

## Photo Description



A large spider with long, thin legs is sitting on a person's hand. The spider has a brown body with darker markings and very long legs that spread out wide. This type of spider is called an orb weaver, and it is known for building beautiful, circular webs to catch insects.

## Scientific Phenomena

Anchoring Phenomenon: Why do spiders build webs, and how do they use them to catch food?

Spiders build webs because they are hunters that need to catch insects for food. The spider creates a sticky web and waits for insects to fly or crawl into it. When an insect touches the web, it gets stuck, and the spider quickly comes to catch its meal. This is how spiders survive in nature—the web is their hunting tool, just like a net would be for catching fish.

## Core Science Concepts

- \* Spider Body Parts: Spiders have eight legs, two body parts (head-chest and abdomen), and special spinnerets that produce silk thread to make their webs.
- \* Hunting and Survival: Spiders are predators that hunt insects. They build webs to help them catch food, which is essential for their survival.
- \* Adaptations: Spiders have special body features (like silk-making ability and multiple eyes) that help them survive. These adaptations make them successful hunters.
- \* Life Cycles: Spiders grow from eggs to spiderlings to adult spiders, and different types of spiders build different kinds of webs.

### Pedagogical Tip:

Second graders are concrete learners who need to see, touch, and observe real examples. Consider using a magnifying glass to observe spider webs outdoors, or safely showing pictures of different web types. Avoid live spider handling by students unless properly supervised; instead, use high-quality photos and videos for detailed observation.

### UDL Suggestions:

Representation: Provide both visual images and tactile models (yarn webs). Use simplified diagrams labeling spider body parts with large text. Action & Expression: Allow students to draw, build, or create webs using string or yarn rather than only answering questions. Engagement: Connect to students' prior knowledge by asking if they've seen spider webs in their homes or yards—this makes the learning personally relevant.

## Zoom In / Zoom Out

### Zoom In: Spider Silk at the Microscopic Level

If we could shrink down really, really small—smaller than an ant!—and look at spider silk under a super-powerful microscope, we would see that the silk is made of teeny, tiny protein strands all twisted together like rope. These protein strands are so small that we can't see them with our eyes, but they're packed together so tightly that they make the silk strong enough to hold a bug. The spider's body makes these proteins special inside the spinnerets, and when the spider pulls the silk out, it hardens into the thread we can see. This is why spider silk is stronger than steel of the same thickness!

### Zoom Out: Spiders in the Food Web and Ecosystem

When we zoom out and look at the bigger picture, we see that spiders are an important part of nature's food web. Spiders eat insects (like flies and mosquitoes), which means spiders help keep the insect population under control in gardens, forests, and yards. At the same time, spiders are food for birds, lizards, and other animals. If there were no spiders, there would be too many insects, and birds wouldn't have enough to eat. So spiders are like a middle link in a chain—they catch smaller creatures and become food for bigger creatures. This balance keeps ecosystems healthy and working properly.

## Discussion Questions

1. What do you think the spider uses its web for, and why does it need to catch insects? (Bloom's: Understand | DOK: 2)
2. How are spider legs helpful to spiders when they are building and sitting on their webs? (Bloom's: Analyze | DOK: 2)
3. If a spider didn't have the ability to make silk, how might its life be different? (Bloom's: Evaluate | DOK: 3)
4. What other animals might use tools or build things to help them find food, just like spiders use webs? (Bloom's: Apply | DOK: 3)

## Potential Student Misconceptions

Misconception 1: "All spiders are dangerous and will bite people."

Scientific Clarification: Most spiders are actually very shy and helpful! They don't want to bite people—they only bite when they feel scared or trapped, and even then, most spider bites are harmless to humans. In fact, spiders help us by eating bugs that bother us, like flies and mosquitoes. The spider in the photo is calm and safe on the person's hand because it's not scared.

Misconception 2: "Spiders are insects."

Scientific Clarification: Spiders are not insects, even though they both have legs and are small. Spiders belong to a different group of animals called arachnids. Insects have 6 legs, but spiders have 8 legs. Insects also have three body parts (head, chest, and belly), but spiders only have two main body parts. It's like how both dogs and cats are animals, but they're different types!

Misconception 3: "All spiders build webs to catch food."

Scientific Clarification: While many spiders build webs, not all spiders do! Some spiders are hunters that chase and catch insects on the ground or by jumping. Some spiders hide and wait for insects to come by, then grab them quickly. Other spiders dig holes in the dirt to trap insects. Spiders have many different ways to hunt, but they all hunt insects to get the energy they need to survive.

