



SHARK SPOTTER

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A digital companion to **Ocean and Sea**

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Sharks are the kings of the ocean. Discover more about these amazing creatures and the watery world they live in. Click a shark to dive in.



What is a shark?
[Boneless fish]

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content**



Spiny dogfish shark
[Pack hunter]



Port Jackson shark
[Bull faced]



Saving our sharks
[Endangered]



Hammerhead shark
[The weird one]



Whale shark
[The big one]



Longnose sawshark
[Jagged one]

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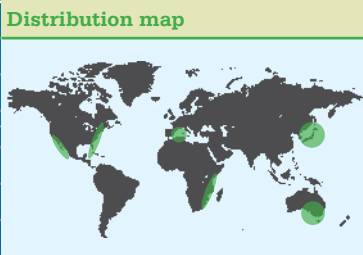
Great white shark [The fierce one]

[Click here to return to the contents](#)

The **great white shark** is one of the largest and most active **predators** in the oceans. It can reach 20 feet (6 m), and it preys on seals, sea lions, dolphins, and other sharks—but not humans. Although it sometimes attacks swimmers and divers, it is thought that the shark mistakes them for turtles or other **prey**. Humans are the only natural enemy of the great white, which is now seriously endangered.

GREAT WHITE SHARK

Scientific name	<i>Carcharodon carcharias</i>
Length	20 ft. (6 m)
Distribution	Worldwide, except polar regions
Diet	Fish, sea mammals, shellfish, cetaceans , mollusks
Young	Gives birth to 2–10 live young
Behavior	Inquisitive hunter that takes a “taster” bite
Amazing fact	Great whites can leap out of the water like whales



The large triangular **dorsal fin** on its back is often the first visible sign of a great white's presence in the water.

A shark's muscular body is **streamlined** to help it speed through the water.

The **pointed snout** has huge jaws. A great white often has scratches on its snout from prey that has fought back.

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The **powerful tail** can propel a shark through the water at speeds of up to 25 miles per hour (40 kph).

The **pectoral fin** helps lift a shark in the water, keeping it afloat.

A **shark's teeth** have serrated edges, like a saw's, to help it tear off chunks from its prey.

Small dots on the snout, called ampullae of Lorenzini, are part of a shark's sensory system. They help it locate other fish nearby.

Great white shark [The fierce one]

[HOME](#)

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GREAT WHITE SHARK

Great white shark

The great white is really a gray-blue in color, with a white underside, which helps make the shark hard to spot in the ocean. It can be found in all the warm seas, but it is especially common in the waters off Australia. It generally lives in the open oceans and rarely goes near the coast. Although it is a fast swimmer, a great white generally cruises along at around 1.5–2 miles per hour (2–3 kph), speeding up to zero in on prey. A great white can travel vast distances, and scientists have calculated that the shark swims an average of 120 miles (200 km) in three days.

A great white is a skillful predator with a fearsome reputation. Its scientific name is *Carcharodon carcharias*, which means “ragged tooth,” and it does indeed bite readily. Other sharks, tin cans, jars, and bits of surfboard are among the items that have been discovered in the stomachs of great white sharks!

The great white hunts alone, not in groups like some sharks such as dogfish sharks do. Once it has detected prey, it zooms in at high speed to take it by surprise. The shark sticks its head out of the water, baring its teeth and rolling back the whites of its eyes—this protects the eyes from being scratched by the victim.

There are fewer than

3,500
great whites left in the sea



video

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discover more about mackerel sharks

Great white shark [The fierce one]

[HOME](#)

The **great white shark** is one of the largest and most powerful predators in the ocean. It can grow up to 20 feet long and weigh over 4,000 pounds. Although it is often called a "killer shark," it is actually a highly intelligent animal that only attacks humans in rare cases. It is the only shark species that has been documented attacking and killing humans.



The power of a shark's tail can propel a shark through the water at speeds of up to 25 miles per hour.



GREAT WHITE SHARK

Shark teeth

A shark's large teeth and wide jaw give it a menacing appearance, and the pointed, razor-sharp teeth are indeed specialized for effective capture and eating of prey. They are triangular, and curved slightly backward. The teeth are not used for chewing—most sharks tear chunks off their prey to be swallowed whole!

