



LET'S INVESTIGATE SHARKS

TAKING A 'BITE' OUT OF SHARK TEETH

Created by Josh Moyer for Sharks4Kids

Disciplinary Core Ideas:

1-LS1.A: Structure and Function

4-LS1.A: Structure and Function

Cross Cutting Concepts:

Students observe the shape and stability of structures of natural and designed objects are related to their function(s)

What's Inside a Shark's Mouth?

An introduction to the study of shark teeth

Prepared by Joshua Moyer for use on www.sharks4kids.com

Introducing shark teeth!

Did you know that long ago people thought shark teeth that they found in the ground were actually the tongues of snakes or dragons? And did you know that people used to think that shark teeth could be used to tell if there was poison in someone's food or drink? And did you know that some sharks have teeth that work like a saw to cut through food, while other sharks have teeth that work like a fork to help them hold on to food?

Shark teeth can tell you a great deal about the sharks themselves. The size and shape of shark teeth help scientists make educated guesses, called *hypotheses*, about how big a shark was or what kind of food it ate. Some scientists even use shark teeth to make hypotheses about how closely related different kinds, or *species*, of sharks are. Shark teeth also help scientists to learn about different species of sharks that existed millions of years ago.

Shark teeth have a lot to teach us about sharks, and if you want to learn about how sharks work and where they come from, then there is no better place to start than by studying their teeth!

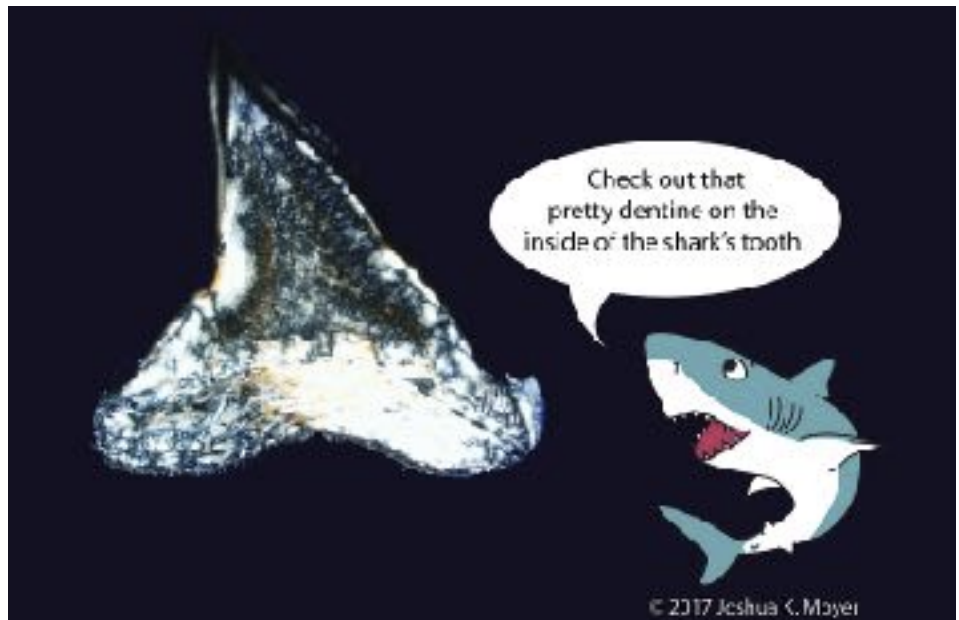
What are shark teeth made of?

Have you ever been to a museum or seen pictures of dinosaur skeletons from millions of years ago? The reason that scientists can piece together a whole skeleton like that after millions of years is because the skeleton is made of bone. When bone is buried in the ground under the right conditions, it can *fossilize*. That means that the bone turns to stone. Scientists can find these fossil bones and build the skeleton, sort of like putting together a giant puzzle.

But shark skeletons don't make good fossils. They don't turn to stone. This is because sharks have skeletons made of a tissue called *cartilage*. That's that same stuff that makes up the tip of your nose or the top of your ear. Cartilage is flexible and light, but it doesn't fossilize well. So to study sharks from millions of years ago, scientists need to study a part of shark bodies that makes good fossils and isn't made of cartilage.

