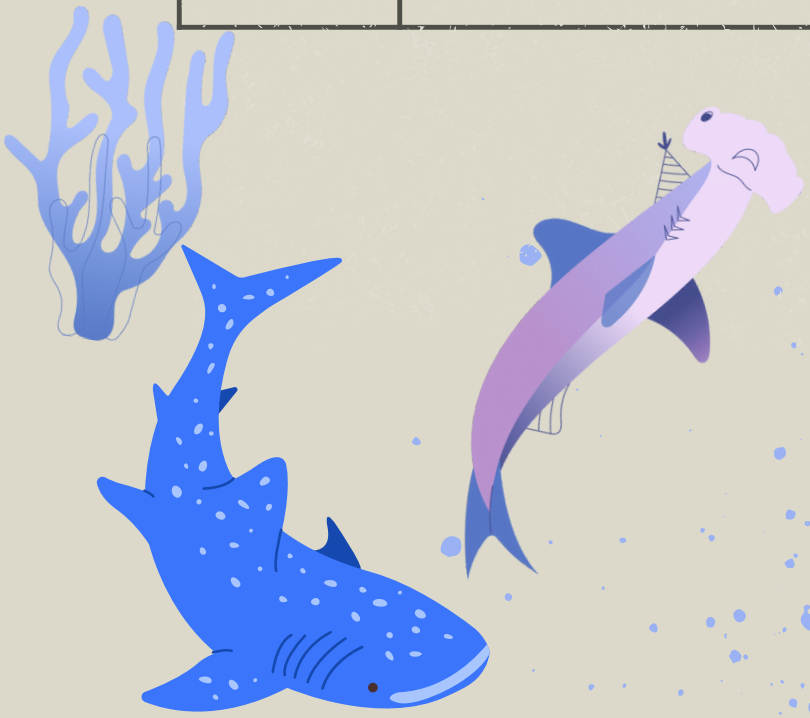
Sharks!

A Dive into Information and Conservation!

NOTEBOOK

By:	Isabelle Brousseau



Dedicated to Ocean Wise's terrific and brilliant Youth To Sea Halifax team, Nikki McIntyre and Tanner Messenger!

In memory of Danielle Moore and Micah Messent (Ocean Bridge), who were great advocates for marine conservation.

You might notice in this book we say "***ocean***" instead of "***oceans***". We do this because although sometimes we give areas in the ocean different names (Pacific, Atlantic, Arctic, Indian, and Southern), the ocean is connected as ***one*** amazing system! It's like calling different parts of a playground by their own name (slide & swings), but knowing they're all part of that same one awesome playground!

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2024

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What are Sharks?

Sharks have inhabited our ocean for a whopping 450 million years, (way before dinosaurs roamed the earth!), and are widely regarded as the ocean's greatest and most fascinating predators. There are over 500 species of sharks in our ocean, all with unique abilities and intriguing features.

These creatures cause all sorts of feelings: fear, wonder, awe, love. Often depicted as ruthless, cold-hearted killers who swim immensely close to shore, it’s natural that people have many preconceived notions surrounding sharks and their capabilities. But the truth of these animals is much less horror-movie-like. When taking a closer look, a complex, intricate, and wonderful animal will reveal itself. Sharks play a tremendous role in the ocean, and ensure the prosperity of our waters. There is so much to dive into!

