

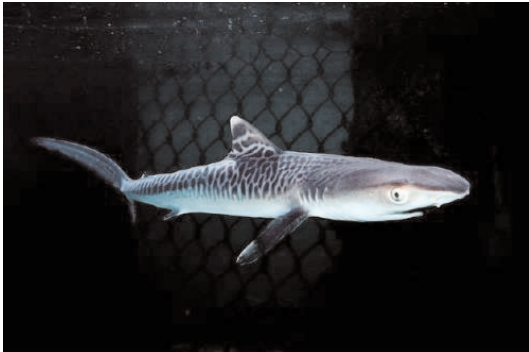
05. Sharks

Raphaëla Le Gouvello Education packet - Windsurfing solo across the Indian Ocean

<http://www.respectocean.com>



Wildlife / biodiversity



Young tiger shark.

Super predators with heightened senses

Sharks have a fine sense of hearing, an excellent sense of smell, and perfect, enhanced vision. Requiem sharks and **hammerhead sharks** have nictitating (third, inner) eyelids that protect their eyes in case of attack. Great white sharks and **mako sharks** have "retractable" eyeballs that roll back into their skulls when they are attacked! But sharks' most unique feature is electro-reception, an acute sensitivity that enables them to find hidden prey by the electrical signals they emit! It is believed that this is what allows migrating sharks to orient themselves across hundreds of miles, guided by the Earth's electro-magnetic field.

Activities

The **spiny dogfish** is a shark. Find out what one looks like. Draw a picture of it. Find out:

- ▶ Where it lives.
- ▶ What it eats.
- ▶ How it is different from other sharks.
- ▶ What it's called when it's on your plate?

No doubt you've heard of the great white shark, the basking shark, the hammerhead shark, and perhaps even the whale shark and the tiger shark. But did you know that there are more than 400 documented species of sharks? These fish strike fear in the hearts of humans because they are all believed to be extremely dangerous. Yet only 4 species have been involved in attacks on humans, among them the white shark and the tiger shark. Of course, other species can cause serious harm, even peaceful species, attacking divers, for example, if provoked.

Sharks live in warm or temperate waters, and are very common in the Indian Ocean. To overcome her fear should she meet up with a shark during her crossing, Raphaëla trained at Nausicaa National Sea Park in Boulogne-sur-Mer, France, by diving into the middle of a tank of sharks... That takes guts!



Photo by François Lopresti.

Shark characteristics

Sharks, like their cousins, the rays, are cartilaginous fish, that is, their skeleton is composed only of cartilage, like our noses and outer ears.

- ▶ Sharks' bodies are covered with dentine and enamel scales shaped like sharp teeth.
- ▶ Their bodies are slender and tapered, enabling them to slip easily through the water.
- ▶ Shark skin is especially well suited to life in the water, and has even been emulated in the design of advanced competition swim suits.
- ▶ Some sharks feed on plankton, while others eat dead or living prey and waste material of all kinds. For the most part, they are not big eaters: they consume only two or three times their weight in a year, while humans eat ten times their own! Sharks can even go for several days without eating at all.
- ▶ Sharks have 5 to 7 pairs of gill slits located near their jaws.
- ▶ Shark teeth vary according to their diet. The large predators, such as **tiger sharks** and **white sharks**, have pointed, triangular teeth rooted in very powerful, clamping jaws. The teeth are continually replaced, from back to front, over the animal's lifetime. The most evolved species have a jaw that is hinged on each side and in the middle of the upper jaw, allowing them a wide range of movement when seizing prey.

05. Sharks

Raphaëla Le Gouvello Education packet - Windsurfing solo across the Indian Ocean

<http://www.respectocean.com>



Hammerhead shark.

Advanced reproduction

Depending on the species, sharks can be oviparous, ovi-viviparous, or viviparous, the latter being the reproduction method of the most evolved species.

- ▶ **Oviparous** females expel fertilized eggs; incubation and hatching take place outside the mother's body.
- ▶ **Ovi-viviparous** females develop and nourish fertilized eggs in a sac inside their bodies until they are ready to hatch.
- ▶ **Viviparous** females reproduce in the same way as mammals: each fertilized egg develops in its own sac, fed by an umbilical cord attached to the mother. Sharks reproduce infrequently and develop slowly. That is why over-fishing of these species places them in such peril.

Shark overview

- ▶ The **whale shark**, along with the basking shark, is the largest fish in the world at 15 to 18 meters (roughly 50 – 60 feet). It is a solitary predator, feeding on anchovies, sardines, shrimp... and plankton. It inhabits tropical waters.
- ▶ The **basking shark** grows 12 to 15 meters long (roughly 40 to 50 feet). It generally frequents temperate waters. Long hunted for its large liver, whose oil was extracted for lighting lamps, the basking shark is now a protected species in many countries. Like the whale shark, it poses no threat to humans.
- ▶ The **white shark** can grow up to 12 meters long (roughly 40 feet) and weigh 4 tons. It has serrated teeth and will eat anything within reach of its powerful jaws, including seals, squid, and sea turtles. Although it has been known to attack humans, they are not part of its usual diet. This endangered

species needs protection from its predator: humans.

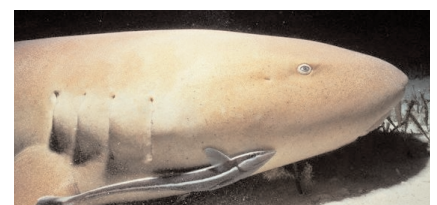
- ▶ The **hammerhead shark**, of which there are several species, has a strange, hammer-shaped head, with eyes located on the "hammer's" lateral extremities. It can sometimes exceed 5 meters in length (16 feet). It attacks other fish, even poisonous rays.
- ▶ The **tiger shark** can grow up to 10 meters long (32 feet). It is striped like a tiger, but its colors are black and grey. It is one of 4 species involved in incidents with humans, and poses much more of a threat than the great white shark.
- ▶ The **blue shark** rarely exceeds 4 meters in length (13 feet), but its teeth are so sharp that the Maori people of Polynesia use them as razor blades.

Activities

- ▶ Find another example of a symbiotic relationship between two species in the animal kingdom.
- ▶ What is the difference between these animals and parasites?

The remora, aka the sucker fish

Sharks are often accompanied by remoras, small fish that attach themselves to sharks with a suction cup on the top of their head. Remoras feed on the external parasites of the host shark, even weaving in and out of their gill slits. Both fish are therefore useful to one another. When two different, very dissimilar species benefit from proximity to one another, it is called "symbiosis."



This remora is cleaning a host shark.