Module 10: Classification - Diversity in the Six Kingdoms
Topic 4 Content: Vertebrates Notes

Introduction

Vertebrates

Click ***NEXT*** to begin.

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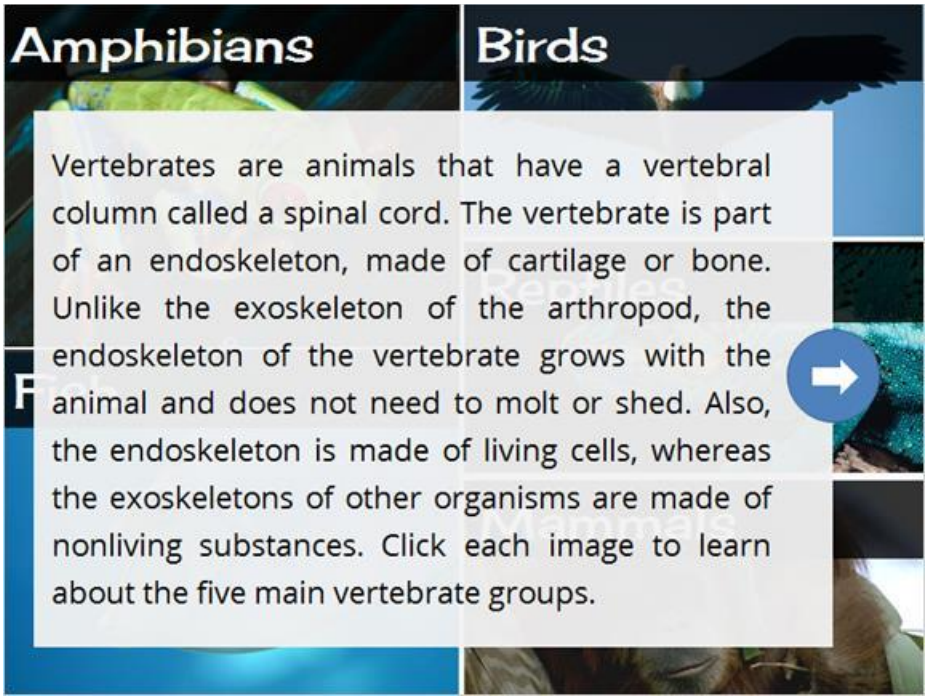
Instructions



Vertebrates are animals that have a vertebral column called a spinal cord. The vertebrate is part of an endoskeleton, made of cartilage or bone. Unlike the exoskeleton of the arthropod, the endoskeleton of the vertebrate grows with the animal and does not need to molt or shed. Also, the endoskeleton is made of living cells, whereas the exoskeletons of other organisms are made of nonliving substances. Click each image to learn about the five main vertebrate groups.

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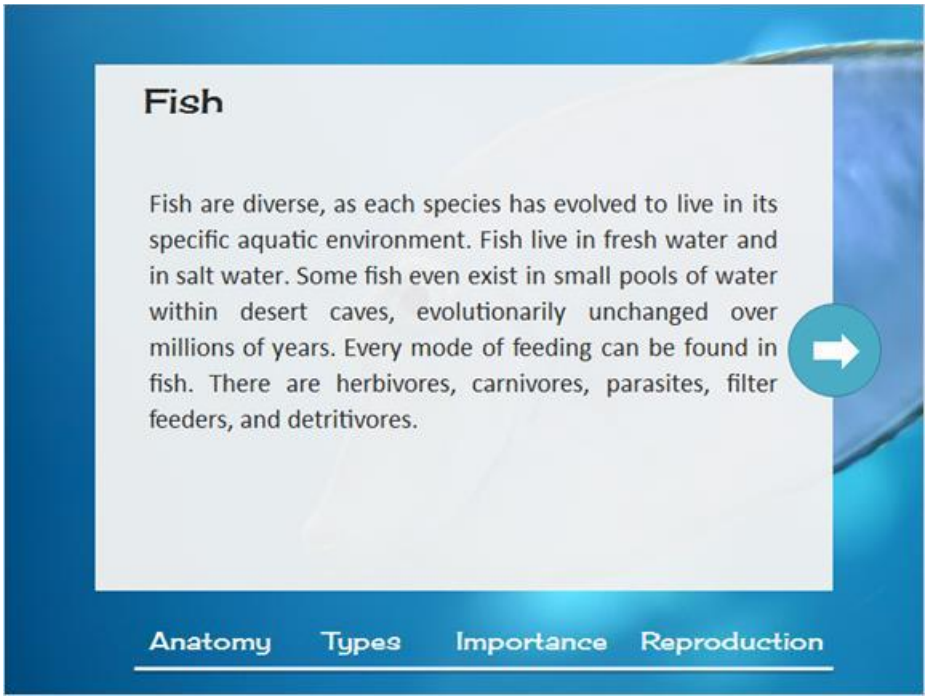
Fish



Fish are diverse, as each species has evolved to live in its specific aquatic environment. Fish live in fresh water and in salt water. Some fish even exist in small pools of water within desert caves, evolutionarily unchanged over millions of years. Every mode of feeding can be found in fish. There are herbivores, carnivores, parasites, filter feeders, and detritivores.

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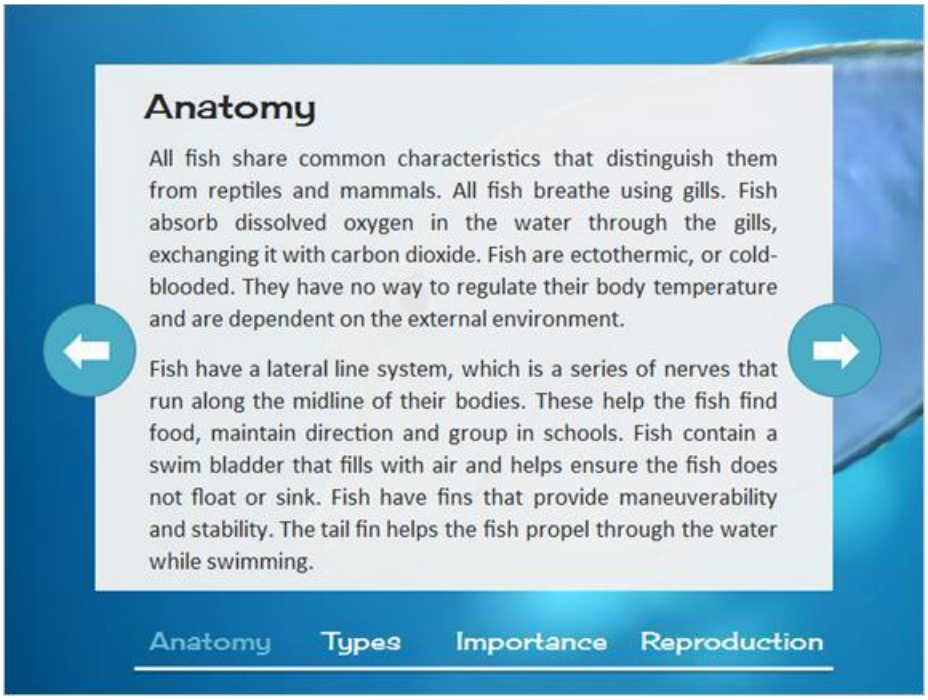
Anatomy



All fish share common characteristics that distinguish them from reptiles and mammals. All fish breathe using gills. Fish absorb dissolved oxygen in the water through the gills, exchanging it with carbon dioxide. Fish are ectothermic, or cold-blooded. They have no way to regulate their body temperature and are dependent on the external environment.

