



Amphibians

Did you know that there are almost 6,000 species of amphibians? Amphibians are unique animals that include frogs, toads, salamanders and caecilians. The word amphibian is derived from the Greek word, *amphibios*, meaning “both” and “life.” Most amphibians are four-legged vertebrates that do not have amniotic eggs. Amniotic eggs have a membranous sac, which serves to protect the embryo during development.

Amphibians lay their eggs in or around water until they hatch. Amphibians are also ectothermic, which means that they use external sources, such as the sun, air or water to regulate their body temperature. Because of this, they can be found in almost every climate on Earth, from the sweltering deserts to the frozen arctic. Most amphibians can not fully exist on land for their complete life cycle. Therefore, all species of amphibians go through a stage in their life known as metamorphosis. Metamorphosis is a biological process in which an animal will completely change its body structure. Usually with metamorphosis, the animal encounters a change in its behavior as well as its habitat.

FROGS

Frogs start their life as eggs usually laid in water or moist areas. After hatching from the eggs, they are called tadpoles. Tadpoles are “fish-like” in shape and have

gills for breathing underwater. The time that it takes a frog to go through metamorphosis depends on the species. During this time, the tadpoles develop hind limbs followed by forelimbs. Their gills turn into lungs and their tails are absorbed into their bodies. Frogs are able to breathe with lungs and absorb oxygen through their skin, which is covered by mucous glands. An adult frog’s skin is very sensitive to its environment. The health of the environment directly impacts the health of frogs. This is why frogs are considered an indicator species.

FROG OR TOAD

Frogs and toads are often mistakenly identified. However, they are both placed in the same order, *Anura*. Frogs have moist skin, while most toads have dry, bumpy skin. Frogs generally stay near water. Toads can wander away from wet habitats. The legs of a frog are longer than those of a toad. Therefore, a frog can jump farther than a toad. The toad tends to hop or walk rather than jump. Frogs also lay their eggs in large masses and toads lay their eggs in strings. However, there are exceptions to this rule.

SALAMANDERS AND CAECILIANS

Salamanders, which are also a type of amphibian, have smooth, damp skin, a



FAST FACTS

- Frogs and toads are both classified as frogs.
- Frogs, toads and salamanders do not chew their food, instead they press their eyeballs down on the roofs of their mouths to swallow food whole.
- True toads do not have any teeth.
- An African clawed frog was successfully cloned thirty years before Dolly the sheep.

KEY TERMS

Herpetology

The study of amphibians and reptiles.

Indicator Species

Animals that are extremely sensitive to changes in their environment.

Camouflage

The technique of using colors, shapes or behaviors to help blend in with an environment.

Metamorphosis

The process amphibians undergo to change from their aquatic larval stage to adulthood.

slender body, limbs without claws and a tail. They also live in wet habitats and spend most of their life on land only to return to the water to breed. Some salamander larvae have external gills, which look like frills sticking out from their neck. As the salamander matures, the gills absorb into their body just like a frog's tail reabsorbs into its body. There are some salamanders that do remain in their larval stage for most of their life. Because of their moist skin and external gills as larvae, it is generally a good idea to not pick up one of these animals if you come across it in nature.

Caecilians do not have any legs, but they do have grooves in their skin, which form rings around their body. They can be found in moist tropical habitats buried under the ground. All caecilians, except *Atretochoana eiselti*, have lungs and can absorb oxygen through their skin and mouth. Caecilians also have internal fertilization, unlike the rest of the amphibians. Most of the caecilians are egg layers. The word caecilian comes from the Latin word caecus, meaning "blind."

THREATS FACING AMPHIBIANS

According to the 2006 IUCN Global Amphibian Assessment, 32.2 percent of all amphibians are globally threatened. Major threats for these amphibians come from habitat loss, degradation, human settlement, industrial development, collection for food, scientific and pet

industries, pollution of water and air, insecticides, parasites, pathogens, diseases caused by the iridovirus and the amphibian chytrid fungus, *Batrachochytrium dendrobatidis*, and climate change. Habitat loss and degradation are the greatest threats facing amphibians. These factors affect almost 4,000 species of amphibians. Habitat loss and degradation are so detrimental that they affect four times the number of amphibian species as pollution alone.

Diseases are not the main source for amphibian decline but, when they strike a certain population, they can have an overwhelming effect leading to sudden extinctions. Scientists speculate that climate change is playing a role in the decline of amphibians because warmer air is raising clouds, which then pass over the mountains instead of sinking beneath the canopies of rain forests to deposit moisture. Since the weather patterns are changing, pathogens are finding ways to survive in dry or moist habitats. When cloud cover is thick, the sun does not get through the canopy to dry out plant matter that the pathogens grow on.

The amphibian chytrid fungus is pathogenic at cooler temperatures, however, it thrives in moist conditions. Only complete dryness will kill the amphibian chytrid fungus. Increased cloud cover allows nighttime temperatures to remain warm

and moist. Thus, providing optimal growth for the amphibian chytrid fungus. Warm years due to climate change are promoting the survival of pathogens and causing a decline in amphibian species. Declines are no longer isolated to amphibians living in rain forests. They are a worldwide occurrence.

Acid rain is also having a tremendous impact on amphibians. The acidity is caused by sulphur dioxide emitted from power plants and nitrogen oxide that seeps out of car exhausts. The trouble with acid rain is that it affects the small breeding pools of amphibians. The acidity of small breeding pools has been blamed for deformities and the reduction of a frog's immune system to several types of bacteria. Scientists are also discovering that the high levels of UV light penetrating Earth's surface is affecting the eggs of amphibians, which inevitably kills the embryos inside. In addition to high levels of UV light, fertilizers decrease the fertility of frogs and affect the larval stages of amphibians. Fertilizers increase algal growth, which benefits trematodes, parasitic flatworms that bury into frog larvae and adults. These trematodes cause diseases in frogs as they grow and mature.



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