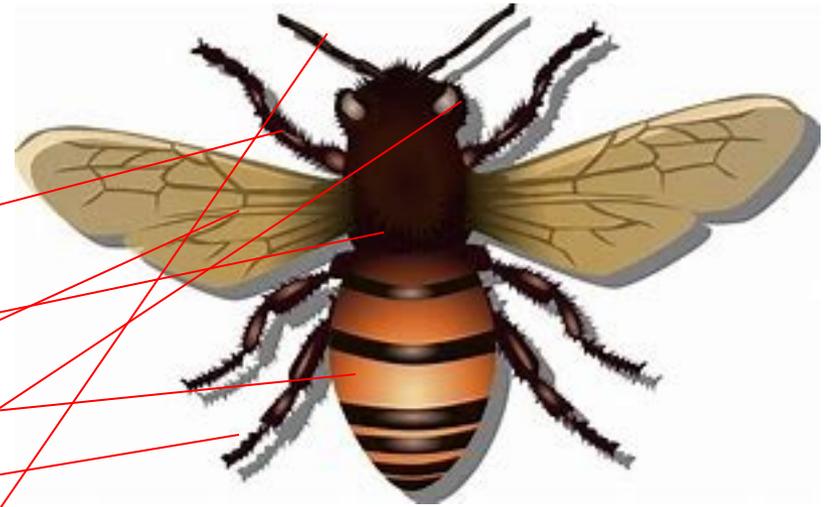
- 2 sets of wings

- 6 legs

- 1 abdomen



You can be BEE anatomy! You can sing this song to *Head, Shoulders, Knees and Toes*.



Head, thorax, abdomen, abdomen 2x
(touch head, chest, tummy)

6 legs, some wings and exoskeleton

(3 fingers each hand, flap hands on shoulders, go head to toes both hands)

Head, thorax, abdomen, abdomen.

Head, thorax, abdomen, abdomen 2x
(touch head, chest, tummy)

Big eyes, small size and 2 antennae too

(2 fists, pointer fingers together, pointer fingers on head)

Head, thorax, abdomen, abdomen.

Growing Up WILD

Bees have specialized body parts for honey collecting.

The pollen basket collects the pollen.

Honey is stored in the honey stomach.



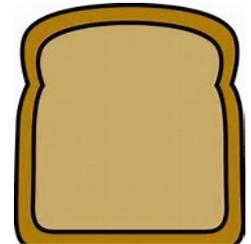
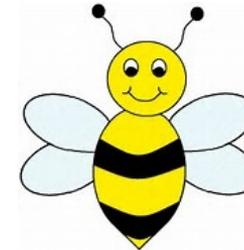
Bees make three kinds of foods.

Bee milk is made from glands in the bees' heads and is fed to the very young larvae.



©Andy Nornik * illustrations01.com/03558

Bee bread is made from pollen mixed with honey and is fed to the worker and drone brood. It is full of protein.



Royal jelly is a kind of extra rich bee milk fed to the queen.



How does nectar become honey?

Bees collect nectar from flowers.
Nectar is 80-95% water.

They also collect pollen in their pollen baskets, and while they are collecting, they are pollinating flowers.

Honey is about 18% water.