Fish have a lateral line system, which is a series of nerves that run along the midline of their bodies. These help the fish find food, maintain direction and group in schools. Fish contain a swim bladder that fills with air and helps ensure the fish does not float or sink. Fish have fins that provide maneuverability and stability. The tail fin helps the fish propel through the water while swimming.

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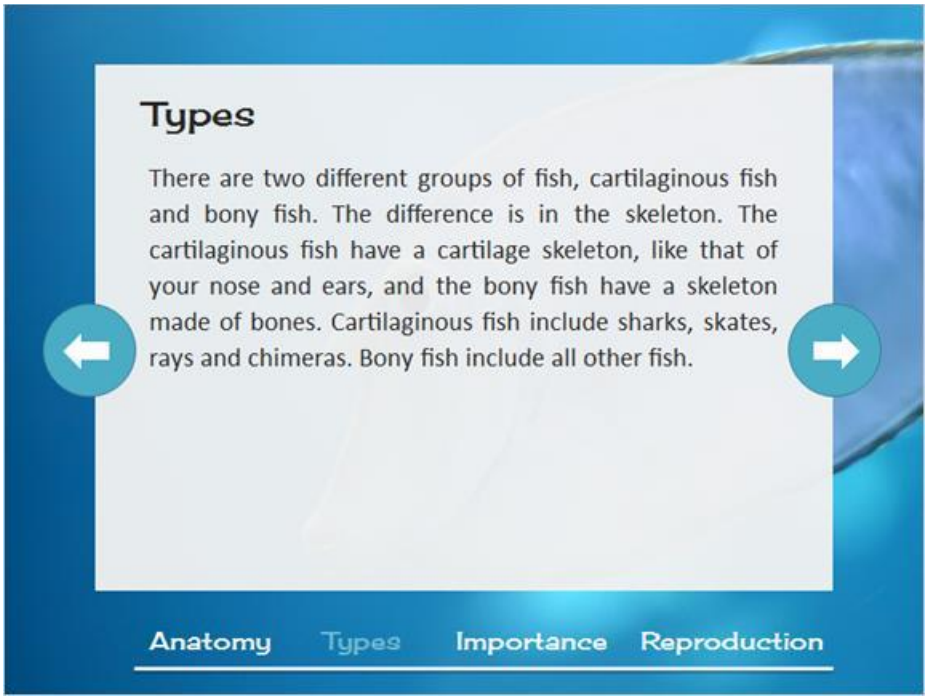
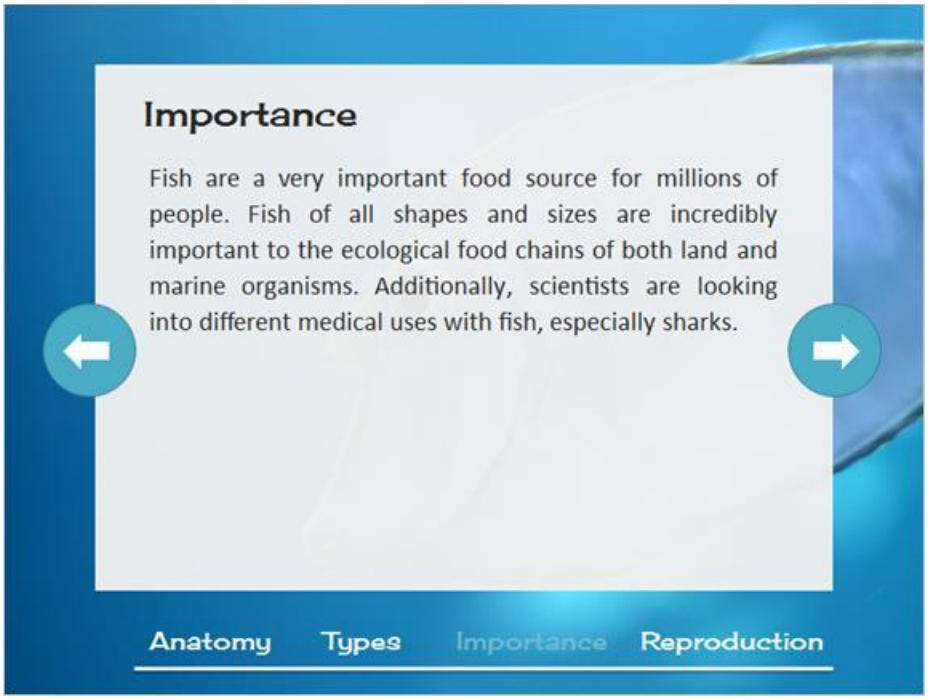
Types



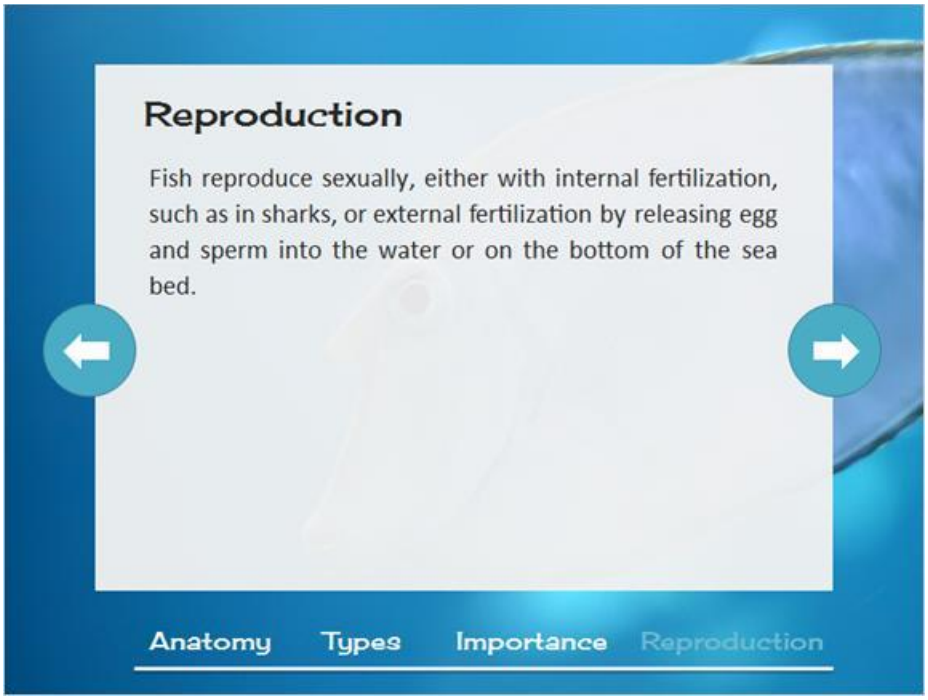
There are two different groups of fish, cartilaginous fish and bony fish. The difference is in the skeleton. The cartilaginous fish have a cartilage skeleton, like that of your nose and ears, and the bony fish have a skeleton made of bones. Cartilaginous fish include sharks, skates, rays and chimeras. Bony fish include all other fish.

