Butterflies and Bees: Teacher's Guide

Grade Level: 4-6 | **Curriculum Focus:** Animals | **Lesson Duration:** One to two class periods

Program Description

Break the cocoon and see where graceful butterflies really come from. Discover the fascinating differences between a butterfly and a moth. Find out why moths, butterflies and bees are all considered insects, and learn the eating habits and predators of each. Probe into the role a bee takes in pollination, and understand why bee farmers are so vital to their life cycles.

Onscreen Activities

Segment 1, The Lives of Butterflies and Moths

- Activity: Butterflies and moths are not identical organisms. Research the general differences between lepidopterans. Then design and create models of a butterfly and moth that show how they differ.

Segment 2, Bees and Plants

- Activity: Write a short story about a honeybee's daily adventures. Include details on the types of flowers, plants, and predators the bee encounters. Illustrate your story with pictures or drawings.

Lesson Plan

Student Objectives

- Understand the concept of pollination and show examples of bee pollination on specific plants.
- Understand the interdependence between insects, plants, and humans.
- Understand that insects can have a negative impact on their ecosystem.

Materials

- *Butterflies and Bees* video and VCR, or DVD and DVD player
- print and online references on bees, butterflies, and pollination
- markers or colored pencils

Procedures

1. Review the concept of pollination with students. Explain that pollination is the process of moving pollen from one plant to another. It is through this process that plant reproduction happens. Briefly discuss the importance of plant reproduction to all living things.
2. Review the ways in which bees and butterflies pollinate plants as they get food for themselves. Bees, while sipping nectar from flowers, get pollen stuck on various parts of their bodies. This pollen then rubs off on certain parts of the next flower that they fly to. Bees are the most important pollinators in nature.
3. Explain to students that they are going to find out more about the "pollination parties" that are taking place on farms around the world. First, pose the following question to the class: Imagine that a beekeeping business was started in your community. Beekeepers handle thousands of bees. How might your community react? What fears might people have?
4. Next, explain that many farmers use bee pollination to raise their crops. Bee pollination often makes for stronger, healthier crops. For example, some pears grown with bee pollination are much bigger than pears grown without the help of bees. Have students choose one plant from the crops below:
    - apples
    - blueberries
    - cantaloupes
    - cotton
    - cucumbers
    - grapes
    - lima beans
    - peaches
    - pears
    - plums
    - pumpkins
    - soybeans
    - strawberries
    - squash
    - tomatoes
    - watermelons
5. Ask each student to use the library or Internet, or both, to conduct research on the plant and how it is pollinated. They should write a brief explanation about how it is pollinated. Does the plant pollinate itself or does it require the help of bees?

6. Next, have students draw a series of pictures to show how the plant produces seeds and attracts a bee. They should show how the bee "catches" some of the pollen in its pollen basket and flies to another plant to feed. Make sure they show how the bee brings the pollen to the new plant.
7. When students have completed their work, compile their drawings into a class book on pollination for your media center. End with a discussion about the ways in which bees are useful to people.

Discussion Questions

1. Worker bees have stingers that are bent at the tip. When a worker bee stings something, its stinger gets stuck in its victim. When the worker pulls away, it loses its stinger—then dies! Queen bees, on the other hand, have straight stingers that can be used over and over again. Why should the queen have a better stinger?
2. Bees are terrific fliers. They can fly forward, backward, and sideways, and they can even hover! If scientists built an airplane that could fly like a bee, what would it look like? Would it have wings? Propellers? What shape would it be?

Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- 3 points: Students provided detailed drawings, well-written responses complete with many supporting details.
- 2 points: Students provided adequate details in drawings, satisfactory responses with some supporting details.
- 1 point: Students provided vague or inaccurate drawings, limited responses with little or no supporting details.

Vocabulary

carnivore

Definition: Any of an order of flesh-eating mammals.

Context: Lions and sharks, which eat meat, are carnivores.

herbivore

Definition: A plant-eating animal.

Context: Pandas and zebras, which only eat plants, are herbivores.

metamorphis

Definition: A marked and more or less abrupt developmental change in the form or structure of an animal occurring subsequent to birth or hatching.

Context: A butterfly undergoes metamorphosis at different life stages, changing its physical form.

nectar

Definition: A sweet liquid that is secreted by the nectaries of a plant and is the chief raw material of honey.

Context: Nectar gives many flowers their smell.

pollination

Definition: The transfer of pollen from an anther to the stigma in angiosperms or from the microsporangium to the micropyle in gymnosperms.

Context: Bees help with the pollination of plants by moving pollen from one plant to another, helping the plants to reproduce.

Academic Standards

National Academy of Sciences

The National Science Education Standards provide guidelines for teaching science as well as a coherent vision of what it means to be scientifically literate for students in grades K-12. To view the standards, visit http://books.nap.edu.

This lesson plan addresses the following science standards:

- Life Science: The characteristics of organisms; organisms and environments

Mid-continent Research for Education and Learning (McREL)

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education addresses 14 content areas. To view the standards and benchmarks, visit http://www.mcrel.org/.

This lesson plan addresses the following national standards:

- Science—Life Science: Understands how species depend on one another and on the environment for survival.
- Science—Life Science: Knows about the diversity and unity that characterize life.
- Science—Life Science: Understands the genetic basis for the transfer of biological characteristics from one generation to the next.