
SYNOPSIS:

Fossils show us that frogs and toads made their appearances on earth at least 100 million years ago. They are amphibians, cold-blooded animals that were among the first backboned animals to leave the water for life on land. Remarkably adaptable and existing in amazing variety, frogs and toads can be found in almost every part of the world except polar regions.

This program features a fascinating array of these intriguing creatures as it begins with the typical frog and toad life cycle, diet, and defense mechanisms, and goes on to show some of the interesting adaptations which have enabled frogs and toads to survive and thrive in such a diversity of habitats.

CURRICULUM UNITS:

Biology
General Science
Life Science

CAREER OPPORTUNITIES:

Biologist
Ecologist
Herpetologist
Lab Technician
Microbiologist
Naturalist

BACKGROUND INFORMATION & PROGRAM OVERVIEW:

The program begins by explaining that FROGS and TOADS are animals that BIOLOGISTS call AMPHIBIANS. Amphibian comes from the Greek words amphi for "both" and bios for "life". Amphibians begin life in water, absorb oxygen through gills and their skin. As they mature,

most amphibians develop lungs and are able to leave the water for land. However, they will continue to absorb oxygen through their skins, and must return to water to lay their eggs.

Students see the typical life cycle of frogs and toads and watch as fish-like TADPOLES develop and hatch from eggs. The tadpoles absorb oxygen through gills and their skin. As they mature, lungs are developed and the gills disappear, they grow legs and their tails are absorbed into their bodies.

Students learn the differences between frogs and toads. Toads have bumpier skin and shorter hind legs than frogs and can tolerate drier habitats. Frogs have smoother, moister skin and are more often found in or close to water. They also have longer, more powerful hind legs for jumping. Many have webbed feet to assist in swimming, but TREE FROGS have pads on their toes which secrete a sticky substance that helps them climb and cling.

Frogs and toads have developed a variety of defense mechanisms. Their great jumping ability is one way they escape PREDATORS. Some species have protective coloration, CAMOUFLAGE, that allows them to blend in with their surroundings to escape detection.

Discover the many reasons that frogs and toads are important in nature's order. As a vital link in the food chain, they eat many pests, helping gardeners and farmers, and perhaps reducing the spread of insect borne diseases such as MALARIA. They provide food for other animals, including humans. Frogs rarely suffer from infections despite living in BACTERIA laden water and researchers have found their skins contain an ANTIBIOTIC type substance that could be a wonder drug to treat and cure many infections and diseases.

ISSUES AND CRITICAL THINKING:

- 1) After showing the video, ask your class the following:
 - a) What are amphibians?
 - b) How can you tell the difference between a frog and a toad?
 - c) Why do most frogs and toads lay many eggs?
 - d) What are some ways frogs and toads protect themselves?
 - e) How are frogs and toads important in nature's order?
- 2) If possible, bring a live frog or toad into the classroom for the children to observe. Point out camouflaging coloration, the differences in color of dorsal and ventral surfaces, number of toes on its feet, positions of the eyes, nostrils, and eardrums. For comparison, try to bring in other amphibians, such as a salamander and a newt (still has gills). Feed the frog or toad a cricket, and have the students watch what happens when the animal eats.
- 3) If you have an aquarium in the classroom, collect eggs and tadpoles of a non-endangered frog species and observe their development and feeding habits.
- 4) The keeping of amphibians and reptiles is one of the fastest growing segments of the pet hobby. Perhaps some of your students keep frogs and toads, and could speak to their classmates about their pets. Also, talk with the class about the potential hazards of releasing "alien" or non-native amphibians into local ecosystems.
- 5) Review the typical life cycle of frogs and toads. Ask the class to think of examples of other animals that undergo metamorphosis.

6) Review the meaning of "cold-blooded", and ask students for more examples. Are cold-blooded animals able to adjust their body temperature? Amphibians can go into a kind of hibernation state when temperatures drop too low for them, or food and water are scarce. Discuss, hibernation. What other animals hibernate? Are they all cold-blooded?

7) Scientists consider many frogs and toads good indicators of the ecological health of their habitats because they are exposed to so many facets of their environments. Ask the class to explain why this might be so.

8) Some of the most brilliantly colored and interesting frogs are the various "poison dart" frogs in South American rain forests. Have the class research the relationship between rain forests, their people, and the poisonous frogs.

GLOSSARY:

Amphibian- Cold-blooded vertebrate animal that goes through metamorphosis from egg, to gill-breathing aquatic larva, to adult form with lungs which can live on land.

Antibiotic- A substance, such as penicillin, that can stop the growth and spread of microbes that cause infection or disease.

Bacteria- Microscopic organisms that can live just about anywhere, and can be harmful or helpful.

Biologist- A scientist who specializes in the study of the lives and life processes of living organisms.

Camouflage- Protective coloration or shape of an animal that allows it to blend in with its surroundings and escape detection.

Frog- Tailless amphibian usually found in or close to water and generally having smooth, moist skin; powerful, long hind legs adapted for jumping; and webbed feet for swimming.

Gills- The respiratory organs of aquatic animals which enable them to absorb oxygen dissolved in water.

Hibernation- A state of inactivity or sleep that allows an animal to survive long periods of cold or food scarcity.

Malaria- A disease caused by a parasite which is transmitted to humans in the bite of infected mosquitoes.

Predator- An animal that lives by devouring other animals.

Spade-foot toad- The eggs of this desert dwelling toad, laid in quick-drying puddles, are the fastest developing of all toad species. During droughts, the adult will bury itself, and is able to survive by absorbing what little moisture there is in the soil directly through its skin and into its bladder.

Strawberry frog- A species of poison dart frog the female lays only a few eggs and carries her tadpoles on her back until she can deposit them in the safety of water pooled between the leaves at the base of a plant. She returns to her tadpoles frequently to lay eggs for them to eat.

Tadpoles- The fish-like, aquatic, immature forms of frogs and toads, which have tail and gills that gradually disappear as their legs and lungs develop.

Toad- Tailless amphibian related to frog, but generally more adapted to drier habitats and having bumpier skin and shorter hind legs.



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Wonders of Biology – Animals, Insects, Plants & Fungi



Show Me Science

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BIOLOGY: UNDERSTANDING FROGS & TOADS