Importance



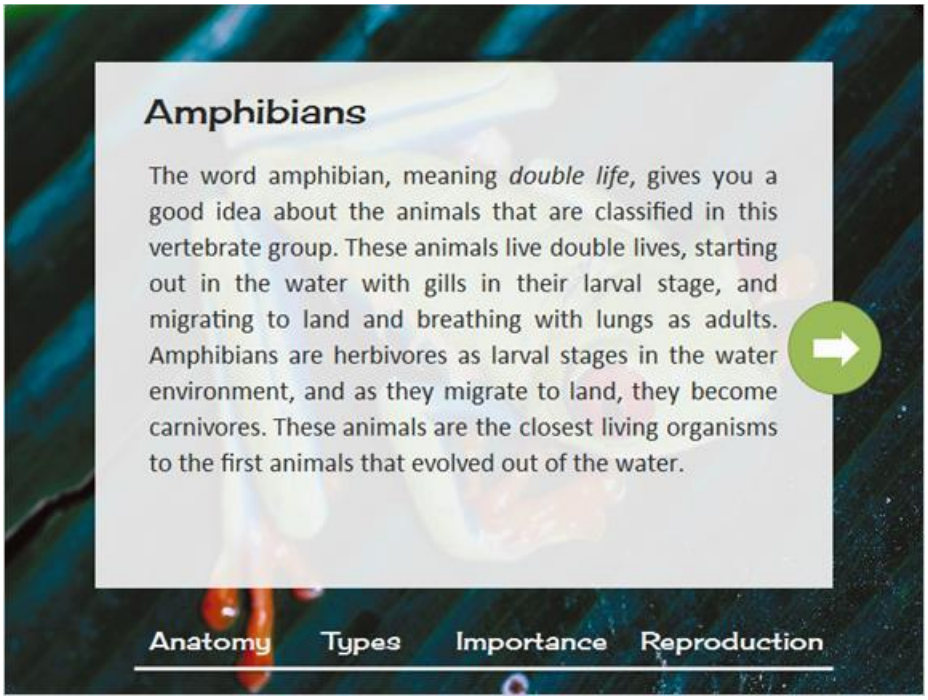
Fish are a very important food source for millions of people. Fish of all shapes and sizes are incredibly important to the ecological food chains of both land and marine organisms. Additionally, scientists are looking into different medical uses with fish, especially sharks.

Reproduction



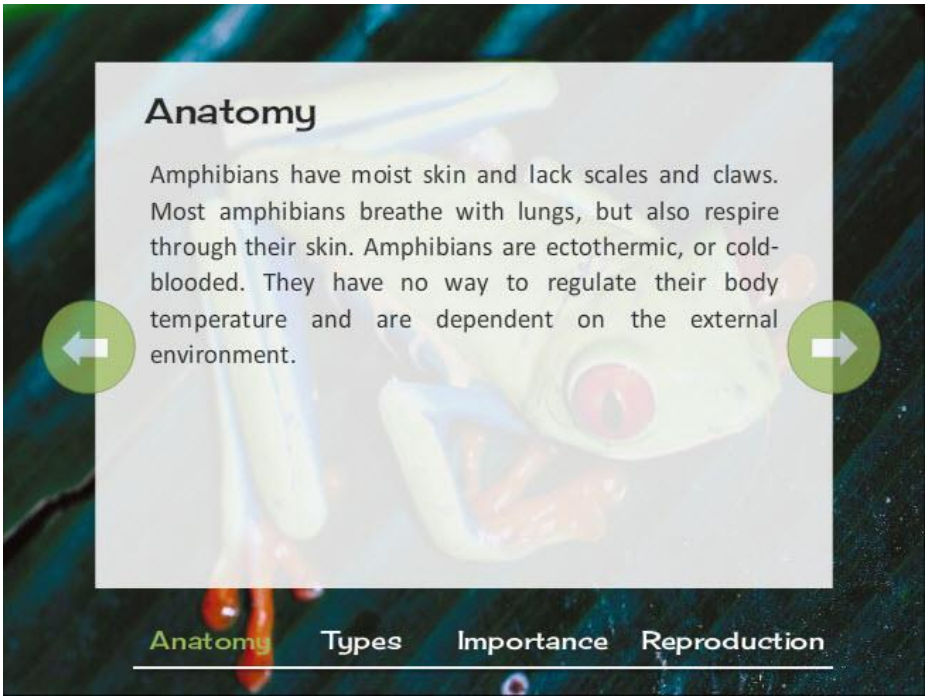
Fish reproduce sexually, either with internal fertilization, such as in sharks, or external fertilization by releasing egg and sperm into the water or on the bottom of the sea bed.

Amphibians



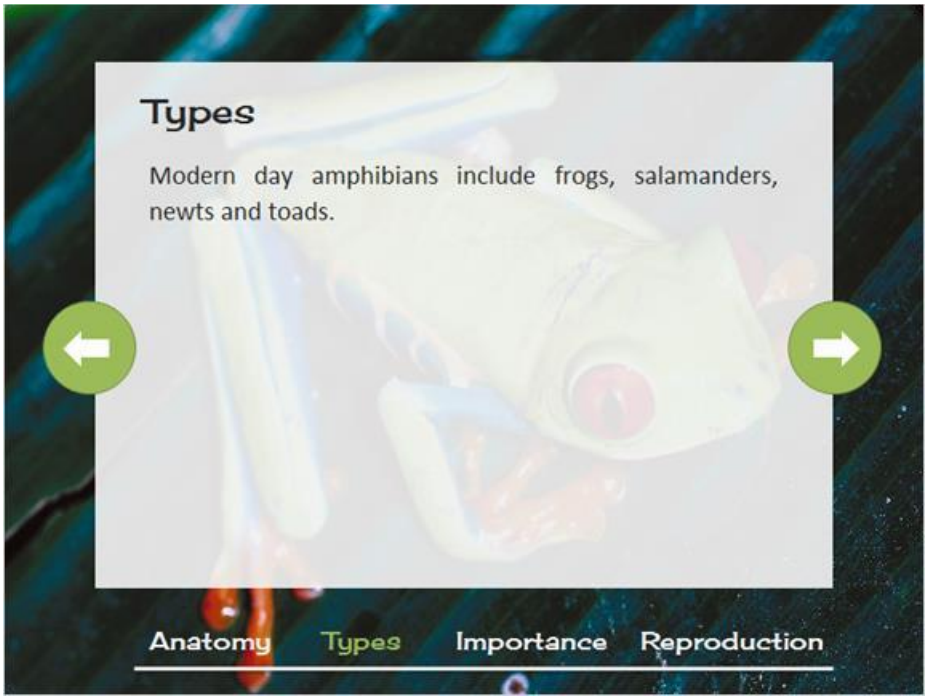
The word amphibian, meaning *double life*, gives you a good idea about the animals that are classified in this vertebrate group. These animals live double lives, starting out in the water with gills in their larval stage, and migrating to land and breathing with lungs as adults. Amphibians are herbivores as larval stages in the water environment, and as they migrate to land, they become carnivores. These animals are the closest living organisms to the first animals that evolved out of the water.

