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Fish of the Ocean

Approximately 71% of the surface of the earth is covered by ocean waters which makes salt water the largest habitat on earth. There are over a million and a half species of living plants and animals on earth and about 30,000 of these species are classified as fish. Fish are subdivided by the composition of their skeleton: cartilage or bone. Sharks and rays are primary examples of fish with cartilaginous skeletons. Fish with a skeleton composed of bone are simply called bony fish and are vertebrates, members of the scientific superclass Osteichthyes. Ichthyology is the study of fish of all kinds and researchers discover about 250 new species of fish each year as they explore the vast breadth and depth of the ocean.

A particular species of bony fish is adapted to inhabit a freshwater or saltwater environment and only a few species are able to survive in both freshwater and saltwater. Most species of salmon are born in freshwater, migrate to the Atlantic or Pacific Ocean for their adult life and return to their freshwater birthplace to reproduce and die.

Outer Characteristics

Bony fish have a characteristic body shape that is cylindrical and tapers at the head and tail. This body shape is called fusiform and creates less drag while swimming than other configurations. All bony fish have fins that are used to propel them through the water or to keep them stable. A pectoral fin is located on the each side of the fish; these fins are roughly the equivalent of forelimbs or arms on mammals. In general pectoral fins are used to help a swimming fish turn. Similarly, pelvic fins are the equivalent of hind limbs. Pelvic fins are used for stability and in some species for slowing the fish's speed. The dorsal fin is located on the top of the fish and serves as a stabilizer. Some species have more than one dorsal fin. The tail of the fish is called the caudal fin; the caudal fin is the primary means of propulsion (swimming) through the water. Some species of fish also have an anal fin located near the anus. With thousands of species of fish there are numerous configurations of fins as well as specialized adaptations for these fins, including absence.

The head of a fish is an integral part of the body; fish do not have a neck. The position of the eyes of fish is adapted to their environment, feeding habits and predators. Similar adaptations exist for mouth design. For example, fish that feed

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on the surface have a mouth that turns upward while fish that feed on swimming creatures have a mouth that opens directly forward. Bottom feeders may have a mouth pointed downward or one that resembles a suction device.

Instead of skin, most fish are covered with tiny plates called scales. There are four different types of scales but most fish have either cycloid (smooth and circular) or ctenoid (toothed edge) scales which have an outer layer of calcium. Fishes that swim slowly may have spines as defensive protection. Most fish secrete a mucus covering for their skin which protects them from infection; this mucus is why fish are often called slimy.

Anatomy

The respiratory system of fish is adapted to life under water. Breathing is accomplished using a system of gills instead of lungs like terrestrial creatures. Gills are located towards the front of the fish just past the head. Water enters a fish's mouth and exits through the gills. Meanwhile blood flowing through the gills absorbs oxygen from the water. Remember that a water molecule is made up of two atoms of hydrogen and one atom of oxygen. Some species of fish are also capable of absorbing oxygen through their skin.

Many species of fish possess an internal organ known as a swim bladder. This organ is located inside the body cavity and is a flexible sac or bladder that holds natural gases that a fish produces. The swim bladder adds buoyancy to the fish and allows it to utilize the principles of physics to maintain its preferred depth without expending any energy.

Fish in the ocean must contend with existence in a salty environment. Just like humans, fish must maintain a constant mix of chemicals in their body and bloodstream. Osmoregulation is the name given to the control of the levels of water and mineral salts in the blood for living creatures. Fish in the ocean are less salty than the ocean itself so natural osmosis results in water leaving the fish through its skin. Freshwater fish are saltier than their surroundings so water naturally enters their bodies through the skin and gills. Since ocean fish lose water, they must drink water by swallowing it. Since they are ingesting salt water, they excrete the excess salt through their gills and some in their urine.

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Circle True or False after analyzing each of the following statements.

1. True False There are over a million and a half species of living plants and animals on earth and about 30,000 of these species are classified as fish.
2. True False Sharks and salmon are examples of fish with cartilaginous skeletons.
3. True False Researchers discover about 250 new species of fish each year.
4. True False Only a few species of fish are able to survive in both freshwater and saltwater.
5. True False Fish have a body shape that is called fusiform and creates less drag while swimming than other configurations.
6. True False A caudal fin is located on the each side of the fish; these fins are roughly the equivalent of forelimbs or arms on mammals.
7. True False The position of the eyes of a fish is adapted to their environment, feeding habits and predators.
8. True False Most fish have either cycloid (toothed edge) or ctenoid (smooth and circular) scales.
9. True False Osmosis is the name given to the control of the levels of water and mineral salts in the blood for living creatures.
10. True False Fish in the ocean are less salty than the ocean itself so natural physical processes result in water leaving the fish through its skin.

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Answers

1. True
2. False
3. True
4. True
5. True
6. False
7. True
8. False
9. False
10. True