

Chapter 31 Reptiles and Birds**Summary****31-1 Reptiles**

Reptiles are vertebrates that are adapted to live entirely on land. They have dry skin that is covered with protective scales. This helps hold water in their bodies. They have efficient lungs that get oxygen from air. Reptiles also have eggs with a shell and several membranes.

As the climate became drier at the end of the Carboniferous Period, amphibians began dying out. This opened up many new habitats for reptiles. The Mesozoic Era is often called the Age of Reptiles because of the diversity and large numbers of reptiles that lived. Dinosaurs were everywhere. The Age of Reptiles ended with a mass extinction at the end of the Cretaceous Period.

Reptiles are ectotherms. They control their body temperature by their behavior. To warm up, they bask in the sun. To cool down, they move into shade, go for a swim, or move to an underground burrow.

Reptiles eat a wide range of foods. They also have many different ways of eating.

Reptile lungs have more gas-exchange area than amphibian lungs. Reptiles also have muscles around their ribs. They are able to expand their chest to inhale and collapse it to exhale.

Reptiles have a double-loop circulatory system. One loop carries blood to and from the lungs. The other loop carries blood to and from the rest of the body. Most reptiles have a three-chambered heart with a partially separated ventricle. Crocodiles have two atria and two ventricles.

Reptiles get rid of liquid wastes as urine. The urine contains either ammonia or uric acid. Reptiles that live in water excrete ammonia. Reptiles that live on land convert ammonia to uric acid. Uric acid is less toxic and requires less water to dilute it.

The reptilian brain is similar to the amphibian brain. However, the cerebrum and cerebellum are larger. Reptiles have well-developed sense organs.

Reptiles have larger and stronger limbs than amphibians. Their legs are rotated further under the body than those of amphibians. In this position, the legs can carry more body weight.

Reptiles have internal fertilization. Most are oviparous, laying eggs that develop outside the mother's body. The embryos are covered with membranes and a protective shell. This amniotic egg keeps the embryo from drying out. Some snakes and lizards are ovoviviparous, and the young are born alive.

Four groups of reptiles survive today. Lizards and snakes (order Squamata) have legs, clawed toes, external ears, and movable eyelids. Snakes are lizards that have lost their legs during their evolution.

Crocodylians (order Crocodylia) have long, broad snouts and a squat appearance. They are fierce carnivores that live only in tropical climates. Crocodylians include alligators, crocodiles, caimans, and gavials.

Turtles and tortoises (order Testudines) have backbones fused to a shell, which provides protection. Turtles usually live in water. Tortoises usually live on land. Instead of teeth, these reptiles have horny ridges on their jaws.

The tuatara (order Sphenodonta) is found only on a few islands near New Zealand. They look somewhat like lizards, but do not have external ears and have primitive scales. They also have a "third eye," which is part of a sense organ on the top of the brain.

31-2 Birds

Birds are reptilelike animals that have a constant internal body temperature. They have two legs that are covered with scales. Their front legs are modified into wings. Birds are covered with feathers. Feathers help birds fly and keep them warm. Birds have different kinds of feathers.

Paleontologists agree that birds evolved from extinct reptiles. Some think that birds evolved directly from dinosaurs. Others think that birds and dinosaurs evolved from an earlier common ancestor.

Birds have many adaptations that enable them to fly. Birds are endotherms. They produce their own body heat. Their high metabolic rate produces heat. Feathers help conserve this heat.

Birds need to eat large amounts of food to maintain their high metabolic rate. Birds have bills adapted to the type of food they eat. Some birds have digestive organs called a crop and a gizzard. The crop is located at the end of the esophagus. Food is stored and moistened in the crop. The gizzard is part of the stomach. It grinds and crushes food so that it is easier to digest.

Birds have a very efficient respiratory system. A system of air sacs and breathing tubes ensures that air flows into the air sacs and out through the lungs in one direction. The lungs are constantly exposed to oxygen-rich air. This helps birds maintain their high metabolic rate.

Birds have a four-chambered heart and two circulatory loops. A bird's heart has two

separate ventricles. Oxygen-rich blood and oxygen-poor blood are completely separated.

Birds have a similar excretory system to reptiles. Nitrogenous wastes are converted to uric acid and sent to the cloaca. The cloaca reabsorbs most of the water from the wastes before they are expelled.

Birds have a well-developed brain and sense organs. The cerebrum and cerebellum are large in relation to body size. These adaptations enable birds to respond quickly to stimuli and coordinate the movements for flight. Birds have well-developed sight and hearing, but do not sense smells or tastes very well.

The bodies, wings, legs, and feet of birds are adapted to many different habitats and lifestyles. Some of these adaptations, like air spaces in bones, help birds fly. All birds, however, do not fly.

Birds have internal fertilization. They lay amniotic eggs that have a hard shell. Most birds keep their eggs warm until they hatch. One or both parents may care for the offspring.