Amphibian

Life Science | Lesson Guide

2nd Grade

Photo Description

This image shows a tree frog clinging to a smooth, white surface. You can see its bumpy, gray-brown skin that helps it hide in nature, four strong legs with special toe pads, and bulging eyes. The frog's sticky toe pads and flat body shape help it climb and stick to surfaces like trees and walls.

Scientific Phenomena

Anchoring Phenomenon: Why can frogs climb smooth surfaces and stick to walls without falling?

Scientific Explanation: Frogs have special adhesive toe pads called adhesive discs that produce a sticky mucus. This mucus creates a chemical bond between the frog's feet and surfaces, allowing them to cling even to vertical or smooth areas. Additionally, the frog's lightweight body and flattened posture reduce the force of gravity acting on it. This adaptation evolved because frogs need to climb trees and rocks to find food, escape predators, and find mates—especially tree frogs that live in rainforest canopies.

Core Science Concepts

* Structure and Function: Frogs have special body parts (toe pads, sticky skin, strong legs) that help them survive in their environment. Each part has a specific job.

* Adaptations: An adaptation is a body feature or behavior that helps an animal survive and thrive. Frogs' sticky toe pads are an adaptation for climbing.

* Life Cycles: Frogs begin as eggs in water, become tadpoles, and eventually transform into adult frogs—a process called metamorphosis.

* Habitats: Frogs live in many different environments (wet rainforests, ponds, trees, ground). Different frogs are adapted to their specific habitats.

Pedagogical Tip:

When teaching about frogs, use the "sticky note" tactile analogy: "Just like a sticky note clings to paper, a frog's toe pads cling to leaves and branches." Have students touch a real sticky note to understand the concept physically before discussing the frog's adaptation.

UDL Suggestions:

Representation: Provide high-quality close-up images of frog toe pads alongside diagrams with labels. Use videos showing frogs climbing in slow motion so students can see the stickiness in action. Include tactile models (textured materials) for students to feel how different surfaces compare.

Action & Expression: Allow students to demonstrate climbing skills using a playground, show toe pads through role-play, or create frog toe pad models using craft materials. Offer choice in how they present their learning: drawing, verbal explanation, or physical demonstration.

Engagement: Connect to student interests by asking which animals they've seen climb (squirrels, bugs, people). Use storytelling about a frog's adventure to maintain interest and emotional connection.

Discussion Questions

1. How does the frog's body help it climb and stick to smooth surfaces? (Bloom's: Understand | DOK: 1)

2. Why do you think tree frogs need sticky toe pads, but frogs that live on the ground might not? (Bloom's: Analyze | DOK: 2)

3. What other animals do you know that have special body parts to help them move in their home? How are they similar to or different from the frog? (Bloom's: Evaluate | DOK: 3)

4. If a frog's toe pads stopped being sticky, what problems might the frog face? (Bloom's: Synthesize | DOK: 3)

Extension Activities

1. Sticky Toe Pad Model: Have students create frog toe pads using craft materials. Provide small foam circles, glue, and textured paper. Students can test different materials (sandpaper, felt, wax paper) by tossing small beanbags or foam pieces to see which "toe pads" work best. This demonstrates the function of real toe pads.

2. Frog Habitat Diorama: Students create a shoebox habitat showing where a tree frog lives (trees, leaves, moisture, insects). They can include clay frogs in climbing positions and label key habitat features. This reinforces that animal structure is connected to their environment.

3. Observation Walk: Take students on a nature walk to look for climbing animals (insects, spiders, squirrels) and discuss their special adaptations. Have students sketch or photograph these animals and compare their climbing features to the frog's toe pads. This extends learning to real-world observation.

NGSS Connections

Performance Expectation:
2-LS1-1: Plan and conduct investigations to provide evidence that plants get the materials they need to grow chiefly from air and water. (Note: While this PE focuses on plants, the frog's structure-function relationship connects to 2-LS1 domain.)

Primary NGSS Standards:
- 2-LS1.D (Information Processing) – Students observe and describe how animals use their senses and body parts.
- 2-LS4.D (Biodiversity and Humans) – Students recognize that different animals have different structures suited to different purposes.

Crosscutting Concepts:
- Structure and Function – The frog's toe pads are structures that function to help it climb.
- Cause and Effect – The sticky toe pads cause the frog to stick to surfaces, which is the effect we observe.

Science Vocabulary

* Amphibian: An animal that lives part of its life in water and part on land, like frogs and salamanders.

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

* Toe Pads: The sticky, round parts on a frog's toes that help it stick to surfaces and climb.

* Habitat: The place where an animal lives, such as a rainforest, pond, or tree.

* Metamorphosis: A big change in how an animal's body looks as it grows, like when a tadpole becomes a frog.

External Resources

Children's Books:
- Jump, Frog, Jump! by Robert Kalan (simple, rhythmic text about a frog's movements)
- From Tadpole to Frog by Suzanne Slade (illustrated life cycle exploration)
- National Geographic Little Kids First Big Book of Reptiles and Amphibians by National Geographic Kids (colorful, accessible images and facts)

YouTube Videos:
- "Tree Frog Climbing in Slow Motion" – BBC Earth describes how tree frogs stick to leaves; demonstrates adhesive toe pads visually. https://www.youtube.com/watch?v=example (Search BBC Earth or Nature documentaries for accurate slow-motion clips.)

- "The Life Cycle of a Frog" – National Geographic Kids explains metamorphosis with animations and real footage. https://www.youtube.com/watch?v=example (Verify current links via National Geographic Kids YouTube channel.)

Implementation Note: This lesson is best taught alongside a sensory observation of the actual photograph or, ideally, a live frog if your school has access through a local nature center or science program. Encourage students to ask questions and make predictions before revealing scientific explanations.