

Pollination Station: Flower Pollinators

Investigative Questions: What plants do pollinators and other organisms visit the most? What can this tell us about plant and pollinator diversity?

Goal: Students act as Pollination Scientists to investigate plant and pollinator interactions. Data will be used to choose plants for a school pollination garden based on pollinator diversity.

Objectives

Knowledge: Students learn a wide variety of insects visit flowers for nectar and pollen rewards. Students describe the interactions between flowers and pollinators. Students graph pollinator visitation data (as a group at Blandy or in the classroom) and explain what their data shows.

Skills: Students observe, examine, and record data on plant/pollinator interactions in the Pollination Garden to learn about organism diversity. Students use observation skills and hand lenses to explore plants and their pollinators.

Value: Students appreciate the diversity of plants and pollinators.

Virginia SOL: Science (2018) 4.1, 4.2 Math 4.14

Materials

- Labeled plants in Blandy's Pollination Garden or any garden with a variety of native plants that insects pollinate (depending on group size, label at least 5 plant 'clusters')
- Data sheets (one per student)
- Clipboards (one per student)
- Pencils (one per student)
- Large white board
- Dry erase Markers
- Stopwatch for adults

Special Safety

- Be aware of any bee or insect allergies. Identify potential hazards prior to the program and show any poison ivy (or other physical hazards) to students at the beginning of the program.

Setup

- Label plants in the Pollination Garden (in September, we used turtlehead, early goldenrod, obedient plant, phlox, and blue lobelia.
- Choose species that are a large enough planting for a group of enough that a cluster of 4-5 students to stand around to observe without stepping in the gardens.

Instructional Strategy

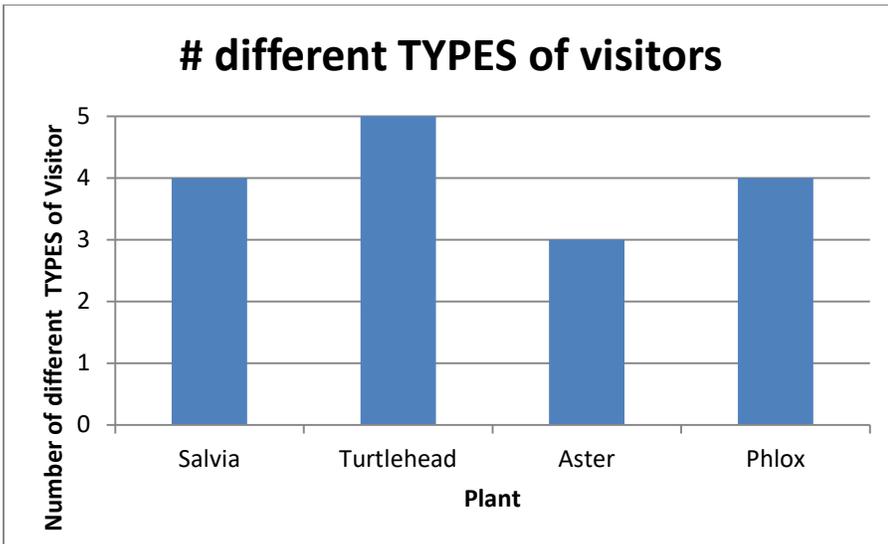
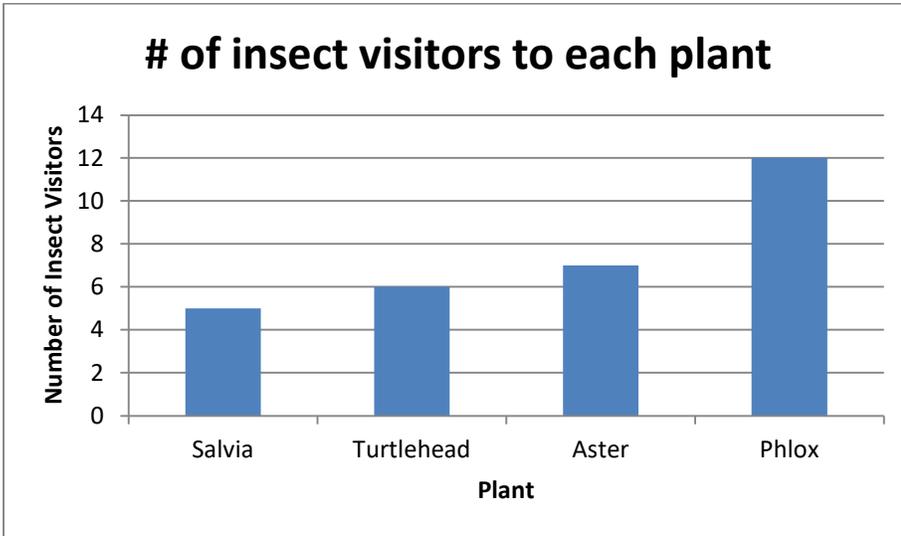
1. **Introduce Blandy:** Provide our etiquette and guidelines and the goal of the visit. Ask: What are some things we need to research before we know what plants to put in the garden? What it looks like? What pollinators visit it? What is the plant's role, or niche, in the habitat? How can we learn this information? Inform students that they will observe and explore plant/pollinator interactions similar to a Pollination Scientists in order to learn more about plant/pollinator interactions.
2. **Engage- Inquire:** Use a selection of the following questions to guide your inquiry engagement of the students. Why do animals visit flowers? Why do plants need animals to visit their flowers? Are all the organisms visiting a flower seeking the same thing (as in nectar or pollen or are some preying on other organisms, etc.)? How can we figure out which plants have the most visitors? What are some things we can look for? Encourage ideas and responses from students, guiding the discussion to arrive at the conclusion that we can look at the number (quantity) of visiting animals as well as tracking the *types* of animals that visit.

