

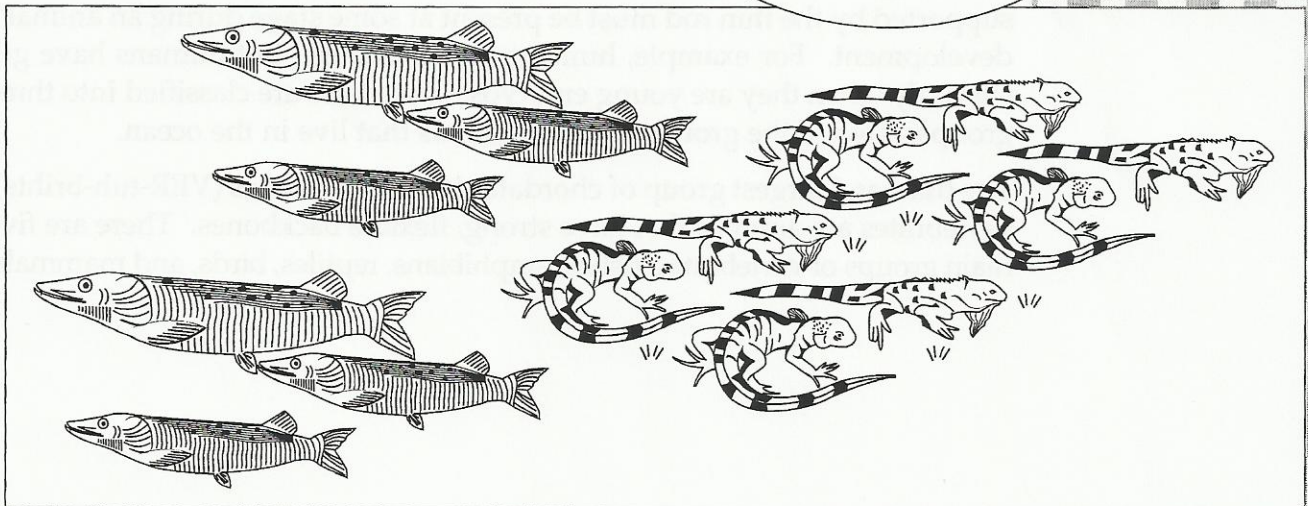
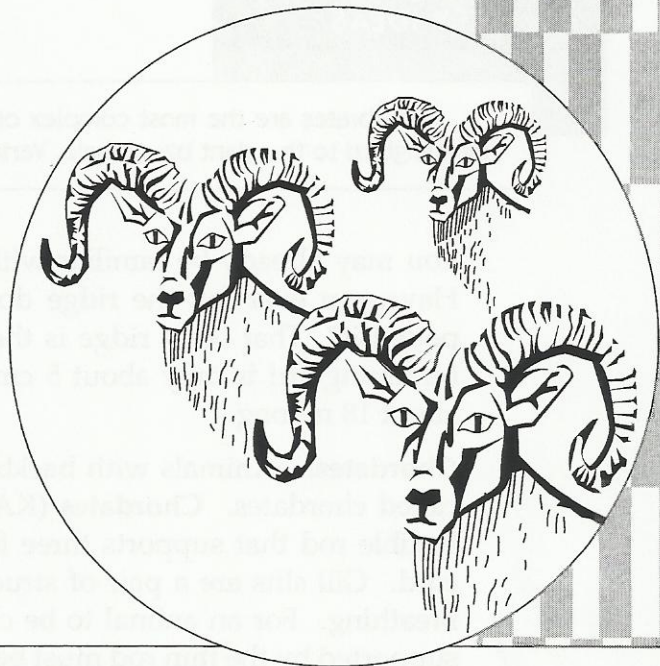
Vertebrates

UNIT

7

Imagine a group of animals that live on land, in water, and move through the air. Animals in this group have bodies covered with scales, hair, feathers, and mucus. These animals live almost everywhere. They live in hot dry deserts, in tropical forests and jungles, on snow-capped mountains, in grassy fields, and in rivers and oceans. Some of these animals swim, others fly, and many run or walk on either two or four legs. An important trait of some of these animals is that they can live on land. They have adapted from life in the water by having different ways to breathe, reproduce, and move.

