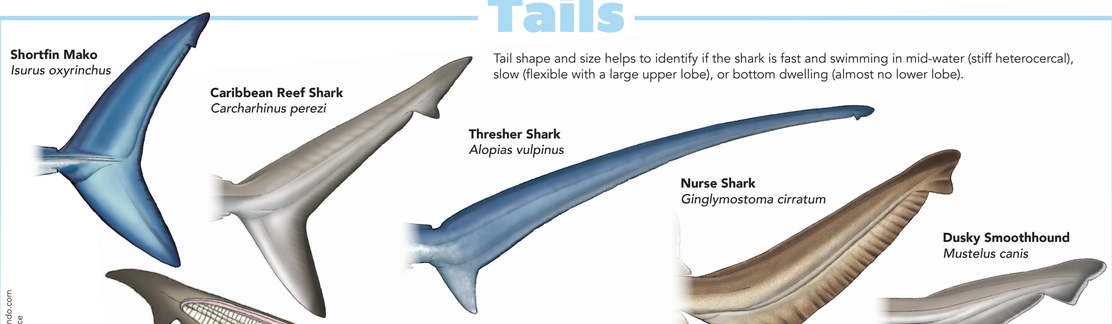
Shark Anatomy

At least 550 species of shark have evolved from the original sharks 400 million years ago. They differ broadly in form and function, which enables them to thrive in multiple habitats and seas ranging from cold Greenland water and deep waters to warm tropical seas.

Tails

Tail shape and size helps to identify if the shark is fast and swimming in mid-water (stiff heterocercal), slow (flexible with a large upper lobe), or bottom dwelling (almost no lower lobe).

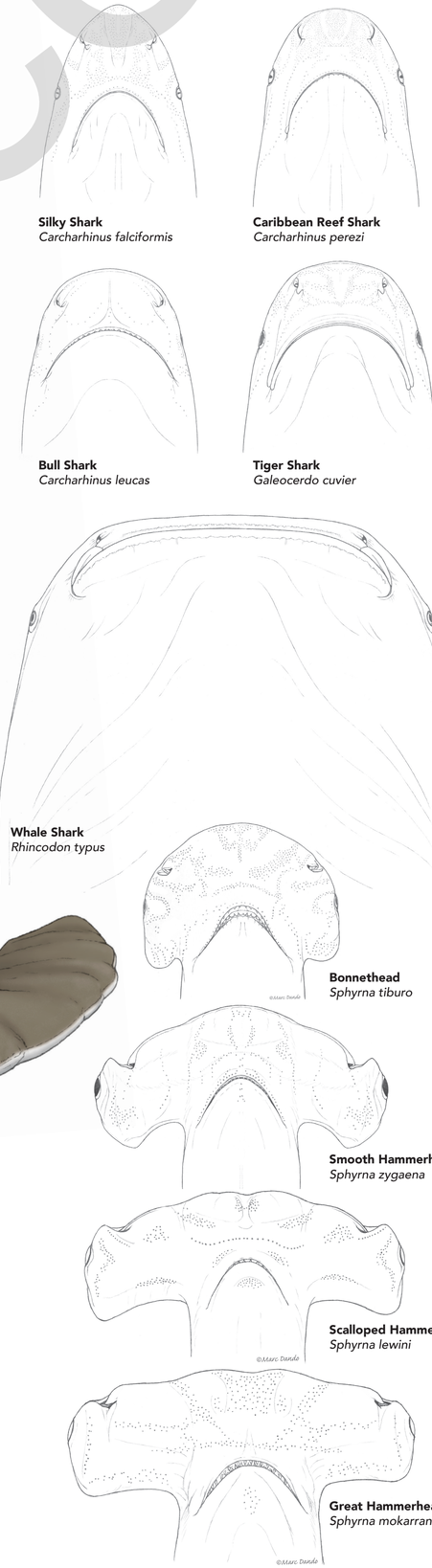


Gills

Sharks take in oxygen from the water or "respire" by flowing water across their gills. Sharks like Zebra or Nurse Sharks can be stationary and "buccal ventilate", pumping water over their gills and even using a spiracle located behind the eye to increase water flow. Others like the white, hammerhead or silky sharks need to swim constantly to respire.

Heads

The size and shape of a shark's head help to identify where and how the animal travels. The large broad Whale Shark head indicates a slower moving animal, the sharper snout of the Silky Shark suggests a more hydrodynamic animal evolved for greater speed.