Anatomy



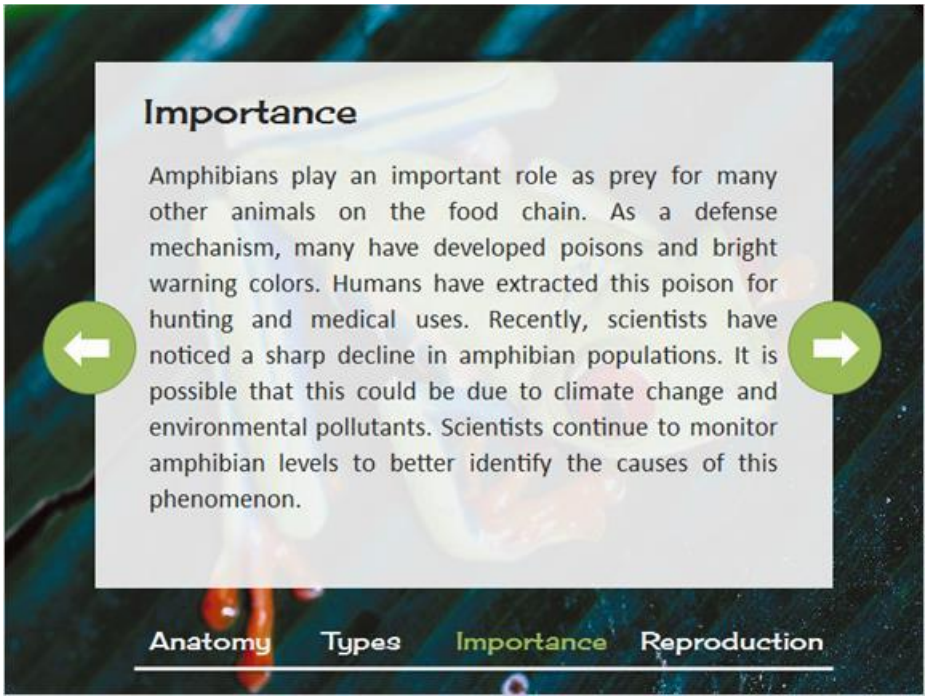
Amphibians have moist skin and lack scales and claws. Most amphibians breathe with lungs, but also respire through their skin. Amphibians are ectothermic, or cold-blooded. They have no way to regulate their body temperature and are dependent on the external environment.

Types



Modern day amphibians include frogs, salamanders, newts and toads.

Importance



Amphibians play an important role as prey for many other animals on the food chain. As a defense mechanism, many have developed poisons and bright warning colors. Humans have extracted this poison for hunting and medical uses. Recently, scientists have noticed a sharp decline in amphibian populations. It is possible that this could be due to climate change and environmental pollutants. Scientists continue to monitor amphibian levels to better identify the causes of this phenomenon.

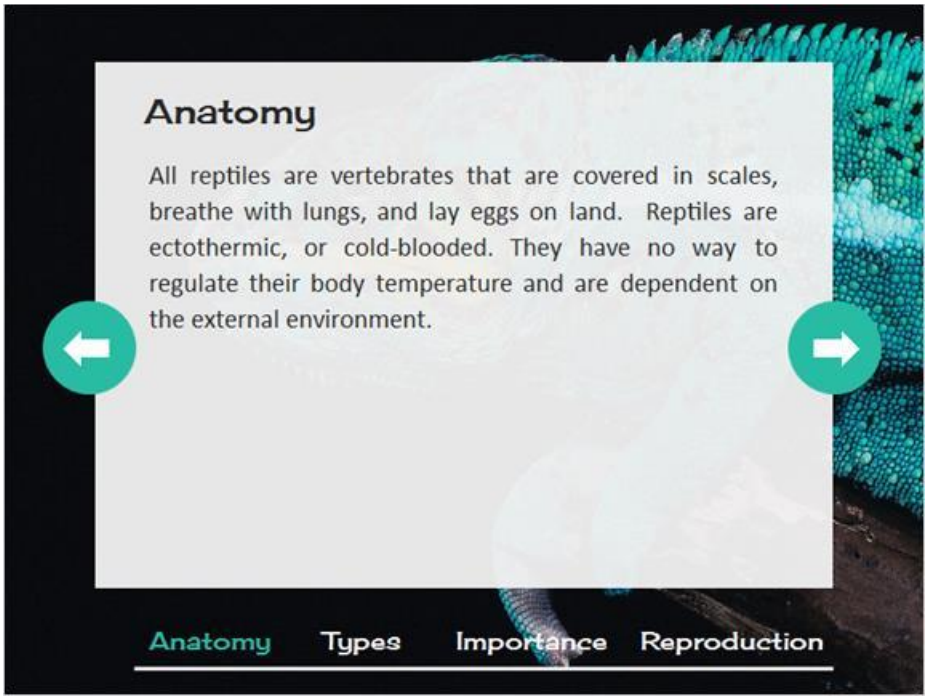
Reproduction

Amphibians reproduce sexually through external fertilization, laying sperm and eggs in shallow, fresh water areas.

