

Flower Power (Grades 3-5)

Grade Levels

3 - 5

Purpose

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

Estimated Time

Two 40-minute sessions

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
- [Flower Dissection Tutorial](https://www.youtube.com/watch?v=po0O9ycGNvc&feature=emb_logo) (https://www.youtube.com/watch?v=po0O9ycGNvc&feature=emb_logo)
- *The Basic Parts of a Flower* handout
- Clear tape
- *Flower Power* activity sheet, 1 per student
- [Parts of a Flower Poster](https://agclassroomstore.com/parts-of-a-flower/) (https://agclassroomstore.com/parts-of-a-flower/)

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
- Scissors
- *Origami Flower Instructions* PowerPoint

*These materials are included in the [Origami Parts of a Flower Kit](https://agclassroomstore.com/origami-parts-of-a-flower/) (https://agclassroomstore.com/origami-parts-of-a-flower/), which is available for purchase from agclassroomstore.com.

Activity 3: The Bee Dance

- 4–5 treat bags (treats selected at your discretion)
- *Honey, I'd Love to Dance* handout
- Written directions to each hidden treat bag

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

- [Flower Power Activity Sheet](https://cdn.agclassroom.org/media/uploads/2015/05/07/Flower_Power.pdf) (https://cdn.agclassroom.org/media/uploads/2015/05/07/Flower_Power.pdf)
- [Honey, I'd Love to Dance Handout](https://cdn.agclassroom.org/media/uploads/2015/05/06/HoneyDance_1.pdf) (https://cdn.agclassroom.org/media/uploads/2015/05/06/HoneyDance_1.pdf)
- [Origami Flower Instruction PowerPoint](https://cdn.agclassroom.org/media/uploads/2015/05/07/Origami_flower_instructions.pptx) (https://cdn.agclassroom.org/media/uploads/2015/05/07/Origami_flower_instructions.pptx)

- [The Basic Parts of a Flower Handout](https://cdn.agclassroom.org/media/uploads/2016/09/15/basic_parts_flower_1.pdf) (https://cdn.agclassroom.org/media/uploads/2016/09/15/basic_parts_flower_1.pdf)

Vocabulary Words

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

pollenizer: plant that provides 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)

Did You Know? (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 Agricultural Connections

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 on to 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.



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 their 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.



We welcome your [feedback](https://usu.co1.qualtrics.com/jfe/form/SV_4HhIVpN4L8IC2IT) (https://usu.co1.qualtrics.com/jfe/form/SV_4HhIVpN4L8IC2IT)! Please take a minute to tell us how to make this lesson better or to give us a few gold stars!

Enriching Activities

- Further explore the world of bees and pollination with these two, half-hour videos from *America's Heartland*:

[Episode 304: Migrant Bees](http://www.americasheartland.org/episodes/episode_304/migrant_bees.html) (http://www.americasheartland.org/episodes/episode_304/migrant_bees.html)

Something has been happening that concerns farmers, especially citrus and nut growers, everywhere: there's less "buzz" in the air. Bees are disappearing. While apiarists (bee farmers) try to determine the cause of "disappearing hive syndrome," some are seeing a new business opportunity in taking their bees on the road.

[Episode 208: Not So Sweet](http://www.americasheartland.org/episodes/episode_208/not_so_sweet.htm) (http://www.americasheartland.org/episodes/episode_208/not_so_sweet.htm)

California almond farmers grow 80% of the world's almond supply and almost 100% of the US almond crop, generating more than 1.5 billion dollars a year in revenue. But to pollinate trees and grow those almonds, you need bees, lots of bees!

Sources

Adapted from the National Honey Board's guide *The Honey Files: A Bee's Life. A Teaching Guide Grade Levels 4-6.*

Origami Flower Model activity developed by Lynn Wallin.

