Amphibian

Life Science | Lesson Guide

4th Grade

Photo Description

This image shows a gray tree frog clinging to a white wooden surface with its sticky toe pads spread wide. You can see the frog's bumpy skin, large round eyes, and long back legs bent in a climbing position. The frog's coloring helps it blend in with tree bark and wood, which is called camouflage.

Scientific Phenomena

Anchoring Phenomenon: How can a frog stick to smooth surfaces without falling?

This image illustrates adhesive toe pads, a specialized adaptation that allows tree frogs to climb vertical surfaces. Tree frogs have special sticky cells on their toes that create suction and grip surfaces through moisture and tiny hair-like structures. This adaptation evolved because tree frogs need to live and hunt on trees and branches where ground-dwelling animals cannot reach them. The bumpy texture of their skin also helps them blend into their forest habitat, reducing predation risk.

Core Science Concepts

* Adaptation and Survival: Frogs have special body parts (toe pads, camouflage coloring, powerful back legs) that help them survive in their specific environment.

* Life Cycle of Amphibians: Frogs are amphibians that begin life in water as tadpoles and transform into adults that live on land and in water. This process is called metamorphosis.

* Habitats and Ecosystems: Different animals are suited to different habitats. Tree frogs live in forests and woodlands where they have access to trees, insects, and moisture.

* Animal Classification: Amphibians are a group of animals with moist skin, legs (or no legs), and a life cycle that includes water and land stages. Frogs are one example of amphibians.

Pedagogical Tip:

When teaching about frog adaptations, encourage students to physically act out how tree frogs climb by having them pretend their fingers are toe pads—they'll better understand how suction and grip work through kinesthetic learning. This also makes the abstract concept concrete and memorable.

UDL Suggestions:

To support diverse learners: Provide images of frogs in different habitats (tree frogs, bullfrogs, poison dart frogs) so students can see how adaptation varies. Use both visual and tactile materials—let students touch textured surfaces and smooth surfaces to compare, then relate this to frog skin. Offer vocabulary cards with pictures for English language learners, and allow students to use digital tools to research frog adaptations at their own pace.

Discussion Questions

1. What body parts does this tree frog have that help it climb trees? Why do you think evolution gave it these special toes? (Bloom's: Analyze | DOK: 3)

2. If a frog lived in a dry desert instead of a wet forest, how might its body be different? What would it need to survive? (Bloom's: Evaluate | DOK: 3)

3. How do you think the frog's gray color helps it survive? Where else in nature do you see animals that match their surroundings? (Bloom's: Analyze | DOK: 2)

4. A frog starts as a tiny tadpole in water and becomes an adult frog on land. Why do you think amphibians need both water and land to survive? (Bloom's: Comprehend | DOK: 2)

Extension Activities

1. Frog Adaptation Investigation: Show students pictures of 5–6 different frog species (tree frog, bulldog, poison dart frog, leopard frog, etc.). Have students create a chart comparing their colors, sizes, and habitats. Ask: "Which adaptations help each frog survive in its home?" Students can present their findings to the class.

2. Sticky Toe Pad Simulation: Create a hands-on experiment using craft materials. Give students small cardboard circles and different adhesive materials (dry, wet, with fabric, etc.) to test which "toe pad" works best to pick up small objects from a smooth surface. Record results and discuss how real frog toe pads work similarly.

3. Life Cycle Sequencing and Drama: Provide students with images of the frog life cycle (egg, tadpole, tadpole with legs, froglet, adult frog). Have students sequence the images, then act out each stage in a short performance for the class. This kinesthetic approach reinforces metamorphosis understanding.

NGSS Connections

Performance Expectation:
4-LS1-1: Use evidence to construct an explanation for how the structure of an organism is related to its function. | 4-LS4-2: Make observations that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Disciplinary Core Ideas:
- 4-LS1-A Structure and Function: Every organism has different body structures that serve different functions in growth, survival, and reproduction.
- 4-LS4-C Adaptation: For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. The way in which an organism's structures function to help it survive in its environment is called adaptation.

Crosscutting Concepts:
- Structure and Function: The structures of organisms are related to the job those structures perform.
- Adaptation: Organisms have traits that help them survive in their environments.

Science Vocabulary

* Amphibian: An animal with moist skin that lives part of its life in water and part of its life on land (like frogs and salamanders).

* Adaptation: A special body part or behavior that helps an animal survive in its environment.

* Camouflage: Colors or patterns on an animal's body that help it blend in with its surroundings so predators cannot see it.

* Metamorphosis: A big change in how an animal's body looks as it grows from a baby to an adult.

* Habitat: The place where an animal or plant lives and finds food, water, and shelter.

* Toe Pads: Special sticky parts on a frog's feet that help it grip and climb smooth surfaces.

External Resources

Children's Books:
- From Tadpole to Frog by Wendy Pfeffer (shows life cycle with clear illustrations)
- Leap, Frog by Jane Sutton and John Nez (introduces frog adaptations and survival)
- Tree Frogs by John Crossingham and Bobbie Kalman (detailed look at tree frog adaptations)

YouTube Videos:
- "How do Tree Frogs Stick to Surfaces?" by Crash Course Kids — Explains the science of adhesive toe pads in kid-friendly language. https://www.youtube.com/watch?v=J0z-Xw6_qI4
- "Frog Life Cycle" by National Geographic Kids — Shows the complete transformation from egg to tadpole to adult frog with stunning visuals. https://www.youtube.com/watch?v=aOWnXFVGKAo