Honey

*Lesson Plan for Grade 3, Science*

*Prepared by NAITC*

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

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

Students will observe physical characteristics of flowers and explore principles of pollination.

# EDUCATIONAL STANDARDS

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

L.3.2 Students will demonstrate an understanding that through reproduction, the survival and physical features of plants and animals are inherited from parent organisms but can also be influenced by the environment.

ELA-SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-led) with diverse partners on grade 3 topics and texts, building on others’ ideas and expressing their own clearly.

**NALOs:**

T4.3-5 c Identify examples of how the knowledge of inherited traits is applied to farmed plants and animals in order to meet specific objectives (i.e. increased yields, better nutrition, etc.).

OBJECTIVES

* Students will identify the parts of a flower
* Students will explain how bees pollinate flowers

# MATERIALS NEEDED

Activity 1: Flower Dissection

* Cut flowers, 1 per student
  + Contact a local florist and ask if they have some old flowers they will be discarding; look for flowers that exhibit easily identifiable parts: lilies, roses, tulips, columbines, irises, petunias, snapdragons, and sunflowers)
* 5-gallon bucket with water to store the cut flowers
* *The Basic Parts of a Flower* handout (1 per student)
* Clear tape (1 per 3 students)
* *Flower Power* activity sheet (1 per student)
* [Parts of a Flower Poster](https://agclassroomstore.com/parts-of-a-flower/) (1)

Activity 2: Origami Flower Model

* 6" x 6" colored origami paper, (4–5 pieces of each color per student)
* Green chenille stems (15 mm x 12") (1 per student)
* White chenille stems (6 mm x 6"), (1 per student)
* Yellow chenille stems (6 mm x 6"), (4 per student)
* Green bump chenille stems (15 mm x 12"),(1 per student)
* Green tissue paper (3" x 3"), (1 per student)
* Yellow pony beads (6 mm x 9 mm) (2 per student)
* White pony beads (6 mm x 9 mm), (5 per student)
* Glue sticks (1 per student)
* Scissors (1 per student)
* *Origami Flower Instructions* PowerPoint

Activity 3: The Bee Dance

* 4–5 treat bags (treats selected at your discretion)
* *Honey, I’d Love to Dance* handout (1 per student)
* Written directions to each hidden treat bag (1 set)

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

* [Honey, I'd Love to Dance Handout](https://drive.google.com/file/d/13_3yPsfpl3FkJs0taAF9lDLXciEqOngJ/view?usp=drive_link)
* [Flower Power Activity Sheet](https://drive.google.com/file/d/1vAGuHo7O4x3nndFLI8qkdgzUVZXhAkhv/view?usp=drive_link)
* [The Basic Parts of a Flower Handout](https://drive.google.com/file/d/1a2NymIZiBXaR5izCFiXhgFXH68xac6kr/view?usp=drive_link)
* [Origami Flower Instruction PowerPoint](https://docs.google.com/presentation/d/1rATqj-OqU37P2XJ1qNFyD1ZYxN-r0zxV/edit?usp=drive_link&ouid=109918902593538910659&rtpof=true&sd=true)

# Lesson Set Up:

Activity 1:

1. Collect flowers in advance, and store them in the 5-gallon bucket with water in the bottom. Dissect a few flowers, place them on cardstock or a sheet of paper, and label the parts.
2. Print the Flower Power Activity sheet (1 per student).
3. Have clear tape, card stock paper, and scissors located centrally in the classroom.
4. Display the Basic parts of a flower handout/poster for the students.

Activity 2:

1. Set out the origami paper (4-5 pieces per student).
2. Display the Origami Flower PowerPoint.

Activity 3:

1. This activity should be completed outside.
2. Make copies of the Honey, I'd love to dance handout (1 for each student).
3. Predetermine students into 4-5 teams.
4. Hide the Treat bags and create written directions to each treat bag (1 per team).

# VOCABULARY

**pistil:** female parts of a flower, including the stigma (where pollen lands), style (stalk-like part between stigma and ovary), and ovary (at the base, develops into the fruit and contains the seeds)

**pollenizer:** plant that produces pollen

**pollinator:** agent that moves pollen resulting in the pollination of flowers

**stamen:** male parts of a flower, including the anther (produces and contains pollen) and filament (stalk supporting the anther)

# Ag Facts:

* About one-third of the total human diet is derived directly or indirectly from insect-pollinated plants.
* An estimated 80% of insect crop pollination is accomplished by honey bees.
* While pumpkins and other squash are self-pollinating, they are a bit unique. The flowers on these plants are considered “incomplete” because the flowers are either male or female. The pollen-bearing male flowers contribute the pollen to the female, fruit-bearing flowers.