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3. Model Observations: Model the following process with the whole class with one plant and then send student groups to flower clusters.
 - a. Students write the name of the plant on the data sheet. Tell students that you are going to **time 30 seconds**, when you say 'go' students **tally or count the number of animal visitors** to the designated plant.
 - b. Stop time. Ask: how many visitors did you observe? Was it easy or difficult to count the number of visitors?
 - c. Inquire: Did all the visiting animals look the same? Can you describe them?
 - d. Next, model the process of observing and counting the **different types** of visitors, naming each NEW TYPE of visitor. Use the class as an example. Look at your feet. We might have 10 sandals, 6 sneakers, 5 flip flops. How many types of shoe is this? Three. (Can use this example if needed as well: six **large bumble bees**, two **red butterflies**, three **stink bugs**, and a **green fly** all visit a flower. So **4 TYPES** of visitor even though it is twelve total animals.) If needed, use the white board to show this process.
 - e. Start the stopwatch time and stop after one minute.
 - f. Ask- how many types of visitors did you see?
 - g. Describe how the students will choose one visiting animal to watch for one minute and describe what it is doing. Ask students to think of behaviors that animals might demonstrate while at flowers.
 - h. Next, choose one visiting animal to observe for one minute. Watch what it does. What are some things it might do? Does it collect nectar, pollen, hover, rest, flit about? If you lose your visiting animal, try to find another one.
 - i. Start timer then stop time after one minute.
 - j. Inquire- What did you observe? (Evidence of pollination examples such as pollen on flowers, pollinators, flowers that have been pollinated with dying petals, etc.) What did you observe that you would like to learn more about?
4. Student Observations: Give each chaperone a stopwatch and send to a plant. Explain to students that they will do the exact same thing they did as a class at their designated plants. Each chaperone will assist their small group. At Flowers- The group begins by recording the plant name and an adult chaperone with the stopwatch timer will lead the student group.
5. Conclusion: If time allows, ask students to describe something interesting they observed.
 - a. Can they explain what the plant/pollinator interaction was?
 - b. Compare data. On the large whiteboard or a newsprint paper, compare pollinator visitation from each plant. (See sample graphs below.)
 - c. Ask: What plants are the best for insect visitors? Why do you think this? What makes it the best – largest quantity of visitors, or more different types?
 - d. Guide discussion towards the idea of providing a diverse habitat for diverse pollinators.
6. Extend: back at school, based on the student data, each class suggest three plants to put in schoolyard garden. Observations from other stations during their visit can be used to advise their choices.

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Sample graphs



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Student Names _____

Record Plant Name from label	
Observe a cluster of flowers for 30 seconds. Count the number of all animal visitors you see on the flower.	
Observe the same cluster of flowers for one minute. Count the different types of visitors (ex. Big bumblebee, red butterfly, stink bug.) You are not counting each organism but <u>type</u> .	
Choose one insect visiting the flower you are observing and observe it for one minute .	
What is the organism doing ?	
Is the animal getting nectar or pollen? Doing something else?	(circle one) Nectar Pollen
Do you see pollen on the animal?	Yes No
Where is the pollen located?	
Describe any evidence that pollen is being moved from the flower.	