Reptiles

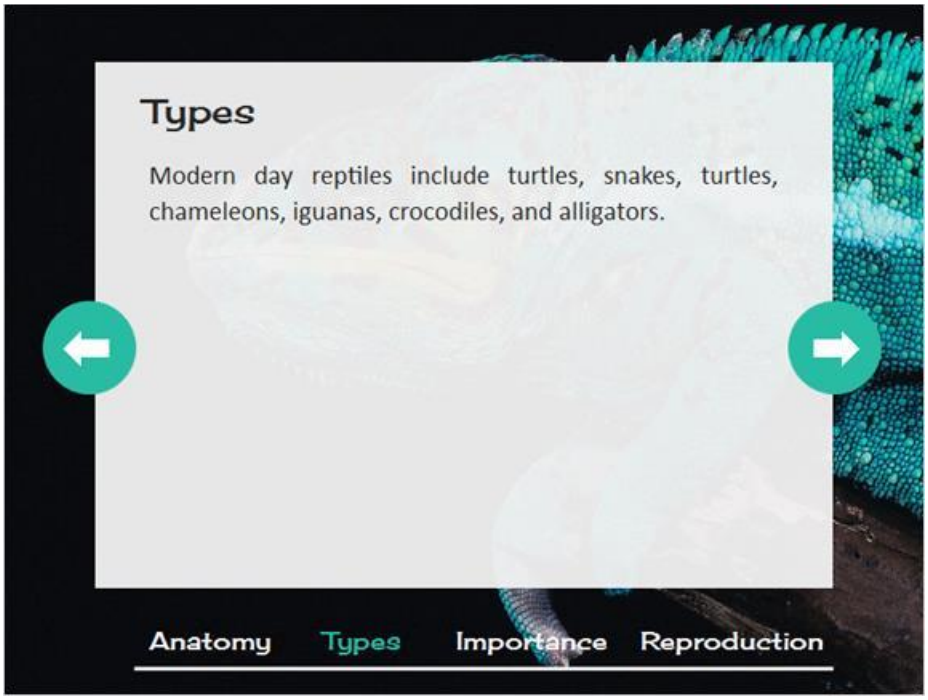
Reptiles have existed for millions of years. They are found throughout most of the Earth, from the temperate and tropical regions. Reptiles have a diverse palate; some are herbivores, like the marine iguana, but most are carnivores. Reptiles, such as the alligator and crocodile, may act as the top predator of the food chain within an ecosystem.

Anatomy



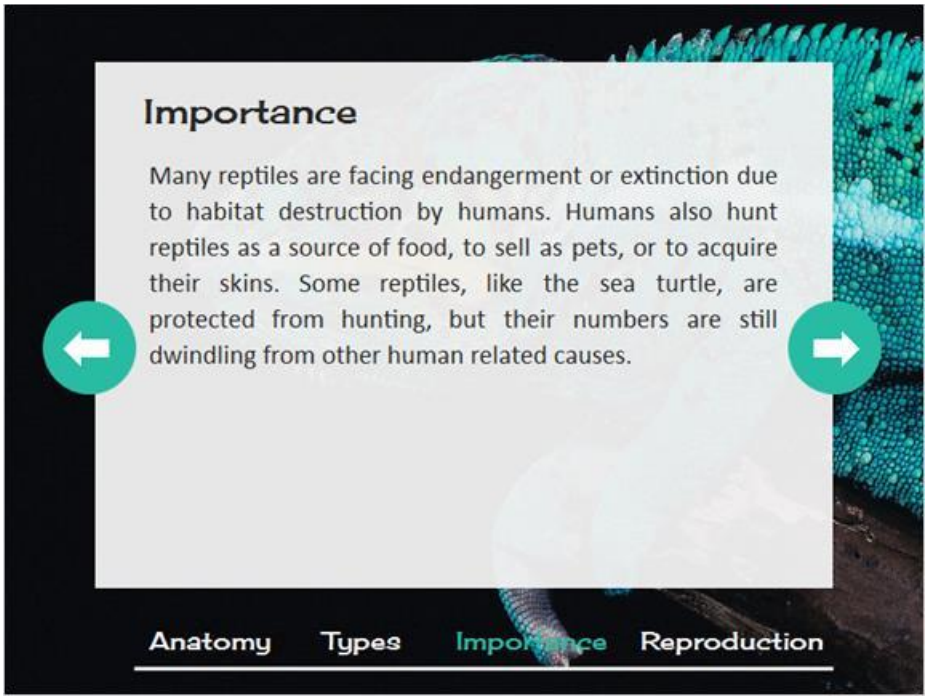
All reptiles are vertebrates that are covered in scales, breathe with lungs, and lay eggs on land. Reptiles are ectothermic, or cold-blooded. They have no way to regulate their body temperature and are dependent on the external environment.

Types



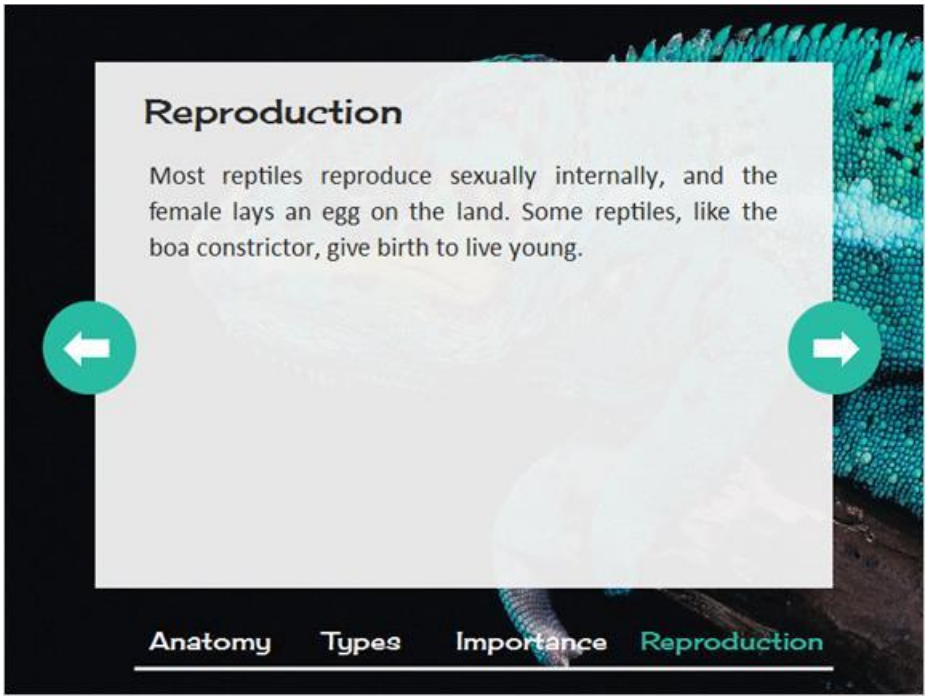
Modern day reptiles include turtles, snakes, turtles, chameleons, iguanas, crocodiles, and alligators.