Lucky for scientists, shark teeth are not made of cartilage, and they make great fossils! That's because shark teeth are made of very similar tissues as your teeth! The hard, shiny outside of your teeth is called *enamel*. In sharks, the shiny outside of the teeth is called *enameloid*. The biggest difference between your enamel and the enameloid of a shark's tooth is that shark teeth have an extra ingredient in their outer layer called *fluoride*. Many humans go to the dentist to get fluoride put on their teeth to make their teeth stronger.

Similar to humans, sharks have teeth that are made of layers. Underneath the enameloid in shark teeth is a tissue called *dentine*. If you cut a shark tooth open and look at it under special light, you can see the dentine turn beautiful colors! In different species of sharks, there may be different types of dentine, but all sharks have teeth made of enameloid on top of dentine.



Ancient Sharks

Because shark teeth fossilize so well, much of what we know about sharks from millions of years ago we learned from fossilized shark teeth. For example, scientists today know that a relative of the Great White Shark lived from about 20 million years ago until about 2-and-a-half million years ago, and it was the size of a bus! We call this shark Megalodon, and its fossilized teeth can get to be as big as your hand! Check out this picture of the Megalodon tooth:

Today, scientists compare fossil shark teeth with the teeth of modern sharks to learn more about ancient sharks. If a fossilized shark tooth looks very similar to the tooth of a modern shark, then we can



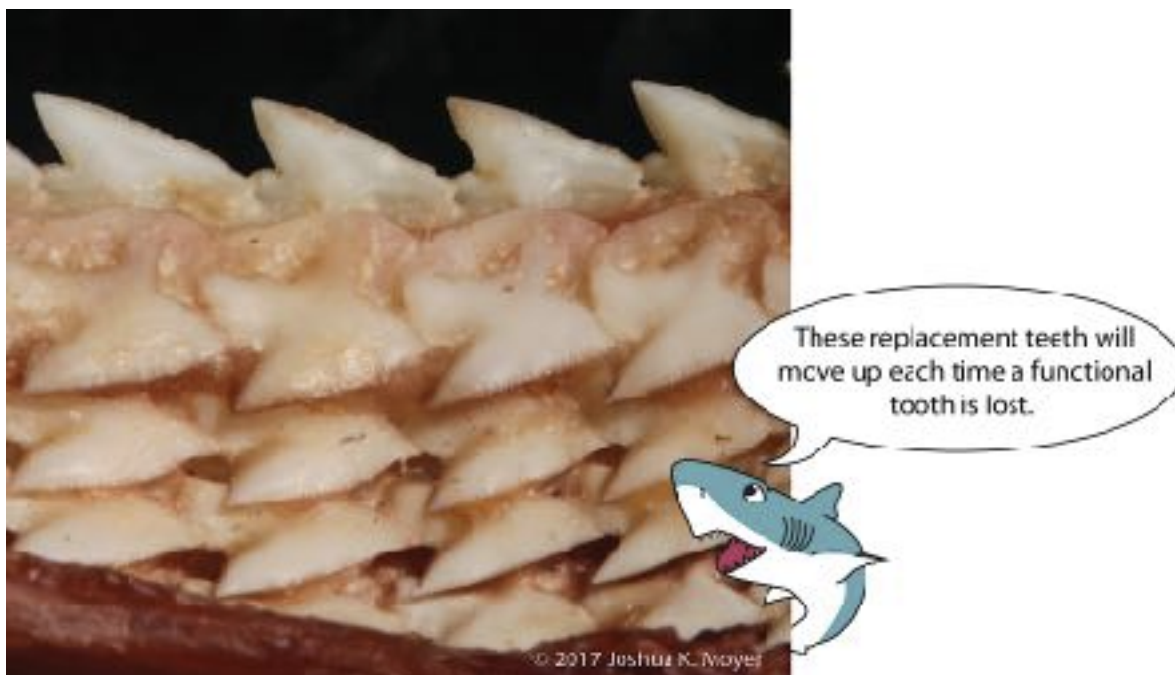
hypothesize that the fossil shark and the modern shark would have had similar diets. We can also estimate the size of fossil sharks thanks to their teeth.

