



## POLLINATORS AND WILDFLOWERS

### Summary

Students will understand that plants depend on pollinators to reproduce and maintain their populations. They learn about wetland plant identification, plant anatomy and plant reproduction while dissecting local wetland flowers, they play in a pollinator relay race, then go outside to collect and identify local pollination insects.

### Objectives

Students will:

- Know that flowers are the reproductive organs of a plant and that seeds are the product.
- Name the parts of a flower.
- Understand the role of pollinators in plant reproduction.
- Name some pollinators.

### California Content Standards Addressed

Grade Five- Science content 2.a.: “*Students know* many multi-cellular organisms have specialized structures to support the transport of materials.”

Grade Six- Science content 5.c.: “*Students know* populations of organisms can be categorized by the functions they serve in an ecosystem.”

Grade Six- Visual Art content 2.1: “Use various observational drawing skills to depict a variety of subject matter.”

Grade Seven- Science content 2.a.: “*Students know* the differences between the life cycles and reproduction methods of sexual and asexual organisms.”

Grade Seven- Science content 5.f.: “*Students know* the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.

Grade Seven- Visual Art content 2.5: “Interpret reality and fantasy in original two-dimensional and three-dimensional works of art.”

### The Basics:

#### Grade Level

5<sup>th</sup>- 8th

#### Subject Areas

Life sciences

#### Duration

95 minutes

#### Number of Docents Needed

2

## Outline

*There are 7 parts to this lesson:*

- 1) Flowers 101 (15 minutes)
- 2) Wildflower Collection and Dissection (25 minutes)
- 3) Pollinator 101 (10 minutes)
- 4) Honeybee Relay Race (25 minutes)
- 5a) Pollinator Hunt (15 minutes)
- 5b) Name that Pollinator! (15 minutes)
- 6) Closing Circle (5 minutes)

## Materials

### *1. Flowers 101*

Whiteboard and markers

### *2. Wildflower Collection and Dissection*

Paper for each student

Pair of scissors or a dull knife for each student

Pack of colored pencils for each student (or enough for a pair of students to share)

Several microscopes

Small magnifying glass for each student

### *3. Pollinator 101*

whiteboard and markers

### *4. Honeybee Relay Race*

1. Pollen pom-poms (yellow). There should be no less than 2 pollen tokens per student.
2. Nectar pom-poms (orange). There should also be no less than 2 nectar tokens per student.
3. One tin can (or similar container) per team, to represent the honeycomb
  - a. Should be empty at the beginning of the game
4. Two tin cans (with pictures of flowers on them) per team, to represent flowers
  - a. One nectar pom-pom and one pollen pom-pom per child in each tin can
5. One bee puppet per team.

### *5a. Pollinator Hunt*

1 bug box for each student (a clear plastic box with a magnifier on the removable lid)

### *5b. Name that Pollinator!*

Several copies of laminated pollinator and flower match up cards (see bottom of this lesson plan)

## Vocabulary

Petal, Sepal, Ovary, Pistil, Stigma, Stamen, Anther, Pollination, Pollinator

## Procedure

- 1) Flowers 101 (15 minutes)

- After making introductions and discussing what we are doing today, ask the students this question, where do seeds come from? (Some might say from plants or trees. Try to get them to name flowers as the specific part of a plant where seeds are produced.) How does a seed come from a flower? (Most students will not know this.) Has anyone heard of pollen? Where does pollen come from? Yes, it comes from flowers but specifically male flowers or the male parts of flowers. Flowers are actually male or female or both. I am going to draw you a picture of a flower that has male and female parts.
- (At this point draw a sketch of a flower on the whiteboard and label each part of the flower. Perhaps discuss each part as you draw and have the students to repeat the name of each flower part.) Pollen comes from the male parts of the flowers called Stamens. Pollen is one of the parts of the plant that creates a seed. To make a seed, the pollen has to fall or be carried on to a female part called a Stigma. The pollen then travels down the inside the stigma to the bottom where the seed eggs are. (Draw the pollen traveling down the stigma on your flower diagram.) Once a tiny pollen and a tiny seed egg meet a seed starts to grow in the flower and the petals fall off. **Pollination** is the word for when the pollen and the seed egg meet. All plants want to be pollinated so that they can grow seeds.
- Is this story surprising? Where did you originally think seeds came from? Pollen is actually one of the parts necessary to make a seed.