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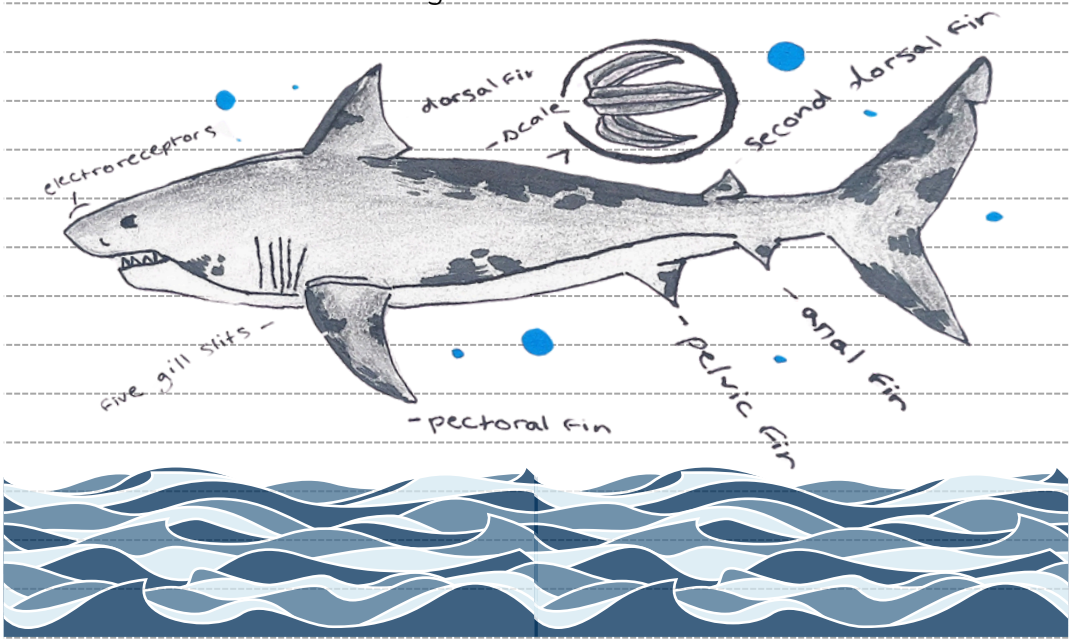
Shark Anatomy

Sharks have five to seven gill slits, which they use for breathing. A shark breathes by taking water into their mouth, which then flows out over the gills. The gills absorb oxygen, and discard CO2, just like our bodies. Some species of sharks that stay near the sea floor, (like cat sharks and wobblegongs) don't have to move fast for their prey. They pump water over their gills by contracting their muscles. Others, like mackerel sharks, use the forward motion of swimming to move water over their gills. Some sharks use both methods! Each breathing method has benefits unique to each species of shark.

Shark skin also has a tiny layer of scales known as placoid scales. They reduce drag when sharks are swimming, allowing sharks to swim fast!



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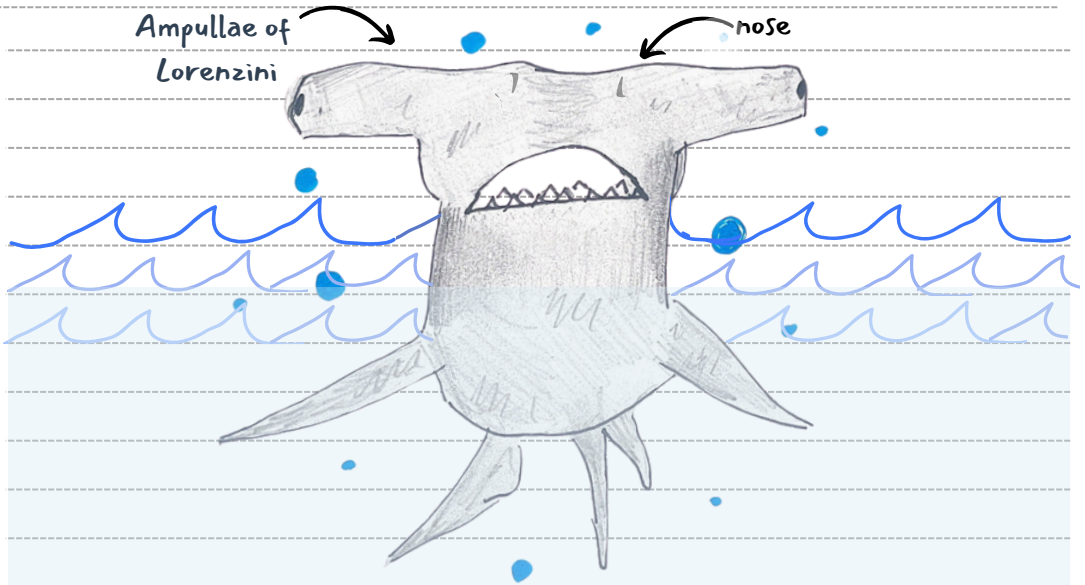

