

STEAM Subject: Entomology

Lab: Pollination: How Do Insects Do It?

Grades: 2-5

Learning objective:

Students will be able to explain how pollination works and why it is essential to our survival. They will also discover that there are more pollinators than they think.

ENGAGE:

Ask students the following questions:

- What is pollination? Why is it important?
- Name some pollinators that you know.
- Why are certain pollinators attracted to certain plants?

EXPLORE:

The Steps of Pollination:

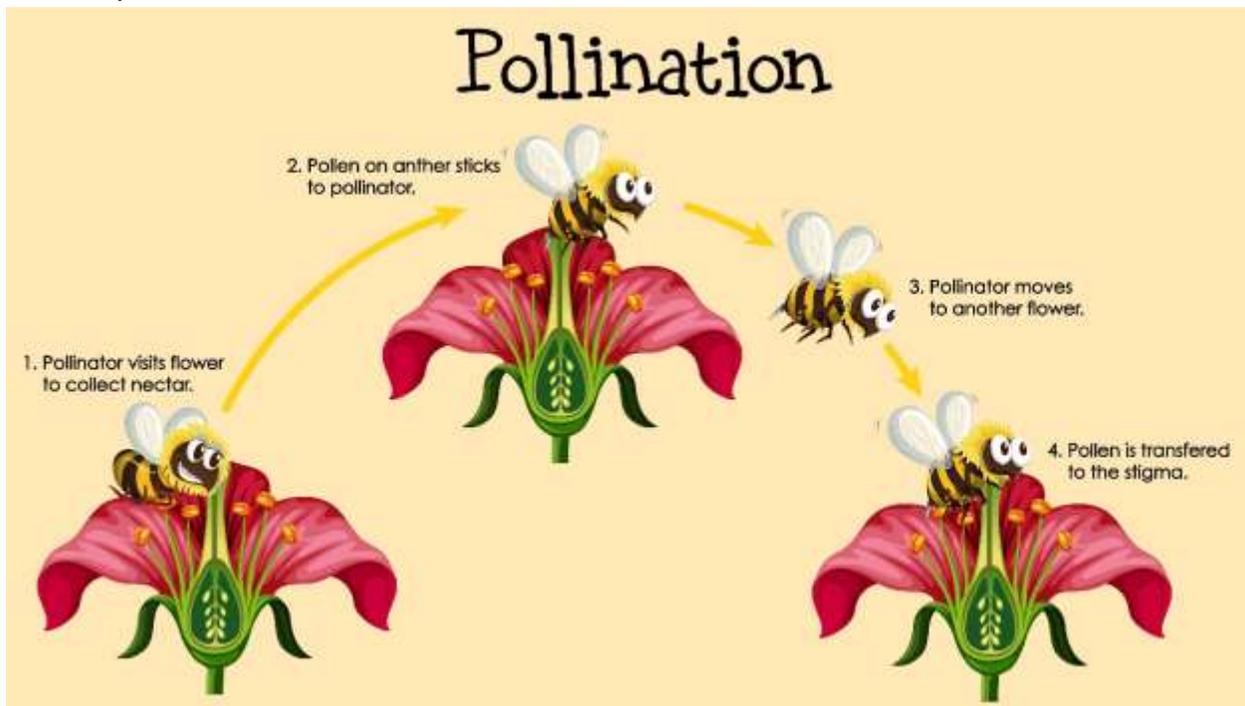


image: Freepik.com

Pollination Activity:

Students will play the role of the pollinator and see how pollen is transferred around throughout an environment.

