Honey

*Lesson Plan for Grade 5th, Science*

*Prepared by PBSLearningMedia, Modified by Mississippi State University,*

*School of Human Sciences for Mississippi Farm Bureau Federation - AITC*

OVERVIEW & PURPOSE

Without pollination, we would not have flowers, fruits, or many vegetables that we enjoy each day. However, it is sometimes hard to see why honeybees and other pollinators play such a big role in our lives. This exercise will help students to visualize the necessity of pollination and of healthy pollinators in the ecosystem. Students will assume the roles of various types of pollinators and go on to produce a dramatic presentation that outlines the interconnectedness of various processes.

# EDUCATIONAL STANDARDS

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

L.5.3A.1 Research and communicate the basic process of photosynthesis that is used by plants to convert light energy into chemical energy that can be stored and released to fuel an organism’s activities.

ELA-RI 5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

**NALOs:**

T2.3-5 e Understand the concept of stewardship and identify ways farmer/ranchers care for soil, water, plants, and animals.

# OBJECTIVES

* Students will be able to identify, describe, and explain pollination
* Students will be able explain why pollination is critical to producing the fruits we eat
* Students will be able to explain why it is necessary to have healthy pollinators to do a good job

# MATERIALS NEEDED

* [The Bounty of Bees](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.producers.betterb/) QuickTime Video
* [Ladybug Pajama Party](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.ladybug/) Video
* [Gray Whale Obstacle Course](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.graymigrate/) Video

### Materials

* Paper Cups (One per "bee" student)
* Basket (One per "flower" student)
* One piece of 11.5 x 17" poster paper per student
* About 100 - 200 small pom poms. Half blue, half red

Essential Links:

* [The Bounty of Bees](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.producers.betterb/) QuickTime Video
* [Ladybug Pajama Party](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.ladybug/)
* [Gray Whale Obstacle Course](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.graymigrate/)

# Lesson Set Up:

1. The teacher should have the [The Bounty of Bees](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.producers.betterb/) ready to be presented to the students.

Activity 1:

1. Predetermine students into four different groups.
2. Set out the supplies to make the beed costume (poster paper, and markers).
3. Set out the blue, red, and flowers scattered around the room.

# 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:

* The honeybee was designated the state Insect of Mississippi in 1980.
* Bee pollination is critical to plant and human survival – beeswax and honey are just surplus gifts from this tiny wonder of nature. The plant world expends a lot of energy attracting bees and other insects with brilliantly colored flowers and sweet nectar (nectar is produced solely to attract pollinating insects).
* The honeybee is recognized as an official state symbol in seventeen states, primarily because honeybees play such an important role in agriculture.

# Background information for teachers:

Bees are some of the hardest working creatures on the planet, and because of their laborious work ethic, we owe many thanks to this amazing yet often underappreciated insects.

Our lives – and the world as a whole – would be a much different place if bees didn’t exist. To illustrate this fact, consider these numbers: bees are responsible for pollinating about one-sixth of the flowering plant species worldwide and approximately 400 different agricultural types of plant.

Honeybees and other pollinators and the invaluable pollinating services they provide us with helped produce approximately $19 billion worth of agricultural crops in the U.S. alone; that’s estimated to be one-third of everything we eat! The other animal pollinators such as bats, moths, butterflies, hummingbirds, ants, and beetles contributed to an estimated $10 billion in 2010! To say we rely on the pollination efforts of bees (and other animals) to sustain our modern food system is an understatement.

#### **Different Types of Bees**

Worldwide, there are around 25,000 different types of bee species (around 4,000 in the U.S.). This huge number is divided into over 4,000 genera of bees, which are then further subdivided into just nine families of bees. The Apidae family is perhaps the most well known family, with familiar members such as the honeybee, carpenter bee, and bumblebee.

All of these species dutifully serve as pollinators of our agricultural world. And they are all excellent at what they do. For example, all bees have stiff hairs and pockets on their legs, allowing them to collect more pollen and be more efficient transporters of it between plants. Not only that, bumblebees appear to be even more successful at pollinating certain crops due to their larger sizes and more vigorous vibrations. This helps to better disperse pollen amongst the flowers and fruits it visits.

#### **Pollination – How it Works & Why it’s Important**

What is pollination? Simply put, it is the transfer of pollen from the male part of the flower, the anther to the stigma, which is the female part of the flower. Upon the two’s meeting, a plant’s seed, nut, or fruit is then formed.

Some plants rely on animals to assist with their pollination process, while others can pollinate themselves or rely on the wind to do it for them.

Bees also tend to focus their energies on one species of plant at a time. By visiting the same flowers of a particular species in one outing, much higher quality pollination occurs – rather than spreading many different pollens to different plants which are not being pollinated, all plants of one species are getting an even distribution of vital pollen from others of its same species.