A shark's teeth never wear out—the shark always has at least one row of pointed teeth at any time. The teeth are not attached to the jaw (like the teeth of bony fish are); instead, they are fixed directly in the gum and arranged in rows, with three to seven rows of replacement teeth growing behind every functional tooth. The teeth gradually move forward until they are ready to drop out. As the shark grows, the teeth grow, too, so the new teeth are bigger than those they are replacing. Each tooth can grow up to 3 inches (7.5 cm) long.

The great white shark, like all toothy sharks, replaces one or two teeth at a time. Some sharks, like the cookie-cutter shark, replace an entire row of teeth simultaneously. In some young, rapidly growing sharks, new teeth may come into use every six weeks.

A great white shark can have

300

teeth in its jaw at one time



video

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discover more about mackerel sharks

Great white shark gallery



A great white's jaw stays slightly open, revealing its gums and large, jagged teeth.



This shark is in pre-attack position, with its tail and pectoral fins pointing down.



The great white is hard to spot from underneath when sunbeams hit the water.



Like most sharks, a great white has five gill slits.

Mackerel sharks [Large and fast]

Mackerel sharks include some of the fastest, fiercest hunters, such as the shortfin mako, which reaches speeds of 40 miles per hour (65 kph) and likes to swallow its prey whole. But other kinds of mackerel shark are gentle giants, such as the basking shark, which filter feeds on plankton from the sea.

Shortfin mako



Scientific name	<i>Isurus oxyrinchus</i>
Length	6–10.5 ft. (1.8–3.2 m)
Distribution	Temperate and tropical seas
Diet	Fish, mammals, birds, turtles
Young	Gives birth to 4–18 live young

Porbeagle shark



Scientific name	<i>Lamna nasus</i>
Length	11.4 ft. (3.5 m)
Distribution	Worldwide, subtropical to temperate
Diet	Bony fish, squid, cuttlefish
Young	Gives birth to 1–5 live young

Basking shark



Scientific name	<i>Cetorhinus maximus</i>
Length	33 ft. (10 m)
Distribution	Cool and temperate waters worldwide
Diet	Plankton
Young	6 live young are hatched within the mother

Sand tiger shark



Scientific name	<i>Carcharias taurus</i>
Length	10.4 ft. (3.2 m)
Distribution	All warm seas except eastern Pacific
Diet	Bony fish, sharks, rays, squid, crabs
Young	2 large live young every 2 years

Pelagic thresher shark



Scientific name	<i>Alopias pelagicus</i>
Length	12 ft. (3.6 m)
Distribution	Indian and Pacific Oceans
Diet	Small fish, cephalopods
Young	2 large (5.2–6.3 ft./1.6–1.9 m) young

Common thresher shark



Scientific name	<i>Alopias vulpinus</i>
Length	Can be over 19.6 ft. (6 m)
Distribution	Temperate and tropical seas
Diet	Small schooling fish, squid, octopuses
Young	Lays eggs, up to 50 a year

Great white shark [The fierce one]

[HOME](#)

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GREAT WHITE SHARK

dorsal fin *noun*

The large, triangular-shaped fin on the midline of a shark's back is its dorsal fin. The sight of a large fin breaking through the water like a knife fills swimmers with terror. A great white's dorsal fin is tall and sleek, allowing the shark to glide through the water. Its main role is to keep the fish from rolling over to one side as it swims.

The dorsal fin is an unpaired fin. Sharks have both unpaired and paired fins; the pectoral fins, one on each side of the body, are paired. There is a second dorsal fin on a great white shark, farther down its back, but it is tiny.



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The **pectoral fin** helps
lift a shark in the water,
keeping it afloat.

A **shark's teeth** have serrated
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[HOME](#)

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streamlined *adjective*

A streamlined shape is usually long and narrow, designed or constructed to offer the least resistance to the flow of liquid or air as possible. The torpedo-shaped body of a great white shark is compact and smooth, so water flows over and around it with ease and the shark can slip through the ocean at high speed.