In a shark's nose there are nerve cells that can detect one part blood in a million parts sea water! They use their nostrils solely for detecting scents, and each one acts independently to pinpoint an exact smell. A shark's incredible sense of smell enables them to detect and track prey, even below the sand, making them efficient and intelligent hunters. Along with smell, sharks have something called Ampullae of Lorenzini, which are electrosensory pores that line their heads and help them find their food! The pores pick up movements from fish and other creatures, and aid in homing and migration through earth's magnetic field. .

Up to two thirds of a shark's brain is dedicated to hearing. Sharks can hear prey moving through the water from 800 feet away!

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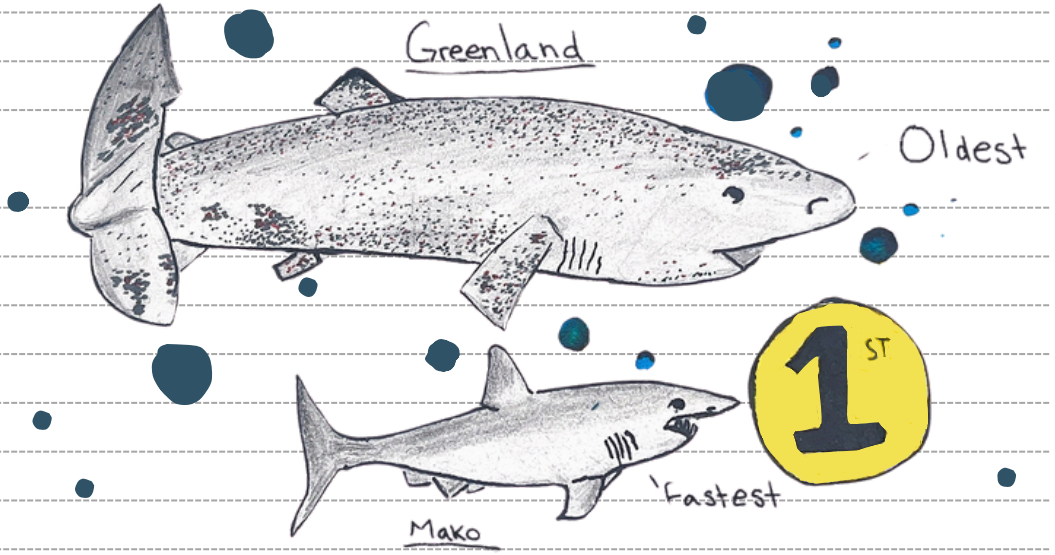
Fantastic Facts

Speed:

The fastest shark is the shortfin mako shark, which is mostly found in tropical waters and can grow up to 13 feet. They can reach speeds of up to 74 km/hour, and swim the length of two school buses in a second! They swim with fast bursts, and their gills allow them to take in oxygen 2 times quicker than other sharks. In contrast, the Greenland shark is the slowest, conserving a lot of energy with their lack of speed. The Greenland shark can live for at least 250 years, and may live over 500 years. This makes them the OLDEST vertebrates on the planet!