Today, fossil shark teeth are one of most commonly collected fossils in the world. That's because sharks have been around for almost 400 million years, and during that time, each shark lost lots of teeth. But don't worry, it isn't a problem because sharks never run out of teeth!

Sharks Never Need a Dentist

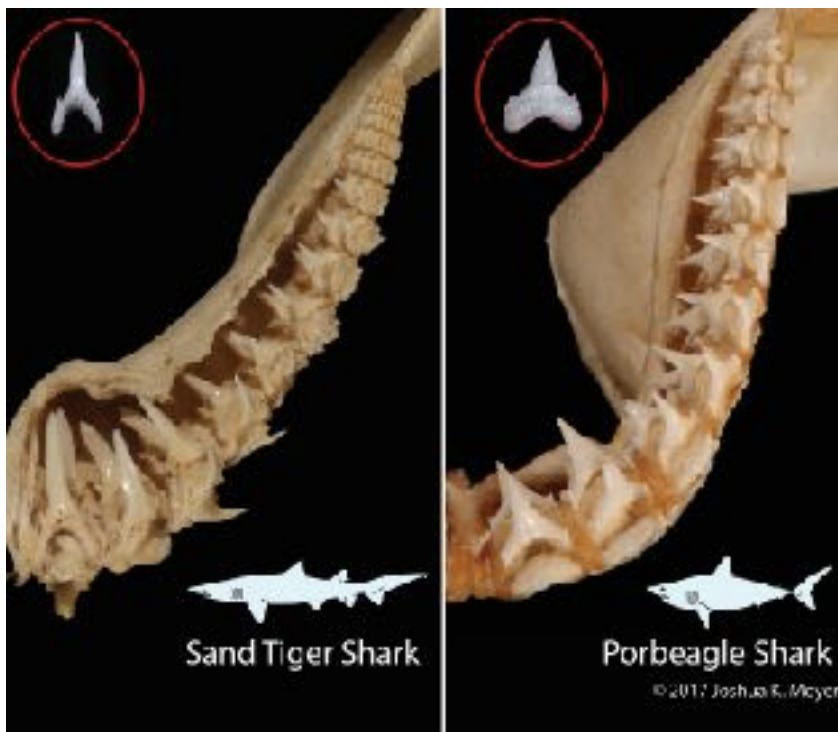
Wouldn't it be nice if you never had to go to the dentist? As humans, we only have two sets of teeth, our baby teeth and our adult teeth. That's why we need to take good care of the teeth we get. But sharks don't have that problem. They have a never-ending supply of teeth!

If you were brave enough to look inside a shark's mouth then you would see rows and rows of teeth. There are the teeth in the front of the mouth that the shark uses to catch and handle its food, and those are called the *functional* teeth. Behind the functional teeth are even more teeth! When a shark loses a functional tooth, the next tooth in line comes up to take its place. Towards the back of the line, new teeth are always being made so the shark never runs out. This is important because a shark doesn't have hands to use a knife and fork. If a shark needs to cut through a chunk of meat, it will bite it and then shake its head back and forth. Some sharks even eat food with hard shells. Shaking and crunching can put a lot of wear and tear on teeth, so it's a good thing sharks don't run out!



Teeth of all shapes and sizes!

What do you think of when you picture a shark? Most people think of a very large animal that swims in the ocean with triangle shaped fins and a huge mouth filled with teeth. Some sharks are very large, but not every shark is a giant like the Great White shark or Whale shark. Many sharks, like the Bonnethead shark or the Epaulette shark, are even smaller than a person. Some sharks are so small that you could hold them in the palm of your hand, like the Dwarf Lanternshark. Sharks come in many shapes and sizes, but one thing that all sharks have in common is teeth. Every species of shark has teeth, and those teeth come in a variety of shapes and sizes just like the sharks themselves!



Some shark teeth are difficult to tell apart. Look at the teeth in the jaws of a Sand Tiger shark and the teeth in the jaws of a Porbeagle shark. Both sharks have teeth that are long and pointy with little bumps on either side of the tooth called *cusplets*. This can make it tough to tell which species of shark the teeth came from. Often times, it helps to look at the entire jaw of the shark.

