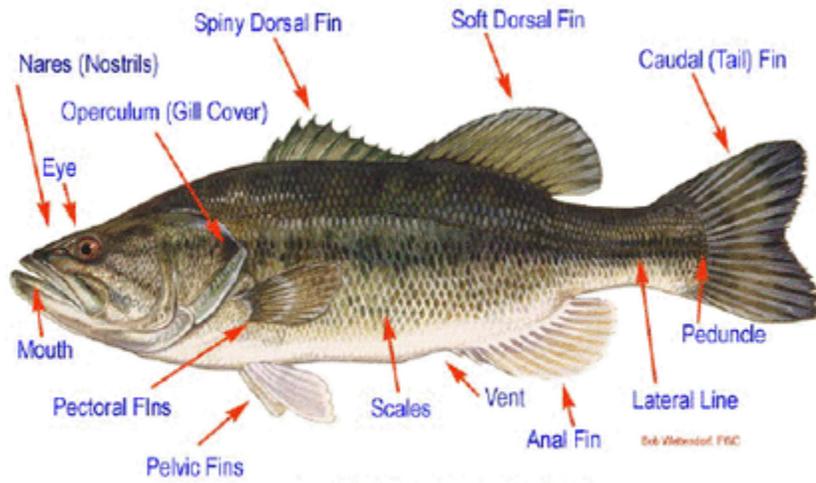
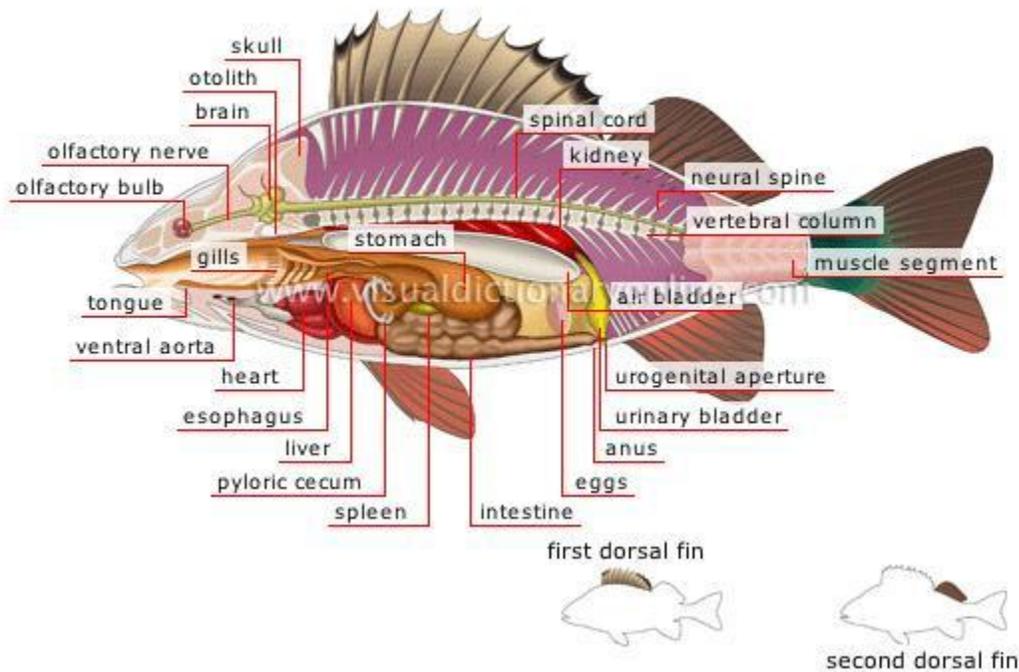


# Module #13: Phylum Chordata



EXTERNAL ANATOMY



## **Backbones and Notochords**

Members of phylum Chordata have either a backbone or a notochord. The sea squirt is a member of subphylum Urochordata, and it has a notochord only in its larval stage. As an adult, it is supported by a leathery tunic. The lancelet is a member of subphylum Cephalochordata, and it has a notochord throughout its life. Animals with backbones are members of subphylum Vertebrata.

There are three types of bone cells: osteoblasts, osteocytes, and osteoclasts. The bones they comprise are made of fibers of a protein called collagen that have been hardened by calcium-containing salts. Bone tissue comes in two types: compact bone tissue (composed of tightly-packed fibers) and spongy bone tissue (composed of loosely-packed fibers) these tissues are surrounded by a membrane called the periosteum that contains blood vessels and nerves. In the very center of the bone is a cavity that holds bone marrow, which produces blood cells.

## **Circulatory system & brain structure**

The vertebrate circulatory system is closed, and it is composed of veins (that carry blood towards the heart), arteries (that carry blood away from the heart), and capillaries (that allow gases to be exchanged with the tissues). Oxygen is carried by red blood cells that get their color from hemoglobin.

Most vertebrate brains have five sets of lobes: olfactory lobes (for smell), cerebrum lobes (for integrating sensory information and making responses), optic lobes (for sight), cerebellum (for involuntary actions and refining muscle movement), and the medulla oblongata (for vital functions). Signals are sent down the medulla oblongata and into the spinal cord.

## **Vertebrate Reproduction**

Vertebrate reproduction can occur by internal or external fertilization, and the embryo's development can be oviparous (in an egg outside the female's body), ovoviviparous (in an egg inside the female's body), or viviparous (inside the female, connected to her by a placenta).

Lamprey eels are in class Agnatha, members of which are commonly called the jawless fish.

They are anadromous, which means they hatch in fresh water, migrate to salt water as adults, then go back to fresh water in order to reproduce.

Sharks, rays and skates belong to class Chondrichthyes. They have cartilaginous endoskeletons, which are more flexible than human endoskeletons. Sharks hunt using many senses, including a lateral line that detects vibrations, and a keen electrical field sensor that detects minute amounts of electricity.

Members of class Osteichthyes are typically called "bony fish", since most or all of their skeletons are hardened with calcium. A member of this class gets its sense of taste from taste buds on its tongue. Food passes through a pharynx (throat) and into the esophagus, which leads to the stomach. There, the food is broken down and stored. It is then sent to the intestine, where it is digested. Any undigested remains leave the fish through the anus. The fish has a liver that produces bile, which is concentrated in the gall bladder and helps digest fats. The air bladder helps it control its depth in the water.

## **Bony Fish**

Bony fish have a two-chambered heart composed of an atrium and a ventricle. Blood from the tissues enters the atrium and is then transferred to the ventricle, which pushes it out. It then passes over the gills to get oxygen and release carbon dioxide. It then goes to the tissues. While it passes through the body, it gets cleaned in organs called kidneys.

All of the organisms in this module are ectothermic, which means they are "cold-blooded".

## **Perch Dissection**

## **Amphibians**

Have these six characteristics in common: endoskeleton made mostly of bone  
smooth skin with many capillaries and pigments (no scales)  
two pairs of limbs with webbed feet  
as many as four organs for respiration,  
three-chambered heart,  
and oviparous with external fertilization

In its larval stage, an amphibian breathes with gills. As an adult, it breathes with lungs, its skin, and the lining of its mouth. It deals with cold weather by hibernating.

## Bullfrog dissection

