

# MARINATING YOUR FISH VOCABULARY

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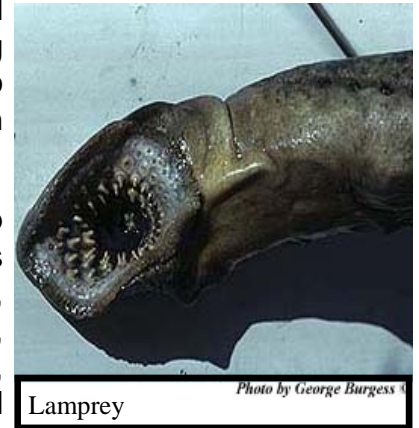
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Vertebrates are animals with a backbone and include mammals, birds and fishes. Considering roughly three quarters of the earth is covered in water it should be no surprise that fish are the most numerous vertebrates in the world. According to the Florida Museum of Natural History there are about 28,000 known fish in the world, although thousands more likely have yet to be discovered. One might think since 97% of the earth's water is saltwater that an equal percentage of fish would be found in saltwater environments. However in reality only 58% of all fish are saltwater fishes, 41 % are found in freshwater and 1% can live in either salt or freshwater. This makes a lot of sense if you think about how all of the freshwater lakes, rivers and streams are really like a bunch of isolated islands, thus fish that may have started out as one species, likely evolved over time into distinctly different species. If we go back to the 58% that live solely in saltwater and look at where they live, the majority (45% of 58%) live in the nearshore areas, in less than 200 meters depth (roughly 600 feet). This is because sunlight can penetrate those waters so there is more primary production (algae), more oxygen, more food and therefore more biodiversity. Most fish are cold blooded (also known as poikilothermic or ectothermic) meaning their internal temperature is the same as the external temperature.

All living fish are divided into three major groups. The first group, Agnatha, is the most primitive and includes hagfish and lampreys. Agnatha are known as jawless fish. They are essentially an eel looking fish with a suctioned mouth for a head. Hagfish and lampreys are slimy and lack scales. Most are temperate species where they are parasitic to other fishes. Fossil records indicate that this group of fishes is at least 500

million years old although the living Agnatha date to about 350 million years ago.

The second group of fish, known as Chondrichthyes, includes sharks, rays, skates, ratfishes and chimaeras. Sharks,



Lamprey

Photo by George Burgess

rays and skates comprise a group of Chondrichthyes known as elasmobranchs. Chondrichthyes means "cartilaginous fishes". The skeletons of sharks and other Chondrichthyans are made of cartilage instead of bone. Chondrichthyes are the earliest known jawed fish. Like the rest of its skeletal structure, their upper and lower jaw is made of cartilage and contains a continuous supply of teeth. Unlike most boney fishes that mass spawn, sharks and rays reproduce through internal fertilization. Many sharks and rays give live birth. In some cases the eggs are held internally but receive no nourishment from the parent (ovoviviparous). Others receive nourishment from the mother (viviparous). Skates more frequently lay egg cases (oviparous) after internal fertilization. The egg cases are



Mermaid's Purse

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commonly called "Mermaid's purses". The males of sharks and rays have modified pelvic fins

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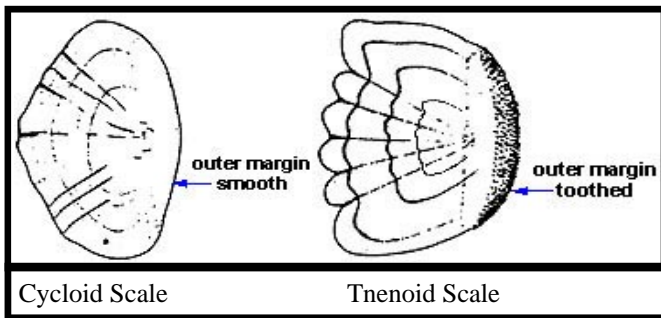
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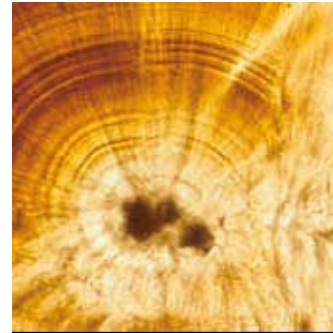
called claspers to hold onto the female during mating. Sharks and rays have placoid scales (also called dermal denticles). The denticles are like teeth that are pointed to the rear. This makes a shark feel like sandpaper if you rub it from back to front. Fossil records indicate sharks date back 400 million years which makes them older than dinosaurs. Rays and skates are about 150 million years old.

The last group of fish is the Osteichthyes or bony fish. This group includes the primitive (lobe finned) lungfishes as well as (ray finned) gars, sturgeon and the largest group teleosts or modern fishes. This last group, modern fishes comprises well over 25,000 species. Bony fishes as its name implies have a skeleton comprised of bone. Most bony fishes have (cycloid=smooth or ctenoid=feathery) scales,



some have armor plates (ganoid scales) and some, like the catfish have no scales and are considered naked. Most bony fish have two sets of paired fins in addition to three unpaired fins to aid in locomotion. They also have a swim bladder which they can inflate and deflate allowing them to move up and down in the water column. The swim bladder is also used to detect movement as are ear stones (otoliths) and the lateral line. Because fish are comprised of water, their density is the same as their surrounding environment, with the exception of the gas filled swim bladder and solid otolith.

Otoliths are made up of calcium carbonate (same as coral). Fish lay down rings of calcium carbonate as they grow just like a tree develops rings. Scientists age fish by slicing the otoliths and counting the rings.



Otolith—NOAA Photo

Source: Ichthyology: At the Florida Museum of Natural History

<http://www.flmnh.ufl.edu/fish/Education/education.htm>



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