



## Ichthyology

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### The study of fish

Ichthyology is the study of fish. Fish can be separated into four classes. The superclass Agnatha includes the very primitive jawless fish - the lampreys (class Cephalospidomorpha) and the hagfish (class Myxini). The other two classes are the Chondrichthyes (cartilaginous fish like sharks) and the Osteichthyes (bony fish).



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## Agnatha

The Agnathans are considered extremely primitive and there are very few species still in existence. As noted above, they lack jaws. Instead, they have a circular mouth of sharp teeth that can be used to bite or even burrow into prey.

Many of them are parasitic. Most have no true bone, only cartilage. They generally lack the paired fins associated with other fish species. Extinct species had bony scales and plates but the existing species do not.

## Chondrichthyes

This class contains the skates, rays, and sharks. They have cartilage but no true bone. Their

teeth and sometimes vertebrae are calcified but are not the same as true bone.

This class of animals is quite old, up to 450 million years with some species changing very little over that time.

These fish lack a swim bladder or lung. This means that they must stay in constant motion to avoid sinking. Motion is also required to move water over their gills for respiration.

They have five to seven pairs of gills with separate, exposed gill slits but no operculum. Like bony fish, they do have paired fins and jaws.

## Sharks

Sharks are scavengers eating anything from garbage and waste to other animals.

They range in size from the minute cookie cutter shark (19 inches in length) to the whale shark which is the biggest of all fish at 49 feet or more. It has been estimated that they may reach as much as 68 feet in length.

There are over four hundred species of shark.

One of the most fascinating things about sharks is their use of electroreception. They have special sensors that allow them to detect the electric current created by the motion of other fish. They use this to help them detect prey and to make up for their weak vision abilities.

## Osteichthyes

The bony fish <sup>[1]</sup> are the biggest group of vertebrates <sup>[2]</sup> with over 20,000 species. In fact, there are more bony fish than all other types of vertebrates combined.

Unlike the sharks, bony fish have excellent vision. They also have a swim bladder which allows them to remain buoyant in the water.

They are also able to breathe without being in motion due to the presence of the operculum which covers the gills. It can be moved to create motion over the gills without the fish having to swim.

All bony fish have jaws and most of them have many teeth, although some are toothless. The body in most species is covered in dermal scales. The fins of bony fish can be lobed or ray-finned.

There is only one species of lobe-finned fish still in existence, the coelacanth. The rest are ray-finned. This means that the fins have thin, skeletal rays of bone in the fins.

Ichthyology offers many fields of study. World fisheries have been overfished and the balance within the environment is being changed dramatically.

For those interested in practical applications, there are many interesting opportunities in non-traditional fields as well as ethology, diversity, and ecological studies.

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## Links

[1] <http://video.nationalgeographic.com/video/animals/fish-animals/bony-fish/>

[2] <https://explorable.com/vertebrates>