It is no coincidence that submarines are designed with the same rocket shape that fish, sharks, and dolphins naturally have. These animals have no limbs sticking out to slow them down, and their fins, especially the pectoral fins, provide lift to keep them from sinking.

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GREAT WHITE SHARK

prey *noun*

An animal that is hunted or caught for food or game is prey. Great white sharks hunt a wide range of prey, including small mammals, such as dolphins and sea lions, as well as fish and other sharks. They have very few natural enemies but are themselves prey to human fishers and hunters. A person or thing that is defenseless against attack is also known as prey.

verb: To prey on an animal is to hunt and kill it for food, in the way that a shark hunts and kills fish and smaller sharks. A shark preys on other marine creatures.

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predator *noun*

The great white shark—along with other large, toothy sharks such as the bull shark and the tiger shark—is a top predator. This means that it hunts and eats sea animals that have eaten other animals but is itself not hunted by any other marine creature. In fact, humans are the only hunters of great white sharks. Fishermen hunt them for sport and for their fins, jaws, and teeth, causing them to become endangered.

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[HOME](#)

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cetacean *noun*

A cetacean is a mammal, like a dolphin or porpoise, that lives only in the sea. Cetaceans range in size from about 4 feet (1.2 m) in length and 80 pounds (36 kg) in weight for the smaller porpoises to about 100 feet (30 m) and 135 tons for the blue whale, the largest animal that has ever lived. Cetaceans vary in color from black to yellow to pink to vividly contrasting patterns of black and white.

Modern cetaceans have a streamlined shape, with paired pectoral (front) flippers containing limb bones and digits, and a fatty blubber coat that serves both as a food reservoir and as insulation.

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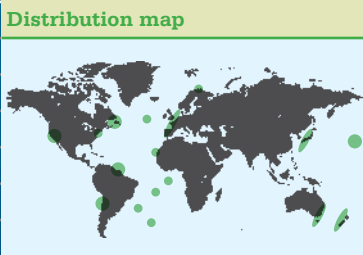
Frilled shark [Long and ruffled]

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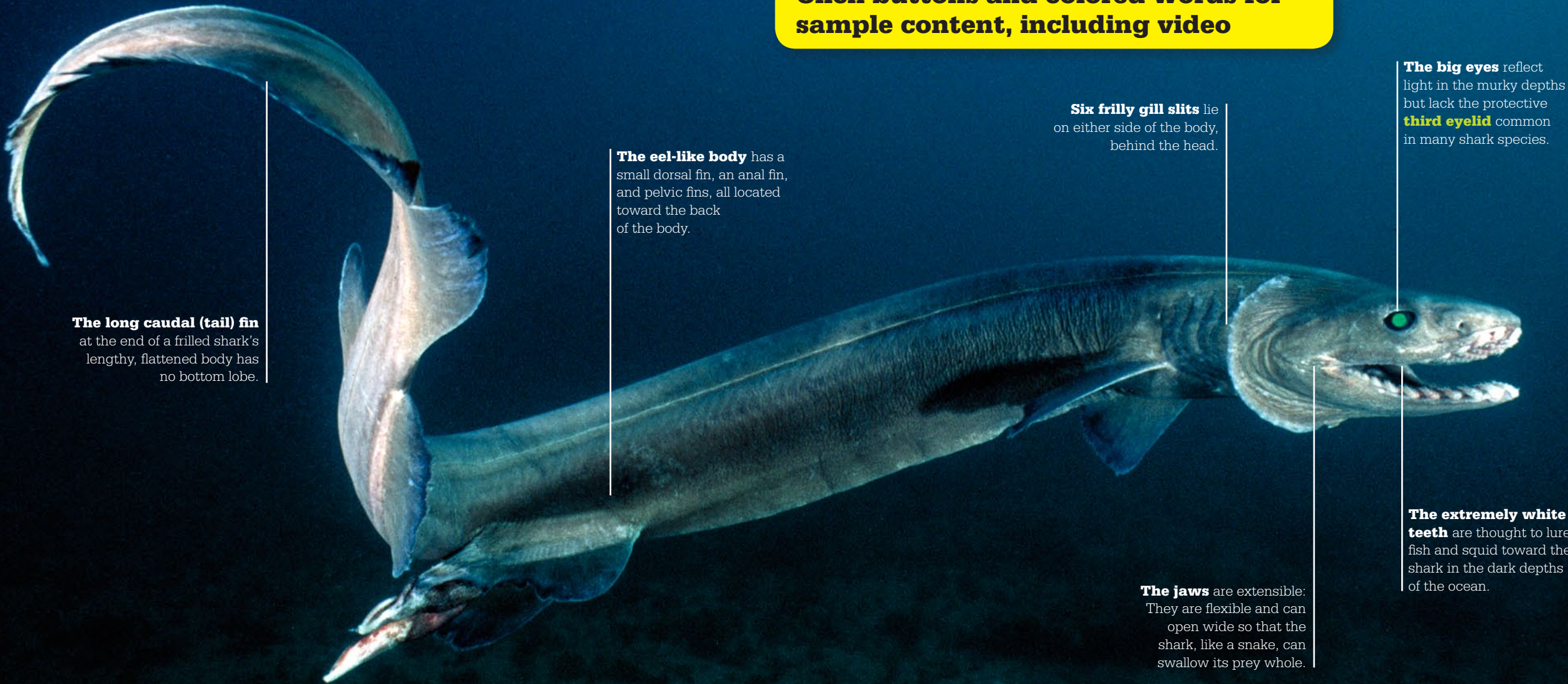
This rarely seen, deep-sea-dwelling shark has a long, slim body and looks more like an **eel** than a shark. It has a flattish, snakelike head, and six frilled-looking **gills** (instead of the more usual five) that give the shark its name. **Frilled sharks** are close relatives of creatures that lived in the seas in Jurassic times, so the sharks are sometimes referred to as living **fossils**.