What are all of these animals? The animals in this very large group are called vertebrates. Unlike invertebrates, vertebrates have a backbone. In this unit, you will learn more about the traits of vertebrates.



Vertebrate Characteristics

Key Words

- chordates:** animals that have a thin, flexible rod that supports three features: the body, gill slits, and a nerve cord. The three features are present either throughout the animal's life or at some stage of its development.
- vertebrates:** animals with a strong, flexible backbone
- endoskeleton:** skeleton inside the body that provides support and protection
- vertebrae:** bones that make up the backbone

KEY IDEAS

Vertebrates are the most complex of all animals. They range in size from the tiny hummingbird to the giant blue whale. Vertebrates all have strong, flexible backbones.

You may already be familiar with the main characteristic of a vertebrate. Have you ever felt the ridge down the back of a dog or cat when you petted it? That bony ridge is the animal's backbone. The backbone of a hummingbird is only about 5 cm long. The backbone of a blue whale is about 18 m long.

Chordates. Animals with backbones belong to a large group of animals called chordates. **Chordates** (KAWR-dayts) are animals that have a thin, flexible rod that supports three features: the body, gill slits, and a nerve cord. Gill slits are a pair of structures behind the mouth that function in breathing. For an animal to be classified as a chordate, the three features supported by the thin rod must be present at some stage during an animal's development. For example, humans are chordates. But humans have gill slits only when they are young embryos. Chordates are classified into three groups. Two of the groups contain animals that live in the ocean.

The third and largest group of chordates is the **vertebrates** (VER-tuh-brihts). Vertebrates are animals that have strong, flexible backbones. There are five main groups of vertebrates: fishes, amphibians, reptiles, birds, and mammals.

Characteristics of Vertebrates. Vertebrates share several common characteristics which make them more complex than invertebrates. Vertebrates all have strong, flexible backbones and a complex body plan. Most vertebrates have two pairs of limbs such as arms, legs, wings, or fins. Most also have eyes, ears, a nose, and a mouth located on the head. All vertebrates have a large central body cavity containing a number of vital organs, such as the heart, lungs, and liver. Vertebrates also have an endoskeleton. An **endoskeleton** (ehn-doh-SKEHL-uh-tuhn) is a skeleton inside the body that provides support and protection. The brain of a vertebrate is complex and covered by the bones of the skull.

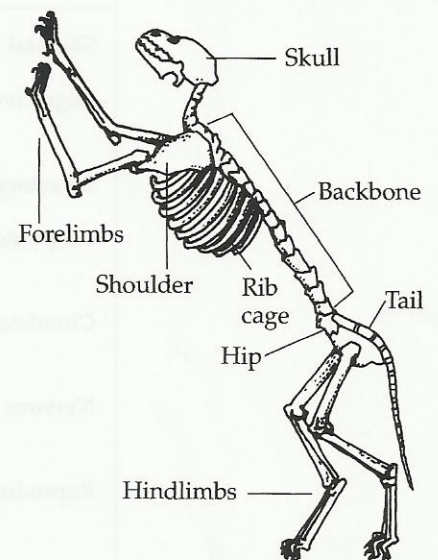
- ✓ 1. What are the five main groups of vertebrates?

Vertebrate Endoskeleton. The main feature of the endoskeleton is the backbone. The backbone is the characteristic that separates vertebrates from all other animals. The backbone is made up of small bones stacked on top of one another. These bones are called **vertebrae** (VER-tuh-bray). The backbone protects and supports the main nerve of a vertebrate called the spinal cord.

