Honey

*Lesson Plan for Grade 2 , Science*

*Prepared by NAITC*

*Modified by Mississippi State University, School of Human Science*

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

Students will investigate the three types of honey bees in a colony, identify their roles, and recognize honey bees as part of a community that works together.

# EDUCATION STANDARDS

**Mississippi College-and-Career Readiness Standards:**

L.2.3A Students will demonstrate an understanding of the interdependence of living things and the environment in which they live.

L.2.3A.2 Construct scientific arguments to explain how animals can make major changes (e.g., beaver dams obstruct streams, or large deer populations destroying crops) and minor changes to their environments (e.g., ant hills, crawfish burrows, mole tunnels).

ELA-RI.2.9 Compare and contrast the most important points presented by two text on the same topic.

**NALOs:**

T5.K-2 d Identify plants and animals grown or raised locally that are used for food, clothing, shelter, and landscapes.

# OBJECTIVES

* Students will investigate types of honey bees
* Students will identify the roles of honey bees
* Students will recognize honey bees as part of a community

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# MATERIALS NEEDED

# Graham Crackers (1 per student)

# Spoons (1 per student)

# Jar of honey (1)

Activity 1: Bee Communities

* What you Know- What you Want to know- What you Learned (KWL) Chart (1)
* The Life and Times of the Honeybee by Charles Micucci (1)
* Honeybee Worksheet (1 per student)
* [Amazing Bees Online Poster](http://www.todayifoundout.com/index.php/2010/12/10-amazzzzing-bee-facts-infographic/) (1)
* Venn Diagram or [Top Hat Graphic Organizer](https://www.education.com/worksheet/article/top-hat-graphic-organizer/) (1 per student)

Activity 2: Making Honey

* The Beeman by Laurie Krebs (1)
* Small cartons or containers of milk (1 per student)
* 3-ounce cups, 1 per student when the class is divided in half
* Instant pudding mix (enough for each student to mix)
* Teaspoon
* Spoon or stir stick
* Can of whipped cream (1 or 2 per class)

Activity 3: A Day in the Life of a Honey Bee

* KWL Chart (1)

Concept Elaboration and Evaluation

* Dry erase boards (1 per student in small groups)
* Dry erase markers (1 per student in small groups)

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### Essential Files (maps, charts, pictures, or documents)

* [Venn Diagram](https://drive.google.com/file/d/1YAO-1Y0Mhg6c5o_HBxRvbbzR8c7mb8l1/view?usp=drive_link)
* [Honeybee Worksheet](https://drive.google.com/file/d/1ATldktExwb84N1rTfITkXXE-H7TtCa_Z/view?usp=drive_link)
* [KWL Chart](https://drive.google.com/file/d/1XDPLz7xyeZBmVXiZzsZqioB4zD7ihPpP/view?usp=drive_link)

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### Essential Links

* [Top Hat Graphic Organizer](https://www.education.com/worksheet/article/top-hat-graphic-organizer/)
* [Amazing Bees Online Poster](http://www.todayifoundout.com/index.php/2010/12/10-amazzzzing-bee-facts-infographic/)
* [Busy Bees YouTube Video](https://www.youtube.com/watch?v=ta154f5Rp5Y)

# Lesson Set Up:

1. The teacher will need to print the Honeybee Worksheet and KWL charts (1 per student).
2. The teacher will need to pull up the Busy Bees YouTube video.
3. Then the teacher should create a Venn Diagram that looks like the example given.

# Vocabulary

**brood:** the offspring produced by the colony (eggs and larvae)

**cell:** a hexagonal chamber built of beeswax for brood rearing and storage of honey and pollen

**crop:** spherically shaped organ in the abdomen of a honey bee that serves as a site for food storage, as a storage place for nectar bees collect from flowers, or as an initial site for the digestion of food; also known as the honey stomach

**drone:** a male honeybee that is produced from an unfertilized egg

**egg:** laid by a queen bee, this is the first stage in the life of a honeybee

**enzyme:** a substance produced by a living organism that acts as a catalyst to bring about a specific biochemical reaction

