Honey

*Lesson Plan for Grade 1, Science*

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

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

In this lesson, students will be able to describe the life cycle of bees from egg to adult.

# EDUCATION STANDARDS

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

L.1.2.2 Obtain, evaluate, and communicate information through labeled drawings, the life cycle (egg, larva, pupa, adult) of pollinating insects (e.g., bees, butterflies).

ELA-W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

**NALOs:**

T2.K-2 a Explain how farmers/ranchers work with the life cycle of plants and animals (planting/breeding) to harvest a crop.

# OBJECTIVES

* Students will describe the life cycle stages of a honey bee

# MATERIALS NEEDED

* [Bee Life cycle worksheet](https://drive.google.com/file/d/1MAT5n-qDtKdv8rDcaGFhbtryb5lLprJC/view?usp=sharing) (1 per student)
* Reading Rainbow [Bee life cycle video](https://www.youtube.com/watch?v=jvAVlAa6_xU)
* Scissors (1 per student)
* Glue (1 stick per student)

Essential links:

* [Bee life cycle video](https://www.youtube.com/watch?v=LM7eEitKcIM)

# Lesson Set Up:

1. Set up the reading rainbow Bee life cycle video.
2. Print the Bee Life Cycle Worksheet (1 per student).

# Vocabulary

**beeswax:** a substance secreted from glands located on the underside of a worker bee’s abdomen

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

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

**colony:** a group living together

**hive:** a home to a colony of bees

**honeycomb:** six-sided wax cells in a beehive

**metamorphosis:** the process of change in the form and habits of an organism during transformation from an immature stage to an adult stage

**nectar:** a sweet liquid secreted by flowers

**pollen:** a fine, powder-like material produced by flowering plants

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

**propolis:** a resin-like material used by bees to construct and seal parts of the beehive

**Royal jelly:** a milky, yellow syrup secreted from a gland in a young worker bee’s head; used to feed larvae

# Ag Facts:

# Bees pollinate 95 different crops, helping to create nearly one-third of the world's food supply.

# Honey is the only food produced by insects that is eaten by humans on a wide scale.

# A queen bee can lay over one million eggs in her lifetime.

# Worker bees' wings can beat 250 times per second allowing the bee to fly at speeds of up to 15 miles per hour

# Background Information for Teacher:

Honey bees are extremely important to humans. Bees are pollinators. They collect pollen and nectar from flowering trees and plants and transfer pollen from flower to flower. Bees pollinate 95 different crops, helping to create nearly one-third of the world’s food supply. Honey bees use the nectar they gather from flowers to make honey, which is the only commercial food produced by insects that is eaten by humans on a wide scale. Honey bees also produce beeswax, which is used to make candles, artists’ materials, lubricants, polishes, and cosmetics. Bee venom, pollen, royal jelly, and propolis are other bee-made products used in manufacturing, and for nutritional and medical purposes.

Honey bees live in large groups called colonies. There are three types, or castes, of honey bees­­—queen, worker, and drone.

The **queen** bee is a female that lays eggs. Each colony has only one queen bee. The queen can live up to four years and can lay over one million eggs in her lifetime. She can lay close to one egg per minute and between 1,000-2,000 eggs a day.

**Worker** bees are female bees who perform many of the jobs for the colony, 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. Worker bees live for about six weeks in the summer and longer in the winter months when they are less active.

**Drones** are male bees responsible only for mating with the queen. They do not work. There are about 100 drones in each colony. They live for about eight weeks in the summer, and are then expelled from the colony and die in the fall.

The size of a honey bee’s body depends on its caste and the task it performs. The queen bee is the largest, and the worker bee is the smallest. Honey bees, like all insects, have three main body regions—head, thorax, and abdomen.

The **head** contains two compound eyes, three simple eyes, two antennae, mandibles, and the proboscis. The **compound eyes** are made up of thousands of tiny lenses that allow the bee to see ultraviolet light (invisible to the human eye) and all colors of visible light except red. The **simple eyes** each have a thick lens that can sense changes in brightness. The honey bee’s **antennae** are movable feelers that detect smells and movement. The **proboscis** is a straw-like tongue used to suck nectar or honey. **Mandibles** are jaw-like structures used to knead wax and to chew honey and pollen.

