

Key Words

birds: endothermic vertebrates that have feathers and wings
feathers: modified scales adapted for flight and conserving body heat

KEY IDEAS

Birds are vertebrates that have feathers and wings. They have special characteristics, such as feathers and lightweight bones, that allow them to fly.

The oldest bird fossil ever found is of the *Archaeopteryx* (ahr-kee-AHP-tuhr-ihks). The *Archaeopteryx* had wings and feathers like today's birds. It also had teeth and three clawed fingers on its wings. Birds today do not have teeth. The Hoatzin (hoh-AT-sihn), found in South America, is one of the few birds with claws on its wings. However, the Hoatzin only has claws while it is young. The claws disappear as the bird matures.

Characteristics of Birds. **Birds** (berdz) are endothermic vertebrates that have feathers and wings. The most obvious characteristic of birds is that they can fly. Insects can fly, but they are not vertebrates. Bats are vertebrates that can fly, but they do not have feathers. Feathers are the characteristic that makes birds different from all other vertebrates. **Feathers** (FEHTH-uhrz) are modified scales adapted for flight and for conserving body heat.

Many characteristics of birds are also adaptations for flight. They have hollow, lightweight bones that are filled with air. Birds have air sacs throughout their bodies that help them breathe more easily during flight. Their front limbs are modified into wings.

Another characteristic of birds are hind legs that can be used for perching, jumping, and swimming. Birds also have hard beaks rather than teeth.



1. What adaptations do birds have for flight?



2. What are feathers?

Like reptiles, birds reproduce by internal fertilization and have an amniotic egg. However, the amniotic egg of a bird has a hard shell. Unlike reptiles

and amphibians, birds have a heart with four chambers and are endothermic. Recall that endotherms have a constant internal body temperature.

Types of Feathers. Birds have different kinds of feathers that perform different functions. Soft, fluffy feathers, called down, help keep the bird warm and maintain its body temperature. Streamlined feathers, called contour feathers, form a smooth surface to ease the bird's movement through the air. They also help keep the bird warm. Special contour feathers on the wings and tail help the bird fly. Fig. 37-1 shows these two different types of feathers.

Skeleton. A bird's skeleton has many adaptations for flight, as you can see in Fig. 37-2. The bones are lightweight and filled with air. The most noticeable difference between birds and other vertebrates is the shape of their breast bone. You may have noticed this bone while eating chicken or turkey. The muscles used for flapping are attached to this large bone.

Classification of Birds. Birds are classified into 27 groups according to their physical characteristics. These characteristics include beaks, feet, and feathers. Scientists have also classified birds according to their behavior and song. One group of birds is water birds. These birds have feet like paddles for swimming or long legs for wading. Water birds include ducks, sandpipers, and gulls. Another group of birds cannot fly. Flightless birds include penguins and ostriches.

