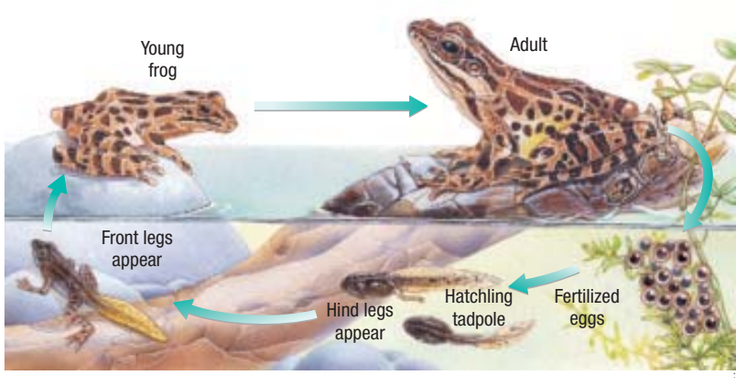


Figure 14 The transition of a larval frog (tadpole) to an adult frog involves a complex series of external and internal body changes. **What major physical change do tadpoles first undergo as they develop into an adult frog?**

Frogs and Toads

There are about 4,000 species of frogs and toads, also known as *anurans*, which live in environments ranging from deserts to rain forests, valleys to mountains, and ponds to puddles. Adult anurans are carnivores that eat a variety of small prey. Most frogs wait for prey to pass near them. They then catch the prey by using a long, sticky tongue that extends rapidly. The frog body, particularly its skeleton, is adapted for jumping, and its long muscular legs provide the power. Toads are very similar to frogs but have squat bodies and shorter legs. Their skin is not smooth like that of a frog but is covered with bumps.

Reproduction in Frogs Like most amphibians, frogs depend on water to complete their life cycle. The female releases her eggs into the water. A male's sperm fertilize them externally. The fertilized eggs hatch into swimming, fishlike larval forms called **tadpoles.** Tadpoles breathe with gills and feed mostly on algae. After a period of growth, hind legs appear on the tadpole. The tadpole continues to grow into an adult frog as its tail and gills disappear. This process of great physical change, shown in **Figure 14,** is called *metamorphosis.*

Reading Check *How do the diets of adult and larval frogs differ?*

tadpole the aquatic, fishlike larva of a frog or toad

ACADEMIC VOCABULARY

cycle a recurring series of functional changes or events

Section 4 Review

KEY IDEAS

1. **Compare** salamander larvae with frog larvae.
2. **Contrast** the external characteristics of caecilians to those of other types of amphibians.
3. **Describe** a frog's adaptations for both aquatic and land environments.
4. **Summarize** the process of metamorphosis.

CRITICAL THINKING

5. **Analyzing Information** Frogs and toads inhabit a wider range of habitats than salamanders do. Why do you think this is the case?
6. **Inferring Relationships** Explain how the number of eggs produced by amphibians most likely relates to the amount of parental care invested.

WRITING FOR SCIENCE

7. **Report** Use library or Internet resources to find more information about caecilians. Your research should focus on what scientists already know about these amphibians and what scientists have yet to find out. Write a report that details what you discover.

Answers to Caption Questions

Figure 14. They grow hind legs.

Demonstration

Tadpole Metamorphosis Obtain some "hind limb budstage" tadpoles. Keep the tadpoles in a small, aerated aquarium, and have students record their observations every few days. Tadpoles will begin to develop hind legs and gradually absorb their tails. Some tadpoles also may begin to develop front legs. In most species, the tadpole's digestive system changes to accommodate the switch from an herbivorous to a carnivorous diet. If the right food is not available at the precise time, the tadpole can starve. The respiratory system changes from gills to lung and skin respiration in the adult frog. LS Visual

Close

Formative Assessment

1. Caecilians look more like earthworms or snakes. They are classified as amphibians because they ____.

A. are blind and have a partially divided heart (Incorrect. The ability to see is not a characteristic exclusive to amphibians.)

B. are burrowing animals and have double-loop circulation (Incorrect. Burrowing is not a characteristic exclusive to amphibians.)

C. have legs and cutaneous respiration (Incorrect. Caecilians do not have legs.)

D. have a partially divided heart, double-loop circulation, and cutaneous respiration (Correct! All of these characteristics define amphibians.)

Answers to Section Review

1. Salamander larvae are carnivorous and look like small adults. Frog larvae are herbivorous and look more like fish than frogs.
2. Caecilians have small, bony scales which other amphibians do not have. They are legless. Other amphibians have legs.
3. Aquatic adaptations for frogs are bulging eyes to see above the water line while submerged, webbed feet for swimming, and the ability to reproduce in water. Terrestrial adaptations are legs for jumping to flee predators, lungs for breathing, and whip-like tongues for capturing prey (insects).
4. Fertilized eggs hatch, releasing tadpoles. Tadpoles live in water and breathe using gills. As a tadpole grows, its respiratory system changes and it grows legs for life on land.
5. Frogs and toads have legs that allow them to jump long distances. They can leave and return to water more quickly than short-legged salamanders.
6. Amphibians that do not protect their eggs lay many eggs to ensure that some will survive and not be eaten by predators. Amphibians that lay fewer eggs protect their eggs from predators.
7. The content of the presentations should cover what is already known about these organisms and also any recent scientific advances in this area of research.