

## Photo Description



This image shows a garter snake camouflaged among dried wood chips, grass, and plant material. The snake's patterned skin with stripes helps it blend into its surroundings. You can see the snake's scales clearly—the small, overlapping pieces that cover and protect the snake's entire body.

## Scientific Phenomena

Anchoring Phenomenon: Why is the snake hard to see in this wood chip habitat?

This image represents camouflage (also called protective coloration), which is an adaptation that helps animals survive. Snakes like this garter snake have evolved skin patterns and colors that match their environment. This happens over many generations through natural selection—snakes with coloring that matches their habitat are less likely to be spotted by predators or prey, so they survive and pass these helpful traits to their offspring. The snake's striped pattern mimics the lines and shadows created by dried plant material and wood chips.

## Core Science Concepts

- **Animal Adaptation:** A snake's skin color, pattern, and texture are physical features that help it survive in its environment. These traits develop over many generations.
- **Camouflage as a Survival Strategy:** Animals blend into their habitats to hide from predators or sneak up on prey. The better an animal matches its environment, the more likely it is to survive.
- **Scales and Skin Structure:** Snakes are covered in scales—overlapping, protective pieces made of a special protein. Scales help the snake move, stay moist, and protect its body from damage.
- **Habitat and Environment:** The snake's appearance is closely connected to where it lives. Different habitats require different adaptations. This snake's striped pattern works well in grassy, woody areas.

### Pedagogical Tip:

When teaching adaptation, avoid the misconception that animals "choose" to change or adapt on purpose. Instead, emphasize that over many, many generations, animals with helpful traits survive longer and have more babies, so those traits become more common in the population. This is the foundation of natural selection and evolution.

### UDL Suggestions:

To support diverse learners: (1) Provide close-up images of scales and a non-camouflaged snake side-by-side for visual comparison; (2) Allow students to physically handle shed snake skin (if available from a local naturalist or pet store) to explore texture and scale patterns; (3) Offer a "Find the Snake" game with multiple difficulty levels—some images with the snake obvious, others well-camouflaged—so all students can participate at their level.

## Zoom In / Zoom Out

### Zoom In: Cellular Level

Beneath the snake's colorful skin pattern lies a layer of special cells called chromatophores (or pigment cells in snakes). These tiny cells contain different colors of pigment—browns, greens, yellows, and whites. When millions of these pigment cells are packed together in a pattern, they create the stripes and colors we see on the outside. Under a microscope, you could see how these individual colored cells work together to create the camouflage pattern. This is the same way that all animal colors are made—from millions of tiny colored cells arranged in specific patterns!

### Zoom Out: Ecosystem and Food Chain

The garter snake doesn't live alone in this habitat. It's part of a bigger system called a food chain. The dried plants and wood chips come from plants that grew in this area. Insects (like grasshoppers and worms) eat those plants. The garter snake eats the insects. Hawks or larger snakes might eat the garter snake. The snake's camouflage is important because it helps it survive in this food chain—if the snake is hidden from predators, it lives longer and can hunt more insects. If the snake is easier to spot, predators catch it faster, and there are fewer snakes to eat insects. Everything in an ecosystem is connected!

## Discussion Questions

1. Why do you think this snake's stripes help it hide in this pile of wood chips? (Bloom's: Analyze | DOK: 2)
2. What would happen to a bright red snake living in this same habitat? Would it survive as well as the garter snake? (Bloom's: Evaluate | DOK: 3)
3. How are a snake's scales similar to the shingles on a roof? How do they help the snake? (Bloom's: Understand | DOK: 1)
4. If a garter snake lived in snow and ice instead of a grassy area, what color and pattern might help it survive there? (Bloom's: Create | DOK: 3)

## Potential Student Misconceptions

Misconception 1: "The snake turned brown and striped to hide on purpose."

Clarification: The snake doesn't decide to change its color or pattern to match its habitat. Instead, over many, many generations, snakes that were born with brown and striped coloring survived longer because predators couldn't see them as easily. These snakes had babies, and their babies inherited the same brown striped pattern. Over hundreds of years, almost all the snakes in this habitat became brown and striped because the ones that didn't match the habitat didn't survive as long. This is called natural selection, and it happens very slowly over time—not during one snake's lifetime.

Misconception 2: "All snakes look the same and live in the same places."

Clarification: There are many different kinds of snakes, and each kind has adapted to a different habitat. Some snakes are bright green and live in trees. Some are yellow and live in deserts. Some are dark colors and live in forests. The garter snake's stripes work best in grassy, wooded areas where it lives. If you put this garter snake in a bright green rainforest, it wouldn't be camouflaged anymore! Different habitats have different colors and patterns, so different snakes are adapted to match their own homes.

Misconception 3: "Camouflage only hides animals from predators."

Clarification: Camouflage helps snakes in two ways. First, it hides the snake from predators (animals that want to eat the snake, like hawks). Second, camouflage helps the snake hide from its prey (the animals the snake wants to eat, like insects and small rodents). When the snake is camouflaged, insects don't see it coming, so the snake can get closer before striking. Camouflage is useful for both hunting and hiding!

## Extension Activities

### Activity 1: Camouflage Hunt

Create a classroom "habitat" by spreading wood chips, dried grass, and leaves on a table or floor. Hide several toy snakes or snake cutouts (some in matching colors, some in contrasting colors) throughout the habitat. Have students search for the snakes and observe which ones are easier or harder to find. Discuss: Why were some snakes harder to find? What colors and patterns worked best? This reinforces the relationship between animal appearance and survival.