Importance



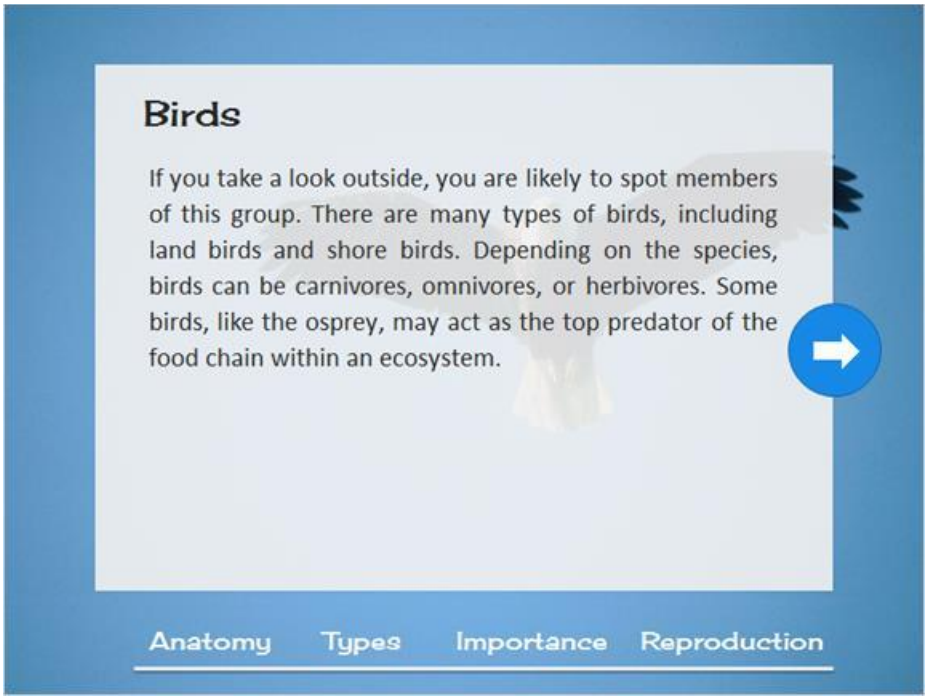
Many reptiles are facing endangerment or extinction due to habitat destruction by humans. Humans also hunt reptiles as a source of food, to sell as pets, or to acquire their skins. Some reptiles, like the sea turtle, are protected from hunting, but their numbers are still dwindling from other human related causes.

Reproduction



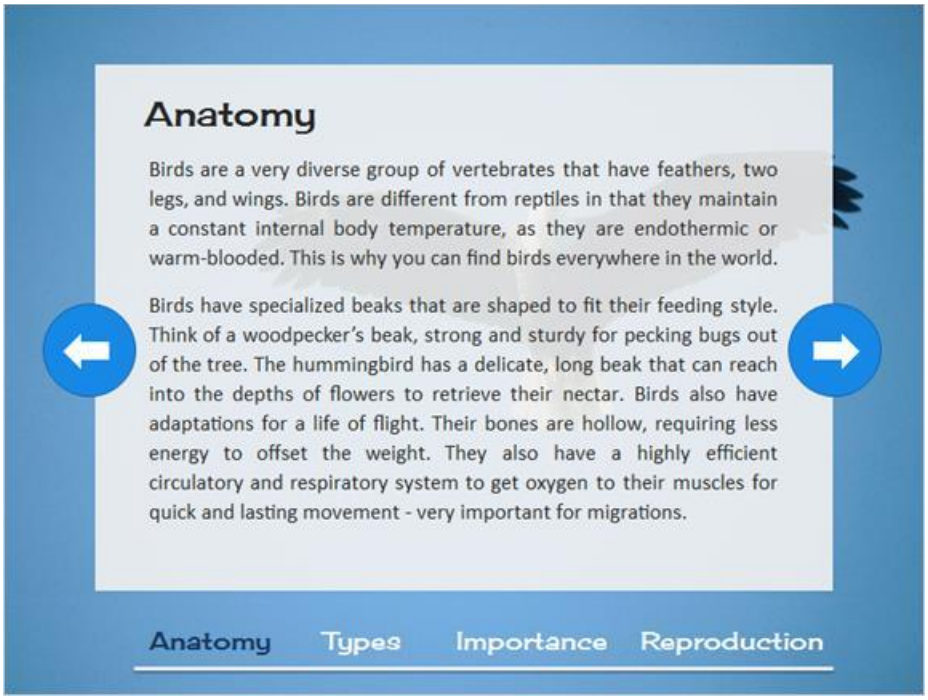
Most reptiles reproduce sexually internally, and the female lays an egg on the land. Some reptiles, like the boa constrictor, give birth to live young.

Birds



If you take a look outside, you are likely to spot members of this group. There are many types of birds, including land birds and shore birds. Depending on the species, birds can be carnivores, omnivores, or herbivores. Some birds, like the osprey, may act as the top predator of the food chain within an ecosystem.

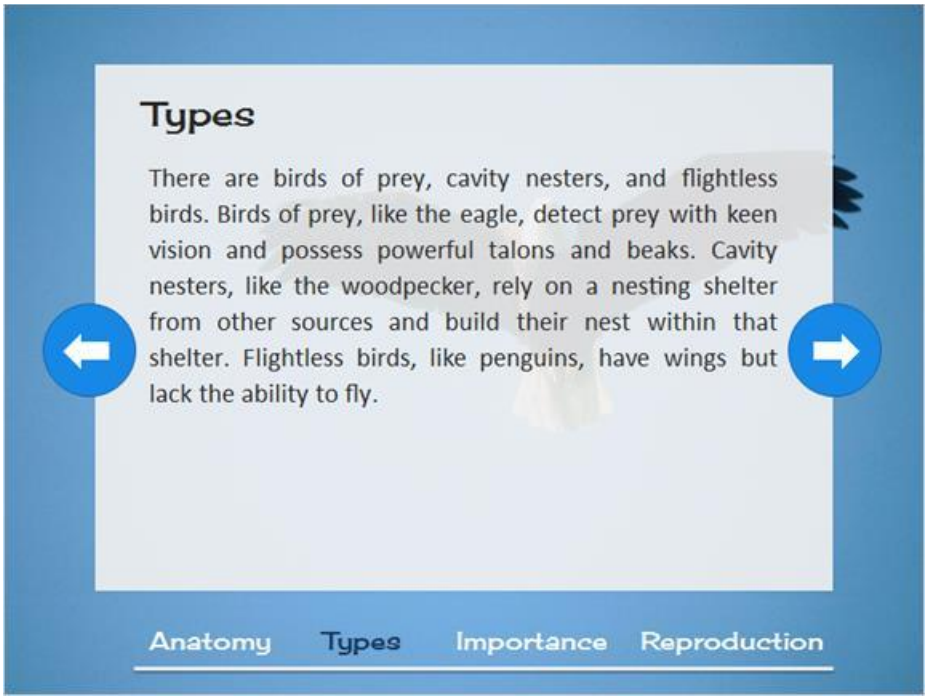
Anatomy



Birds are a very diverse group of vertebrates that have feathers, two legs, and wings. Birds are different from reptiles in that they maintain a constant internal body temperature, as they are endothermic or warm-blooded. This is why you can find birds everywhere in the world.