### Extension Activities

1. Spider Web Hunt: Take students on a safe outdoor walk to look for real spider webs. Have them draw or photograph the webs they find and discuss the different shapes and locations. Ask: Where do you see the most webs? Why do you think the spider built it there?
2. Create a Web with Yarn: Provide students with yarn, string, or pipe cleaners to create their own model spider web on a frame or tree branch. After building, place small paper insects on the web and discuss how a real spider's sticky web would catch them. This builds understanding of web function.
3. Spider Body Parts Craft: Provide templates or have students draw a spider and label its eight legs, body, eyes, and spinnerets. Use this as an opportunity to compare spider bodies to insect bodies (which have six legs) and discuss how the extra legs help spiders.

### Cross-Curricular Ideas

#### Math Connection: Counting Spider Legs and Comparing Patterns

Have students count the spider's eight legs and compare this number to insects, which have six legs. Create a simple chart showing different animals and how many legs they have. Students can use this data to create picture graphs (e.g., "How many more legs does a spider have than an insect?") and solve addition and subtraction problems: "If a spider has 8 legs and an ant has 6 legs, how many more legs does the spider have?"

#### ELA Connection: Spider Story Writing and Descriptive Language

Ask students to write or dictate a short story from the spider's perspective: "What would a day in the life of a spider be like?" Encourage them to use descriptive words (long, sticky, tiny, fast) to describe what the spider sees, feels, and does. Students can also create "Spider Fact Cards" with simple sentences and illustrations to share with classmates, building both writing and informational text skills.

#### Art Connection: Nature Webs and Collaborative Mural

Students can create art by painting, drawing, or constructing spider webs using various materials (watercolors, colored pencils, string, yarn, or even pasta). As a class project, design a large collaborative mural showing a garden or forest ecosystem with different types of webs, spiders, insects, and plants. This allows students to express their learning creatively while reinforcing the concept that spiders are part of a larger environment.

#### Social Studies Connection: Spiders Around the World

Introduce students to the idea that spiders live in many different places around the world—rainforests, deserts, mountains, and homes. Show pictures or videos of spiders from different countries and climates. Discuss how spiders adapt to their environments (e.g., some are brightly colored, some are hairy, some live underground). This builds geographic awareness and understanding that animals are found in diverse habitats across our planet.

### STEM Career Connection

Arachnologist (Spider Scientist)

An arachnologist is a scientist who studies spiders and other arachnids like scorpions. These scientists observe how spiders live, what they eat, how they build their webs, and how they help our environment. Some arachnologists work in museums, others work in universities, and some go into rainforests or deserts to find and study spiders nobody has ever seen before! They help us understand why spiders are important and how to protect them.

Average Annual Salary: \$65,000–\$75,000 USD

#### Biomimicry Engineer

A biomimicry engineer is a scientist who looks at how nature solves problems and then uses those ideas to invent new things. Spider silk is super strong, so engineers study how spiders make it and try to create new materials that could be used to make stronger clothes, safer ropes, or even better body armor! These engineers work in laboratories and offices, designing and testing new inventions inspired by spiders and other animals.

Average Annual Salary: \$70,000–\$85,000 USD

#### Pest Control Specialist

A pest control specialist helps people deal with unwanted insects in their homes and gardens. These workers understand how different insects and spiders live and behave, so they know the best ways to manage pest problems. Many pest control specialists encourage people to let spiders stay in their yards because spiders eat the bugs that cause problems! They might use safe traps, natural solutions, or educational advice instead of harsh chemicals.

Average Annual Salary: \$35,000–\$50,000 USD

### NGSS Connections

Performance Expectation:

2-LS1-1: Plan and conduct investigations to provide evidence that plants get the energy they need to grow chiefly from water and light, and animals get energy from food.

Disciplinary Core Ideas:

- \* 2-LS1.A - All animals need food, water, and air to survive; spiders hunt insects as their food source.
- \* 2-LS1.B - Different animals have body parts and behaviors that help them find, catch, and eat food.

Crosscutting Concepts:

- \* Structure and Function - Spider body parts (legs, spinnerets, eyes) serve specific functions in hunting and web-building.
- \* Patterns - Spiders follow predictable patterns: they build webs in similar locations and wait for insects in a similar way.

### Science Vocabulary

- \* Spider: A small animal with eight legs, a body, and the ability to make silk thread to build webs.
- \* Web: A net made from sticky silk thread that spiders build to catch insects for food.
- \* Predator: An animal that hunts other animals for food.
- \* Silk: A very strong, thin thread that spiders make from their bodies to build webs.
- \* Adaptation: A special body part or behavior that helps an animal survive and find food.
- \* Spinneret: The special body part on a spider that makes and releases silk thread.

### External Resources

Children's Books:

The Very Busy Spider\* by Eric Carle – A tactile story about a spider building its web on a farm.

Spiders\* by Nic Bishop – Nonfiction photo book with stunning close-up images of different spider types.

Are You a Spider?\* by Judy Allen – An engaging introduction to spider life and behavior.