Suggested Companion Resources

- [Beebuzz](https://www.agclassroom.org/matrix/resource/315/) (<https://www.agclassroom.org/matrix/resource/315/>)
- [Shape, Form, and Function in the Garden](https://www.agclassroom.org/matrix/resource/642/) (<https://www.agclassroom.org/matrix/resource/642/>)
- [Wisconsin Fast Plants®](https://www.agclassroom.org/matrix/resource/364/) (<https://www.agclassroom.org/matrix/resource/364/>)
- [Achoo! Why Pollen Counts](https://www.agclassroom.org/matrix/resource/336/) (<https://www.agclassroom.org/matrix/resource/336/>)
- [Bea's Bees](https://www.agclassroom.org/matrix/resource/1051/) (<https://www.agclassroom.org/matrix/resource/1051/>)
- [Beekeepers](https://www.agclassroom.org/matrix/resource/140/) (<https://www.agclassroom.org/matrix/resource/140/>)
- [Bees and Wasps](https://www.agclassroom.org/matrix/resource/247/) (<https://www.agclassroom.org/matrix/resource/247/>)
- [Honeybee](https://www.agclassroom.org/matrix/resource/1033/) (<https://www.agclassroom.org/matrix/resource/1033/>)
- [How Do Apples Grow?](https://www.agclassroom.org/matrix/resource/317/) (<https://www.agclassroom.org/matrix/resource/317/>)
- [How Do Flowers Grow?](https://www.agclassroom.org/matrix/resource/246/) (<https://www.agclassroom.org/matrix/resource/246/>)
- [How Flowers Grow](https://www.agclassroom.org/matrix/resource/257/) (<https://www.agclassroom.org/matrix/resource/257/>)
- [In the Trees, Honey Bees](https://www.agclassroom.org/matrix/resource/987/) (<https://www.agclassroom.org/matrix/resource/987/>)
- [Jack's Garden](https://www.agclassroom.org/matrix/resource/1022/) (<https://www.agclassroom.org/matrix/resource/1022/>)
- [Pick, Pull, Snap! Where Once a Flower Bloomed](https://www.agclassroom.org/matrix/resource/1038/) (<https://www.agclassroom.org/matrix/resource/1038/>)
- [Pollen: Darwin's 130 Year Prediction](https://www.agclassroom.org/matrix/resource/982/) (<https://www.agclassroom.org/matrix/resource/982/>)
- [The Bee Book](https://www.agclassroom.org/matrix/resource/937/) (<https://www.agclassroom.org/matrix/resource/937/>)
- [The Life and Times of the Honeybee](https://www.agclassroom.org/matrix/resource/355/) (<https://www.agclassroom.org/matrix/resource/355/>)
- [The Reason for a Flower](https://www.agclassroom.org/matrix/resource/133/) (<https://www.agclassroom.org/matrix/resource/133/>)
- [The Thing About Bees: A Love Letter](https://www.agclassroom.org/matrix/resource/1060/) (<https://www.agclassroom.org/matrix/resource/1060/>)
- [When the Bees Fly Home](https://www.agclassroom.org/matrix/resource/356/) (<https://www.agclassroom.org/matrix/resource/356/>)
- [Origami Parts of a Flower](https://www.agclassroom.org/matrix/resource/796/) (<https://www.agclassroom.org/matrix/resource/796/>)
- [Honey Bee Study Prints](https://www.agclassroom.org/matrix/resource/357/) (<https://www.agclassroom.org/matrix/resource/357/>)
- [Parts of a Flower Poster](https://www.agclassroom.org/matrix/resource/801/) (<https://www.agclassroom.org/matrix/resource/801/>)
- [Amazing Time-Lapse: Bees Hatch Before Your Eyes](https://www.agclassroom.org/matrix/resource/925/) (<https://www.agclassroom.org/matrix/resource/925/>)
- [City of Bees: A Children's Guide to Bees DVD](https://www.agclassroom.org/matrix/resource/175/) (<https://www.agclassroom.org/matrix/resource/175/>)
- [How It's Made: Honey](https://www.agclassroom.org/matrix/resource/353/) (<https://www.agclassroom.org/matrix/resource/353/>)
- [Introduction to Pollination video](https://www.agclassroom.org/matrix/resource/881/) (<https://www.agclassroom.org/matrix/resource/881/>)
- [NMSU Field Trip: Honey](https://www.agclassroom.org/matrix/resource/363/) (<https://www.agclassroom.org/matrix/resource/363/>)
- [The Honey Files](https://www.agclassroom.org/matrix/resource/220/) (<https://www.agclassroom.org/matrix/resource/220/>)
- [Wings of Life](https://www.agclassroom.org/matrix/resource/358/) (<https://www.agclassroom.org/matrix/resource/358/>)
- [Edible Gardening: Growing Your Own Vegetables, Fruits, and More](https://www.agclassroom.org/matrix/resource/361/) (<https://www.agclassroom.org/matrix/resource/361/>)
- [Pollen Gallery](https://www.agclassroom.org/matrix/resource/327/) (<https://www.agclassroom.org/matrix/resource/327/>)
- [Utah State University Bee Lab](https://www.agclassroom.org/matrix/resource/350/) (<https://www.agclassroom.org/matrix/resource/350/>)

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