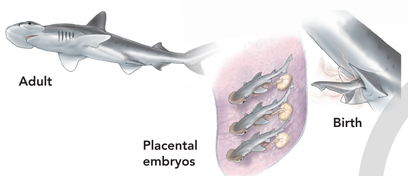


Reproduction

Three modes of reproduction have evolved in sharks. Adults reproduce using internal fertilization: males fertilize eggs in the female (like mammals) and produce young sharks called "pups". Gestation can take 4.5 to 36 months. The largest bearer is the Whale Shark (up to 300 embryos) whereas Sandtiger Sharks bear only two pups. Pups have to be ready to survive as soon as they are born: there is no parental care in the shark world.

1. Oldest mode or "**oviparity**": fertilized eggs turn into embryos inside egg cases in one of the two female's uteri. The egg cases known as "mermaid's purses" are laid or wrapped around substrate and hatch a young shark several months later after the yolk sac is consumed. Ex: catsharks, Zebra Shark.

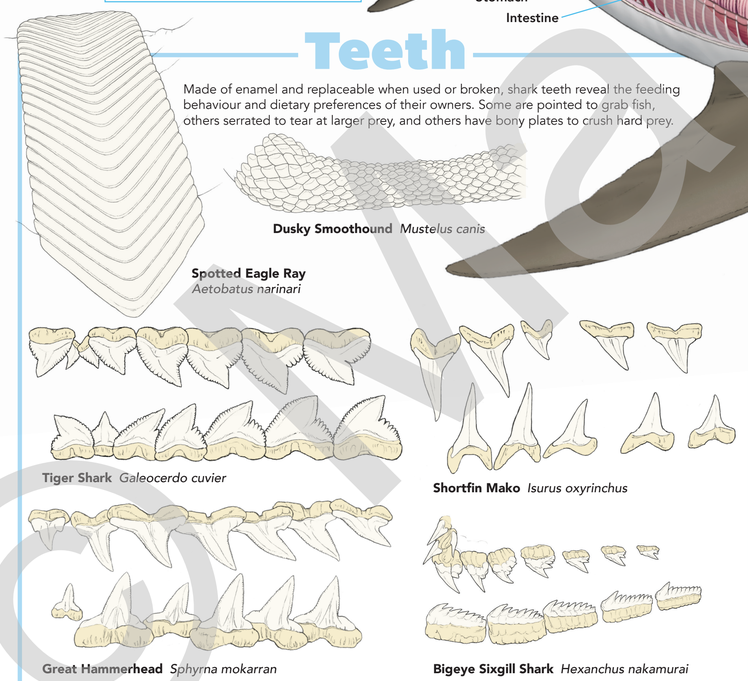
2. "**Aplacental viviparity**": Several different modes, but unified by a lack of placental attachment to the mother and live birth. Yolk sac viviparity: embryos develop *in utero* and are primarily nourished via a large external yolk sac, which is absorbed as the pups approach birth. Eg angel sharks, nurse sharks, Spiny Dogfish. **Oophagy**: fertilized ova develop into embryos in utero and the female ovulates multiple unfertilized ova (eggs), which the embryos consume throughout gestation as their primary source of nutrients (all lamniform sharks, some deepwater sharks such as false catsharks). In some extreme cases the largest embryos consume other embryos (sandtiger sharks). A small number of large pups are born live.



3. Most recently evolved mode or "**placental viviparity**": embryos develop a placental connection while they develop inside the uterus and are fed with a milk-like nutrient rich substance termed "histotroph". At term, the pups are born live. Ex: hammerheads, Bull and Lemon Sharks

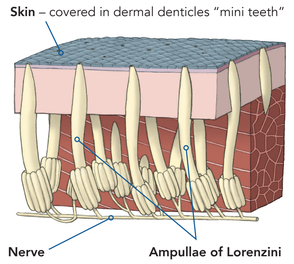
Teeth

Made of enamel and replaceable when used or broken, shark teeth reveal the feeding behaviour and dietary preferences of their owners. Some are pointed to grab fish, others serrated to tear at larger prey, and others have bony plates to crush hard prey.



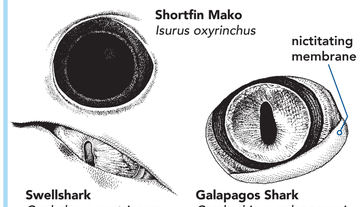
Ampullae

Named by the biologist Lorenzini, these super sensory organs are gel-filled sacs located around the head and snout that detect electrical impulses and help sharks find nearby or hidden prey.



Eyes

Most sharks have excellent vision and see in color. They have a high number of "rods" and an extra membrane at the back of the eye "tapetum lucidum" (like a cat) that allows them to see in very low light conditions. Species such as Caribbean Reef and Galapagos Sharks have eyelids known as "nictitating membranes". Others like the whale shark are able to protect their eyes by rolling them backwards in their heads.



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