

Photo Description



This image shows a centipede, a long arthropod with a reddish-brown body made up of many connected segments. Each segment has a pair of legs attached to it, allowing the centipede to move quickly across surfaces like the wood shown here. The centipede's body is flexible, which helps it squeeze into tight spaces and navigate uneven ground.

Scientific Phenomena

Anchoring Phenomenon: Why does this creature have so many legs, and how does it use them to survive?

Scientific Explanation: Centipedes have evolved to have numerous body segments with paired legs as an adaptation for moving quickly through soil, leaf litter, and under bark. The multiple legs allow them to maintain speed and stability on uneven surfaces while hunting for small insects and other prey. Each segment operates somewhat independently, creating a wave-like motion that propels the centipede forward efficiently. This body structure is perfect for a predator that hunts in dark, cramped spaces where flexibility and speed are survival advantages.

Core Science Concepts

- * **Arthropod Body Structure:** Centipedes are arthropods with segmented bodies, an exoskeleton (hard outer covering), and jointed legs. These features are shared by insects, spiders, and crustaceans.
- * **Adaptation and Survival:** The centipede's many legs, flexible body, and speed are adaptations that help it catch food and escape predators. Structures and behaviors that help organisms survive are called adaptations.
- * **Movement and Locomotion:** Centipedes move using coordinated leg movements that create a rippling motion down their body. This is more efficient than having just four legs like mammals.
- * **Habitat and Ecological Role:** Centipedes are decomposers and predators that live in moist environments like soil, rotting wood, and leaf litter. They help control populations of small insects and break down dead material.

Pedagogical Tip:

When teaching about centipedes, start with observable features students can see in the photo before moving to invisible concepts like "adaptation" or "predator." Create a simple two-column chart on the board: "What I See" (many legs, long body, brown color) and "Why It Helps the Centipede" (fast movement, flexible, blends in). This scaffolds the abstract concept of adaptation.

UDL Suggestions:

Provide multiple means of representation: Show the photo on a large screen, provide printed copies with labeled parts, and create a tactile model using pipe cleaners and beads so students can feel how the segments connect. Offer choice in how students demonstrate understanding—some may draw the centipede, others may write about it, and some may act out its movement.

Zoom In / Zoom Out

Zoom In (Microscopic Level): Inside each of a centipede's legs is a tiny system of muscles, nerves, and joints that work together to bend and straighten. When the centipede's brain sends signals through its nervous system, the muscles contract and relax in just the right order, making the legs move in a coordinated wave. If you could zoom in even further, you'd see individual cells that make up these muscles, and each cell would be working hard to create the movement we see in the photo.

Zoom Out (Ecosystem Level): This centipede is part of a much larger community of living things in the forest or garden soil where it lives. The centipede eats insects and small creatures, helping to control their populations. When the centipede eventually dies, decomposer organisms (bacteria and fungi) break down its body, returning nutrients to the soil. These nutrients feed plants, which feed herbivores, which feed other predators like birds and snakes. The centipede is just one small but important link in a food chain that connects all living things in its habitat.

Discussion Questions

- * What do you think would happen to a centipede if it lost several legs? Why? (Bloom's: Analyze | DOK: 2)
- * Compare the centipede's legs to a dog's legs. Why do you think they are different? (Bloom's: Analyze | DOK: 2)
- * Where would be a good place to find a centipede, and why would it be living there? (Bloom's: Evaluate | DOK: 3)
- * If a centipede had to move through sand instead of wood, how might its body need to be different to survive? (Bloom's: Create | DOK: 3)

Potential Student Misconceptions

Misconception 1: "Centipedes have 100 legs because 'centi' means 100."

Clarification: While "centi" does mean 100, most centipedes actually have fewer legs than that—many have 30 to 40 legs. The name is more of a general description meaning "many legs" rather than an exact count. Different species of centipedes have different numbers of legs, but it's always an odd number of pairs.

Misconception 2: "Centipedes and millipedes are the same thing, just with different names."

Clarification: Centipedes and millipedes look similar but are quite different! Centipedes are fast predators with one pair of legs per body segment, while millipedes are slower and eat dead plant material with two pairs of legs per segment. They also have different head shapes and different numbers of legs overall.

Misconception 3: "The centipede moves all of its legs at the same time, like someone marching in a line."

Clarification: A centipede's legs don't all move together. Instead, they move in a wave pattern—legs on one side move forward while legs on the other side push backward. This creates a smooth, rippling motion that's much more efficient than moving all legs at once, like a Mexican wave at a soccer game!

Extension Activities

1. **Centipede Movement Lab:** Give students yarn or string to create a "centipede" that moves in a wave-like pattern. Students can tape the yarn to paper and then carefully lift it to see how the wave motion travels from one end to the other, mirroring how a centipede moves. Have them measure how quickly they can move their "centipede" across a table.