**evaporate:** turn from liquid to vapor

**forage:** search widely for food

**hive:** a container for housing honeybees; a colony of bees

**nectar:** a sweet liquid secreted by flowers of various plants

**pollen:** the fine, powder-like material produced by the anthers of flowering plants

**pollination:** the transfer of pollen from the anther to the stigma of a plant

**pollinator:** an animal that moves pollen from the anther to the stigma of a plant

**proboscis:** straw-like tongue used by honey bees to suck nectar or honey

**queen:** a female bee that lays eggs

**regurgitate:** bring swallowed food up again to the mouth

**workers:** female bees who build and guard the hive, look after the queen and gather food

# Ag Facts:

* Did you know that a honey bee can fly around 15 mph?
* Honey bees gather 10 pounds of nectar to make one pound of honey.
* A foraging honey bee can carry 80% of their weight in pollen or nectar.
* Honey bees make up 80% of all pollinators.
* Honey bees use several dances in the hive to communicate the location of nectar and water to other bees. One well known dance is called the waggle dance.
* There is only one queen per colony. More than one queen will fight and only one will survive.
* The queen honey bee lays between 1,000-3,000 eggs per day!

# Background Information for Teacher:

Honey bees are an important insect that are familiar to many elementary students. Honey bees like to live in dark, enclosed places. In the wild, they can be found in tree limbs and trunks. Beekeepers care for honey bees in wooden **hives**. Three different kinds of honey bees live in the hive:

* **Queen -** One female who lays all of the **eggs**. She has a long, thin body and is the largest bee. Queen bees live from 3-5 years and can lay up to 2,000 eggs each day.
* **Drones -** Drones are male bees. Their job is to mate with the queen so she can lay eggs. Each colony in the hive has about 100 drone bees.
* **Workers -** Worker bees are all females. There are usually hundreds of worker bees in a hive. They are the smallest bees, but they have many important jobs. These jobs include grooming the queen, nursing the **brood** (young bees), creating wax, building the honeycomb, guarding the hive, **foraging** for **nectar** and water, and making honey.

When worker bees are foraging, they collect nectar from flowers using their straw-like mouth part known as a **proboscis**. The nectar is stored in a special part of their body called the **crop**, or honey stomach. **Pollen** is collected on the legs and body of the forager bees. The pollen is transferred from flower to flower to **pollinate** the plants so seeds, fruits, and vegetables are produced. Over 1,000 different plants that are grown for food, beverages, fiber, species, and medicine need **pollinators** in order to produce the products we need and want.

When the forager worker bees have a full crop, they travel back to the hive. When they are back in the hive, the forager **regurgitates** the nectar and transfers it to a worker bee in the hive. **Enzymes** in the stomach of the bees convert nectar into a thin, watery form of honey. This liquid is placed in a **cell** in the honeycomb. The bees use their wings to fan the liquid to **evaporate** the water until it thickens. Finally, the wax-making worker bees seal the honeycomb cell where the honey continues to ripen and develop flavor.

# LEARNING PROCEDURES

Interst Approach:

1. Provide a sample of honey on a cracker or spoon for students to taste. Encourage them to use adjectives to describe the taste and sweetness that they are experiencing.
2. Ask the students,

**"How do you think honey is made? Where does it come from?"**

1. Write the word "bee" on the board. Ask the students to brainstorm connections bees have to food, plants, and agriculture. As a class, create a list, [mindmap](http://insideteaching.grad.msu.edu/using-mind-maps-for-learning/), or [Wordle](http://www.wordle.net/) about bees that can be posted in the classroom as a tool that can be referred back to throughout the lesson.