FRILLED SHARK

Scientific name	<i>Chlamydoselachus anguineus</i>
Length	6.4 ft. (2 m)
Distribution	Wide ranging but patchy, found almost worldwide
Diet	Other sharks, squid, bony fish
Young	Gives birth to 2–10 live young
Behavior	Slow-moving, solitary deepwater shark
Amazing fact	Its sharp teeth have injured unwary scientists



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The long caudal (tail) fin at the end of a frilled shark's lengthy, flattened body has no bottom lobe.

The eel-like body has a small dorsal fin, an anal fin, and pelvic fins, all located toward the back of the body.

Six frilly gill slits lie on either side of the body, behind the head.

The big eyes reflect light in the murky depths but lack the protective **third eyelid** common in many shark species.

The extremely white teeth are thought to lure fish and squid toward the shark in the dark depths of the ocean.

The jaws are extensible: They are flexible and can open wide so that the shark, like a snake, can swallow its prey whole.

Frilled shark [Long and ruffled]

This rarely seen, deep-sea-dwelling shark has a long, slim body and looks more like an eel than a shark. It has a flattened head (instead of a pointed snout) and a ruffled collar around its neck (instead of a dorsal fin). It has a name that lives up to its appearance: that lives up to its appearance: that lives up to its appearance: are so

FRILLED SHARK



The frilled shark's ruffles reflect murky depths and provide protective camouflage. It is a common species.



The extremely white teeth are thought to lure prey toward the shark in the dark depths.



Frilled shark

This elusive and unusual shark may be the creature that ancient fishermen based their legends of sea serpents on. It is long and slim, with tiny fins, so it looks more like an eel or a snake (or serpent) than a shark. It can reach 6.5 feet (2 m) in length; snakes on land, though, can be far longer. A frilled shark's distinguishing feature is the ruffle of gills around the neck.

The frilled shark is rarely seen and is thought to inhabit very deep waters. It has been found as deep as 5,150 feet (1,570 m), although around Japan it has more often been observed swimming at depths of 160–660 feet (50–200 m).

Scientists think that the frilled shark opens its wide, flexible jaw and lunges forward to snatch and swallow its prey in the same way that a snake rears its body and captures its prey whole. One 3-foot-long (0.9 m) Southern African frilled shark was found to have swallowed a ghost catshark that measured 40 percent of its own body length!

