

# Honeybee Activities

What's in your kit?

- Materials to complete the activities
- Recipes that include honey
- Honey sticks! (The dark yellow tubes in your kit, feel free to use these for your recipes!)
- In this packet you will find activity directions on Honey Bee Anatomy, Communication, Foraging, and Life Stages

**Check out our video for the Mystery Bug Activity!**

*You can use the yellow paper provided and any writing utensil you have at home*



## Honeybee Fun Facts

- Honey bees must visit two million flowers to make one pound of honey.
- Bees fly over 55,000 miles to make one pound of honey.
- On average, a worker bee will only make 1/12 of a tsp of honey in her lifetime.
- Bees can fly at about 15 miles per hour.
- Bees have been producing honey from flowering plants for 10—20 million years.
- Each year, the United States consumes 1.1 pound of honey per capita (per person).
- Honey bees have four wings.
- There are an estimated 211,600 beekeepers in the United States.
- In a collection trip, a honey bee will visit 50—100 plants.
- The USDA estimates there are 3 million honey producing bee colonies in the United States.

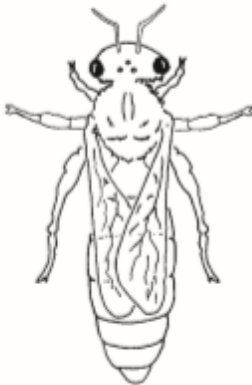


# Meet the Bees!

## Who Am I?

Did you know that honeybees are social insects? This means they like to live with other honeybees. They live in groups called colonies. Each colony has three types or “castes” of honeybee: a **queen**, **worker bees**, and **drones**. Members of each caste have different body shapes depending on the work that they do. Look at the three types:

**Queen**



**Worker**



**Drone**



There is only ONE **queen bee** in a colony. She is bigger than all the other honeybees. Her abdomen is longer. Her thorax is shiny, and she does not have pollen baskets on her legs. She does have a stinger but only uses it to fight off other queens that want to take over her hive. She may sting many times without dying.

The smallest honeybees are the **worker bees**. They are females with long proboscises (mouthparts). They use their proboscis to suck up nectar from flowers. Worker bees’ hind legs are fringed with stiff hairs that form pollen baskets. Yep, pollen baskets!! They do not have hands to carry the pollen, so they must use their pollen baskets. Worker bees do have a stinger, but they do not want to sting you. If they do, they will die because their stingers and internal organs are pulled out when they sting.

The males of the colony are called **drones**. They are larger than the worker bees. They have rounded abdomens, huge compound eyes, and powerful wings. They do not have long proboscises because they do not forage like the worker bees. They are fed by the worker bees. They do not have stingers and cannot defend themselves. Drones do not have wax secreting glands either. So, what do they do? Their only job is to mate with the queen.