## 2) Wildflower Collection and Dissection (25 minutes)

- Now each of you are going to get to dissect a few wildflowers from the ESHA and examine these flower part up close with magnifying glasses. Then you will get to draw your own flower diagram of one of the flowers you dissected.
- Break the students into small groups and pair them up with stewards and docents. Then the head out to the ESHA to pick some flowers. Each student should only pick two or three flowers. Once they have flowers they come back inside, sit with their group, and gently dissect their flowers with scissors.
- Students examine them with magnifying glasses then draw and label the parts of one of their flowers with paper and colored pencils. Once they are done, flowers go in the trash or outside and drawing are collected.

## 3) Pollinator 101 (10 minutes)

- Gather the students together and ask them this question, how does pollen, which does not move on its own, get to the female flower or female part of the plant. Sometimes wind does it, sometimes pollen can just fall from the male part to the female part when they are on the same flower, but most of the time, pollen is carried from flower to flower by insects! Small animals like insects who carry pollen around are called **pollinators**.
- Most of the time pollinators do not even realize that they are carrying pollen from flower to flower. They do it accidentally because they are going into the flowers to find something else. Do any of you have an idea what the

pollinating insects might be after? They are after something really sweet that they use as a food source. It's nectar, which is a sweet juice the flower makes to attract insects to the flowers so that they can be tricked into carrying pollen around for the flowers.

- Can anyone think of some other kinds of animals other than insects that are potential pollinators? Think of some animals that fly. That's right some birds, like hummingbirds, drink nectar and accidentally carry pollen around. Also bats drink nectar and are pollinators of some plants. What is the most famous pollinator of all? Who do you see around flowers a lot? Honeybees!

#### **4) Honeybee Relay Race (25 minutes)**

- Move all the students outside and review the following information with the students.
- Bees gather nectar and pollen from flowers for their own use as food. They use the nectar to make honey and some pollen is used to provide important nutrients to young bees or brood. While the bees are gathering food they scatter pollen and pollinate many flowers. When bees leave the hive and find a nice patch of flowers they need to communicate that with the other bees in the hive. They do this by performing a "waggle" dance which tells the other bees the direction and distance to the flowers. In this activity all of you students will become bees and will fly from your hive to flowers in the field where you will collect nectar and pollen, pollinate a flower, fly back to your hive and communicate with other bees by doing a waggle dance.
- Break the students up into two or more even teams (the number of students in a team will determine the length of the activity). Ask the teams to stand behind a starting line and place the honeycomb container at the beginning of the line. This is where the bees will deposit all of the nectar and pollen that they collect in the field. Place a flower container with pollen pom-poms and nectar pom-poms half way across the running area in front of each team. Place a second flower container at the far end of the running area in front of each team with pollen and nectar pom-poms. See attached Playing Field Diagram.
- Explain the rules: The runner holds the bee puppet while running. Each runner in turn must go to the first flower bucket and pick out one pollen pom-pom and one nectar pom-pom. The runner must then go to the second flower bucket and deposit one pollen pom-pom in the bucket. The runner must then pick up one pollen pom-pom and one nectar pom-pom from that container. The runner now has two nectar pom-poms and one pollen pom-pom. The runner runs back to the hive and places the pom-poms in the honeycomb container. Before passing the bee puppet to the next runner in line the current runner must do a waggle dance that includes at least one total rotation of the body. Then the puppet is passed to the next student and the previous runner sits at the end of the line.
- Start the race. Encourage the kids to all run the race even if one of the teams have finished. When all teams have finished the race look in the honeycomb and the flower containers and analyze the contents. They may play again if they wish.