Activity 1: Bee Communities

1. Provide each student with the *KWL Chart* handout. As a class or independently, have the students create a [KWL chart](http://www.nea.org/tools/k-w-l-know-want-to-know-learned.html) to record what they Know (K) about honey bees, what they Want (W) to know about them, and what they have Learned (L) by the end of the lesson.
2. As a class watch the video [Busy Bees](https://www.youtube.com/watch?v=ta154f5Rp5Y) . (You can also read a book to the students about bees and their different jobs if you have one available).
3. Hand out a copy of the *Honeybee Worksheet* to each student. Discuss the roles of the three types of honeybees and have the students complete the worksheet. Integrate the following facts into the discussion:
   * Bees live in groups called **colonies**.
   * Each colony has one **queen**. The queen has a longer body than all of the other bees in the colony.
   * **Drone** bees are smaller than the queen. They are male bees and their only job is to mate with the queen so she can lay more eggs. One colony will have about 100 drone bees.
   * **Worker** bees are the smallest bees in the colony. They are all female and have lots of different jobs including feeding the larvae; cleaning the hive; creating wax and using it to make new cells; grooming and feeding the queen; guarding and protecting the hive; and leaving the hive to collect pollen, nectar, and water. There are thousands of worker bees in the colony.
4. Use the information on the [Amazing Bees Online Poster](http://www.todayifoundout.com/index.php/2010/12/10-amazzzzing-bee-facts-infographic/)to help students discover the ways in which bee colonies work together as a community.
5. Use a *Venn Diagram* or [Top Hat Graphic Organizer](https://www.education.com/worksheet/article/top-hat-graphic-organizer/) to compare and contrast how bees in a hive and students in a classroom work together as a community. Examples include:
   * The bees in a hive live in large groups called colonies. In our school, our class is a large group of students.
   * In the hive, there is one bee who is the leader—the queen. In our classroom, the teacher is the leader.
   * In the hive, the worker bees have special jobs—take care of the young bees, guard the hive, create wax to build the honeycomb where eggs are laid, forage or find pollen and nectar to feed the bees in the hive, and make honey. In our classroom, we all have jobs. (Students can list jobs specific to their classroom.)
   * If a bee doesn't do his/her job, the whole hive is affected. For example, if the bees that are supposed to look for pollen and nectar decide not to, some or all of the bees will not have the proper nutrients. In our classroom, if someone doesn't do their job, it affects the entire class. For example, if one person does not put away their books in our library, other students won't be able to read those books.

Activity 3: A Day in the Life of a Honey Bee

1. Lead a discussion about the importance of honey bees and how they affect the environment. Integrate the following points into the discussion:
   * As bees travel to find nectar, they brush up on the flower's pollen.
   * Pollen is powder-like and sticks to the bees' hairy bodies.
   * When the bees fly to the next flower, some of the pollen is brushed off onto the flower.
   * The flower uses the pollen to make seeds which can grow new plants that give us fruits, nuts, and vegetables. We depend on pollination for the fruits and vegetables we eat.
2. Ask the students to think about what they have learned about honey bees and what a honey bee's day might be like.
3. Have the students write and/or draw about where they would fly and what they would do if they were honey bees. Allow time for the students to share their work.
4. Complete the KWL chart from *Activity 1* by listing what the class learned about bees.

**Concept Elaboration and Evaluation**

* Assess students in small groups. Provide each student with a dry-erase marker and marker board on which to write their answers. Read each question aloud and have the students write the corresponding letter of their chosen answer on their marker boards.

1. The name of the place where a bee lives is called a:  
   A. hole  
   B. hive  
   C. house  
   D. cave  
   Answer: B
2. Which of these is NOT one of the three types of bees we learned about?  
   A. a drone  
   B. a worker  
   C. a sweeper  
   D. a queen  
   Answer: C
3. When a baby bee is growing and it looks like a worm, it is called a:  
   A. larva  
   B. pupa  
   C. caterpillar  
   D. snake  
   Answer: A
4. When a baby bee is growing its eyes, legs, and wings, and has not hatched yet, it is called a:  
   A. worker  
   B. pupa  
   C. queen  
   D. larva  
   Answer: B

# Additional Learning Procedures

To help students review and elaborate more about honey try using the [“Carousel”](https://drive.google.com/file/d/17BQ6QhnslRpWu5NUAyj1GfE6b760E38_/view?usp=sharing) method to allow students to think deeper and make new connections.

Additional texts to integrate into your classroom:

[The Honeybee Man](https://www.agfoundation.org/recommended-pubs/the-honeybee-man)

[The Honey Makers](https://www.agfoundation.org/recommended-pubs/the-honey-makers)

[From Flower to Honey](https://www.agfoundation.org/recommended-pubs/from-flower-to-honey)



Source: <https://www.agclassroom.org/teacher/matrix/>

*For more information and additional lessons visit*

*https://msfb.org/ag-in-the-classroom/lesson-plans/.*