

## Photo Description



This image shows a bumblebee visiting a bright pink and red flower with yellow stamens. The bumblebee has a fuzzy, round body with yellow and black stripes, dark wings, and you can see yellow dust on its legs. The bee is collecting food from the flower while the flower provides something important in return.

## Scientific Phenomena

**Anchoring Phenomenon:** A bumblebee collecting pollen and nectar from a flower.

**Why It's Happening:** Bumblebees visit flowers to collect nectar (a sugary liquid) and pollen (a yellow powder) to eat and bring back to their hive. As the bee moves from flower to flower, pollen sticks to its fuzzy body and legs. When the bee visits the next flower, some of that pollen rubs off onto that flower. This is called pollination, and it helps flowers make seeds and fruit. This is a partnership—the bee gets food, and the flower gets help making new plants!

## Core Science Concepts

- \* **Pollination:** When pollen moves from one flower to another, usually by insects like bees, helping plants make seeds.
- \* **Plant-Animal Relationships:** Bees and flowers depend on each other. Bees get food (nectar and pollen), and flowers get help reproducing.
- \* **Adaptations for Survival:** Bees have fuzzy bodies that collect pollen, and flowers have bright colors to attract bees.
- \* **Food Chains and Energy:** Bees eat nectar and pollen from flowers, and other animals eat bees, connecting all living things in nature.

### Pedagogical Tip:

Use this image as a "mystery to solve" in your classroom. Ask students, "Why do you think the bee is visiting the flower?" and "What do you notice on the bee's body?" Let them observe and hypothesize before revealing the pollination concept. This builds scientific thinking and curiosity.

### UDL Suggestions:

Provide multiple ways for students to engage with this content: (1) Visual learners can observe and sketch the bee and flower, (2) Kinesthetic learners can act out the bee's movements and the role of pollen, (3) Auditory learners can listen to books about bees read aloud and discuss observations in small groups. Consider using real flowers or safe manipulatives so students with visual impairments can feel the texture and explore the concept tactilely.

### Zoom In / Zoom Out

#### Zoom In: Inside the Flower's Pollen Grain (Microscopic Level)

If we could shrink down and look at a single grain of pollen under a microscope, we'd see it has a hard, protective shell with bumpy or spiky patterns. Inside each pollen grain is special material that helps make new plants and seeds. When a pollen grain lands on another flower, it can travel down to the flower's center and help create seeds. This tiny grain is so small you can't see it without a microscope, but it's doing a huge job in nature!

#### Zoom Out: The Whole Garden Ecosystem (Ecosystem Level)

When we zoom out and look at the bigger picture, this one bumblebee visiting this one flower is part of a whole garden community. That garden has many flowers of different colors, many bees and other insects, birds that eat insects, and plants that grow from seeds. The bees pollinate flowers, flowers make seeds and fruit, birds eat the fruit and seeds, and everything is connected. If one part disappears (like if there were no bees), the whole garden ecosystem would change. This shows us that all living things depend on each other in nature.

### Discussion Questions

1. What do you think the yellow powder on the bee's legs is, and why is it there? (Bloom's: Analyze | DOK: 2)
2. How do bees and flowers help each other? (Bloom's: Understand | DOK: 2)
3. What would happen to flowers if there were no bees to visit them? (Bloom's: Evaluate | DOK: 3)
4. Why do you think this flower is bright pink and red instead of gray or brown? (Bloom's: Analyze | DOK: 2)

### Potential Student Misconceptions

Misconception 1: "Bees are just eating the flowers."

Clarification: While bees do eat the nectar and pollen, they're also helping the flower in return. As the bee collects food, pollen sticks to its fuzzy body. When the bee visits another flower, that pollen rubs off and helps the flower make seeds. It's a fair trade—the bee gets food, and the flower gets help making babies (seeds). This is called a partnership or symbiotic relationship.

Misconception 2: "All the yellow on the bee is from just one flower."

Clarification: The yellow powder (pollen) on the bee's legs and body comes from many different flowers the bee has visited that day. Bees travel from flower to flower, collecting pollen from each one. That's why they're so good at spreading pollen around—they carry it from plant to plant!

Misconception 3: "Bees visit flowers just because they like the pretty colors."

Clarification: While bright colors do help bees find flowers, bees are actually looking for food. They come for the nectar (a sweet drink) and pollen (food with protein). The bright colors are a signal from the flower saying, "I have food here!" Flowers evolved bright colors over a long time because bees were attracted to them, making it easier for both the flower and bee to find each other.

### Extension Activities

1. Flower Observation Walk: Take students outside to observe real flowers and insects visiting them (if available in your area). Have them sketch or photograph flowers they see and mark what colors they are. Discuss why certain flowers attract certain insects. Safety Note: Keep a safe distance; never touch nests or provoke insects.