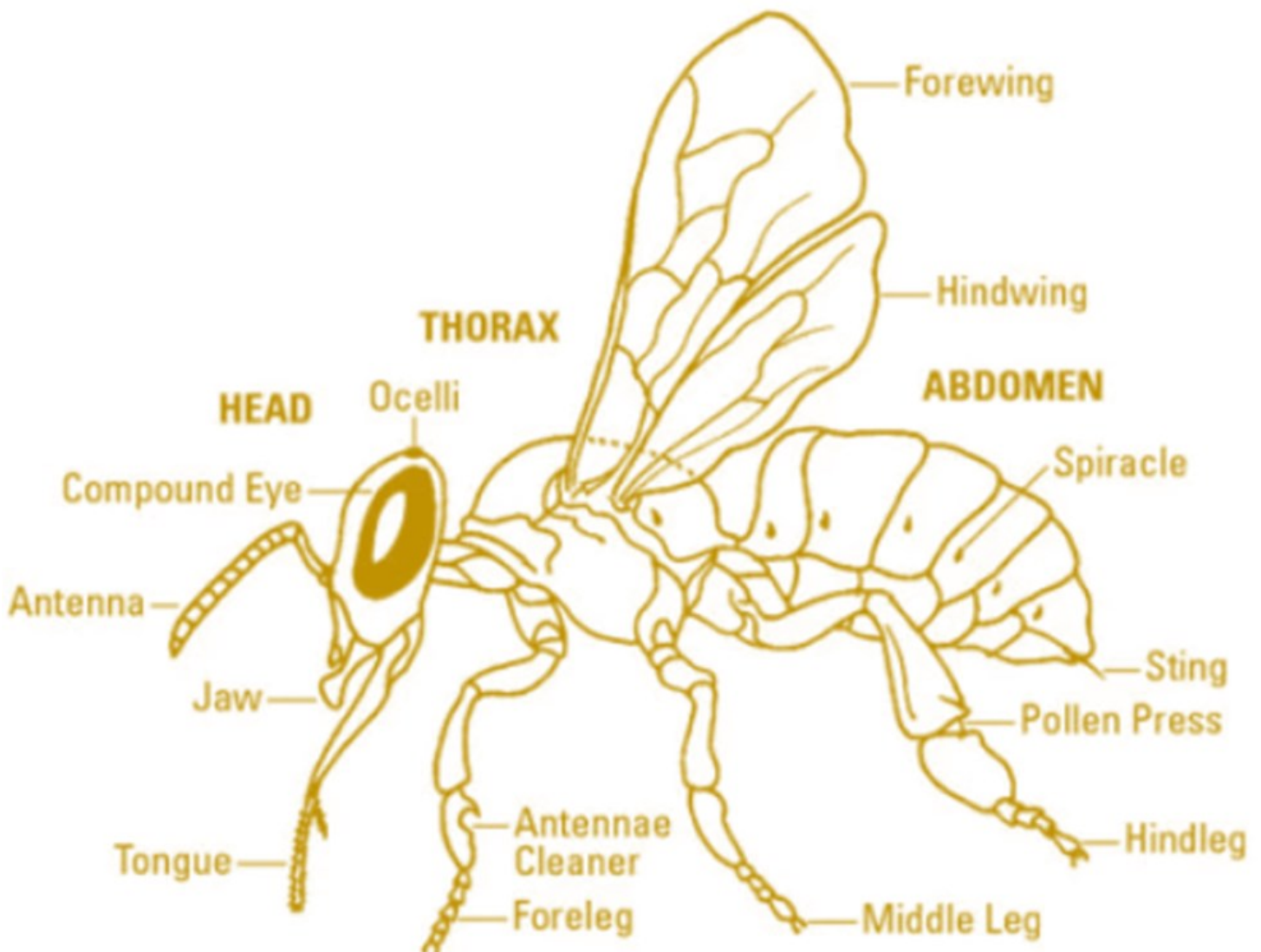
# Honeybee Anatomy

## Activity 1:

Use the following diagram to create a honey bee model of your own using the supplies listed below (provided in your kit) and anything else you have on hand!

- Play dough
- Pipe cleaners
- Balloons
- Styrofoam balls
- Toothpicks
- Construction paper

There is also paper included in your kit that have pieces of the bee anatomy printed. You can cut out these pieces and put them together for a fun, bee puzzle!



# Life Stages of a Honeybee

There are four stages of development of a honeybee: **egg**, **larva**, **pupa**, and **adult**. Honeybees look very different in each stage.

It all begins when a queen bee inserts her abdomen into an empty cell in the hive and lays a tiny, white, oval **egg**. Did you know it is about the size of a dot over an “i”? Now, that is little!

It takes *THREE* days for a **larva** to hatch from the egg. It looks like a small worm. The larva is fed by worker bees that are actually called “nurse” bees. Depending on what the larva is fed, the size of the cell it is in, and whether or not the egg was fertilized, will determine what type of bee develops. The larva grows and grows.

On day *TEN*, the larva does not eat any more. It spins a silk covering called a cocoon around itself. An adult worker bee caps the cell with wax. Do you know why? To protect the larva that is changing into a **pupa**. As the pupa grows in the cocoon, it begins to look more and more like an insect. It grows eyes, legs, and wings. After a little bit more time goes by, the **adult** chews its way out of the cell.

The time it takes an adult to come out of the cell depends on the type of bee it is. There are many worker bees in the hive. There are not as many drones. And there is only *ONE* queen.

**Queen** bees develop from fertilized eggs. They are in the largest cells in the hive because queen bees have the biggest body. When they are in the larva stage in the cell, they are fed royal jelly for this entire life stage. This is definitely food for a queen!

**Worker** bees develop from fertilized eggs too. They are fed royal jelly but only for *THREE* days. Then they must eat beebread for the remainder of their larval stage. Beebread is a mixture of nectar and pollen.

The male bees, **drones**, develop from unfertilized eggs that are laid in cells that are larger than the worker cells. They are fed royal jelly for *THREE* days and then fed beebread too.

# Life Stages of a Honeybee

Here you can see how long the types of honeybee are in each life stage.

BEE	EGG	LARVA	PUPA	ADULT
Queen	Days 1-3	Days 4-9	Days 10-15	Day 16
Worker	Days 1-3	Days 4-9	Days 10-20	Day 21
Drone	Days 1-3	Days 4-9	Days 10-23	Day 24

Below is a diagram of a bee going through each life stage.

