How Pollinators Pollinate

Habitat Lab Field Journal Activity Lesson Plans & Resources

Online Lesson Plans & Resources available on the Alabama Wildlife Federation website

Students will investigate how pollinators (bees, birds, butterflies, bats etc.) help to transfer pollen from one plant to another or one flower to another.

Materials: Copies of **"**How Pollinators Pollinate" Habitat lab Field Journal Activity Pages, Clipboards, Pencils, Crayons/Colored Pencils, Magnifying Glasses AND Q-tips with Specimen Jars or Ziploc Bags to collect pollen (*Optional Discovery Activity: iPads or Cellphones)*

Duration: Intro Discussion – 40 min. | Outdoor Exploration – 20 min. | Review of Observations – 20 min.

STEP 1: Engage through Discussion

The background information, vocabulary and questions below can be used to help introduce the topic, engage the students, and build a foundation to discuss the topic:

Background Information (online as a PDF)

All living things, including plants, need to be able to **reproduce** (create a "copy" or "baby") to create the "next generation" or the species will die out and no longer exist. One of the ways that plants can reproduce is by creating and distributing seeds that contain genetic material (information about "mom" and "dad") along with "building instructions" to create a new "baby" plant that has the same traits and characteristics as the "parent" plants.

Seed-producing plant **species** (a group of plants with the same traits and characteristics that can exchange genetic material and reproduce) require genetic material from a male and female of the same species to reproduce. For some plant species, the **stamen** ("male" part) and the **pistil** ("female" part) can be found in the same flower of a plant, while other species of plants can have all male parts in their flowers or all female parts in their flowers. The stamen produces a yellow, sticky powder called **pollen** that must be transferred to the pistil through a process called **pollination** in order to produce a seed.

Since plants cannot pull their roots out of the ground and move around to visit other plants, they use their flowers to attract **pollinators** (animals like birds, bees and butterflies that transfer pollen from plant to plant and flower to flower) to help them with pollination—this important step in the reproduction process. The pollen becomes attached to parts of a pollinator's body and is deposited on other plants as the pollinator searches for nectar to eat.

Plants must be the same species for pollination to occur. Plants that are not the same species cannot pollinate each other. For example, only pollen from a dandelion can pollinate another dandelion—pollen from a lily or red bud tree would not work.

Pollination is an important process for the production of new plants including vegetables and fruits. Research shows that 1,000 out of 1,200 common crops are pollinator dependent and over 1/3 of all of the food we eat requires pollinators. *(McGregor 1976, Buchmann and Nabhan 1997)*

This background information along with more pollination details can be found at:

- https://www.fs.fed.us/wildflowers/pollinators/What_is_Pollination/
- http://www.mbgnet.net/bioplants/pollination.html

- https://extension.illinois.edu/gpe/case4/c4facts1a.html
- https://www.epa.gov/sites/production/files/2016-08/documents/vicki_wojcik_6-23-16.pdf

Example Discussion Questions & Answers (online as a PowerPoint or PDF)

Q: Do all living things reproduce? Do ALL animals create baby animals? Do ALL plants create "baby" plants?

A: *Yes, because if they don't reproduce (make a "copy" or a "baby"), then their species will die and no longer exist*.

Q: How do plants reproduce? How do adult plants make "baby" plants?

A: *They create seeds. For example, the students may have had the chance to see the seeds of a dandelion plant when they blow the seeds in the wind.*

Q: How does a seed make a new plant?

A: *A seed contains the genetic material (information about "mom" & "dad") along with "building instructions" to create a new "baby" plant that has the same traits & characteristics as the "parent" plants.*

Q: How does a plant create a new seed?

A: *A plant uses its flowers to create new seeds. For example, a sunflower plant has hundreds of tiny flowers on the "head" of the plant. Each of those tiny flowers can produce one seed, so one sunflower plant can create hundreds of seeds.*

Q: How does a flower create a seed?

A: *Plants require a male and female of the same species to create a seed, just like animals need a male and female to create a baby. The male and female parts are found in a plant's flower. The male part is called the stamen, and the female part is called a pistil.*

Q: Do all flowers have a stamen and a pistil?

A: *Some flowers have both a stamen AND a pistil, while other plants may only have stamens or only pistils.*

Q: How do the stamen and pistil create a seed?

A: *The stamen (the male part) produces pollen. Pollen is the yellow, sticky powder. Then the pollen is transferred to the pistil (female part) of the flower where it creates a seed.*

Q: How does the pollen move from the stamen to the pistil? Does the plant use its hands to move the pollen? Does the plant pull its roots out of the ground and walk around to give its pollen to other plants?

A: *No! Plants do not have arms or hands, and plants do not have feet and they cannot walk.*

Q: How does the pollen get from the stamen to the pistil?