Other sharks have teeth that look very different. Just look at the tooth of a Tiger Shark and the tooth of a Great White Shark.

The Tiger Shark has a very wide tooth with jagged edges. It has a curved side, and on the other side of the tooth there is a zig-zag edge. The Great White Shark has teeth that are shaped like a triangle, and its edges are straight.



Teeth
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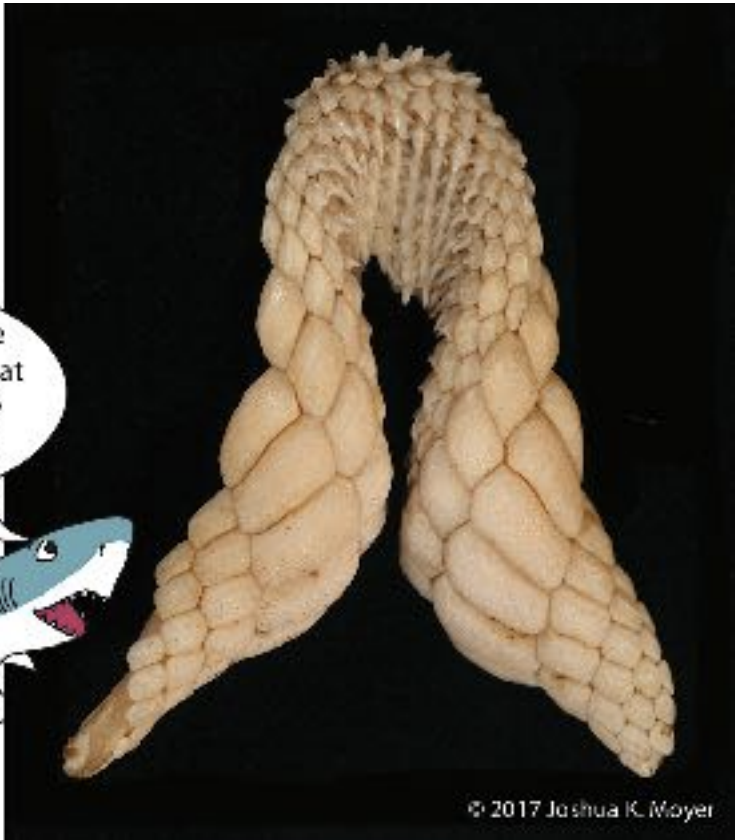
are
predator's tools.

Sharks are *predators*. This means that that sharks eat other animals to survive. The animals that a predator eats are called *prey*. Although all sharks are predators not all sharks eat the same kind of prey. Some sharks, like the Mako shark, eat speedy fish that can be difficult to catch and hold on to. Other sharks, like the Nurse shark, eat crabs or lobsters that are not as fast as a fish but have hard shells. The biggest shark of all, the Whale shark, only eats tiny fish and plankton, which are small, microscopic animals that float on the ocean's currents. Each one of these prey type requires a different type of tooth.

You wouldn't use hammer to cut a steak, would you? Of course not! But you might you a hammer to crush a shell. That's because different tools are good for different tasks, and the task of catching and eating a speedy fish is not the same as the task of cutting through a turtle shell or crunching a lobster. That's why sharks that eat fish, turtles, and lobsters have different shaped teeth. The teeth in a shark's mouth are the tools it uses as a predator.

Scientists can spot patterns in how shark teeth look and what they're used for. Flatter teeth are good for crunching, so sharks that eat things like clams or snails or crabs tend to have flatter teeth. Sharks that have long, pointy teeth usually eat fish or other fast, slippery prey because long and pointy teeth can be used like a fork – they help you to hold on to what you're eating. Other sharks have teeth with rough sides that look like a steak knife. These teeth are good for cutting through tough, thick meat. Each tooth shape is a tool that helps the shark handle different kinds of prey.

Look at all those flat teeth in the jaw of a Horn shark! Those are great for crunching. What kind of prey do you think a Horn shark eats?



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