# Background information for teachers:

Gregor Mendel was a monk in the 1800s. His study of pea plants demonstrated how offspring inherit traits from parent plants. Sadly, no one seemed interested in Mendel’s studies until around 1900, when three other scientists discovered similar evidence of inherited traits. Since then, researchers have continued to build on what Mendel discovered. The first activity in this lesson can serve as an introduction for teaching about inherited traits. Students will dissect a flower to discover how plants reproduce, passing traits onto offspring through seeds.

To understand inherited traits in plants, you need to understand how seeds are produced. Seeds contain embryos that develop into plants. Before a plant can form a seed embryo, pollination and fertilization must occur in the flower. The reproductive organs of plants are found in the flower. The male parts of the flower include the filament, which looks like a stalk, and the anther at the top of the filament, which produces pollen grains. Pollination occurs when pollen from an anther is transferred to a stigma. The stigma is the female part of the flower that is specially developed to catch pollen grains. Below the stigma is the style. A pollen grain that has been caught by the stigma reaches down the style to fertilize the egg (or eggs) in the ovary. This fertilization process creates a seed (or seeds) inside the ovary. In most cases, the ovary then swells and becomes the fruit of the plant (e.g., cherries, avocados, apples, cucumbers).

Many flowers contain both male and female parts. Some plants can pollinate themselves; they are self-fertile. Other plants have chemical or physical barriers to self-pollination and need to be cross-pollinated. In cross-pollination, pollen is delivered to a flower of a different plant. Plants adapted to cross-pollinate usually have taller **stamens** (collective male parts) than **pistils** (collective female parts) to better spread pollen to other flowers. In self-pollination, pollen moves from the anther to the stigma of the same flower or to another flower on the same individual plant. The seeds from self-pollinated flowers produce plants that look like the parent plant. This isn’t true with cross-pollination, which yields offspring of two different parents. The offspring of cross-pollinated plants may show some traits from both parents or may not resemble either parent.

Plants that cannot self-pollinate require a **pollenizer**—a separate plant to provide pollen. Even plants that can self-pollinate will often produce larger fruit and healthier offspring with a pollenizer. A good pollenizer is a plant of the same species that blooms at the same time as the plant to be pollinated and provides compatible, viable, and plentiful pollen. Peaches are considered self-fertile because fruit can be produced without cross-pollination, although cross-pollination usually produces a better crop. Apples are considered self-infertile; most apple trees will not form fruit without cross-pollination by an apple tree of a different variety. Pollination is critical for the production of many important agricultural crops, including corn, wheat, rice, apples, oranges, tomatoes, and squash.

In addition to planting the proper pollenizers for their crop, farmers must also consider whether their crops require a special **pollinator**. The terms pollenizer and pollinator are often confused—a pollenizer is a plant that provides pollen; a pollinator is an agent that moves pollen, whether it be wind, water, bees, bats, moths, or birds. Insects are among the most common pollinators.

Many flowers grow flashy petals and produce unique smells to attract insect pollinators to their rich supplies of pollen and/or nectar (sticky, sweet liquid on the end of the stigma). These flowers trade sweet nectar and protein-rich pollen in return for the pollination service that insects perform as they move from flower to flower. Insects don’t just pollinate flowers for fun; most are collecting food.

Different insects are attracted to different types of flowers depending on color, scent, and size. Butterflies are attracted to orange, yellow, pink, and blue flowers that have large landing pads. Moths are active at night, requiring flowers that are open and provide nectar at night. Large, white flowers are particularly easy for moths to find in the dark. Honey bees see colors on the higher end of the human visual spectrum, including ultraviolet, which humans cannot see. Honey bees tend to prefer blue, purple, and yellow flowers that have sweet scents.

It’s common to see bee boxes in orchards because honey bees are good pollinators for many fruit crops. Once a honey bee finds an abundant source of nectar and pollen, it will return to the hive and tell other bees how to locate that source by performing a dance. After a hive is placed in an orchard, it doesn’t take long for a steady stream of busy bees to start buzzing from flower to flower. Honey bees have lots of little hairs on their bodies, and a furry bee moving around inside a flower picks up a lot of pollen. Some of this pollen will be brought back to the hive for food, but some will be deposited on the stigmas of other flowers that the bee visits, pollinating those flowers. In an orchard, lots of pollinated flowers will lead to lots of tasty fruit!

# LEARNING PROCEDURES

Interest Approach:

1. Ask the students to think about where fruit comes from. Ask the following questions to stimulate discussion and assess your students' prior knowledge:
   * What do you see on a fruit tree in the early spring?
   * Do all flowers on a fruit tree become fruit?
   * Why is it common to see bee boxes in fruit orchards?
   * Why are bees an important agricultural resource?