A: *Plants use their flowers to attract animals like bees, butterflies and other insects to transfer pollen from plant to plant and flower to flower. This process is called pollination. The animals that help move the pollen are called pollinators.*

Q: How do the flowers attract the pollinators?

A: *The flowers have bright colors, smell good, and provide nectar to eat which tastes like honey.*

Q: How do the pollinators move the pollen from flower to flower?

A: *The pollen sticks to parts of the pollinator's body, and then the pollen is deposited on other flowers that the pollinators visit in search of nectar.*

Q: Where can we find pollen in the habitat lab?

A: *In flowers…flowers in the woods, on trees, in gardens, on vines, etc.*

Q: What types of pollinators could we find in the habitat lab?

A: *Beetles, bees, wasps, ants, butterflies, spiders, etc.*

Building Background Vocabulary:

Put the chart on Elmo/whiteboard so that you can review the vocabulary to build background knowledge with your students.

"Bee" in the Know About Pollination

- **Pollinators** are organisms that help to move pollen from one flower to another.
- **Pollination** is the process of pollen being transferred from the male part of one flower to the female part of another flower of the same species.
- The male part of the flower is called the **stamen**.
- **Pollen** is small, powdery grains produced on the male part of the flower called the **anther**.
- The female part of the flower is the **pistil**.
- Pollination causes the pollen to travel down a **pollen tube** where new seeds are then made.
- The new **seeds** can make new plants.

STEP 2: Explore with Literature

These books can be used to further explore the topic with your students:

- *What is Pollination? (Big Science Ideas)* by Bobbie Kalman ISBN: 978-0778733065
- *The Reason for a Flower: A Book About Flowers, Pollen, and Seeds* by Ruth Heller ISBN: 9780698115590

- *Animal Pollinators* by Jennifer Boothroyd ISBN: 978-1467760690
- *Who Will Plant a Tree?* by Jerry Pallotta ISBN: 978-1585365029

STEP 3: Explain using Technology

These videos can be used to further explain the topic to your students:

- Pollination for Kids (8:17 min. @ https://www.youtube.com/watch?v=9AuVm1jpKEA)
- Seed Song – How Seeds Move (4:25 min. @ https://www.youtube.com/watch?v=3CCOWHa-qfc)
- The Decline in Bees – Part of *America's Heartland* Show (5:12 min. total – *click play button and it will auto play from 8:43 to 13:55* @ http://www.americasheartland.org/episodes/episode_304/migrant_bees.html)

STEP 4: Elaborate with a Field Investigation in the Habitat lab 

The Habitat lab Field Journal Activity Observation Page(s) allow students to apply what they have learned as they investigate and record their real-world observations in their field journals. Before you go outside, don't forget to review the activity tips, activity instructions and your Habitat lab Rules:

- How Pollinators Pollinate Habitat lab Activity Tip**:** Before taking the students outdoors to explore the habitat lab, consider splitting them into groups of two or three, so that they can work together as teams. One child can hold the clipboard and record the observations on the Field Journal page, one child can hold the magnifying glass to view the details of the flower, and one child can collect and hold a sample of pollen in a container such as a Ziploc bag. If resources allow, take iPads or cell phones to take pictures of the plant and the pollen grains up close. Students can use the photos to observe similarities and differences in the pollen grains as a follow up activity.
- Activity Instructions for the How Pollinators Pollinate observation page(s): Have students explore the habitat lab looking for flowering plants, shrubs and trees and pollinators. Give them a magnifying glass to magnify the pollen in the flowers, and a Q-tip to collect the pollen. They should record their observations, and then complete the pollination process diagram on the activity page.
- Example Habitat lab Rules: The habitat lab is not a playground, so do not run and do not climb on anything. Remember that the habitat lab provides habitat (a home) for local wildlife, and you should not damage the local wildlife habitat. Therefore, do not pick up wildlife, plants, flowers or rocks. Also, do not feed wildlife.

STEP 5: Review and Assess

Review and assess the students' observations and answers on their observation pages. Another extension might be to have students research a different type of pollinator than the one they observed in the habitat lab.

Alabama Course of Study Standards for 2nd Grade

Language Arts (2016)

1.) Ask and answer such questions as who, what, where, when, why and how to demonstrate understanding of key details in a text.

12.) Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

16.) Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.

19.) By the end of the year, read and comprehend informational text, including history/social studies, science and technical texts, in the Grades 2-3 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Science (2015)

6.) Design and construct models to simulate how animals disperse seeds or pollinate plants (e.g., animals brushing fur against seed pods and seeds falling off in other areas, birds and bees extracting nectar from flowers and transferring pollen from one plant to another).