### Activity 2: Design Your Own Adapted Snake

Provide students with a large paper snake template and a habitat picture (desert, forest, snow, water, etc.). Students color their snake to match the habitat's colors and patterns, then explain in writing how their design helps the snake survive. Display adaptations and have classmates guess which habitat each snake lives in.

### Activity 3: Scale Exploration

If possible, obtain a shed snake skin from a local nature center, museum, or reptile educator. (Shed skins are harmless and fascinating!) Pass it around so students can feel the texture, count scales, and observe how scales overlap. Alternatively, use close-up photographs or videos. Students can draw and label snake scales, then write about how scales protect the snake and help it move.

## Cross-Curricular Ideas

### ELA Connection: Descriptive Writing

Have students write a "Snake's-Eye View" story from the perspective of the garter snake hiding in the wood chips. What does the snake see, hear, and feel as it hides? Encourage students to use sensory words (rough, scratchy, dry, still, quiet) and descriptive phrases. This connects animal adaptation to narrative writing and helps students practice point of view. Display student stories alongside the photo for a classroom nature writing display.

### Math Connection: Pattern and Measurement

Provide students with close-up images or actual photos of snake scales and stripes. Have them count the number of stripes on a garter snake, measure the length of the snake in centimeters, or estimate how many wood chips would fit along the snake's body. Students can create bar graphs comparing the stripe patterns of different snake species or measure the width of a snake's head versus its body. This integrates measurement, data collection, and pattern recognition.

### Art Connection: Camouflage Collage

Students create a collage using natural materials (torn brown and tan paper, dried grass clippings, small wood pieces) to build a habitat. Then they use pencil or markers to draw a camouflaged snake on top of their collage. Challenge them to make the snake blend in so well that classmates have to hunt to find it! This connects adaptation to artistic choices about color, texture, and composition while reinforcing camouflage concepts.

### Social Studies Connection: Animal Habitats Around the World

Different habitats around the world have different snakes with different camouflage patterns. Students can research garter snakes compared to snakes from other regions (e.g., green tree pythons from rainforests, sand vipers from deserts). Create a world map showing where different camouflaged snakes live and how their appearance matches their habitat. This builds geography skills while reinforcing that adaptation is specific to place and environment.

## STEM Career Connection

### Wildlife Biologist / Herpetologist

A herpetologist is a scientist who studies snakes, lizards, frogs, and other cold-blooded animals. Herpetologists observe how snakes behave in nature, study their adaptations, and work to protect them. They might spend time in forests, swamps, or deserts watching snakes to understand how they survive, what they eat, and how many there are in an area. Some herpetologists teach other people about snakes so that folks aren't afraid of them. This job helps us understand nature better and protect animals that are in danger.

Average Annual Salary: \$65,000–\$80,000 USD

### Zookeeper

A zookeeper takes care of animals in zoos and wildlife centers, including snakes. They feed the snakes, clean their habitats, keep them healthy, and teach visitors about them. Zookeepers design habitats that match where snakes naturally live—including the right temperature, plants, and hiding spots—so the snakes feel safe and comfortable. They also watch for signs that snakes are sick or stressed and help the veterinarian care for them.

Average Annual Salary: \$28,000–\$35,000 USD

### Nature Photographer or Documentary Filmmaker

These professionals use cameras, drones, and technology to capture images and videos of animals like snakes in their natural habitats. They might hide in bushes for hours to photograph a camouflaged snake or film how a snake hunts. Their photos and videos are used in textbooks, websites, nature programs, and museums to teach people about animals. They combine science knowledge with artistic skills to help others learn about and appreciate wildlife.

Average Annual Salary: \$45,000–\$70,000 USD

## NGSS Connections

### Performance Expectation:

4-LS1-1: Use evidence to construct an explanation that plants get the materials they need for growth chiefly from air and water. (Note: While this PE focuses on plants, the following DCIs and CCCs apply to this snake adaptation lesson)

### Disciplinary Core Ideas:

- 3-LS3.B - Variations in traits: Many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment. (Foundation for understanding adaptation)
- 3-LS4.C - Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.
- 3-LS4.D - Biodiversity: There are many different kinds of living things in any area, and they exist in different places both in land and water.

### Crosscutting Concepts:

- Patterns - The snake's striped pattern repeats and reflects patterns found in its natural habitat.
- Structure and Function - The snake's skin structure (scales) and coloration work together to provide protection and camouflage.
- Cause and Effect - Environmental pressures (predators, prey availability) cause animals to have specific adaptations.

## Science Vocabulary

\* Adaptation: A trait or behavior that helps an animal survive and thrive in its environment.

\* Camouflage: Colors, patterns, or shapes that help an animal hide by blending into its surroundings.

- \* Scales: Small, hard, overlapping pieces of skin that cover and protect a snake's body.
- \* Habitat: The natural home or environment where an animal lives.
- \* Predator: An animal that hunts other animals for food.
- \* Trait: A characteristic or feature of a living thing, like color, size, or shape.

### External Resources

Children's Books:

- Ssssssss! A Book About S Sounds by Rebecca Stefoff (simple, rhyming introduction to snakes)
- Snakes by Seymour Simon (with stunning photographs and clear explanations; Fifth Grade level but accessible)
- Hide and Seek: Animals in Camouflage by Loretta Holland (explores camouflage across multiple animals)

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Teacher Notes: This lesson scaffolds understanding of adaptation, a complex concept, by using a concrete, observable example. The garter snake's camouflage is visually obvious and engaging for Fourth Graders. Emphasize the long timescale of adaptation (many generations) and avoid teleological language (animals don't "try" to change). Connect this to students' own observations: Can they spot similar camouflage in insects or birds in their schoolyard?