**Frilled sharks have about
25 rows
of sharp, pointed teeth**



discover more about frilled and cow sharks

Frilled shark [Long and ruffled]

This rarely seen, deep-sea-dwelling shark has a long, slim body and looks more like an eel than a shark. It has a flattened head (instead of a pointed snout) and a name that reflects that it lives in deep, dark water. There are some

FRILLED SHARK



The big eyes reflect murky depths and the protective film is a common feature of deep-sea species.



The extremely white teeth are thought to lure prey toward the shark in the dark depths of the ocean.

The jaws are covered in rows of sharp, pointed teeth that are used to catch and hold onto prey.



Third eyelid

Because sharks do not blink—they don't need to blink to clean their eyes, because they live in water—they (and fish) do not have eyelids. However, many species of shark do have a "third eyelid" known as a nictitating membrane. *Nictitating* comes from the Latin word that means "to blink."

Birds, amphibians, and reptiles as well as fish can have these transparent lids that slide across the eye instead of closing from top to bottom as your eyelids do. The film protects the eye while the animal is underwater or attacking prey. Like frilled sharks, great white sharks do not have nictitating membranes, which is why they roll their eyes back when they rear to attack—this keeps their eyes from being scratched if the prey fights back.

Frilled sharks have relatively large eyes. They live in deep, dark water, and their eyes reflect light to help them see in the dim conditions. Their big eyes glow like a cat's eyes do when light shines on them.



discover more about frilled and cow sharks

Frilled shark [Long and ruffled]

This rarely seen, deep-sea-dwelling shark has a long, slim body and looks more like an eel than a shark. It has a flattened head (instead of a pointed snout) and a name that reflects its appearance. That's why it's called a frilled shark.

FRILLED SHARK

Fossil

Fossils are remains of prehistoric organisms. Preserved by burial under countless layers of sedimentary material, they serve as a record of the past 3.5 billion years.

Entire or partial bodies of organisms are called body fossils; marks left in rock—such as footprints, tracks, burrows, or marks where a body once lay—are called trace fossils. Most of the body fossils commonly found in layered rock are made up of hard skeletal material, such as shell, bone, and tooth. These have a much better chance of burial and preservation. Since sharks have cartilage skeletons, it is usually fossils of their jaws or teeth that are preserved and discovered.

The oldest shark fossil discovered consists of portions of the head and top part of a shark's body, including its teeth and a fin. In contrast, complete fish skeletons have survived, including a 480-million-year-old fish fossil from Australia.

The study of fossils is called paleontology.

Shark tooth fossil



The big eyes reflect murky depths and protective camouflage. Frilled sharks are common in the deep sea.

The extremely white teeth are thought to lure prey toward the shark in the dark depths of the ocean.

The jaws of a frilled shark are made of cartilage, which is soft and flexible. This allows the shark to swallow its prey whole.



discover more about frilled and cow sharks

Frilled shark [Long and ruffled]

This rarely seen, deep-sea-dwelling shark has a long, slim body and looks more like an eel than a shark. It has a flattened head (instead of a pointed snout) and a name that reflects its appearance. That is, it looks like a eel. Frilled sharks are so named because of the ruffled skin along their sides.

FRILLED SHARK

Honeycomb moray eel



Eel

Eel is the common name for about 400 species of mostly marine (sea-dwelling) snakelike fish that live in shallow tropical waters throughout the world, although some are found in cold, deep sea waters, and a few species live in rivers. The group includes morays (Muraenidae), conger eels (Congridae), snake eels (Ophichthidae), snipe eels (Nemichthyidae), and many other marine groups, as well as freshwater eels (Anguillidae).

Eels do not have pelvic fins. Their dorsal and anal fins are elongated and tend to merge with the tail fin to form one continuous fin around the body. All but 3 of the 22 marine families are scaleless. One family of freshwater eels has tiny, barely visible scales. Many eels can change color; the freshwater eels of North America and Europe do so several times, usually coinciding with their mating season or during migration. Like frogs, freshwater eels have dense networks of blood vessels in their skin and can absorb oxygen directly from air or water.

The name *eel* is also given to lampreys—primitive, round-mouthed, cylindrical creatures that spend their lives hiding in burrows and crevices.



The big eyes reflect murky depths and provide protective camouflage. Eels are common in shallow waters and deep species.