2. Pollen Transfer Simulation: Give each student a small paintbrush (to represent a bee) and a plate with cocoa powder or cinnamon (to represent pollen). Have them "visit" paper flowers by brushing the powder onto them, then visiting other "flowers." Observe how the powder transfers. Discuss: "Is the pollen moving like it does in real life?"
3. Bee and Flower Role Play: Assign students roles as bees or flowers. Have the "bees" walk around the classroom to "flowers," and students can physically exchange small paper cutouts or tokens representing pollen. This kinesthetic activity reinforces the pollination concept and plant-animal relationships.

### Cross-Curricular Ideas

#### Mathematics Connection: Counting and Patterns

Have students count the petals on the flower in the photo and then count petals on real flowers if available. Create a simple bar graph showing "How many petals does each flower have?" Students can look for patterns: "Do all pink flowers have the same number of petals? Do all yellow flowers?" This builds data collection and graphing skills while deepening observation of nature.

#### English Language Arts Connection: "Bee's Day" Narrative Writing

Ask students to write or dictate a simple story from the bee's perspective: "Today I woke up and flew to find breakfast. I visited a pink flower..." Students can draw pictures of the flowers the bee visits and write one sentence about each. This combines creative writing, sequencing, and vocabulary practice while reinforcing the concept of pollination.

#### Art Connection: Symmetry and Color Mixing

Have students fold paper in half and paint one side with watercolors to create symmetrical flowers like the one in the photo. Discuss how the pink and red petals work together. Students can explore color mixing by combining red and white to make pink, or yellow and red to make orange. Display flowers around the classroom and discuss: "Which colors do you think would attract bees?"

#### Social Studies Connection: Helping Our Community

Discuss how bees help our community by pollinating foods we eat (apples, berries, cucumbers, almonds). Create a classroom chart of foods that depend on bees to grow. Students can draw or cut out pictures of these foods. Extend the discussion: "Why should we take care of bees? How can we help them?" This builds community awareness and environmental stewardship.

### STEM Career Connection

#### Beekeeper

A beekeeper takes care of honeybees and bumblebees. They build special homes for bees (called hives), make sure the bees have enough flowers to visit, keep them healthy, and collect honey. Beekeepers help protect bees because they're so important for growing food like apples and honey. It's like being a farmer, but instead of growing plants, you're helping bees thrive! Average Annual Salary: \$50,000–\$65,000 USD

#### Botanist (Plant Scientist)

A botanist is a scientist who studies plants—how they grow, how they make flowers and seeds, and how they work with animals like bees. Botanists might study why flowers are certain colors, how pollen works, or how to grow new kinds of plants. Some botanists help protect plants that are disappearing from Earth. Average Annual Salary: \$65,000–\$75,000 USD

#### Pollinator Biologist / Entomologist (Insect Scientist)

An entomologist is a scientist who studies insects, including bees. They watch how bees and other insects help plants, learn about bee behavior, and work to protect bees from diseases or disappearing habitats. Some entomologists work to understand why bee populations are changing and how we can help them survive. Average Annual Salary: \$60,000–\$80,000 USD

### NGSS Connections

Performance Expectation:

2-LS2-1: Plan and conduct investigations to provide evidence that plants get the materials they need for growth chiefly from air and water.

Disciplinary Core Ideas:

- \* 2-LS2.A (Interdependent Relationships in Ecosystems) – Students understand that plants depend on animals like bees for pollination and reproduction.
- \* 2-LS4.D (Biodiversity and Humans) – Students recognize that plants and animals have specific traits that help them survive in their environments.

Crosscutting Concepts:

- \* Patterns – The pattern of bees visiting flowers is regular and predictable in nature.
- \* Structure and Function – The bee's fuzzy body structure allows it to carry pollen; the flower's bright colors function to attract bees.

### Science Vocabulary

- \* Pollen: A yellow powder made by flowers that helps make new plants (seeds).
- \* Nectar: A sweet liquid inside flowers that bees drink for food and energy.
- \* Pollination: When pollen moves from one flower to another, helping flowers make seeds.
- \* Adaptation: A special body part or behavior that helps an animal or plant survive.
- \* Bumblebee: A large, fuzzy bee that visits flowers and lives with other bees in a colony.

### External Resources

Children's Books:

The Bee Tree\* by Patricia Polacco – A charming story about a girl following bees to find a honey tree, emphasizing the importance of bees in nature.

Bee\* by Isabel Thomas (DK Findout Series) – A beautifully illustrated beginner book with real photos and simple explanations about bee life cycles and pollination.

What Do Bees Do?\* by Sam Godwin – A question-and-answer format book that explores how bees live, work, and pollinate flowers.