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Keep up with the latest daily buzz with the BuzzFeed Daily newsletter! Most of us would take to the seas a bit easier without any hammerheads, blacktips or bull sharks patrolling the waters below. The truth is, however, sharks help maintain a balanced ecosystem. By Chris Opfer It's scary enough to imagine a shark's toothy jaw snapping at your half-submerged body in the ocean. But the actual impact of its massive mouth clamping down? Surprisingly wimpy. By Josh Clark If your ears picked up on a 40-hertz signal, you might wonder what the annoying sound was all about. But if you're a shark and you hear this "yummy hum," it might mean it's dinner time. By Josh Clark Scuba divers, leave your bling at home. Don't wear yellow when you swim in the ocean. We hear all sorts of advice designed to keep sharks at bay. But is it legit? By Josh Clark If you went back in time and looked at the first, unremarkable prehistoric sharks of the Ordovician period you might never guess that their descendants would become such dominant creatures, holding their own against vicious marine reptiles like pliosaurs and mosasaurs and going on to become the "apex predators" of the world's oceans. Today, few creatures in the world inspire as much fear as the Great White Shark, the closest nature has come to a pure killing machine--if you exclude Megalodon, which was 10 times bigger. Before discussing shark evolution, though, it's important to define what we mean by "shark." Technically, sharks are a suborder of fish whose skeletons are made out of cartilage rather than bone; sharks are also distinguished by their streamlined, hydrodynamic shapes, sharp teeth, and sandpaper-like skin. Frustratingly for paleontologists, skeletons made of cartilage don't persist in the fossil record nearly as well as skeletons made of bone, which is why so many prehistoric sharks are known primarily (if not exclusively) by their fossilized teeth. We don't have much in the way of direct evidence, except for a handful of fossilized scales, but the first sharks are believed to have evolved during the Ordovician period, about 420 million years ago (to put this into perspective, the first tetrapods didn't crawl up out of the sea until 400 million years ago). The most important genus that has left significant fossil evidence is the difficult-to-pronounce Cladoselache, numerous specimens of which have been found in the American midwest. As you might expect in such an early shark, Cladoselache was fairly small, and it had some odd, non-shark-like characteristics, such as a paucity of scales (except for small areas around its mouth and eyes) and a complete lack of "claspers," the sexual organ by which male sharks attach themselves (and transfer sperm to) the females. After Cladoselache, the most important prehistoric sharks of ancient times were Stethacanthus, Orthacanthus, and Xenacanthus. Stethacanthus measured only six feet from snout to tail but already boasted the full array of shark features: scales, sharp teeth, a distinctive fin structure, and a sleek, hydrodynamic build. What set this genus apart were the bizarre, ironing-board-like structures atop the backs of males, which were probably somehow used during mating. The equally ancient Stethacanthus and Orthacanthus were both fresh-water sharks, distinguished by their small size, eel-like bodies, and odd spikes protruding from the tops of their heads. Considering how common they were during the preceding geologic periods, sharks kept a relatively low profile during most of the Mesozoic Era, because of intense competition from marine reptiles like ichthyosaurs and plesiosaurs. By far the most successful genus was Hybodus, which was built for survival: this prehistoric shark had two types of teeth, sharp ones for eating fish and flat ones for grinding mollusks, as well as a sharp blade jutting out of its dorsal fin to keep other predators at bay. The cartilaginous skeleton of Hybodus was unusually tough and calcified, explaining this shark's persistence both in the fossil record and in the world's oceans, which it prowled from the Triassic to the early Cretaceous periods. Prehistoric sharks really came into their own during the middle Cretaceous period, about 100 million years ago. Both Cretoxyrhina (about 25 feet long) and Squalicorax (about 15 feet long) would be recognizable as "true" sharks by a modern observer; in fact, there's direct tooth-mark evidence that Squalicorax preyed on dinosaurs that blundered into its habitat. Perhaps the most surprising shark from the

Cretaceous period is the recently discovered Ptychodus, a 30-foot-long monster whose numerous, flat teeth were adapted to grinding up tiny mollusks, rather than large fish or aquatic reptiles. After the dinosaurs (and their aquatic cousins) went extinct 65 million years ago, prehistoric sharks were free to complete their slow evolution into the remorseless killing machines we know today. Frustratingly, the fossil evidence for the sharks of the Miocene epoch (for example) consists almost exclusively of teeth--thousands and thousands of teeth, so many that you can buy yourself one on the open market for a fairly modest price. The Great White-sized Otodus, for example, is known almost exclusively by its teeth, from which paleontologists have reconstructed this fearsome, 30-foot-long shark. By far the most famous prehistoric shark of the Cenozoic Era was Megalodon, adult specimens of which measured 70 feet from head to tail and weighed as much as 50 tons. Megalodon was a true apex predator of the worlds' oceans, feasting on everything from whales, dolphins, and seals to giant fish and (presumably) equally giant squids; for a few million years, it may even have preyed on the equally ginormous whale Leviathan. No one knows why this monster went extinct about two million years ago; the most likely candidates include climate change and the resulting disappearance of its usual prey. Most bony fish have a special swim bladder that helps them move around in the water. When the fish takes in oxygen, it can release some of the gas into the bladder. This increases the fish's buoyancy, so it rises through the water. To sink down to the bottom, the fish squeezes some of the gas out of the bladder, decreasing its buoyancy. In this way, a fish is something like a blimp or hot air balloon that uses the upward lift