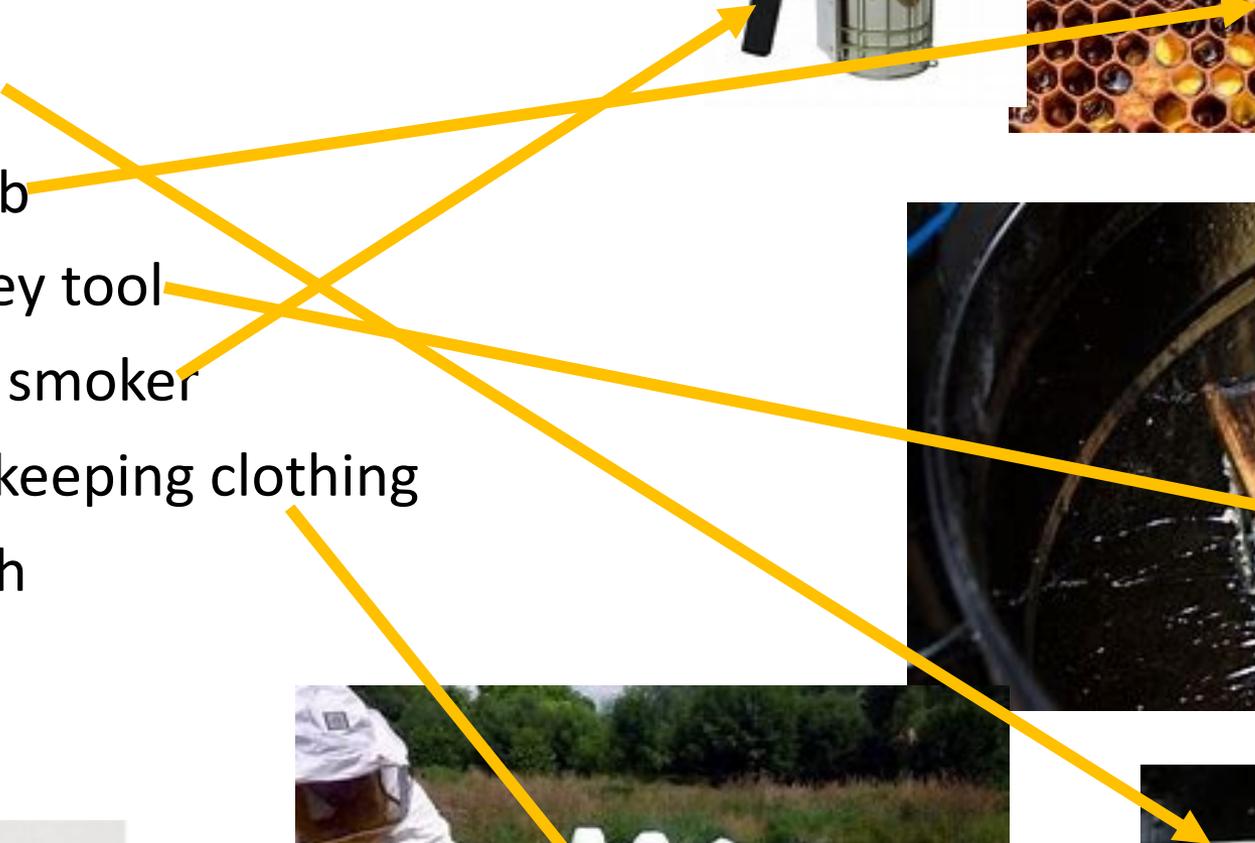
When the bees return to the hive with the nectar, they pass it from bee to bee and fan it with their wings and gradually the water is reduced, and more sugar remains.

They store the honey in the hexagonal (6 sided) cells in the honeycomb.



There are different tools for separating and lifting frames.

- Hive
- Comb
- Honey tool
- Hive smoker
- Bee keeping clothing
- Brush

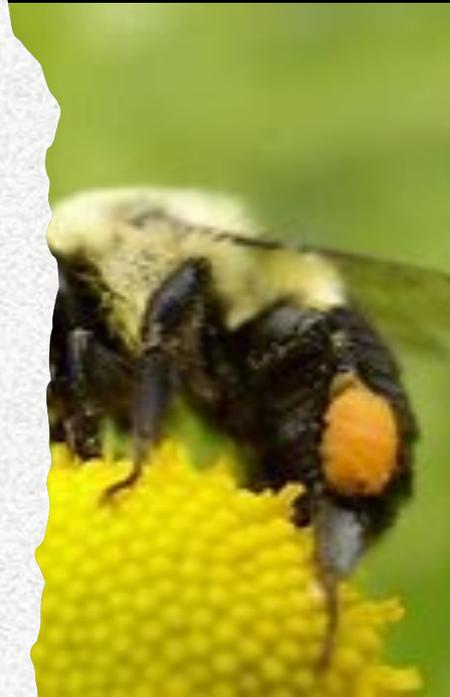


Big word alerts for big brain thinking!