- Verbally review the activity with the students. What do bees pick up when they are visiting flowers? What do they do with the nectar? What do they do with the pollen? How do the bees help the flowers? How do the flowers help the bees? How do bees tell other bees where there are flowers? When you are done, have the students help you clear up all the relay race supplies.

**5a and 5b are alternative activities. Choose one or the other based on student interest and weather. Or do both if you have the time.**

#### **5a) Pollinator Hunt (15 minutes)**

- Explain that we will now look for flower pollinators of the wetlands. Split the kids up into their groups again and pass out bug boxes to each student. Have them go out onto the ESHA in their groups and search for insects that are on flowers or flying from flower to flower. Have them try to **gently** catch a pollinator in their bug box. Once everyone in each group has collected a pollinator, the students should pass around their bug boxes in their group for everyone to observe the different insects. Students and stewards should help each other identify the insects.
- Once they have passed around their insects it is time to **gently** release their insect on to a plant or into the air. When all insects are released they may come back to the WERC classroom.

#### **5b) Name that Pollinator! (15 minutes)**

- Break the students up into groups of 16. Have them sit in their groups either in the inside classroom or outdoor classroom. Pass out copies of the pollinator and flower match up cards to each group. Each student gets either a flower card or a pollinator card. (If you have less than 16 kids in a group, you will not use all the cards, so make sure that you are passing out the right matches.) Each student with a flower card takes turns putting their flower card in the middle of the group. Each pollinator reads their card aloud. The whole group tries to match the correct pollinator to each type of flower. Collect cards into a pile when done with the game.

#### **6) Closing Circle**

- Have students and mentors circle up. Students pass around a stone and say one fact they learned today.

#### **Extensions**

- **Flower Pressings.**

Go outside and collect wild flowers in small groups. Come back to the classroom and put flowers in plant presses. When students come back for another field trip, check on the flowers and have them make drawings that include their pressed flowers.



**Ants** visit light-colored, simple, low-growing flowers positioned close to the stem.



**Cascade Knotweed** (*Polygonum cascadense*)



**Bees** are attracted to bright white, yellow, blue, or violet flowers, or those that reflect ultraviolet light. The flower's shape is often tubular or has lots of petals.



**Marigold** (*Tagetes sp.*)



**Beetles** tend to pollinate flowers that are dull white or green with an odor that is often unpleasant to humans. The flowers are large and flat or bowl-like.



*Aster (Aster sp.)*





**Butterflies** feed from bright red, orange, yellow, pink, blue, or purple flowers that are often large and showy with a faint fresh odor. The flower often features a funnel shape or narrow tube.



Honeysuckle (*Lonicera periclymenum*)



**Flies** visit pale and dull green flowers as well as dark brown or purple; sometimes the flowers are flecked with translucent patches. Preferred flower shapes include simple bowl shapes or funnel-like shapes.



Jack-in-the-Pulpit flower (*Arisaema triphyllum*)



**Moths** visit pale flowers that can be white, pink, purple, or red and usually open in late afternoon or at night. The flowers, often described as large and showy, are tubular with deeply hidden, abundant nectar and limited pollen.



*Yucca* (*Yucca sp.*)



**Hummingbirds** pollinate scarlet, orange, red, or white tubular flowers. They are typically large and showy with abundant nectar. Unlike other birds, hummingbirds do not require perch support because they hover while feeding on nectar.



**Red Salvia** (*Salvia splendens*)



**Bats** generally visit large, showy flowers that are dull white, cream, green, or purple. Bat-pollinated flowers open at night, at which time they emit a strong musty, fermenting, or fruity odor. The flowers tend to be firm, wide-mouthed and bell- or dish-shaped.



**Morning Glory** (*Ipomoea albivena*)