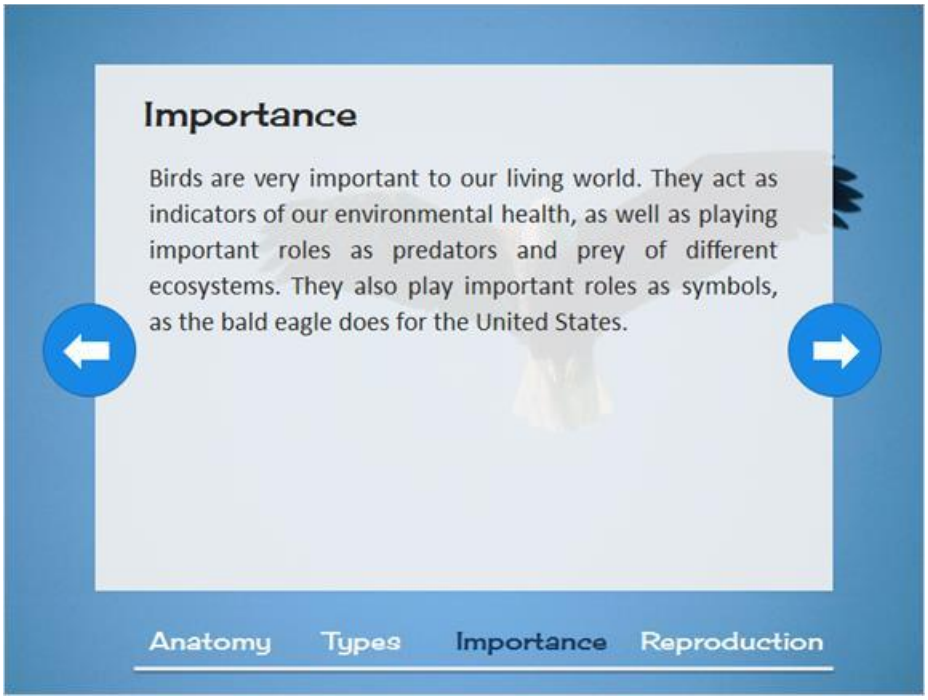
Birds have specialized beaks that are shaped to fit their feeding style. Think of a woodpecker's beak, strong and sturdy for pecking bugs out of the tree. The hummingbird has a delicate, long beak that can reach into the depths of flowers to retrieve their nectar. Birds also have adaptations for a life of flight. Their bones are hollow, requiring less energy to offset the weight. They also have a highly efficient circulatory and respiratory system to get oxygen to their muscles for quick and lasting movement - very important for migrations.

Types



There are birds of prey, cavity nesters, and flightless birds. Birds of prey, like the eagle, detect prey with keen vision and possess powerful talons and beaks. Cavity nesters, like the woodpecker, rely on a nesting shelter from other sources and build their nest within that shelter. Flightless birds, like penguins, have wings but lack the ability to fly.

Importance

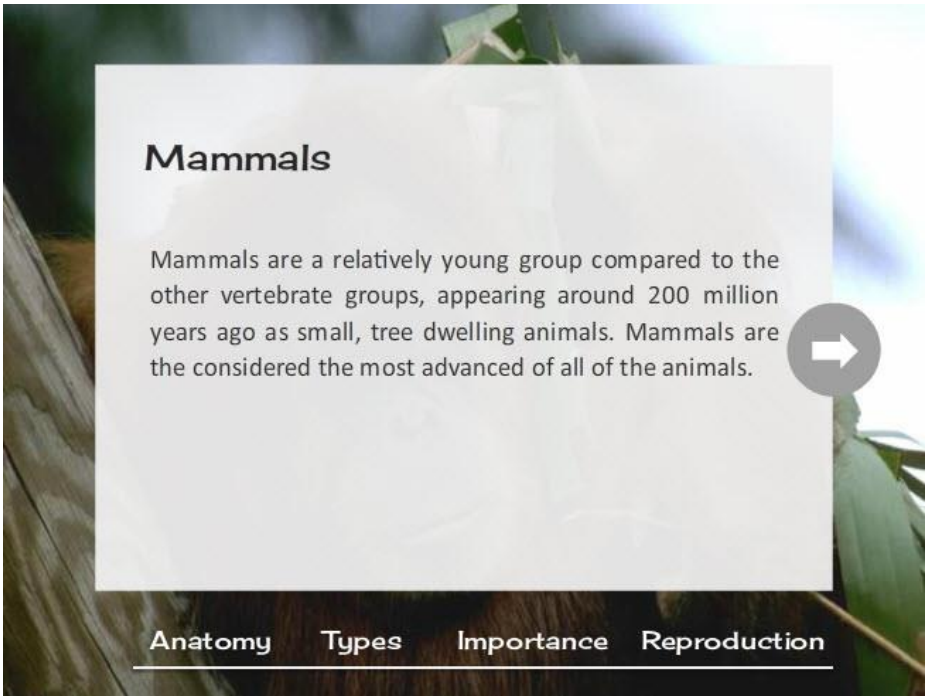


Birds are very important to our living world. They act as indicators of our environmental health, as well as playing important roles as predators and prey of different ecosystems. They also play important roles as symbols, as the bald eagle does for the United States

Reproduction

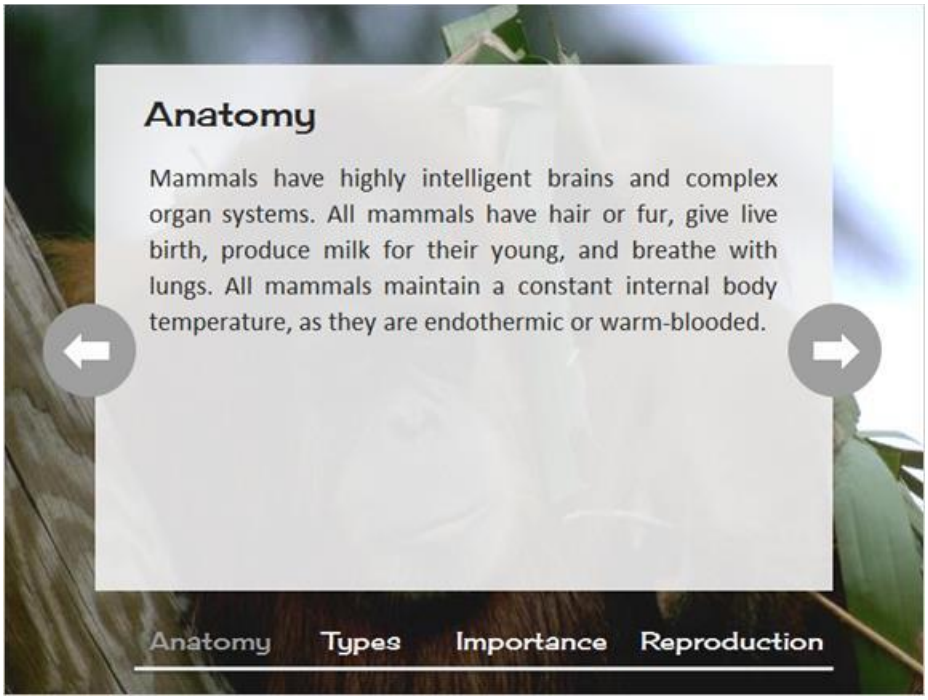
Birds reproduce sexually by internal fertilization. After the egg is fertilized, it is incubated, hatched, and reared.