2. Design-a-Creature Challenge: Show students pictures of different habitats (a tree, a burrow, a stream, a rocky canyon). Have small groups choose a habitat and design a creature with specific adaptations for that place. They must explain how each body part helps the creature survive. This connects centipedes to broader ideas about how all animals fit their homes.

3. Centipede vs. Millipede Sort: Provide photos or illustrations of both centipedes and millipedes. Have students investigate the differences (centipedes have one leg pair per segment; millipedes have two). Create a Venn diagram comparing them. Extend by having students hypothesize: "Which one is the better predator and why?"

Cross-Curricular Ideas

Math Connection: Leg Counting and Patterns

Have students count the legs visible on the centipede in the photo (or on illustrations) and create a pattern chart. If one segment has 2 legs, how many legs would 5 segments have? 10 segments? Students can create multiplication arrays or skip-counting sequences to solve "centipede leg" word problems. Extend by graphing different centipede and millipede species and their leg counts.

ELA Connection: Descriptive Writing and Research

Students can write detailed descriptions of the centipede using sensory words (though they shouldn't touch a real one!). Have them research and write a short informational paragraph about centipede habitats, diet, or adaptations. Create a "Day in the Life of a Centipede" narrative story from the centipede's perspective, incorporating scientific facts they've learned.

Art Connection: Movement and Pattern

Students can create a large-scale centipede artwork using paint, collage, or clay, emphasizing the segmented body and repeating leg pattern. Have them experiment with different media to show how the centipede might move—for example, using metallic paint for the shiny exoskeleton or layering tissue paper to show segments. Display artwork and discuss how artists use repetition and pattern, just like nature does.

Social Studies Connection: Habitats Around the World

Research centipedes from different regions and climates (Amazon rainforest centipedes, desert centipedes, temperate forest centipedes). Create a world map showing where different centipede species live and what makes those habitats special. Discuss how people in different parts of the world view centipedes differently—some cultures consider them pests, while others see them as beneficial for pest control.

STEM Career Connection

Entomologist (Insect and Arthropod Scientist)

An entomologist is a scientist who studies insects and other small creatures like centipedes. They observe how these animals live, what they eat, how they move, and how they fit into nature. Some entomologists work in labs with microscopes, while others work outside in forests and gardens collecting specimens. They help us understand whether centipedes and other creatures are helpful or harmful to humans. Average annual salary: \$65,000–\$75,000 USD

Wildlife Biologist

A wildlife biologist studies all kinds of animals in their natural habitats, including centipedes and other arthropods. They spend time outdoors observing animals, collecting data, and learning how creatures interact with their environment. Wildlife biologists help protect endangered species and manage habitats so that all animals—big and small—can survive. Some work for zoos, parks, or environmental organizations. Average annual salary: \$63,000–\$72,000 USD

Zookeeper or Museum Educator

A zookeeper or museum educator takes care of living animals (or teaches people about them in museums) and helps visitors learn about creatures like centipedes. They prepare proper habitats, feed animals, keep them healthy, and teach school groups and families about arthropods and why they're important. This job combines hands-on animal care with teaching and storytelling. Average annual salary: \$28,000–\$40,000 USD

NGSS Connections

Performance Expectation:

4-LS1-1: Use evidence to construct an explanation for how the structures of animals function to support survival, growth, behavior, and reproduction.

Disciplinary Core Ideas:

- * 4-LS1.A - Structure and Function: Students observe that centipede body parts (legs, segments, exoskeleton) support its survival.
- * 4-LS4.B - Natural Selection: The centipede's structure represents an adaptation shaped by natural selection in its environment.

Crosscutting Concepts:

- * Structure and Function - The centipede's many legs enable fast movement and escape from predators.
- * Adaptation - Physical features help organisms survive in their specific environments.

Science Vocabulary

- * Segment: One of the connected ring-shaped sections that make up a centipede's body.
- * Arthropod: An animal with a hard outer skeleton, jointed legs, and a body divided into sections (like insects, spiders, and centipedes).
- * Adaptation: A structure or behavior that helps an animal survive and thrive in its environment.
- * Exoskeleton: A hard outer shell that protects an arthropod's body and helps support its muscles.
- * Predator: An animal that hunts and eats other animals for food.
- * Decomposer: An organism that breaks down dead plants and animals into soil.

External Resources

Children's Books:

The Centipede and Millipede* by Melissa Stewart (National Geographic Little Kids First Big Book series) – Beautifully illustrated with clear, accessible text.

Creepy Crawlies* by Giles Sparrow – Features centipedes and other arthropods with fun facts.

Are You a Butterfly?* by Judy Allen (features arthropods and body structures) – Engaging question-based format.

Implementation Tip: Begin this lesson with the anchoring phenomenon photo displayed on a large screen. Ask students to simply observe and describe what they see for 2-3 minutes before you provide any labels or information. This activates their curiosity and leverages their natural wondering before introducing formal science vocabulary.