

Photo Description



This image shows a dark-colored toad sitting on the ground among fallen leaves and small plants. The toad has bumpy, wet-looking skin and a large, round eye that helps it see in different directions. Its body appears moist and textured, which is important for how toads survive in their environment.

Scientific Phenomena

The anchoring phenomenon here is amphibian adaptation for survival. This toad demonstrates how amphibians have evolved specific body structures and behaviors to thrive both in water and on land. The toad's moist, permeable skin allows it to breathe through its skin in addition to its lungs, while its bumpy texture helps with camouflage and protection. The positioning among leaf litter shows behavioral adaptation for finding moisture, food, and shelter in its terrestrial habitat.

Core Science Concepts

1. Amphibian Life Cycle: Toads undergo metamorphosis, starting as eggs in water, developing into tadpoles with gills, then transforming into adult toads with lungs and legs.
2. Structural Adaptations: The toad's bumpy skin, large eyes positioned on top of its head, and powerful hind legs are all structures that help it survive by providing camouflage, wide vision, and jumping ability.
3. Habitat Requirements: Toads need both aquatic and terrestrial environments during their lifetime, requiring moist conditions to keep their permeable skin healthy.
4. Behavioral Adaptations: Hiding in leaf litter and remaining still helps toads avoid predators while staying close to moisture and potential prey.

Pedagogical Tip:

Use a "Think-Pair-Share" strategy when introducing amphibian adaptations. Have students first observe the image individually, then discuss with a partner what they notice about the toad's features, and finally share observations with the class to build collective understanding.

UDL Suggestions:

Provide multiple ways for students to demonstrate their understanding of toad adaptations: drawing and labeling diagrams, acting out toad movements, creating clay models, or recording voice explanations. This supports different learning preferences and abilities.

Zoom In / Zoom Out

1. Zoom In: At the cellular level, the toad's skin contains specialized cells that allow oxygen and water to pass through the skin membrane. This cutaneous respiration happens because amphibian skin lacks the thick, waterproof layer that mammals have.
2. Zoom Out: This toad is part of a larger wetland ecosystem where it serves as both predator (eating insects and small invertebrates) and prey (for birds, snakes, and mammals). Healthy toad populations indicate a balanced ecosystem with clean water sources and adequate habitat connectivity.

Discussion Questions

1. How do you think the toad's bumpy skin helps it survive in this leafy environment? (Bloom's: Analyze | DOK: 2)
2. What might happen to this toad if all the nearby water sources dried up? (Bloom's: Evaluate | DOK: 3)
3. Why do you think the toad's eyes are positioned on top of its head rather than on the sides? (Bloom's: Apply | DOK: 2)
4. What evidence can you find in the image that shows this toad is well-adapted to its environment? (Bloom's: Analyze | DOK: 2)

Potential Student Misconceptions

1. Misconception: "Toads and frogs are exactly the same animal."

Clarification: While both are amphibians, toads typically have drier, bumpier skin and spend more time on land, while frogs usually have smoother, more moist skin and stay closer to water.

2. Misconception: "Toads are slimy and will give you warts."

Clarification: Toads have moist skin but are not slimy, and they cannot give humans warts. Their bumpy skin texture is natural and helps with camouflage.

3. Misconception: "Toads live their whole lives on land."

Clarification: Toads need water to reproduce and lay their eggs, and they require moist environments to keep their skin healthy for breathing.

NGSS Connections

- Performance Expectation: 3-LS4-3 - Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- Disciplinary Core Ideas:
 - 3-LS4.C - Environmental changes affect organisms
 - 3-LS1.B - Growth and development of organisms
- Crosscutting Concepts:
 - Structure and Function
 - Cause and Effect

Science Vocabulary

* Amphibian: An animal that can live both in water and on land and breathes through its skin and lungs.

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

- * Metamorphosis: The process of changing from one form to another as an animal grows up.
- * Permeable: Allowing liquids or gases to pass through easily.
- * Camouflage: Colors or patterns that help an animal blend in with its surroundings.
- * Habitat: The natural place where an animal lives and finds everything it needs to survive.

External Resources

Children's Books:

- From Tadpole to Frog by Wendy Pfeffer
- Frogs and Toads and Tadpoles, Too! by Allan Fowler
- National Geographic Readers: Frogs! by Elizabeth Carney

YouTube Videos:

- "Frog and Toad Life Cycle" by SciShow Kids - Explains amphibian metamorphosis in kid-friendly terms with animations:
<https://www.youtube.com/watch?v=hYYHvOBXuIQ>
- "How Do Frogs Breathe Through Their Skin?" by Mystery Science - Demonstrates cutaneous respiration with simple experiments: <https://www.youtube.com/watch?v=rFxu7NEoKC8>