Mammals



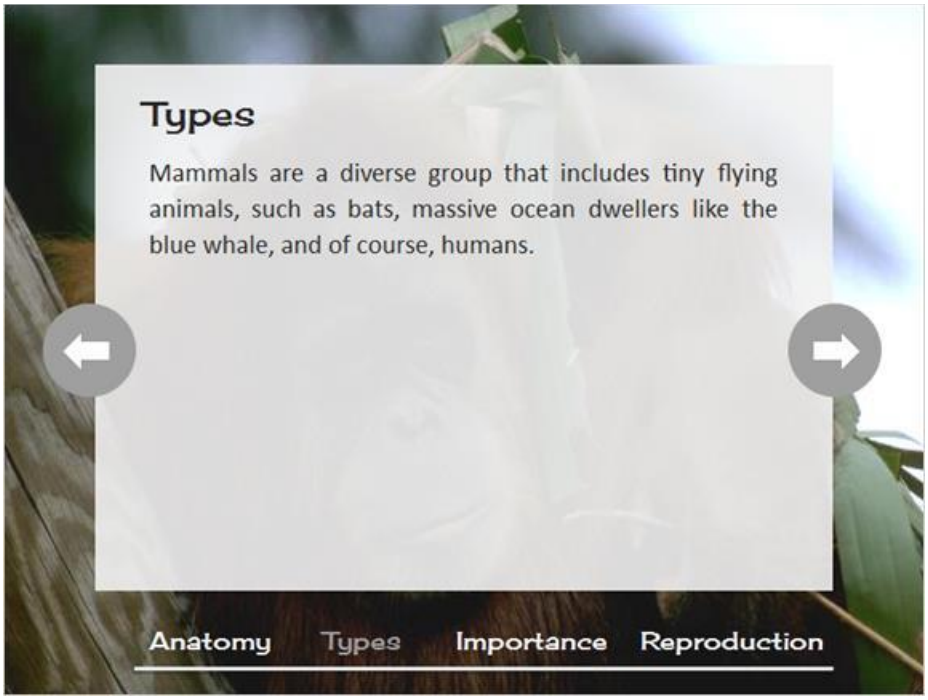
Mammals are a relatively young group compared to the other vertebrate groups, appearing around 200 million years ago as small, tree dwelling animals. Mammals are the considered the most advanced of all of the animals.

Anatomy



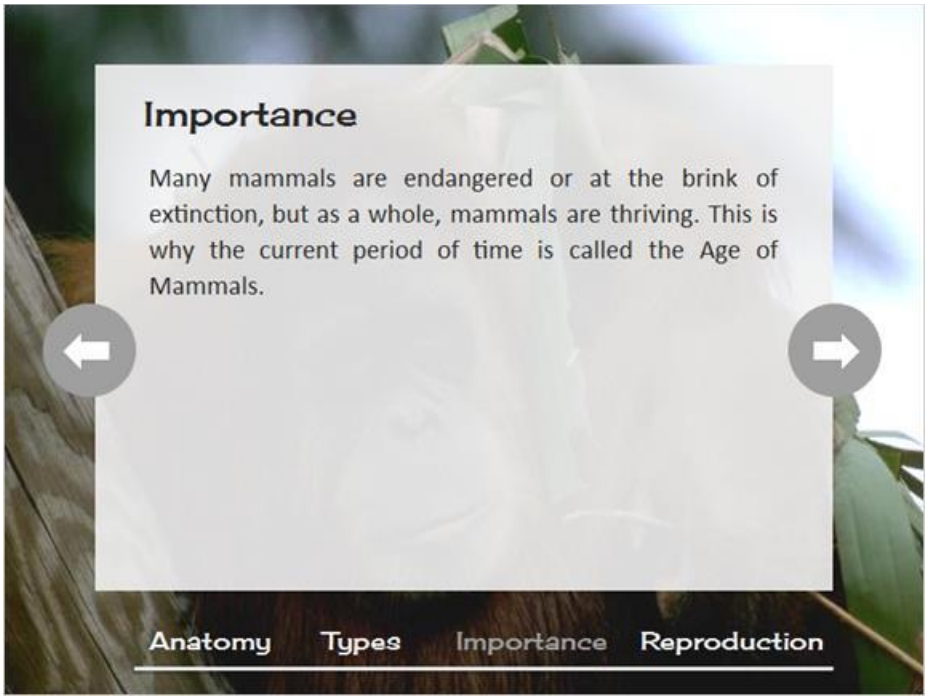
Mammals have highly intelligent brains and complex organ systems. All mammals have hair or fur, give live birth, produce milk for their young, and breathe with lungs. All mammals maintain a constant internal body temperature, as they are endothermic or warm-blooded.

Types



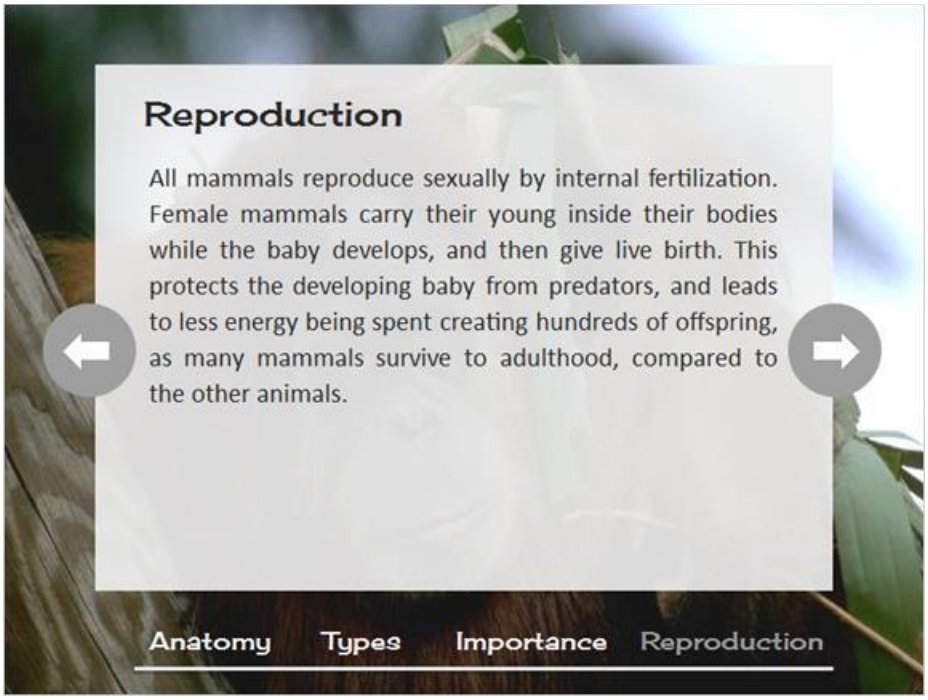
Mammals are a diverse group that includes tiny flying animals, such as bats, massive ocean dwellers like the blue whale, and of course, humans.

Importance



Many mammals are endangered or at the brink of extinction, but as a whole, mammals are thriving. This is why the current period of time is called the Age of Mammals.

Reproduction



All mammals reproduce sexually by internal fertilization. Female mammals carry their young inside their bodies while the baby develops, and then give live birth. This protects the developing baby from predators, and leads to less energy being spent creating hundreds of offspring, as many mammals survive to adulthood, compared to the other animals.