Propolis is the gummy resin bees make from materials they collect, on their legs, to clean the hive and seal cracks.

Trophallaxis is the exchange of material to share pheromone communication and remove excess water from nectar to turn it into honey.

Corbicula is the hairy part of the leg to transport pollen.



Hive boxes have several levels.

The bottom board is at the bottom with the hive stand.

The hive body has the frames for the colony.

The honey super is above the hive body and holds the honey for extracting.

The cover is on the top.



What do we use to extract and process the honey?

First you use the smoker to calm the colony and your hive and frame tools to remove a frame.

The heated knife and uncapping fork unseal the cells.

The frame goes into the extractor which spins out the honey from the cells.

You pour the honey through a double sieve to catch any wax and let it sit to get air bubbles out, before you pour it into jars or bottles.



Bees are social insects. They live in a group called a colony. At different ages worker bees have different roles—the big word for this is *polyethism*. Queen bees lay the eggs. Drones help make the babies.

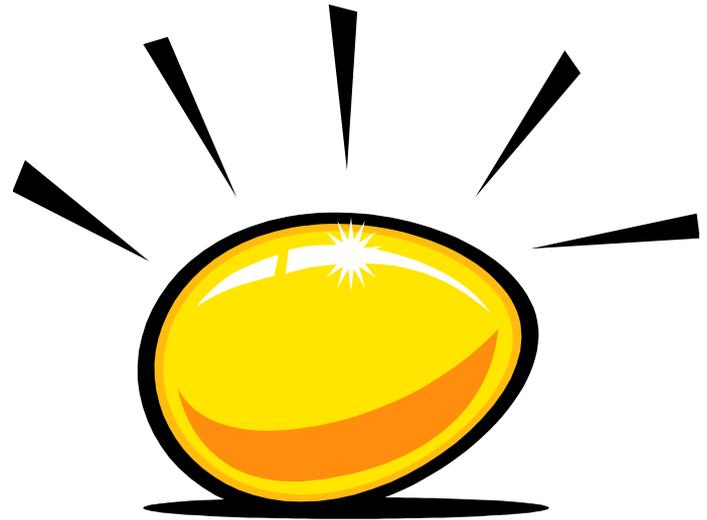


Bee roles include nurse bees that take care of the larvae, housekeeping bees that clean the cells, construction bees that help build the honeycomb, foraging bees that gather pollen and nectar, and guardian bees that protect the hive