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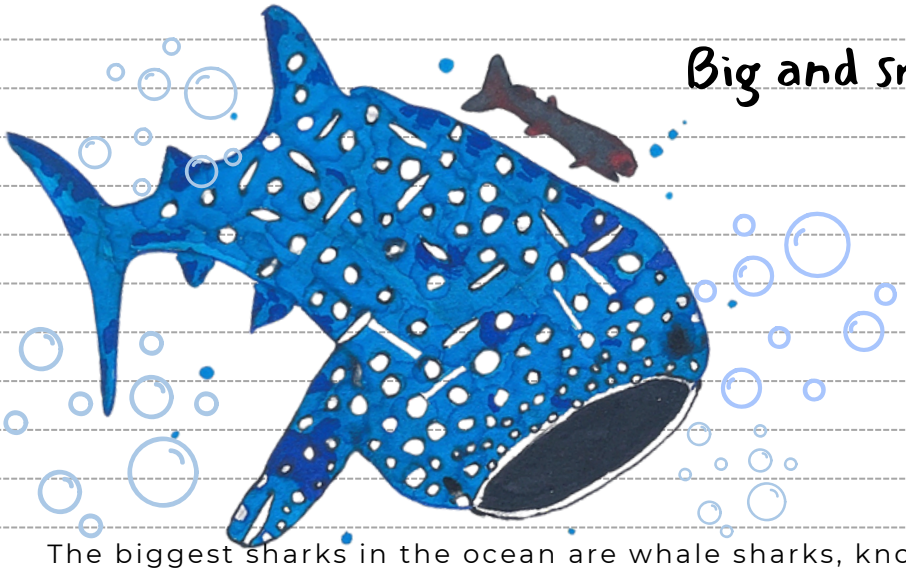
Water powers:

The bull shark is the only shark that can survive in freshwater as well as salt water. They have even been found in the Mississippi river and the Amazon river!

Big and small:



The biggest sharks in the ocean are whale sharks, known for their beautiful dappled patterns and extraordinary size (39 feet on average)! Instead of using rows of teeth for chewing, whale sharks have mouths that open up and let in gallons of water. The water is filtered through their gills, leaving small plankton, (like krill) behind. This process is known as filter-feeding, which two other kinds of sharks also use: megamouth sharks, and basking sharks. Filter feeding allows sharks to consume large amounts of food with little effort. These kinds of big sharks are found all around the world.

The smallest shark is the dwarf lantern shark, which is smaller than a human hand! Little is known about this mysterious shark, as it dwells very deep in the sea.

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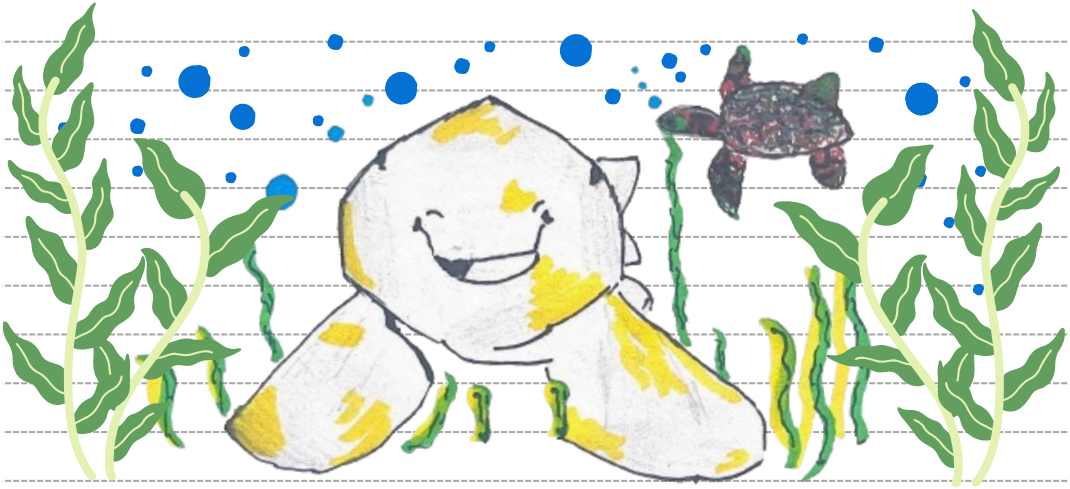
Importance of Sharks in our Ocean

Sharks are imperative members of ocean ecosystems: without sharks present in the ocean, ecosystems would fall apart! Sharks hold many roles in ensuring ocean health, from being top predators, to acting as clean-up crew, to promoting biodiversity in their ecosystems. Each individual shark has a role to play in our ocean, and all are of great importance to the wellbeing of our world.

Top predators:

Many species of sharks are regarded as apex predators (meaning they are at the top of the food chain!), because they have very few natural predators. As top predators, sharks are in charge of keeping prey populations in check. They remove the weak and the sick, and ensure balance and equilibrium in their ecosystems. This promotes biodiversity and health for all.