of atmospheric buoyancy to change altitude. A shark is more like an airplane. It doesn't have a swim bladder, so it uses its forward movement to control vertical position. The tail is like the shark's propeller -- the shark swings it back and forth to move forward. In an airplane, this forward movement pushes air around the wings. In a shark, this forward movement pushes water around the fins. In both cases, this movement of matter creates lift -- the fluid is different, but the principle is exactly the same. Sharks have two sets of paired fins on the sides of their body, in the same general position as the main wings and horizontal tail wings of a plane. The shark can position these fins at different angles, changing the path of the water moving around them. When the shark tilts a fin up, the water flows so there is greater pressure below the fin than above it. This creates upward lift. When the shark tilts the fin down, there is greater pressure above the fin than below it. This pushes the shark downward. The shark also has one or two vertical dorsal fins on its back and sometimes a vertical anal fin on its underside. These fins work like the vertical stabilizer wing on an airplane. They help the shark keep its balance as it moves through the water and they can be moved from side to side to turn the shark left and right. This fin arrangement gives sharks amazing maneuverability. They can cruise at high speeds, stop suddenly and make sharp turns in every direction. This is one of the reasons they are such effective hunters. They move more quickly and with greater control than any of their prey -- most of the time, a shark's prey doesn't even know what hit it. Of course, before a shark can swoop in for the kill, it has to locate its prey. In the next couple sections, we'll examine the finely tuned senses that help sharks locate and track their food. One of the main reasons sharks are such effective predators is their keenly attuned senses. Initially, scientists thought of sharks as giant swimming noses. When researchers plugged the nasal openings in captive sharks, the sharks had trouble locating their prey. This seemed to demonstrate that the shark's other senses weren't as developed as the sense of smell. Further research demonstrated that sharks actually have several acute senses, but that they depend on all of them working together. When you take one away, it significantly hinders the shark's hunting ability. The shark's nose is definitely one of its most impressive (and prominent) features. As the shark moves, water flows through two forward facing nostrils, positioned along the sides of the snout. The water enters the nasal passage and moves past folds of skin covered with sensory cells. In some sharks, these sensitive cells can detect even the slightest traces of blood in the water. A great white shark, for example, would be able to detect a single drop of blood in an Olympic-size pool. Most sharks can detect blood and animal odors from many miles away. Another amazing thing about a shark's sense of smell is that it's directional. The twin nasal cavities act something like your two ears: Smell coming from the left of the shark will arrive at the left cavity just before it arrives at the right cavity. In this way, a shark can figure out where a smell is coming from and head in that direction. Sharks also have a very acute sense of hearing. Research suggests they can hear low pitch sounds well below the range of human hearing. Sharks may track sounds over many miles, listening specifically for distress sounds from wounded prey. Hammerhead sharks are characterized by their wide head structure. The sharks eyes and nostrils are positioned at the ends of these protrusions. In sharks, eyesight varies from species to species. Some less active sharks that stay near the water's surface don't have particularly acute eyesight, while sharks that stay at the bottom of the ocean have very large eyes that let them see in near darkness. Most all sharks have a fairly wide field of view, however, since their eyes are positioned on each side of the head. The most extreme example of this is the hammerhead, whose eyes actually protrude out from the head. Many shark species also rely heavily on their sense of taste. Before these sharks eat something, they will give it a "test bite" first. The sensitive taste buds clustered in the mouth analyze the potential meal to see if it's palatable. Sharks will often reject prey that is outside their ordinary diet (such as human beings), after this first bite. In addition to these familiar senses, sharks also possess some senses we don't fully understand. The ampullae of Lorenzini give the shark electroreception. The ampullae consist of small clusters of electrically sensitive receptor cells positioned under the skin in the shark's head. These cells are connected to pores on the skin's surface via small jelly-filled tubes. Scientists still don't yet understand everything about these ampullary organs, but they do know the sensors let sharks "see" the weak electrical fields generated by living organisms. The range of electrosense seems to be fairly limited -- a few feet in front of the shark's nose -- but this is enough to seek out fish and other prey hiding on the ocean floor. Water flows through the lateral line systems. Vibrations in the water stimulate sensory cells in the main tube, alerting the shark to prey and predators. Another unique sense organ is the shark's lateral line. The lateral line is basically a set of tubes just under the shark's skin. The two main tubes run on both sides of the body, from the shark's head all the way to its tail. Water flows into these main tubes through pores on the skin's surface. The insides of the main tubes are lined with hair-like protrusions, which are connected to sensory cells. When something comes near the shark, the water running through the lateral line moves back and forth. This stimulates the sensory cells, alerting the shark to any potential prey or predators in the area. By themselves, none of a shark's sense organs would be adequate for effective hunting. But the combination of all these senses make the shark an incomparable predator. The success of sharks is due largely to these physiological advancements -- they are superbly built to find food. They are also quite good at catching food, of course, as we'll see in the next section.