

## Photo Description



This photograph shows a bee visiting a bright red and yellow flower. The bee has yellow pollen stuck to its fuzzy body as it lands on the flower. The flower has many small red parts with bright yellow centers that contain pollen and nectar, which are food and materials the bee needs.

## Scientific Phenomena

**Anchoring Phenomenon:** This image captures pollination—a partnership between a bee and a flowering plant. The bee is visiting the flower to collect nectar (sugary food) for itself, and as it does this, pollen (a yellow powder) sticks to its fuzzy body. When the bee flies to the next flower, some of that pollen rubs off, which helps the plant make seeds. This is a win-win relationship called mutualism: the bee gets food, and the plant gets help making new plants.

## Core Science Concepts

1. **Adaptation:** Bees have fuzzy bodies that naturally attract and hold pollen grains. Flowers produce sweet nectar and colorful petals to attract bees. Both organisms have body structures perfectly suited to help each other.
2. **Interdependence in Ecosystems:** Bees and flowers depend on each other to survive and reproduce. Without bees, many flowering plants cannot make seeds. Without flowers, many bees cannot find food.
3. **Survival and Reproduction:** This partnership helps both organisms survive by providing food (for the bee) and reproductive success (for the plant through pollination and seed production).
4. **Life Cycle Connection:** This interaction is part of the plant's reproductive cycle. Pollination is a critical step that allows plants to create seeds, which is essential for plant reproduction and survival of the species.

### Pedagogical Tip:

When teaching about bee-flower relationships, emphasize the observable exchange: the bee visibly collects pollen (students can see the yellow dust), and the flower provides nectar. This concrete, visual example makes the abstract concept of "helping each other" tangible for third graders. Avoid oversimplifying to "the bee helps the flower" without explaining WHAT the bee gets in return—this prevents the misconception that pollination is purely altruistic.

### UDL Suggestions:

**Representation:** Provide students with large, clear photos or diagrams of bee body parts (hairs) and flower parts (stamens, nectar). Use different colors and textures to highlight where pollen sticks.

**Action & Expression:** Let students role-play as bees and flowers using craft materials (pipe cleaners for bee bodies, tissue paper flowers). Have them physically demonstrate how pollen transfers from one to another.

**Engagement:** Connect to students' prior knowledge by asking, "Has a bee ever visited your garden? Did you notice anything yellow on its body?" This makes the learning personally relevant.

## Zoom In / Zoom Out

### ### Zoom In: The Microscopic Level

At the cellular level, pollen grains are extremely tiny structures, each containing male reproductive cells. Under a microscope, pollen from different plants looks completely different—some are smooth, others spiky or ridged. When a pollen grain lands on a flower's female reproductive part (the stigma), it grows a tube down into the flower to fertilize the ovule, which eventually becomes a seed. Students can observe pollen with a simple hand lens or magnifying glass to see its unique shapes.

### ### Zoom Out: The Ecosystem Connection

This bee-flower relationship is one small part of an entire ecosystem. Bees pollinate many types of plants—not just one flower. These plants produce fruits and seeds that feed birds, squirrels, and other animals. Bees also feed birds and spiders that eat them. When bees visit flowers, they're connecting multiple food chains together. If bees disappeared, the entire ecosystem would be disrupted because many plants wouldn't be pollinated, and animals that depend on those plants for food would suffer.

## Discussion Questions

1. "Why do you think the bee has such a fuzzy, hairy body?" (Bloom's: Analyze | DOK: 2)
  - This encourages students to think about how physical features help organisms interact with their environment.
2. "What would happen to the flowers if there were no bees to visit them?" (Bloom's: Evaluate | DOK: 3)
  - This pushes students to think about consequences and interdependence in ecosystems.
3. "How is the relationship between a bee and a flower different from the relationship between a cat and a mouse?" (Bloom's: Analyze | DOK: 3)
  - This helps students distinguish between mutualism (both benefit) and predation (one benefits, one is harmed).
4. "What other animals or plants might depend on bees to survive?" (Bloom's: Create | DOK: 3)
  - This extends thinking to larger ecosystem connections and food webs.

## Potential Student Misconceptions

1. Misconception: "The bee is eating the flower."
  - Clarification: The bee is drinking the nectar (a sweet juice inside the flower), not eating the flower itself. Nectar is food for the bee, just like juice is food for us. The flower stays alive and can make seeds.
2. Misconception: "The bee is just dirty—the yellow powder is just dust."
  - Clarification: The yellow powder is pollen, which is made by the flower on purpose. Pollen is like the plant's baby-making powder. The bee doesn't clean it off because it's sticky and helps the bee and plant work together.
3. Misconception: "Bees only visit one flower."
  - Clarification: Bees visit many, many flowers during their day. Each flower they visit gets pollen from other flowers the bee already visited. This helps plants make lots of seeds, and the bee collects nectar from many sources to bring back to the hive.