The other main parts of a vertebrate's skeleton are the skull, the rib cage, and two areas called girdles, where the limbs are attached. One girdle is located at the shoulders, where the arms, or forelimbs, are attached. The other is located at the hips, where the legs, or hindlimbs, are attached. Fig. 32-1 shows the main parts of a cat's skeleton.

- ✓ 2. What characteristic distinguishes a vertebrate from all other animals? _____

Fig. 32-1



Vertebrate Organ Systems. All vertebrates have highly organized and specialized organ systems. The endoskeleton makes up the skeletal system. Other systems are the nervous system, a closed circulatory system, the digestive system, the respiratory system, the excretory system, and the reproductive system. Fig. 32-2 shows the organ systems of a cat. The cat represents a typical vertebrate.

Fig. 32-2

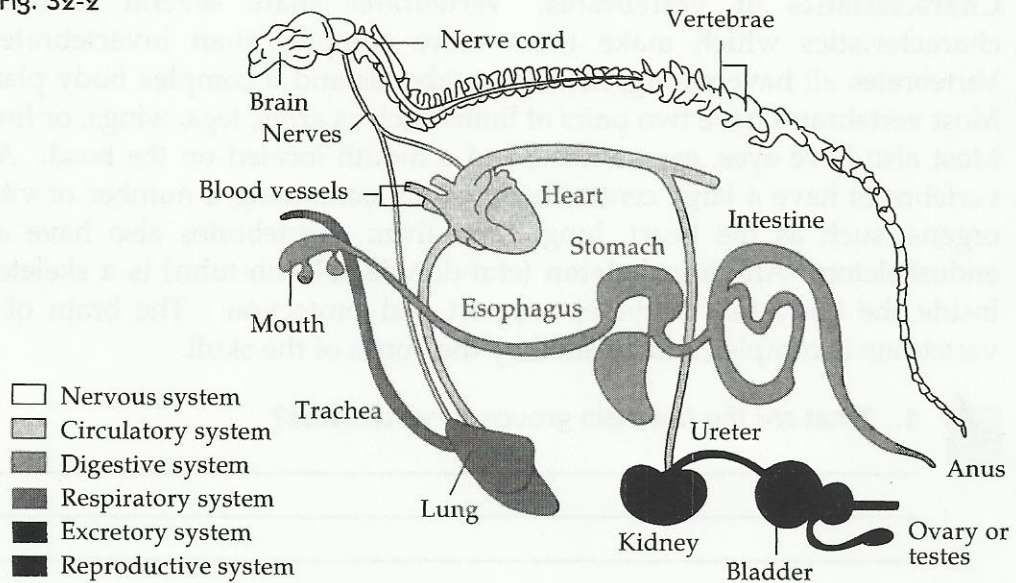


Fig. 32-3 shows the functions of the seven main organ systems of a vertebrate.

Fig. 32-3

Vertebrate Organ System		
System	Main Parts	Function
Skeletal	Bones, cartilage	Offers support and protection
Digestive	Mouth, stomach, intestines	Prepares food for use, removes undigested food
Excretory	Kidneys, bladder	Removes liquid wastes
Respiratory	Gills or lungs	Allows gas exchange between animal and its environment
Circulatory	Heart, blood vessels	Carries blood from heart to rest of body
Nervous	Brain, spinal cord, nerves	Controls and coordinates body functions
Reproductive	Male and female reproductive organs	Produces sperm and eggs for fertilization

**TAKE
ANOTHER
LOOK**



Check Your Understanding

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

3. chordate, vertebrate _____

4. vertebrate, vertebrae _____

Fill in the blanks in the following paragraph.

Animals with backbones are called (5) _____. They belong to a larger group of animals called (6) _____. These animals have an internal skeleton called a(n) (7) _____. Animals with backbones are divided into five main groups. They are (8) _____, (9) _____, (10) _____, (11) _____, and (12) _____.

13. List the seven main organ systems of a vertebrate.

14. Why are vertebrates considered complex animals?



What
Do You
Know?