Fig. 37-1

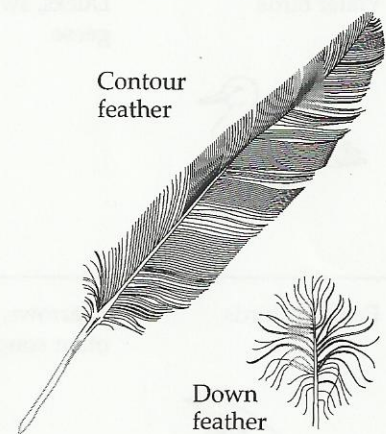


Fig. 37-2

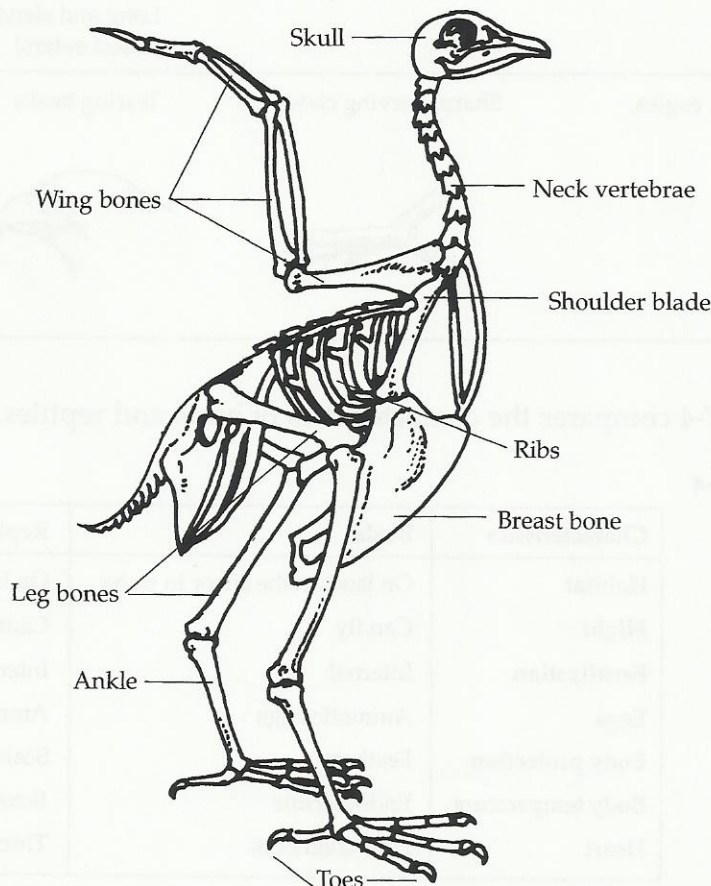


Fig. 37-3 shows the characteristics of four common groups of birds.

Fig. 37-3




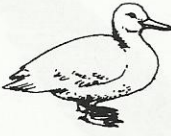
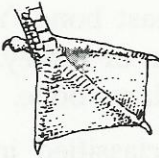
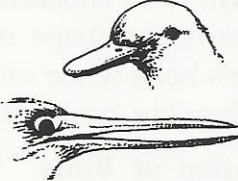

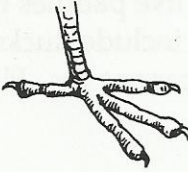



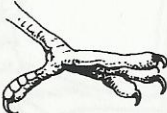

Type	Examples	Type of feet	Types of beaks
Flightless birds 	Penguins, rheas, ostriches	Adapted for running 	(Beaks vary) 
Water birds 	Ducks, swans, geese	Webbed 	Broad and flat for filtering  Long and pointed for fishing
Perching birds 	Sparrows, robins, other songbirds	Toes cling to branches 	Short, thick, strong (seed eaters)  Long and slender for probing (insect eaters) 
Birds of prey 	Hawks, eagles, owls	Sharp, curving claws 	Tearing beaks 

Fig. 37-4 compares the characteristics of birds and reptiles.

Fig. 37-4

**TAKE
ANOTHER
LOOK**

Characteristics	Birds	Reptiles
Habitat	On land, in the air, or in water	On land or in water
Flight	Can fly	Cannot fly
Fertilization	Internal	Internal
Eggs	Amniotic eggs	Amniotic eggs
Body protection	Feathers	Scales
Body temperature	Endothermic	Ectothermic
Heart	Four chambers	Three chambers

Check Your Understanding

Write a sentence explaining the connection between each pair of words.

3. bird, endothermic _____

4. bird, feathers _____

Complete the following paragraph by filling in the blanks.

Birds are endothermic vertebrates that have (5) _____ and (6) _____. Endothermic means having a (7) _____ internal body temperature. Birds are like reptiles in that they have (8) _____ fertilization and (9) _____ eggs. They are different from reptiles because birds have a (10) _____-chambered heart and they are (11) _____. Birds have special characteristics that allow them to fly. These traits include (12) _____, (13) _____, and (14) _____ bones.

15. What are two functions of feathers? _____

16. Name four common groups of birds. Give an example of each.

17. In what two ways are birds different from most other vertebrates?