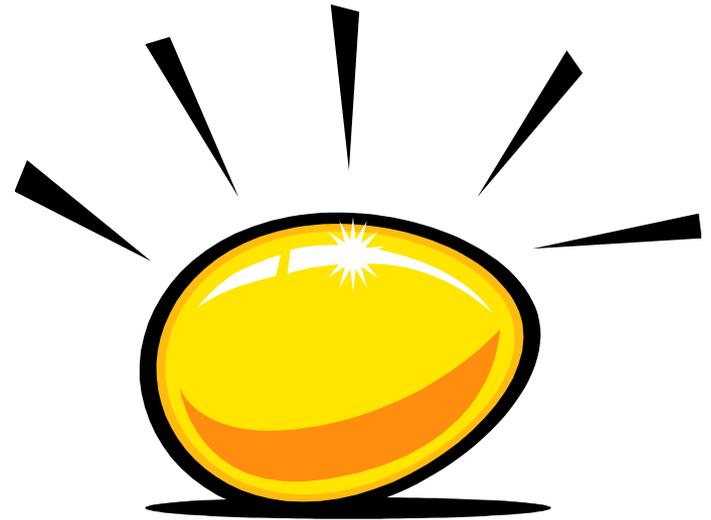
Helps make eggs

Drone=daddy



Lays eggs

Queen=mommy



Food collector

Worker



Worker

Nest builder



Worker

Protector



Worker

Daycare, nanny, babysitter, parent



Janitor

Worker



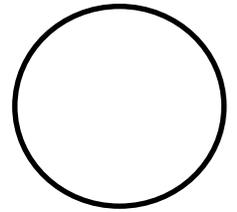
Worker

Cook

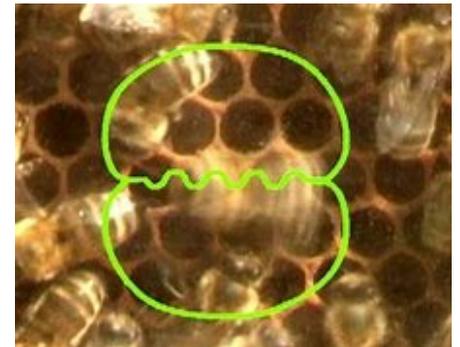


Bees use dances to communicate where to find nectar and pollen.

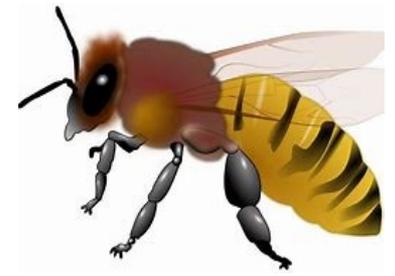
When the source of nectar and pollen is close the bee dance looks more like a circle with the bee shifting clockwise and counterclockwise and is referred to as the round dance.



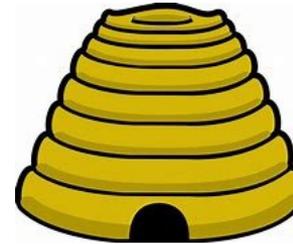
When the source is farther away the dance is called the waggle dance and looks more like a figure **8** with the speed and direction of the waggle indicating both distance and direction.



You can be Finger Bees!

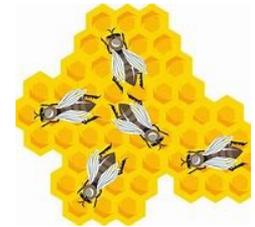


Here is the honeybee. (pincer finger thumb)



Here is the hive. (tent hands)

Working together (mesh fingers)



To keep bees alive! (clap)



You can sing the song to *Do Your Ears Hang Low?*

Are you wearing fuzz? (wiggling fingers)

Making rumblings like a buzz? (buzzing sound)

Is the garden where you roam? (flying hands)

Making a fine hive a home? (triangle hands)

Wearing stripes, a little funny? (drawing fingers across chest)

Knowing how to make honey? (licking finger)

Do you like to buzz? (buzzing sound)

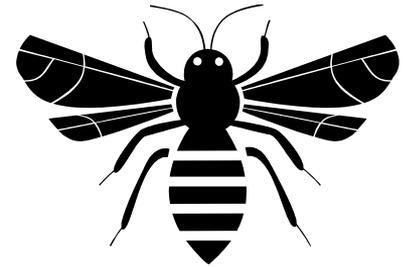


You can sing this song to *Jingle Bells*.
Honeybee, honeybee,
Land right on my nose, (touch nose)
Honeybee, honeybee,
Land right on my toes. (touch toes)
On arms, hands and legs, (touch arm, leg, elbow)
On those own elbows.
Honeybee, oh honeybee
Landing, and then she goes. (hand flies off)



Bees for the bee songs!







Beekeeping is busy busy!

BUSY BEEKEEPING

Bee clothing

Beekeepers



Bees are social insects with different roles. They live in a colony in the hive.



The hive box has several stories and contains the frames of honeycomb..



Each frame contains a wax honeycomb.