The extremely white teeth are thought to lure prey toward the shark's dark depths.

The jaws are strong and can crush hard prey.



discover more about frilled and cow sharks

Frilled and cow sharks [Long and old]

There are only six sharks in this group—two frilled sharks and four cow sharks. They are the oldest group of sharks—evidence from frilled shark fossils dates them to 95 million years ago. All of them have six or seven gills and only one dorsal fin. They have long, eel-like bodies and all live in the deep sea, so they are rarely seen by humans.

Sharpnose sevengill shark



Scientific name	<i>Heptranchias perlo</i>
Length	4.4 ft. (1.3 m)
Distribution	Tropical and temperate seas worldwide, except the eastern north Pacific
Diet	Small sharks, rays, bony fish, marine invertebrates such as shrimps
Young	Gives birth to 9–20 live young

Southern African frilled shark



Scientific name	<i>Chlamydoselachus africana</i>
Length	3 ft. (0.9 m)
Distribution	Southern Angola to southern Namibia
Diet	Unknown
Young	Gives birth to live young, numbers unknown

Bigeyed sixgill shark



Scientific name	<i>Hexanchus nakamurai</i>
Length	5.8 ft. (1.8 m)
Distribution	Patchy, in warm temperate and tropical seas
Diet	Crustaceans and small bony fish
Young	Up to 13 live young

Frilled shark [Long and ruffled]

[HOME](#)

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FRILLED SHARK

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gill *noun*

Sharks do not breathe air. Instead, like other fish, they get oxygen from the water through their gills. Each gill opening contains a network of many tiny blood vessels called capillaries. As a shark pumps water into its mouth and out through its gills, the capillaries absorb oxygen from the water and eliminate carbon dioxide.

Most species of shark have five gills; however, frilled sharks can have six or seven.



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Frilled shark video



The jaws are extensible; they are flexible and can open wide so that the shark, like a snake, can swallow its prey whole.

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discover more about frilled and cow sharks

How to use this digital book

Look out for interactive buttons that light up as you roll over them. Click to discover more about sharks and other incredible creatures in the oceans.

Look for these clickable buttons:

Best fish.
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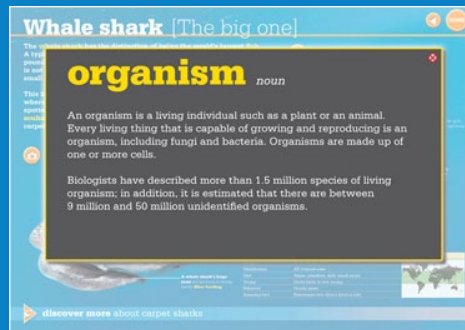
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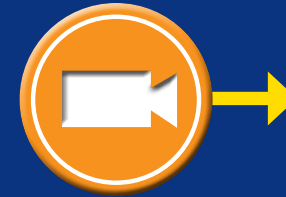
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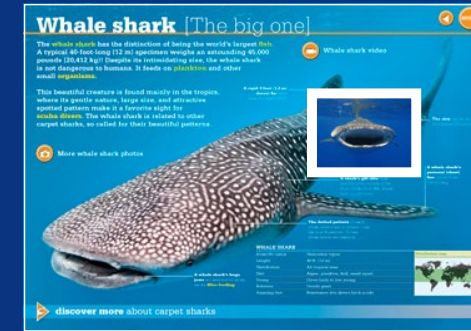
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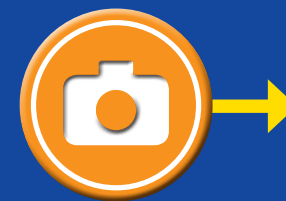


Video



Watch awesome
shark scenes

Videos open in a window on each main page.
Replay or close them when they are finished. Watch whale
sharks swimming, a great white hunting, and an angel shark
hiding on the seafloor, ready to snap up unwary prey.



Gallery



More amazing pictures



Previous page



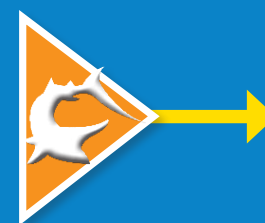
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Meet a shark family

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