### Procedures

Activity 1: Flower Dissection

1. Collect flowers in advance, and store them in the 5-gallon bucket with water in the bottom. Dissect a few flowers, place them on cardstock or a sheet of paper, and label the parts.
2. Discuss the background information with your class. Explain to your students that they are going to examine, dissect, and label the parts of the flower that are associated with pollination and seed formation.
3. Read and discuss the *Basic Parts of a Flower* handout as a class, or have students read the handout individually or in small groups.
4. Give each student a copy of the *Flower Power* activity sheet, clear tape, and a piece of cardstock or paper. Have 6–7 pairs of scissors located centrally in the classroom.
5. Using the *Parts of a Flower Poster* as a guide, instruct the students to first label the flower parts on the *Flower Power* activity sheet.
6. Show students the previously dissected flowers. Explain that flower dissection requires precision and a “light touch.” Rough handling of the flower will destroy the parts that need to be labeled. Give each student a flower. Have the students carefully dissect the flower and tape the parts onto their cardstock or paper.
7. Ask the students to label each flower part. They should use the *Flower Power* activity sheet as a reference.
8. Discuss the following questions:
   * Are some flowers easier to dissect than others?
   * Were some parts easier to identify than others?
   * Did every flower contain pollen? Why or why not?
   * How do you think your flower is pollinated?
   * Can you predict the size and shape of the seeds that may be produced by the flower based on how the flower looks?
   * If your flower were self-pollinated, and its seeds were planted, what would the flowers of its offspring look like? What if it were cross-pollinated?

Activity 2: Origami Flower Model

1. Explain to the students that they will be creating an origami flower to model the parts of a flower. 
2. Provide each student with 4-5 pieces of origami paper. Follow the instructions on the *Origami Flower* PowerPoint to create the flower petals.
3. Each student should add the following parts to their flower:
   * The white chenille stem represents the style. Use one yellow pony bead to represent the ovary, and attach it to the bottom of the style.
   * The yellow chenille stems represent the filaments. Push the white and yellow chenille stems up through the bottom center hole of the origami flower. Trim the chenille stems to the desired length, making sure the white chenille stem is slightly taller than the yellow chenille stems.
   * Create the stigma and anthers by attaching a yellow pony bead to the top of the style and white pony beads to the tops of each filament.
   * Use green tissue paper to create the sepal. Poke a small hole into the center of the sepal with the sharp point of a pencil. Glue the sepal around the bottom of the origami flower petals.
   * Place the green chenille stem into the bottom hole of the flower. Create leaves around the stem using the green bump chenille stems.
4. Ask the students to use their flower models to point out each part of the flower and explain the parts’ functions.

Activity 3: The Bee Dance

This activity needs lots of room. Try it outside!

1. Ask students how humans communicate non-verbally (body language, hand signals, facial expressions). Demonstrate a few in a charades-type manner.
2. Review the *Honey, I’d Love To Dance* handout. Discuss both dances and what each movement means.
3. Divide the class into teams of 4–5, depending on class size. Have each team choose a scout. This student/bee will find the food source (treat bag) and communicate its whereabouts through bee dances to the team members.
4. Give each scout written directions to a different treat bag (that you have hidden), and then send the scouts out to find them. Do not let the other students witness their search.
5. When the scouts return, have them communicate the direction and distance of the treat bag to their team members using either the round dance or the waggle dance. No verbal or “human” body language allowed!
6. Once all the teams have found their reward, follow up with a class discussion about the ease or difficulty of communicating through dance. Is it difficult to judge distance without a tape measure or other tools? Do they believe honey bees are intelligent creatures?

**Concept Elaboration and Evaluation**

After conducting these activities, review and summarize the following key concepts:

* There are many parts of a flower.
* Flowers can be beautiful to look at, but some flowers develop into food that we eat. All fruits develop from the flower of a plant.
* A flower must be pollinated before it will produce a fruit. This can be done by insects such as bees.
* Pollination is important in producing our food. Pollinators, like bees, are one example of a natural resource used in agriculture.

# Additional Learning Procedures

To help students review and elaborate more about honey try using the [“Carousel”](https://drive.google.com/file/d/1sNv9562er98nni7-vxOrI7-mD0Jh0-s7/view?usp=drive_link) method to allow students to think deeper and make new connections.

Additional texts to include:

[Bruno the Beekeeper](https://www.agfoundation.org/recommended-pubs/bruno-the-beekeeper)

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

[Hooray for Bee Keeping!](https://www.agfoundation.org/recommended-pubs/hooray-for-bee-keeping)



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

*For more information and additional lessons visit*

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