The honeycomb is the substrate for brood cells, pollen, nectar and honey storage.



The hive too is used to separate the frames.



The brush is used to brush the bees off the extracted frame.



The smoker calms the bees so the frames can be handled safely. The smoke masks alarm pheromones.



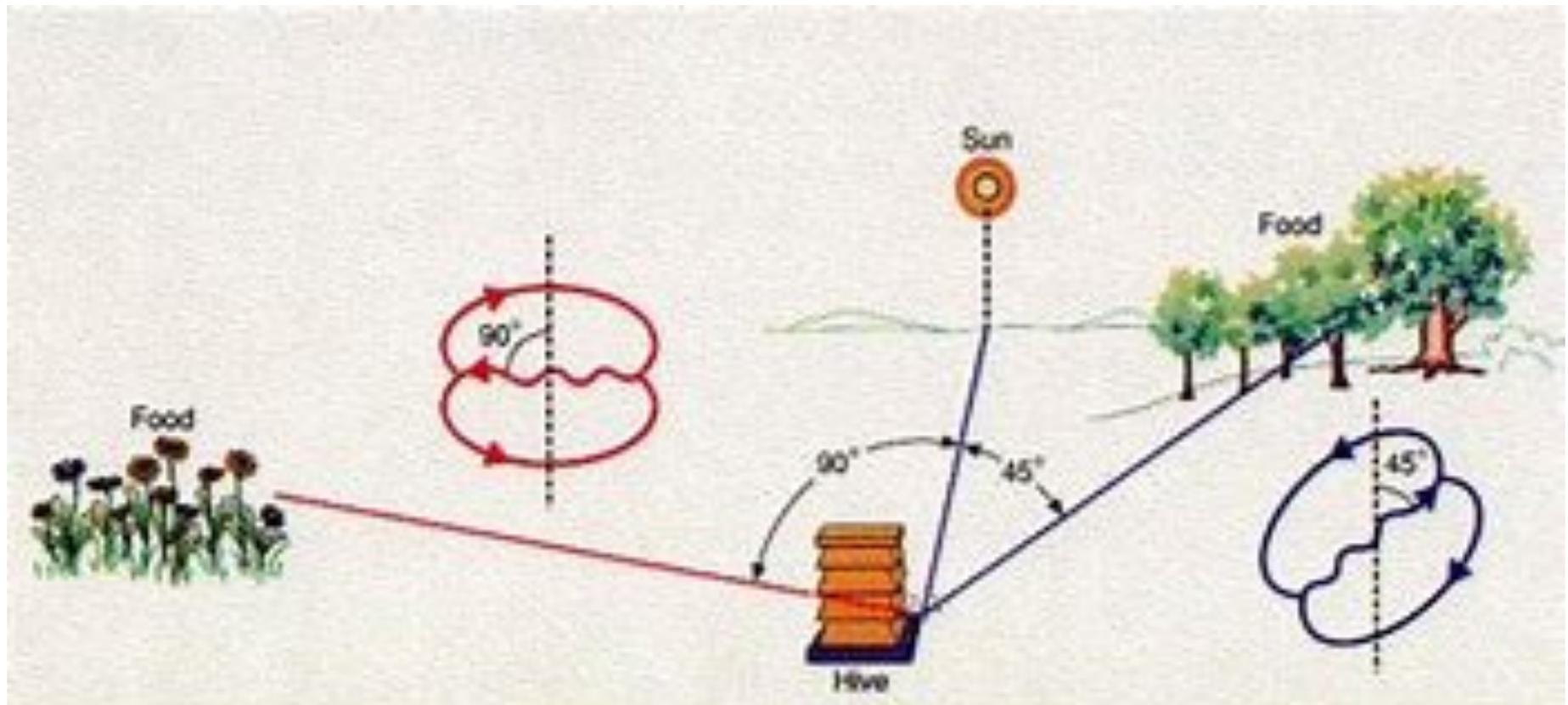
A close-up photograph of a wasp nest built inside a plant. The nest is a textured, light-colored structure made of mud or paper, nestled among large, green, serrated leaves. Several wasps with yellow and black stripes are visible on the nest and the surrounding foliage. A small red horizontal bar is located in the top left corner of the image.