1. Queen laying eggs.



2. Larva in cell.



3. Pupa in cell.



4. Adult chews out of cell.



## Activity 2:

Watch the YouTube video below on honey bee life stages:

[https://www.youtube.com/watch?time\\_continue=23&v=f6mJ7e5YmnE&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=23&v=f6mJ7e5YmnE&feature=emb_logo)

Use the items listed below to craft a honey comb that includes the life stages of honeybees. For more pictures to reference, see this link:

<https://onlinesciencenotes.com/life-cycle-honey-bee-uses-honey/>

Supplies Needed: (some provided and some optional)

- Toilet paper or paper towel rolls (honeycomb cells)
- Construction paper for back of cells
  - Cotton balls
  - Couscous or rice (egg)
- Macaroni (larva)
- Shell pasta (pupa)
- Bowtie pasta (adult)
- Markers for labeling
  - Glue

# Bee Communication

How do Honeybees talk to each other?

Honeybees do not talk to each other like people do. So, how do they communicate? They use pheromones and body language. *Pheromones* are natural chemicals that are secreted or excreted from insects that trigger a response in other insects.

Have you ever been over to a friend's house and as you walk into their door you smell something that makes you think, "Oh, the house smells just like my friend?"

We could say that this was a pheromone we are smelling. This is the same for insects. Just like this, honeybees can tell when a "strange" honeybee that is not from their colony is trying to get into their hive. Activity 3 will help you understand this concept.

Activity 3:

Look in your kit. There are several plastic baggies that have cotton balls in them. They look the same, right? For this activity, pretend these are honeybees. Find a way to identify the different colonies and answer the questions below. Once you think you have them sorted into "hives," turn to page 11 to check your answers and to learn more!

- How many different hives are represented here with the cotton balls?
- How can you tell which of these are from the same "hive"?





# Bee Communication

Honeybees also use body language to communicate. They like to dance, and they know how to talk through dance. Follow Activity 4 to see how this works.

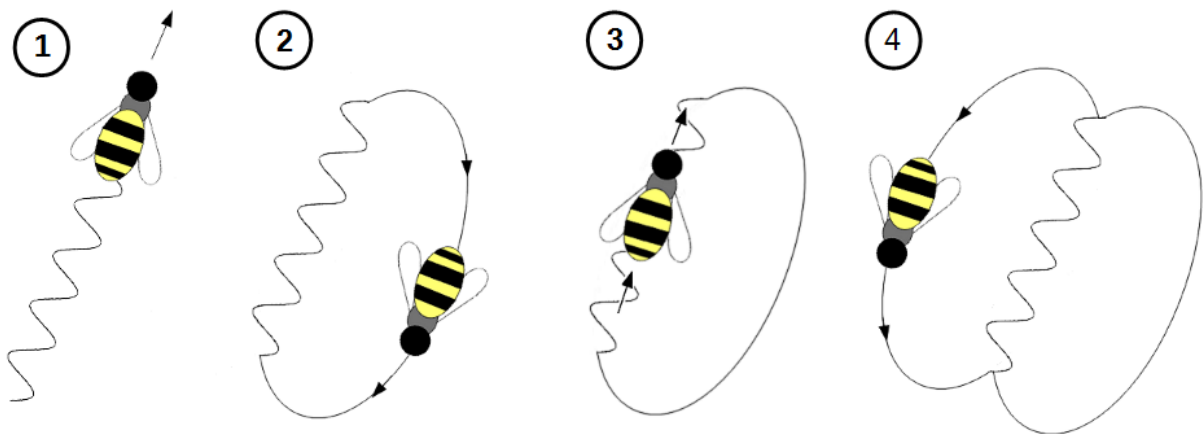
*Activity 4 Directions:*

View the following videos on bee dances:

Waggle Dance: [https://www.youtube.com/watch?v=LU\\_KD1enR3Q](https://www.youtube.com/watch?v=LU_KD1enR3Q)

Round Dance: <https://www.youtube.com/watch?v=02fi44OLJh8>

Practice how you can dance like a bee! Using teams or a partner within your household, take turns being a “scout” for food. The scout will pick a location to communicate to their team or partner where the “food source” is. You can pick any location you like. Try to communicate the way a worker bee would when they find a good food source that they are excited to share!



# Honeybees and Foraging

Have you ever wondered what honeybees eat? They do not eat pizza or cheeseburgers or even chicken nuggets. They gather pollen and nectar from flowers to feed their larvae and the other members of their colony. When they do this, they are foraging. Honeybees may fly up to SIX miles from their hive to forage and search for food. Whew! I bet they get tired.

What is nectar? It is the sweet fluid produced by flowers to attract bees and other insects, birds, and mammals. Worker bees drink the nectar and store it in a pouch-like structure called the honey sac. This is how they get it back to their hive. These worker bees then hand it off to “house bee”. How do they do this? They use their mouths. Gross!!