The **thorax** is the honey bee’s middle region containing the flight muscles, four wings, and six legs. Honey bees have two **hind wings** and two **forewings** that can beat 250 times per second allowing the bee to fly at speeds of up to 15 miles per hour. They have three pairs of segmented **legs** used for walking, dusting their antennae, brushing pollen off body hair, and storing pollen. The hind legs of worker bees contain a **pollen basket**—a collection of hairs where pollen is stored for transport.

The **abdomen** is the rear region that contains organs for digestion, reproduction, and respiration as well as the stinger and wax glands. The **stinger** is only found in female honey bees. A worker bee’s barbed stinger is used for defense. When stinging, the barb anchors the stinger in the victim while the stinger’s pouch pumps venom. After stinging, the bee died of an abdominal rupture. When stinging insects, the bee’s stinger remains attached while the barb tears through the target’s exoskeleton. The **honey sac** is a stomach-like organ connected to the digestive tract. The sac stores the nectar until the bee returns to the hive. **Wax glands** are located on the underside of the bee’s abdomen. These glands form and excrete wax.

Honey bees have four distinct life stages—egg, larva, pupa, and adult. Complete metamorphosis takes between 16 and 24 days.

The queen lays each **egg** into a different cell of the honeycomb. It is her job to determine whether the egg will grow into a male or female bee. Fertilized eggs will become female workers, and unfertilized eggs will become male drones. After three days, the egg hatches and a worm-like creature, called **larva**, is unveiled. Worker bees feed the larvae royal jelly—a milky, yellow syrup secreted from a gland in the worker bee’s head. As it grows, the larva sheds its skin four or five times. On day nine, the larva spins itself a cocoon. A worker bee seals the cocoon into the cell with wax.

Inside the cocoon, the larva transforms into a **pupa**—developing eyes, legs, and wings. When the bee is fully grown, it chews its way out of the cell and emerges as an **adult**. It takes 16 days for a queen bee to develop from an egg to an adult; worker bees take 18-22 days, and drones need 24 days.

# LEARNING PROCEDURES

1. Explain to the students that they will be investigating the life cycle of a honey bee.
2. Ask students:

**“Why are honey bees important?”** Student answers could vary from they make honey

etc. Answer “ **Honey bees are important for all different kinds of reasons. Not only do they make honey that we eat, but they also make beeswax that we make different things out of like chapstick and lotions. The most important thing that bees do however is that they are pollinators. Bees travel from flower to flower and get pollen dust all over them. They then carry this pollen to the different flowers that they get nectar from, pollinating as they go. This is important to some crops because they need to be pollinated before they can produce their fruit and flowers.”**

1. Show students the reading rainbow episode about the life cycle of a bee.
2. Then briefly go back over the stages of the life cycle of a bee starting with an egg, then a larva, then a pupa, and finally an adult bee.
3. Have students complete the bee life cycle worksheet by having them cut out the stages and match and glue them to the correct order they go in on the diagram.

**Concept Elaboration and Evaluation**

* Summarize the lesson by going over the stages of the honey bees life cycle again.

# Additional Learning Procedures

To help students review and elaborate more about honey, complete a [“I used to think… now I think…”](https://drive.google.com/file/d/1uuUn6pyK94nT6eodL_aDX0aUo5dg0_YP/view?usp=sharing) chart and share with other students.

To create new ways for students to further engage with the lesson try reading [“The Bee Book” by: Charlotte Milner.](https://www.amazon.com/Bee-Book-Charlotte-Milner/dp/1465465537/ref=asc_df_1465465537/?tag=hyprod-20&linkCode=df0&hvadid=312053899840&hvpos=&hvnetw=g&hvrand=2465767292504921043&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=1020785&hvtargid=pla-491305007180&psc=1&tag=&ref=&adgrpid=61316180799&hvpone=&hvptwo=&hvadid=312053899840&hvpos=&hvnetw=g&hvrand=2465767292504921043&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=1020785&hvtargid=pla-491305007180)

Additional Texts to Include:

[What if There Were No Bees?](https://www.agfoundation.org/recommended-pubs/what-if-there-were-no-bees)

[Life Cycle of a Bee](https://www.agfoundation.org/recommended-pubs/life-cycle-of-a-bee)

[The Beeman](https://www.agfoundation.org/recommended-pubs/the-beeman)



*For more information and additional lessons visit*

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