

## Photo Description



A beautiful butterfly with black wings and yellow spots is drinking nectar from a pink flower. The butterfly uses its long, thin tongue called a proboscis to reach deep inside the flower to get the sweet nectar it needs for energy.

## Scientific Phenomena

This image captures the Anchoring Phenomenon of pollination through mutualistic relationships. The butterfly is engaged in nectar feeding, which represents a mutually beneficial interaction where the butterfly obtains energy-rich nectar from the flower while simultaneously transferring pollen between flowers as it moves from bloom to bloom. This phenomenon occurs because both organisms have evolved complementary structures and behaviors that support their survival needs - the flower provides food rewards to attract pollinators, while the butterfly's feeding behavior facilitates the flower's reproduction.

## Core Science Concepts

1. Animal Needs and Survival: Butterflies need food (nectar) to survive and get energy, demonstrating how animals meet their basic needs from their environment.
2. Plant and Animal Interactions: The butterfly and flower help each other - the butterfly gets food while helping the flower make seeds by moving pollen.
3. Specialized Body Parts: The butterfly's proboscis (long tongue) is perfectly designed for reaching nectar deep inside flowers.
4. Life Cycles and Habitats: Adult butterflies live in environments where flowering plants provide the resources they need to survive.

### Pedagogical Tip:

Use the "Think-Pair-Share" strategy when introducing pollination. Have students first think individually about what they notice, then discuss with a partner, and finally share observations with the class. This builds confidence and allows processing time before whole-group discussion.

### UDL Suggestions:

Provide multiple ways to represent this concept by combining visual observation of the image with hands-on models using straws as "proboscis" and cotton balls as "pollen" that stick to students as they "feed" from paper flowers. This supports kinesthetic learners and makes abstract concepts concrete.

### Zoom In / Zoom Out

1. Zoom In: At the microscopic level, tiny pollen grains are sticking to the butterfly's body and legs through static electricity and tiny hairs. These pollen grains contain the male reproductive cells that will fertilize other flowers when the butterfly visits them.
2. Zoom Out: This pollination interaction is part of a larger ecosystem web where flowering plants depend on animal pollinators for reproduction, while many animals depend on plants for food. This supports biodiversity and food webs that include many other organisms like birds, mammals, and insects.

### Discussion Questions

1. What do you think would happen to the flowers if butterflies disappeared from this area? (Bloom's: Analyze | DOK: 3)
2. How is the butterfly's tongue similar to tools that humans use? (Bloom's: Apply | DOK: 2)
3. What evidence can you see in the photo that shows the butterfly and flower are helping each other? (Bloom's: Evaluate | DOK: 2)
4. Why do you think flowers are often bright colors and smell sweet? (Bloom's: Analyze | DOK: 3)

### Potential Student Misconceptions

1. Misconception: Butterflies eat flowers or leaves like caterpillars do.  
Clarification: Adult butterflies drink liquid nectar, not solid plant parts. Only caterpillars (baby butterflies) eat leaves.
2. Misconception: The butterfly is hurting or damaging the flower.  
Clarification: The butterfly helps the flower by moving pollen to other flowers so the plant can make seeds and reproduce.
3. Misconception: All insects are harmful to plants.  
Clarification: Many insects like butterflies, bees, and beetles actually help plants by pollinating them.

### NGSS Connections

- Performance Expectation: 3-LS4-3 - Construct an argument that some animals form groups that help members survive.
- Disciplinary Core Ideas: 3-LS4.D - Being part of a group helps animals obtain food, defend themselves, and cope with changes
- Crosscutting Concepts: Cause and Effect - Students can identify the cause and effect relationship between butterfly feeding behavior and flower pollination
- Science and Engineering Practices: Constructing explanations about how animal behaviors help them survive

### Science Vocabulary

- \* Nectar: Sweet liquid inside flowers that gives butterflies energy
- \* Proboscis: A butterfly's long, tube-like tongue used for drinking nectar
- \* Pollination: When pollen moves from one flower to another to help plants make seeds
- \* Pollen: Tiny yellow powder made by flowers that helps create new plants
- \* Habitat: The place where an animal lives and finds everything it needs to survive

### External Resources

Children's Books:

- The Magic School Bus: Inside a Beehive by Joanna Cole
- From Caterpillar to Butterfly by Deborah Heiligman
- Flower Garden by Eve Bunting

YouTube Videos:

- "Pollination for Kids" - Simple explanation of how bees and butterflies help flowers reproduce: <https://www.youtube.com/watch?v=aoQLfXBTzQM>
- "Butterfly Life Cycle Song" - Educational song showing complete metamorphosis with engaging visuals: <https://www.youtube.com/watch?v=gVTVOCRAhkl>