Materials needed per student:

- 2 cupcake liners (to represent the flowers)
- 1 Q-tip or cotton swab (to represent the bee)
- 2 different colored powders (to represent the pollen)
 - This could be Kool-Aid mix, Jell-O mix, colored sugar sprinkles, etc.
- A large paper plate or mat/tray to do the experiment on to keep any surfaces from getting messy
- A small cup of water

Directions:

1. Place a small amount (about a teaspoon) of the one colored powder into a cupcake liner, do the same with the other color. These will represent the flowers with different colored pollen.
2. Gently dip the Q-tip in water to make it able to pick up the pollen better. This will represent the bee's body. As a bee goes to feed on the nectar of a colorful flower, it picks up pollen along the way with its fuzzy body and Velcro-like legs (called **pollen baskets**).
3. Dip the damp Q-tip in the first flower and observe the pollen that stuck on to it.
4. Dip the *SAME* Q-tip end into the second flower, and observe how the pollen has now mixed, both in the cupcake liner and on the Q-tip. Notice how the Q-tip is now holding both flower's pollen, and the cupcake liner should also have some mixed pollen in it as well. By the bee going to the next flower and collecting nectar, some of the pollen from the first flower will mix with the pollen from the new flower, allowing fertilization to occur and seeds to be made.
5. Optional Step: Try adding more flowers with different colors. See how many different mixtures/fertilizations you can create as a bee!





Note: If this experiment becomes messy in any way, use that to your advantage! The “pollen” that falls onto the plate or table can be an example of how pollen can fall and cause allergies to humans!

EXPLAIN:

Now of course, a Q-tip is not as complex as a pollinator, but it does allow the “pollen” to stick to it because it is fuzzy and we have dampened it. For a bee, the most well known pollinator, it has many adaptations that allow it to collect nectar for itself and its hive, and to carry pollen to help fertilize plants.

- **Review Science Vocabulary**

- **Pollination:** the transfer of pollen from the stamens to the stigma of flowers. Pollen can be carried by insects, other animals, wind, or water
- **Pollen:** a powder like substance in a flower that is made up of grains.
- **Pollinators:** an animal that involuntarily transfers a flower’s pollen from male reproductive organs to female reproductive organs of flowers
- **Nectar:** a sweet liquid that is secreted by flowers as an attractant for pollinators, it also serves as food for pollinators
- **Adaptation:** a special skill which helps an animal to survive and do everything it needs to do. It could be a physical change to the body or a behavioral change.
- **Proboscis:** an elongated sucking mouthpart that is typically tubular and flexible.

- Watch videos about pollination.

- Pollination explanation: <https://youtu.be/txv2k7OoY7U>
- Pollination up-close: <https://youtu.be/MQiszdkOwuU>
- Butterfly in action: <https://youtu.be/KkbrcySYUNg>

A POLLEN DELIVERY SYSTEM

The honeybee is one of many insects that pollinate flowering plants. As it forages for food, it picks up pollen from one plant's male part, the stamen, and deposits it on the female part, or pistil, of another of the same species.

