

Pollination Pals

GRADES: 3–5

Key Words and Definitions

- POLLINATION** : process of how plants reproduce with the help of pollinators.
- POLLINATOR** : animal that carries pollen from one plant to another.
- POLLEN** : fine substance produced in flowers that can fertilize other flowers to create seeds.
- NECTAR** : sweet liquid produced by plants to attract pollinators.
- PETALS** : modified leaves that surround the reproductive parts of a plant and are usually brightly colored to attract pollinators.
- SEPAL** : beneath the petals; smooth leaf-like projection.
- FRUIT** : the product of pollination that contains seeds and often can be eaten.
- ADAPTATION** : specialized feature that allows a plant or animal to better survive in its environment.
- STAMEN** : male part of the flower, composed of the filament (stalk) and anther (pollen holding structure).
- STYLE** : tube which connects stigma and ovary.
- STIGMA** : sticky platform at the top of the style, where pollen is deposited.
- OVARY** : the part of the plant that contains eggs—pollen fertilizes eggs.

*Look for keywords—**BOLDED**—throughout this lesson extension!*

Activity 1: Flower Dissection

One, approximately 35-minute session; pre-visit

LEARNING OBJECTIVE

Students observe the parts of a flower and identify specific functions.



MATERIALS

- Fresh flowers (recommended: lilies, daffodils or irises)
- Magnifying glasses

PROCEDURE

Tell students that soon you will be journeying to Wave Hill to learn all about plants and **POLLINATORS**. Access prior knowledge by asking: what is a pollinator? What are some important plant parts for pollinators? How might plants attract pollinators?

Break the class into smaller groups of 3 to 4 students. Give each group a flower. Identify the petals and sepal. Have students make a sketch of each. Then, ask them to remove the sepals and petals by pulling them down toward the stem. Use magnifying glasses to examine the petals. Ask: what is the texture like? The color? How might these attract pollinators?

Next, have students identify, sketch and remove the flower's stamens. At the top of the stamen is the anther, which holds pollen. Ask students to break the anthers off and examine the pollen with magnifying glasses. Ask: can you see the shape each pollen grain?

After you have finished with the pollen, remove all parts except the pistil, or female, part of the flower so that it alone remains on the stem. At the top of the pistil is the **STIGMA**, which collects pollen and carries it down through its hollow body, called the **STYLE**, to the ovary. Ask students to carefully pull the pistil in half lengthwise and use magnifying glasses to look inside. Students should be able to see that the style is a long, hollow tube. Students might be able to see tiny eggs, or ovules, in the pistil's ovary. Ask students: how does pollen travel from the anther to ovary? Confirm that it must be transported from the anther (often by a pollinator) to the stigma. Once there, it can enter the flower's style and descend to the ovary.

Review the plant parts and functions as a class. Take a minute for students to write down any questions they might have for Wave Hill Educators about flowers and their relationships with pollinators.

Activity 2: Pollinator Obstacle Course

One, approximately 30-minute session; post-visit

LEARNING OBJECTIVE

Students engage in a pollinator obstacle course to explore threats faced by pollinators and determine potential solutions to these threats.

MATERIALS

- Carpet circles
- Plastic bats
- Tunnel
- Candy

PROCEDURE

In this activity, students learn more about the threats **POLLINATORS** face when trying to visit flowers. In 2 or 3 pollinator teams (ex.: Team Bee, Team Butterfly, Team Hummingbird), have students race through the following obstacles one after the other:

1. **Habitat Loss** Many pollinators are affected when large tracts of habitat are broken up into smaller, isolated patches by road construction or agriculture. Habitat fragments may not be large enough to meet all the needs of pollinators by themselves.
 - **Obstacle** Carpet circles can be placed some distance apart from each other and the students will have to jump from one circle to another.
2. **Non-native Species** Some non-native plants crowd out wildflowers needed by pollinators. Non-native plants can attract pollinators away from native species that are better food sources. To combat this, we can maintain the health of native flora, such as milkweed for monarch butterflies, or plant more native flora in our school gardens or yards.
 - **Obstacle** Students must play rock-paper-scissors with you, another adult, or a student volunteer who is not currently running the race. Play best of 2 out of 3. If you win, they must freeze for 5 seconds before continuing.
3. **Pesticides** Air pollution in the form of pesticides can be a major problem for pollinators that rely on scent trails to find flowers. Insecticides applied to seeds can contaminate **POLLEN** grains, damage pollinators' food sources and hinder pollinators' senses of navigation and smell. Pesticide exposure can lead to neurological harm and even death amongst pollinators. The effects of pesticides can be curbed by using less harmful chemicals and allowing natural predators to keep pests in check.
 - **Obstacle** Dizzy Bats: With a whiffle bat (or something similar) laid on the ground, the student must bend down and touch the end to their nose then spin around the tip for 5 counts. They will then try to walk to the final station—the FLOWER where they can collect their reward (nectar/candy) from a bowl.
4. **Pollination Destination** Pollinators serve an important ecological role as they collect **NECTAR** to feed themselves and fertilize plants by transporting pollen from one flower to another.



- **Obstacle Tunnel:** Students crawl through a tunnel to collect nectar (candy) to bring back to the team. The tunnel represents the nectary, the nectar-secreting glandular organ, of a flower.

Regroup as a class and review the threats pollinators face (habitat loss, non-native species and pesticides). Reflect on their experience as a pollinator:

- Was your journey difficult? Why?
- What threats did you face on your journey to collect nectar?
- What are some ideas you have to help combat these threats?

NOTE: You can modify the obstacles according to available materials and student accessibility. Just make sure the obstacles correlate to the corresponding threats.

This lesson can extend to a stewardship project. Once you discuss the threats pollinators face, you may generate projects responding to these issues (e.g., planting native wildflowers around the school or helping to maintain a school garden).

BACKGROUND INFORMATION

Pollination and Plant Parts

"Parts of a Flower and Pollination | The Dr. Binocs Show | Learn Videos For Kids." *YouTube*, Peekaboo Kidz, 29 July 2015, www.youtube.com/watch?v=djPVgip_bdU&feature=youtu.be.

Plant Dissection Video

"DISSECTION OF A HIBISCUS FLOWER." *YouTube*, Jackson Yeo, 4 July 2016, www.youtube.com/watch?v=yLl7iEpqxZA&feature=youtu.be.

Pollination and Fruits

"Like Fruit? Thank a Bee!" *YouTube*, SciShow Kids, 14 July 2016, www.youtube.com/watch?v=txv2k7OoY7U&feature=youtu.be."

"Bees up Close" Wild Kratts WILD KRATTS | Follow That Bee! | PBS KIDS." *YouTube*, PBS KIDS, 3 May 2017, www.youtube.com/watch?v=xc2v20BncF8&feature=youtu.be.

How Bees See

"How Bees Can See the Invisible." *YouTube*, It's Okay To Be Smart, 22 Apr. 2013, www.youtube.com/watch?v=N1TUDFC0wjY&feature=youtu.be.



Urban Gardening

"Your Urban Garden Is Better with Bees." *Pollinator.org*, North American Pollinator Protection Campaign, www.pollinator.org/assets/generalFiles/Better-with-Bees.pdf.

Native Plant Share and Workshop

"Home." *Butterfly Project*, Butterfly Project NYC, 2016, www.butterflyprojectnyc.org.