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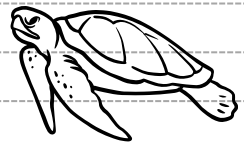
Clean-up crew:



Sharks indirectly maintain seagrass and coral reef habitats, which thousands of ocean creatures call home. If sharks were taken out of coral reef ecosystems, larger predator fish populations would increase dramatically, lessening the amount of small herbivores in the food chain. With fewer herbivores, algae would take over the ecosystem, affecting the survival of the reefs! Tiger sharks in Australia scare sea turtles away from seagrass meadows, preventing them from overeating. Plummeting shark numbers means more seagrass depletion, which, once destroyed, lets out blue carbon, (carbon found in plant life in the ocean), contributing to global warming. Without sharks' regulation, our atmosphere would be susceptible to a lot more greenhouse gases.

Biodiversity promotion:

Another way sharks assist is by supplying ecosystems with rich nutrients through…..excretion. Sharks dive to feed on deep water animals, and then swim to shallow waters and deposit nutrients. An example of this is with grey reef sharks, who transport nitrogen to coral reefs in need, ensuring they continue to thrive and support marine life.

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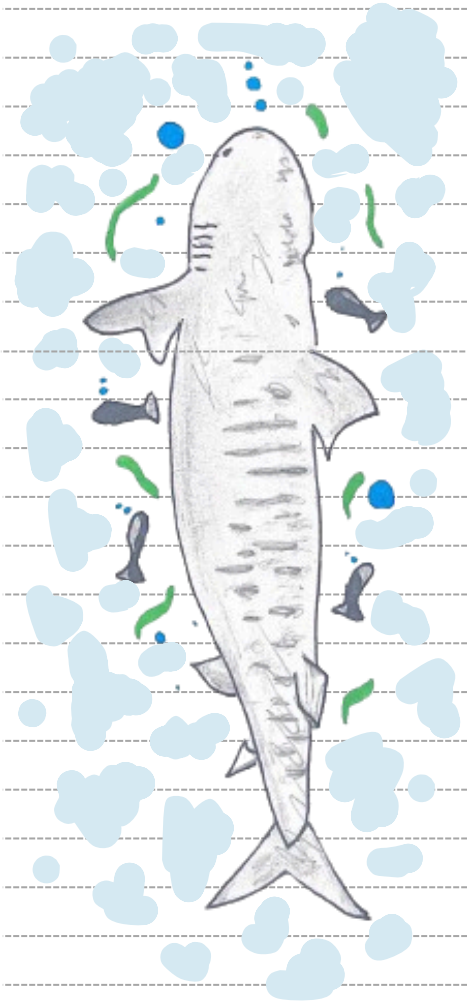
Threats Sharks Face



As resilient and tough as these animals may seem, they're facing some big problems. Every year, a huge number of sharks - around 73 million - are killed in pursuit of their fins. Shark fin soup is considered a delicacy in Taiwan and South East Asia. Though it's against the law in many places, this practice still poses a massive issue to shark populations. Only 2-5% of the shark is used before the shark is tossed back into the ocean to ultimately die.

The International Union for Conservation of Nature now claims that a third of all shark and shark-like species (like skates and rays) are threatened with extinction. (Oceana, 2015).