Bees make
nests in
many
different
places.

In a plant! Not all bees live in hives and modern hives are layers of boxes.

You can do the waggle dance and be a bee forager!

Dance in a figure 8 wagging as you cross and then waggle in the direction of the flowers. Waggle fast if it is close; the longer the waggle, the farther away, A lively dance means good quality food. The optic flow of the image while flying allows the bee to estimate distance. You can search for good nectar and pollen sources around your house!



You can make a paper roll bee house or a bee!

You can make a bee house with paper rolls. Take pages of a magazine or newspaper and roll them tightly around a pencil. Now tape it closed. Fill a container with the rolls. This will make a perfect house for a bee!

Let's be bee thinkers! Did you know that bees come in different colors? Yes they do! What are some of materials you could use to make a hive or a bee? Could you use play dough, a plastic cup, a toilet tissue roll? What would you use for wings, legs, antennae or eyes?

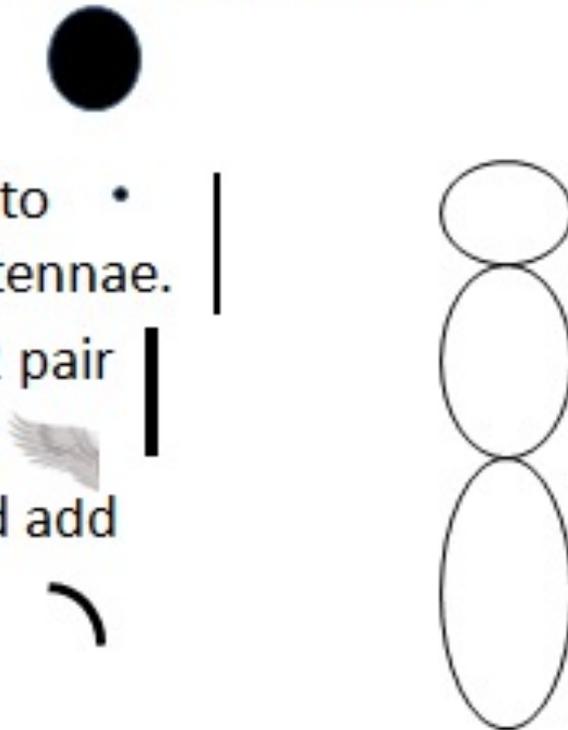




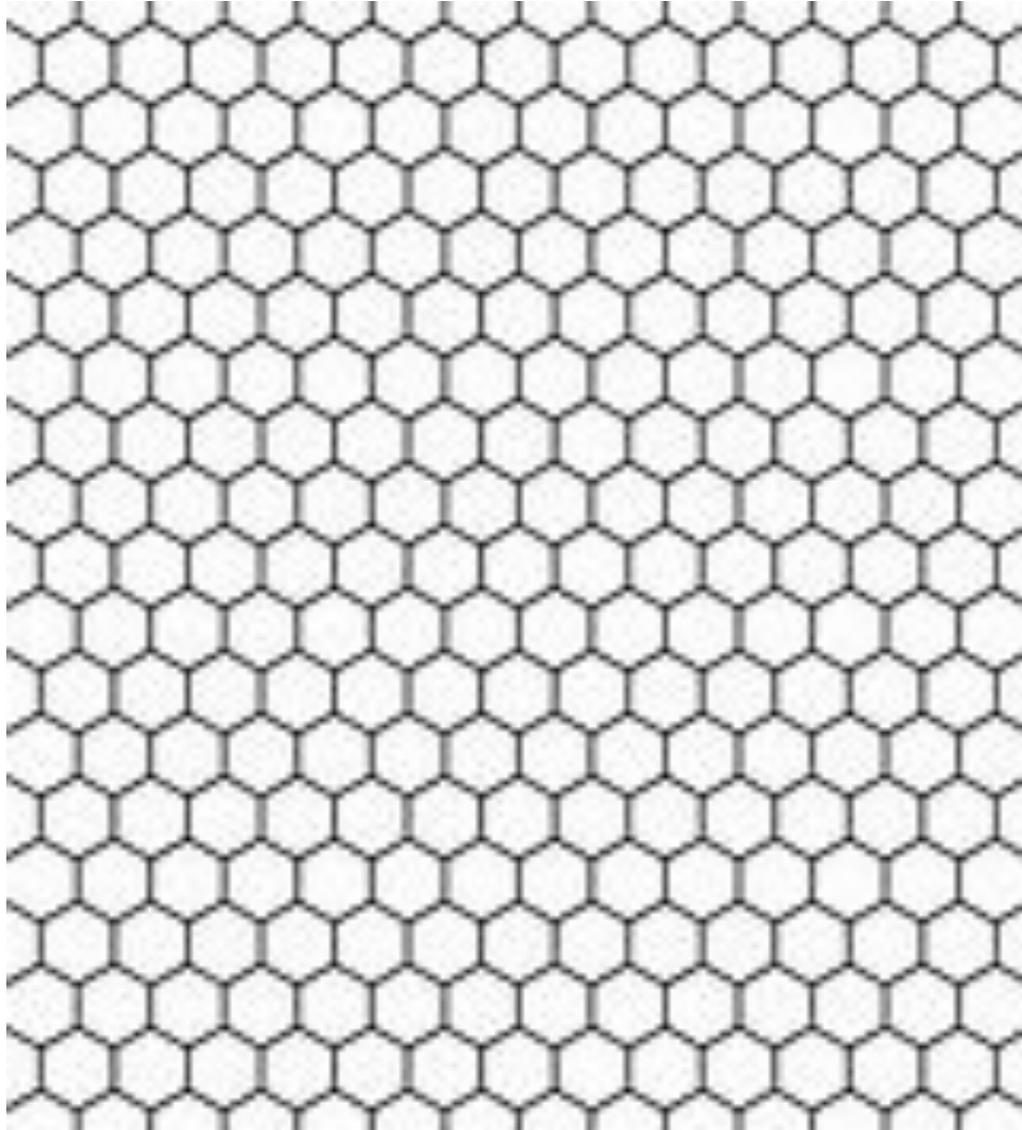
Make a house for a bee!

Make a bee

- Add 2 big eyes
- and 3 little eyes to head. Add 2 antennae.
- Add 6 legs and 2 pair wings to thorax.
- Color yellow and add black stripes to abdomen.



You can glue bee roles onto the honeycomb!



Bee roles—janitor, cook, nanny, protector, builder, food collector, queen, drone=daddy



You can glue bee roles onto the honeycomb!



Bee roles on
honeycomb!

I made a beehive with bee roles!

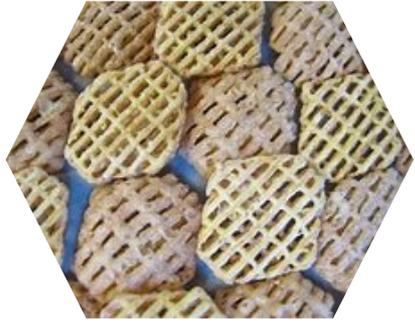




What could you use to make a bee?

There are lots of ways to be a BEE chef!

You can make a honeycomb with honeycomb cereal or crackers.



What can you use to make an edible bee? Use your culinary imagination!



You can use a banana, pretzels and chocolate sauce too!



Be a bee chef!



Lots of
different bee
roles work
together in
the hive!



You can make a mini-book!

- Fold the paper in half
- Then in half again.