The house bees will mix it with enzymes and deposit it into a cell where it is exposed to air for some time to allow some of the water to evaporate. They may help the water evaporate by using their wings to fan the open cells. After the water is evaporated and the enzymes are added, the nectar becomes honey. YUMMY! The honeybees then cap the honey cells with beeswax.

Honeybees are hairy. Pollen sticks to the hairs while the bees are visiting the flowers. The bees move the pollen from their hair to their pollen baskets that are located on their hind legs. Have you ever seen bees with small orange or yellowish balls of pollen hanging from their hind legs? It is really neat to see.

The pollen is a powder-like substance that comes from flowers. You will learn a lot about this in the pollination section. The pollen can be very sticky. The honeybees mix the pollen with some of the nectar to form a mixture called beebread. Remember this? Beebread is used to feed larvae. It is rich in protein.

## *Activity 5:*

Use an empty cup to designate as the hive and place a water filled cup at opposite side of the room to designate as the nectar source

You are the worker bee, and your job is to leave the “hive” in search of a nectar source. Once at the nectar source, take your pipet and collect ONE drop of “nectar” (water). Then return to your hive and empty the drop of nectar into the “hive”.

Repeat this until 1 minute is up and then measure the amount of nectar in the hive.

*Do not expect large amounts.*



# Recipes...Featuring Honey!



## Fried Ice cream

### a. Ingredients:

- i. 1 carton vanilla ice cream
- ii. 1 box corn flakes (cheapest brand)
- iii. Cinnamon
- iv. Honey

### b. Directions:

- i. Take 2 tablespoons of corn flakes and crush them into small pieces. Add one scoop vanilla ice cream to corn flakes and roll in flakes until all ice cream is covered. Add more corn flakes if needed.
- ii. Mix two tablespoons honey and two shakes of cinnamon.
- iii. Stir together.

## Honey Butter Popcorn

### a. Ingredients:

- i. 1/2 cup honey
- ii. 1/4 cup sugar
- iii. 1 tablespoon butter
- iv. 1/2 teaspoon cinnamon
- v. 5 cups hot-air popped popcorn
- vi. Butter for handling

### b. Directions:

- i. Place air-popped popcorn in a large bowl and set aside.
- ii. In a 2-quart microwave-safe bowl, combine honey, sugar, cinnamon, and 1 tablespoon butter. Cover with plastic wrap and microwave on high for 5-7 minutes.
- iii. Pour honey mixture over popcorn and stir to coat with a wooden spoon then set aside.
- iv. Butter hands then shape popcorn.



## Banana Pops

### a. Ingredients:

- i. Bananas
- ii. Honey
- iii. Sprinkles
- iv. Graham crackers
- v. Chocolate chip minis

### b. Directions:

- i. Divide banana into two pieces
- ii. Drizzle honey over banana
- iii. Roll in favorite topping



# Recipes...Featuring Honey!

## Honey Crispies

### a. Ingredients:

- i. 1/2 cup powdered sugar
- ii. 1/2 cup honey
- iii. 1/2 cup peanut butter (leave out if students have allergies)
- iv. 1-1/2 cups crispy rice cereal
- v. 1/2 cup raisins
- vi. 1/2 cup chocolate or candy sprinkles



### b. Directions:

- i. Place waxed paper on cookie sheet.
- ii. Combine powdered sugar, honey, and peanut butter in a medium bowl. Mix well.
- iii. Stir in cereal and raisins.

## Cereal

### a. Ingredients:

- i. Corn flakes
- ii. Honey
- iii. Banana
- iv. Milk

### b. Directions:

- i. Pour a bowl of corn flakes and milk.
- ii. Add banana slices.
- iii. Add honey.



  
**Enjoy!**

# Additional Resources

<http://www.surrybeekeepers.org/>

<https://www.natgeokids.com/uk/discover/animals/insects/honey-bees/>

<https://kids.sandiegozoo.org/animals/bee>

<https://www.fs.fed.us/wildflowers/pollinators/animals/bees.shtml>

<https://scstatebeekeepers.wildapricot.org/resources/Documents/2017%20Journeyman%20Lancaster%20Class/Honey%20Bee%20Anatomy%20and%20Physiology.pdf>

*Information for Activity 2:*

Did you separate the cotton balls into “hives”? How many hives did you have? If you answered three, you were correct. Each cotton ball had a smell. The cotton balls that belonged to the same hive had the same smell. This is how honeybees identify each other too! Did you smell a mint hive? Did you smell a vanilla hive? What else did you smell? You should have found ONE cotton ball that was all by itself. This one was from a different hive and was a robber bee! It was trying to get into one of the other hives and steal their honey they have worked so hard for. How did you do?

## References

<https://triedandtasty.com/honey-butter-popcorn/>

<https://www.lifelab.org/wp-content/uploads/2010/02/3rdGardenPollinators2016.pdf>