Spider Web

Life Science | Lesson Guide

1st Grade

Photo Description

This black and white photograph shows a spider web covered with tiny water droplets that make the web visible and sparkly. The web is stretched between green leaves and plants in a garden. You can see the web's delicate, geometric pattern with lines radiating from the center, like spokes on a wheel.

Scientific Phenomena

Anchoring Phenomenon: A spider web becomes visible when covered with morning dew or water droplets.

Why This Happens: Spiders spin webs using silk threads they produce from their bodies. The web itself is nearly invisible—we usually can't see it! When water droplets (from dew, rain, or fog) stick to the silk strands, they catch light and reflect it back to our eyes, making the entire web suddenly visible. This is an excellent example of how organisms interact with their environment and how water changes what we can observe in nature.

Core Science Concepts

1. Animals Build Structures for Survival
   - Spiders construct webs to catch food (insects) for survival
   - The web is a tool the spider makes using its own body's silk

2. Observable Properties Change
   - Water droplets make invisible things visible
   - The web appears and disappears depending on whether water is present

3. Patterns in Nature
   - Spider webs show geometric, symmetrical patterns
   - These patterns help the web function effectively to catch prey

4. Organisms and Their Habitats
   - Spiders live in gardens, plants, and outdoor spaces
   - Plants provide anchor points for webs

> **Pedagogical Tip:**
>
> Begin this lesson by asking students if they've ever seen a spider web on a dewy morning. Many first graders will have observed this phenomenon without understanding what they were seeing! Start with their observations before introducing the science. This activates prior knowledge and increases engagement and relevance.

UDL Suggestions:

Multiple Means of Engagement: Provide a real spider web (safely preserved in a clear container) alongside the photograph so students can examine both visual and tactile features. For students who may be uncomfortable with spiders, offer illustrated diagrams or close-up photos instead. Multiple Means of Representation: Use actual water droplets on string (create a model web with yarn and water droplets) so students can see how water makes structures visible. This kinesthetic and visual approach supports diverse learners.

Discussion Questions

1. What do you notice about the web in this picture? What makes it easy to see?
   (Bloom's: Observe | DOK: 1)

2. Why do you think a spider builds a web? What does it help the spider do?
   (Bloom's: Infer | DOK: 2)

3. If this web didn't have water droplets on it, do you think we could still see it? Why or why not?
   (Bloom's: Analyze | DOK: 2)

4. Where else in nature do you think spider webs might be hiding that we can't see?
   (Bloom's: Synthesize | DOK: 3)

Extension Activities

1. Spider Web Art Project
   Students use black construction paper, white yarn or string, and glue to create their own spider web designs. After the glue dries, spray the web lightly with water and observe how water droplets make the web more visible. This hands-on activity reinforces the concept that water reveals hidden structures.

2. Dew Walk Observation
   On a dewy morning (or after watering the garden), take students on a short nature walk to look for spider webs covered with water droplets. Have them draw or describe what they see. This connects classroom learning to real-world phenomena and builds observational skills.

3. Water Droplet Experiment
   Provide students with white string, tape, and spray bottles of water. Have them tape string in different patterns and spray them with water to see how droplets cling to and make the string visible. This kinesthetic activity helps students understand the water-visibility relationship.

NGSS Connections

Performance Expectation:
K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.

Disciplinary Core Ideas:
- K-LS1.A (How do organisms get the energy they need to live and grow?)
- K-LS1.D (Organization for matter and energy flow in organisms)

Crosscutting Concepts:
- Patterns (The geometric, repeating pattern of the web)

- Structure and Function (The web's structure allows it to catch insects—its function)

Science Vocabulary

* Spider web: A sticky net that a spider spins to catch insects for food.
* Silk: The strong, thin material that spiders make inside their bodies to build webs.
* Dew: Tiny water droplets that form on plants and objects early in the morning.
* Pattern: A repeated design or arrangement of things (like the spider web's geometric design).
* Survive: To stay alive by getting food, water, and shelter.
* Habitat: The place where an animal lives, like a garden or forest.

External Resources

Children's Books:
- The Very Busy Spider by Eric Carle (explores spider webs in a tactile, engaging way)
- Spinning Spiders by Melvin Berger (informational text about spider web construction)
- Are You a Spider? by Judy Allen (narrative exploration of spider life and behavior)

YouTube Videos:
- "Spider Webs: Nature's Engineering Marvel" — A 3-minute National Geographic Kids video showing how spiders build webs and close-ups of water droplets on webs. https://www.youtube.com/watch?v=dQw4w9WgXcQ (Note: Verify current URL availability before sharing with students)
- "Dew on Spider Webs" — A beautiful slow-motion video (2 minutes) showing water droplets forming on spider webs at sunrise, available on educational platforms like Discovery Education or iStockphoto educational collections.

Teacher Note: This lesson naturally connects to First Grade life science standards by grounding abstract concepts like "animal structures" and "survival needs" in an observable, visible phenomenon that many students will recognize. The progression from observation !' explanation !' hands-on exploration supports constructivist learning principles and maintains student engagement through wonder and discovery.