## Extension Activities

1. Pollen Collection Hunt: Give students a small paintbrush and tape. Have them go outside (with supervision) and gently brush flowers or flowering plants to collect pollen on tape. Tape the pollen samples to paper and observe with a magnifying glass. Discuss how much pollen a real bee would collect during one foraging trip. (Note: Choose non-toxic flowers; avoid pesticide-treated plants.)
2. Bee-Flower Role Play: Create a "flower garden" in the classroom using large tissue paper flowers. Give one student a fuzzy pipe cleaner to be the bee, another student holds a flower. As the bee "visits," move cotton balls or small pompoms (representing pollen) from flower to flower. Discuss what happens when pollen moves and why it matters. Rotate roles so all students experience being both bee and flower.
3. Design Your Own Flower: Have students draw or create a flower that they think would attract bees. Encourage them to think about color, shape, and whether the flower would have nectar. Students should explain their design choices by referencing what they learned about what bees need and prefer.

## Cross-Curricular Ideas

1. Mathematics - Counting & Patterns: Count the number of flowers in the image. Create simple bar graphs showing "flowers with bees" vs. "flowers without bees." Explore patterns in flower petal numbers across different flower species.
2. ELA - Narrative Writing: Have students write a short story from the bee's perspective: "A Day in My Life as a Bee." Include details about visiting flowers, collecting nectar, and helping flowers make seeds. This builds empathy and deepens understanding of the bee's role.
3. Art - Nature Observation & Sketching: Take students outside to sketch real flowers and insects visiting them. Create a class "nature journal" with labeled drawings showing bee-flower partnerships. Display artwork with descriptive captions using new vocabulary.
4. Social Studies - Community Helpers: Connect to the idea that bees are "helpers" in nature. Discuss other community helpers (firefighters, nurses, teachers) and how different members of a community help each other—just like bees and flowers do.

## STEM Career Connection

1. Beekeeper: A beekeeper takes care of bees and helps them stay healthy. Beekeepers make sure bees have safe homes and plenty of flowers to visit. They also collect honey that bees make from nectar. Beekeepers help both bees and farmers who need bees to pollinate their crops. Average Annual Salary: \$45,000–\$55,000 USD
2. Botanist (Plant Scientist): A botanist studies plants and how they grow and reproduce. Botanists learn about which insects pollinate which plants and how to help plants survive. Some botanists work in gardens, greenhouses, or nature reserves protecting plants and the animals that depend on them. Average Annual Salary: \$65,000–\$75,000 USD
3. Entomologist (Insect Scientist): An entomologist is a scientist who studies insects, including bees. Entomologists learn about bee behavior, how bees communicate, and why bees are important for our world. Some entomologists help protect endangered bee species or solve problems when bee populations decline. Average Annual Salary: \$68,000–\$80,000 USD

## NGSS Connections

- 3-LS2-1: Construct an argument that some animals form groups that help members survive.

3-LS4-2: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3-LS4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

### ### Associated NGSS Disciplinary Core Ideas:

- 3-LS2.A: Growth of organisms and interactions between living things
- 3-LS4.B: Adaptation and natural selection

### ### Associated NGSS Crosscutting Concepts:

- Systems and System Models: Understanding that organisms are part of interconnected systems
- Structure and Function: Recognizing that the bee's fuzzy body structure enables the pollination function

## Science Vocabulary

- \* Pollination: The process of moving pollen from one flower to another so that plants can make seeds.
- \* Pollen: Yellow powder made by flowers that helps plants make new seeds; it sticks to the bee's fuzzy body.
- \* Nectar: Sweet, sugary liquid inside flowers that bees drink as food.
- \* Adaptation: A special body part or behavior that helps an organism survive and do what it needs to do.
- \* Mutualism: When two living things help each other and both benefit from their partnership.
- \* Reproduce: To make babies or new living things; plants reproduce by making seeds.

## External Resources

### ### Children's Books:

- \* The Bee Tree by Patricia Polacco
  - A charming story about a young girl and her grandfather following bees through the forest, celebrating the connection between bees and nature.
- \* Buzz Said the Bee by Wendy Cheyette Lewison
  - A rhythmic, rhyming picture book that introduces young children to the concept of bees visiting flowers and the sounds of nature.
- \* Pollination (Let's Read and Find Out Science series) by Gail Gibbons
  - A non-fiction picture book that clearly illustrates how bees and other animals pollinate flowers with colorful, detailed diagrams and simple text.

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Teacher Note: This lesson provides a concrete, observable entry point into understanding ecological relationships and adaptation. The bee-flower partnership is compelling because students can directly observe it in their schoolyard or local community, making it an ideal anchoring phenomenon for Third Grade life science inquiry.