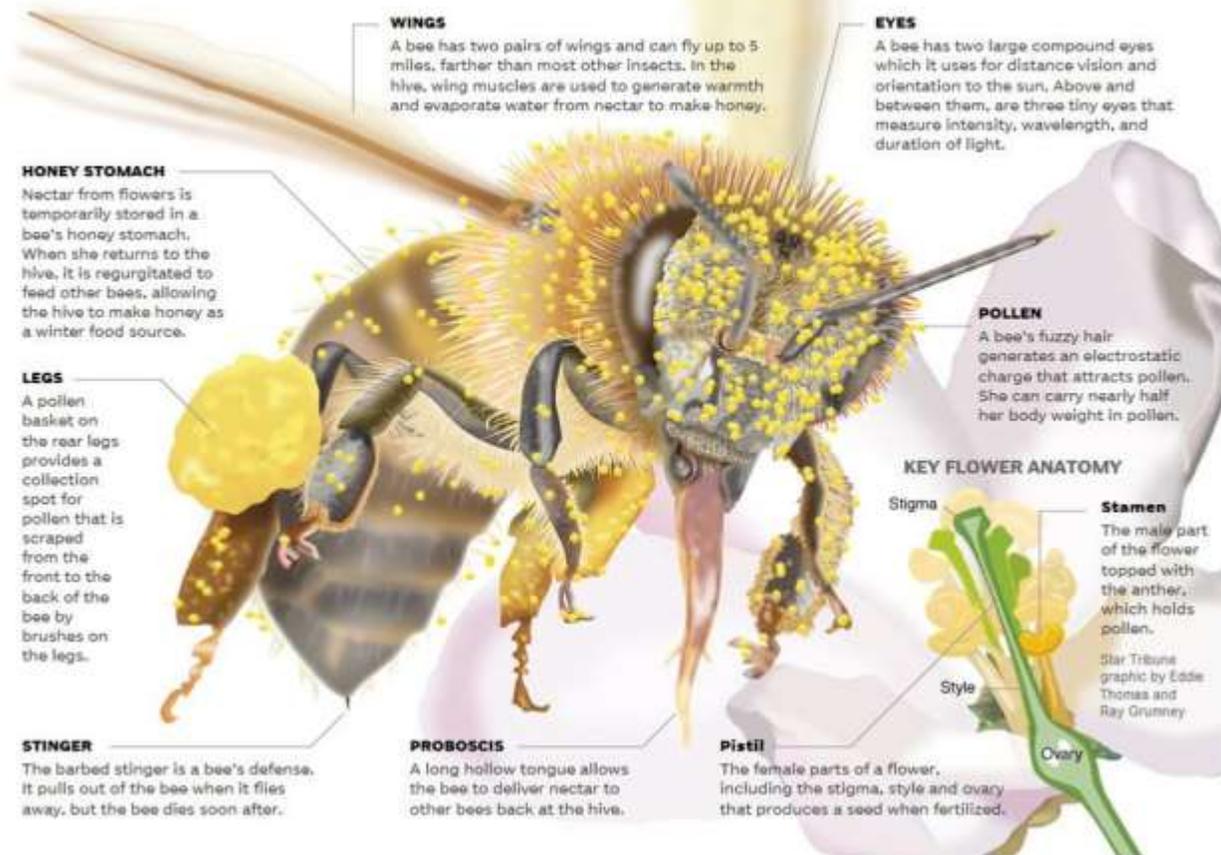


Image: <https://www.ferreiraapiary.com/beefacts/>

While bees play a large role in pollination, there are many other insects and animals that play this vital role in the world.

Other insects, such as butterflies, beetles, flies, and wasps, as well as other animals like hummingbirds and bats, often collect the nectar of the flower and the pollen will stick to their bodies and legs, where they will spread it by landing on another flower to drink the nectar. Some insects, like butterflies, use a proboscis to suck out the nectar in a flower. Take a look at the many adaptations of a bee that allows it to play this essential role in our world!

ELABORATE:

- What does the end result show? *The two pollens have mixed together*
- What does this mean for the plant? *It is fertilized and can now grow a fruit*
- Pollination is essential for many fruits to grow, so do we need pollinators in order to eat?
 - Check out this list of food that relies on pollinators to produce (<https://www.pollinator.org/list-of-pollinated-food>) and notice just how many foods you know and love are on it! Maybe think twice about squishing a bug the next time you see one! Different pollinators are attracted to different types of flowers based on their biology.
 - Optional Activity: Try and match the pollinators to the plant they pollinate using this interactive website or the printable version!
<https://www.pbs.org/wgbh/nova/nature/pollination-game.html>

EVALUATE:

- If possible, go on a walk in the backyard, around the neighborhood, or at a park on a sunny day and observe. Look at the different types of pollinators that we discussed above and see what kind of plants they are attracted too. Think about the importance of pollination and discuss the ways that we as humans can help to support these pollinators.
- Brainstorm a few practical things that we can do to attract more pollinators and if possible do them! (Plant certain flowers and plants that attract pollinators, create a butterfly feeder, make a bee hotel, set up a hummingbird feeder, etc.).
- Here are some ideas on what you can do to help pollinators!
<https://outdoorfamiliesonline.com/pollinator-garden-bees/>
<https://www.angieslist.com/articles/attract-butterflies-making-diy-feeder-6-simple-steps.htm>
<https://nationalzoo.si.edu/migratory-birds/hummingbird-nectar-recipe>

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