

Name _____

Floral Variation Inquiry Lab- Advanced

Objectives

Learn one method to collect species observation data and use this method to test for bee floral preference.

Background

Pollination is a symbiotic relationship that shapes entire ecosystems. Bees and other pollinators benefit as they gather nectar and pollen from flowers for food. In turn, plants benefit as the pollinators transfer pollen between flowers and allow them to reproduce. But pollination is also a competitive relationship. Pollinators have remarkable adaptations that allow them to outcompete other pollinators for food, and plants have equally diverse methods of attracting pollinators to their own flowers and not their competitors'.

This activity will allow you to test one factor that influences how pollinators select flowers. **Be sure to add sugar water to each artificial flower you create.**

Observations

Record as many observations as you can about the relationship between pollinators and the flowers they visit. Conduct some research in the literature about flower preference for bees and other pollinators. List your main observations and findings here:

Question

For this lab, you will be using craft materials to make artificial flowers in order to test a hypothesis about floral preference. Using your observations as a starting point, develop a testable question about pollinator flower selection, then decide as a group on what question you will actually investigate.

Hypothesis

In the space below, record a hypothesis for your question. Be sure to include a justification.

Materials

- Colored construction paper
- Glue
- Tape
- Scissors
- Wooden skewers/pipe cleaners/sticks
- Sugar water and dropper, sugar water added for each flower

Procedure

This is an open-ended lab. Decide as a group how you will test your hypothesis about flower shape and color and pollinator preference. You should make a variety of different flowers, but make sure that the flowers are the same except for one independent variable, such as color or shape. Record your procedure below.

Data Use this space to record the data from your experiment.

Conclusion and Analysis

1. Write a conclusion for your group's experiment. What did you find? Explain what the data showed. Was your hypothesis correct? Why or why not? Explain why you think you got the results you did. How could you investigate this further? It will probably take a couple paragraphs to write a sufficient conclusion.
2. Discuss your results with another group that asked a different question. What did they investigate? What did they find?
3. Why have flowers evolved so many different ways of attracting pollinators? Why don't they all just look the same and do the same thing?
4. Some plants attract a wide range of pollinators to their flowers, while others have a symbiotic relationship with only one animal that pollinates them exclusively. What might be the advantage of having only one pollinator?
5. What are some ways flowers have adapted to attract a single species of pollinator?
6. Did you observe more than one species of pollinator at your flowers? Why is this significant?

Teacher notes for Floral Variation Inquiry Lab

Approximate time: 2-3 days (One day to observe flowers in a garden, a second day to come up with a procedure and design flowers, and another day to conduct the experiment)

- Some of the things students might test include flower color, flower size, flower shape, patterns on flower petals (such as nectar guides), flower height, flower spatial arrangement. If you give them suggestions, they will almost certainly pick options you give them. If they start by coming up with their own ideas, they may come up with unique experiments.
- A variety of materials can be used to make the artificial flowers. Colored construction paper, tape, and wooden skewers are inexpensive and work well.
- You may want to introduce the lab by having students take a walk through a garden with a variety of flowers. Tell them that they are going to be designing a lab to investigate how pollinators choose flowers, and have them look for inspiration and make observations during the walk through the garden. Have them record some of what they see in the Observations section of the lab.
- Have students start the activity individually, first making observations about some of the factors that might influence pollinator floral selection, and also allow them to come up with questions as individuals. Once everyone has written their own question(s), have them get in a group of two or three, and decide on a question that they want to test. Each member can have their own hypothesis, but the lab question should be the same for everyone in the group.
- Option: After groups have written conclusions and finished the lab, have them make posters to present their experiment and results to the rest of the class.