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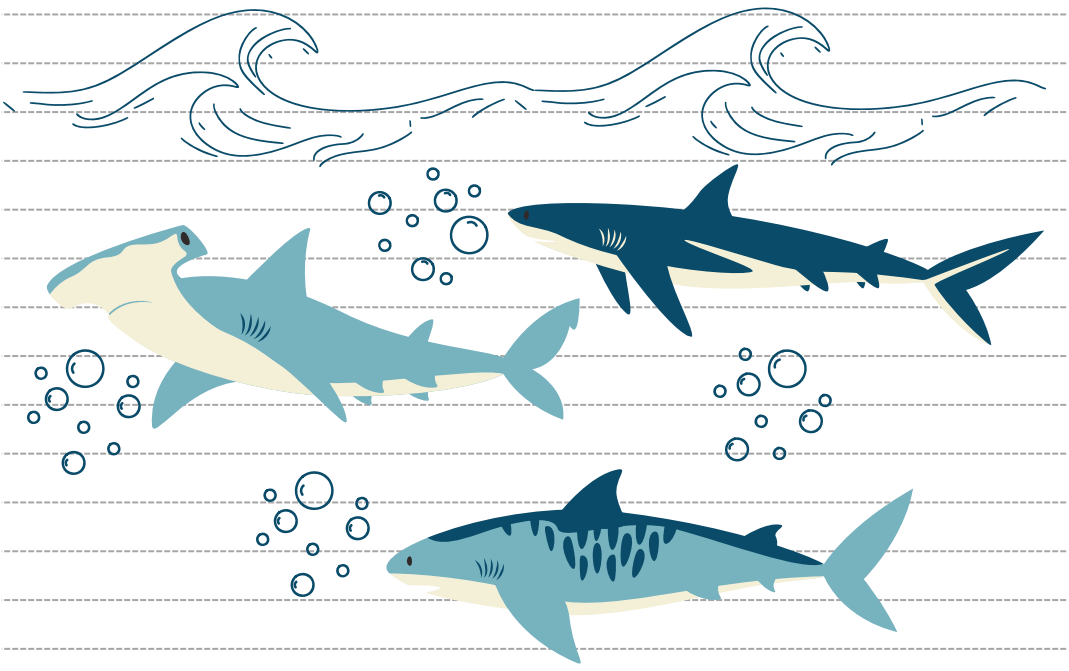
Sharks also face an extreme amount of fear stemming from peoples' lack of education and understanding. The vast majority of sharks are extremely independent, choosing to live out their lives far away from human interaction. When shark bites happen, it is usually due to curiosity or pure confusion; sharks never intend to harm humans. Out of 500+ species of sharks, only 3 sharks are said to be more "aggressive" than the rest (bull sharks, white sharks, and tiger sharks), and even with them you are more likely to be struck by lightning than bitten! Sharks are intelligent and incredible creatures, who are quite unlike how they are depicted in films, and we must respect and protect them.



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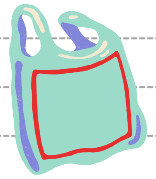
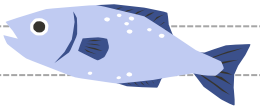
How Can We Keep Sharks Safe?

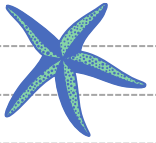
→ Choose seafood options that promote sustainable fishing/limit over-fishing





→ Reduce single-use plastics

→ Participate in ocean cleanups to keep our beaches clean and reduce garbage build-up in the sea



→ Donate to conservation initiatives

→ Educate others on the impact sharks have on ocean health!

As we've learned, sharks have extraordinary abilities and are responsible for keeping our ocean healthy and teeming. They are utterly amazing creatures, who deserve our utmost respect and protection!

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Your turn!

Use this space to observe the wonders around you! Whether you're in a city, the forest, or by the sea, jot down what you see and hear! Are there bugs crawling? Birds chirping? Waves crashing? Leaves falling? Every observation, big or small, can help us appreciate and understand the world around us.

Happy exploring!

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About the Author & Illustrator

Isabelle Brousseau is a Grade 12 high school student, with plans to attend Memorial University after graduation. There she will study marine biology, which has been her passion ever since she first stepped foot on the beach. Born and raised in the Maritimes, Isabelle has spent countless summers at beaches all over Nova Scotia, New Brunswick, and Prince Edward Island. She is also an avid reader and writer, who through the Ocean Wise Youth To Sea program, was able to accomplish her dream of publishing a novel. This book is a labour of love to a species she hopes to dedicate her future to: sharks.

Isabelle, Age 4

Sharks!

A dive into information and conservation.

Dive into the captivating world of sharks as this book brings the underwater world to the surface! This engaging children's book unveils the diversity of shark species, their crucial role in ecosystems, and the need for conservation. Styled like a notebook, this book is perfect for young explorers and inspires a love for marine life!

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