Pollination is essentially plant reproduction. Without help from animal pollinators, our everyday food supply would look much different – at least one third of our staples we’ve come to rely on would no longer be available.

#### **Bees Provide Sources of Food**

A few examples of the foods that would no longer be available to us if bees ceased pollinating our agricultural goods are: broccoli, asparagus, cantaloupes, cucumbers, pumpkins, blueberries, watermelons, almonds, apples, cranberries, and cherries.

Honey is a food product created by bees and is not to be forgotten. Made by bees regurgitating nectar and passing it back and forth in their mouths to one another before depositing and sealing it in a honeycomb, its intended use is for the bees’ winter food stores. Humans are quite fond of this amber liquid as well.

#### **Bees Beautify the Planet**

Pollinating flowers and contributing to the beautification of the planet’s floral landscapes may be the bees’ perhaps simplest and least economically important actions, but it’s certainly its most aesthetically pleasing one.

By keeping flowers pollinated, bees perpetuate floral growth and provide attractive habitats for other animals such as insects and birds.

Bees are easily amongst the most important insects to humans on Earth. These humble, buzzing bugs deserve a huge thanks – for helping provide us with our favorite fruits and vegetables, their delicious honey, and beautiful, flowery gardens!

# LEARNING PROCEDURES

Interest Approach:

Watch the video clip, [The Bounty of Bees](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.producers.betterb/) to help students get acquainted with the issue. Students should also be familiar with the concept of migration, for which the resources [Ladybug Pajama Party](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.ladybug/) and [Gray Whale Obstacle Course](https://mpb.pbslearningmedia.org/resource/kqed07.sci.life.oate.graymigrate/) may be helpful.

### Activity 1: Groups and Roles

1. Tell groups that today you will be putting on a 2 minute play with the class about pollination. There will be four different roles:

1. Honey bees (normal)
2. Honey bees that cannot fly
3. Flowers – this should be a slightly larger group

2. Put the students into four different groups - One different role per group

### Part II: Designing the Costume

3. Tell students that they will need to design a costume for themselves for the play today. The costumes will be posters that they will wear during the play. Their poster should have on it:

1. A pictorial representation of their role
2. Title - what role they are playing
3. Short explanation of their role (no more than two sentences

4. Hand out the paper and the markers. Circulate the room explaining each role to the student groups:

1. Honey bees (normal): will go around as fast as they can and TAKE 3 BLUE pollen grains (pom poms) from each “flower” and GIVE 1 pollen grain to each flower that they go to.
2. Honey bees that cannot fly: will stay at their hive the entire time (have them cheer on other bees)
3. Honey bees that are slow/sick because of parasites: will walk in super slow motion to each flower that they can get to and TAKE 3 RED pollen grains (pom poms) from each “flower” and GIVE 1 pollen grain to each flower that they go to.
4. Flowers: will have large baskets filled with pom poms to represent pollen. Flowers will be scattered around the room at different spots

5. When students are ready with their posters/costumes, have them affix them to the front of their clothing.

### Part III: The Two-Minute Play

6. Distribute the students representing the flowers around the room

Remind everyone of their roles one final time before starting the 2-minute timer allowing for the bees to play out their roles.

9. After this, write the following questions on the board. Allow students ten to fifteen minutes to copy and answer the questions.

1. Which type of bee had the most pollen grains in their cups/hive? Why do you think this is?
2. What do you think that the “cup” represents?
3. Why did each bee give 1 pollen grain to each flower that they came to?
4. Which color of pollen did flowers have the most at the end? Why is this important to think about?

**Concept Elaboration and Evaluation**

* Allow students three to five minutes to discuss answers in their small groups
* Discuss answers to the questions with the class -- there can either be a reporter, or you can call out individuals, or whichever reporting method you choose.

# Additional Learning Procedures

To help students review and elaborate more about honey, try using the [“I used to think.. Now I think…”](https://drive.google.com/file/d/1JTb3bJjt3WJvThHT0WLuLghAutmknbLb/view?usp=drive_link) method to allow students to think deeper and make new connections.

Additional Things to Include:

[Beebuzz Activity](https://agclassroom.org/matrix/resource/315/)

[Achoo! Why Pollen Counts](https://agclassroom.org/matrix/resource/336/)

[Bees and Wasps](https://agclassroom.org/matrix/resource/247/)

[Flight of the Honey Bee](https://agclassroom.org/matrix/resource/316/)



Source:<https://mpb.pbslearningmedia.org/resource/a6391284-9cc7-481f-8d7e-76c1ffb1a12b/a6391284-9cc7-481f-8d7e-76c1ffb1a12b/>

*For more information and additional lessons visit*

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