

# Food chains & ecosystems

## Self-guided learning

This guide provides you with information linked to key displays throughout Kelly Tarlton's SEA LIFE Aquarium that can be used to explore food chains & ecosystems during your visit. By drawing out the points included in this guide you will be able to introduce or recap on the key learning outcomes and provide students with a fantastic real life context for learning.

## Education Room

You may like to book a session with an educator for the end of your visit, to explore any questions that have arisen about our creatures at Kelly Tarlton's SEA LIFE Aquarium. Please speak to our reservations team when you book to arrange a suitable time. Alternatively, you may want to explore your questions back in your own classroom and email our Education Team later for help.

## Other topics in this series:

- Behaviour
- Habitats & Adaptations
- Conservation

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## Learning objectives

### By completing this tour students will:

- Understand the terms 'food chain' and 'ecosystem'.
- Learn that animals perform different roles in their specific ecosystems.
- Understand that animals and plants need to remain balanced in their ecosystem and that imbalances can cause problems for all connected organisms.
- Be able to identify the sequence of organisms in the rockpool food chain.



# SEA TURTLES

## Visit Area: SHIPWRECK DISCOVERY TUNNEL

The only turtles you will see on display at Kelly Tarlton's SEA LIFE Aquarium (if any) are rescued turtles. The turtles will often drift here from the warmer Pacific Ocean waters via ocean currents, after they have become too weak to swim against them. There are seven species of sea turtles, but sadly, six of these species are now either endangered or critically endangered.



## Questions:

### What do we know about reptiles?

Reptiles are cold blooded. This means they need to stay in a warm environment to keep their body temperature up. To help keep warm, most sea turtles live in warm tropical waters.

### How long do you think a Green Sea Turtle can stay underwater for?

When they are swimming around being active, Green Sea Turtles need to visit the surface for air every few minutes but when they are resting, they can stay underwater for up to 5 hours!

### Some Green Sea Turtles can live for over 100 years and weigh 200kg. What do you think they eat to get as big as this?

As herbivores they eat plants that can be found on the sea floor but they also occasionally eat small animals like jellyfish, crabs and fish.

### Do you think Green Sea Turtles spend all of their time in the water?

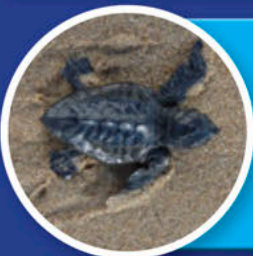
No, female Green Sea Turtles don't. Every 3 to 6 years they make their way to an isolated beach where they dig a deep hole with their flippers and lay their eggs – between 200 and 300 at a time! Sometimes they have to swim huge distances to arrive at the correct beach.

### FACT

A tagged Green Sea Turtle was recorded to have travelled around 6,000 miles across the Pacific from Mexico to her birthplace in Japan in 368 days!

### FACT

Some turtles can live for more than a year without food!



## Activity: What's for dinner?

Sea Turtles all have different bodies to suit their type of feeding. Match the heads with the type of food they eat on the Exploration Sheet.

**PROTECT**

## You can help!

Sea turtles often mistake plastic bags floating in the sea for jellyfish. Thousands die every year choking on these plastic bags. It's very important we use a 'bag for life' not a plastic bag.



Name: \_\_\_\_\_

# Find out about food chains & ecosystems

## Rockpool food chain

Can you place the animals below into the correct order in the food chain?

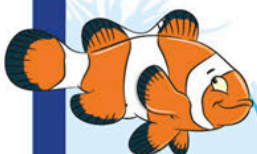
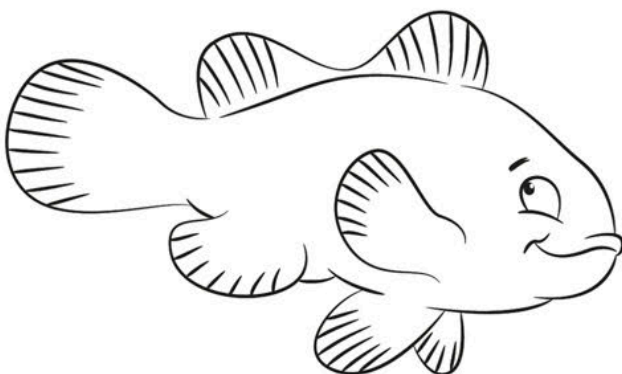
Who is top of the rockpool food chain?



<p> <b>Mussels</b></p> <p> <b>Sun</b></p> <p> <b>Plankton</b></p> <p> <b>Crab</b></p> <p> <b>Starfish</b></p>	<p>START - Bottom of food chain</p>	
<p>END - Top of food chain</p>		

## Colourful clownfish

Draw the pattern you see on the clownfish.



My bright colours attract prey to the anemone.

## Penguin Pose

Measure yourself against the penguin wall display to see which penguin you are closest to in height. Draw this penguin species below and record the species and average height:

Species: \_\_\_\_\_

Height: \_\_\_\_\_

# Find out about food chains & ecosystems

## Which ray?

Write down the names of the ray species you found in Stingray Bay.



Which of my friends did you see?

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## Jellyfish anagrams

Unscramble these words about how jellyfish eat.

1. Jellyfish sting prey with their:



2. They gather up plankton using their:

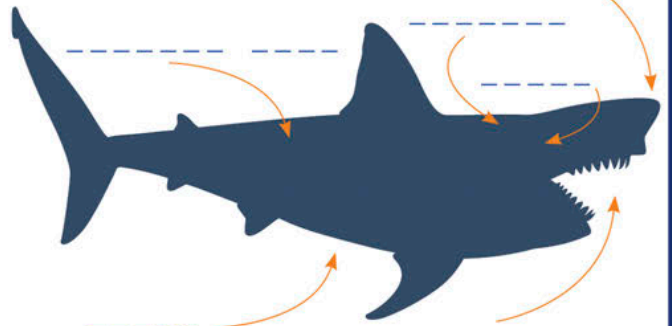


3. Food they catch is put into their:



Sharks have 7 senses!

## Seven senses



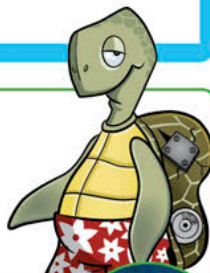
\_\_\_\_\_ & \_\_\_\_\_

Try and match each of the shark's 7 senses to the right part of its body. Some are more difficult than others!

- Sight
- Taste
- Ampullae of Lorenzini
- Touch
- Smell
- Hearing
- Lateral line

## What's for dinner?

Look at the heads of these different turtles and connect them to what they like to eat.



**Loggerhead**  
A huge head with powerful jaws for crushing food.



Jellyfish



**Green Sea Turtle**  
A saw-like beak for scraping food from coral and rocks.



Coral covered in algae



**Leatherback**  
A sharp beak for catching and piercing food.



Mussels



**Hawksbill**  
A narrow head and long beak for finding food in small gaps.



Sponges

# Introduction



Use the questions on this page to introduce the topic to students before starting your tour.

## Questions:

### What is an ecosystem?

An ecosystem is a group of living things that can all be found in one area.

### What types of living things could make up an ecosystem?

An ecosystem is made up of a mixture of plants and animals. These plants and animals normally rely on each other for food, protection or both. If one of the plants or animals starts to die out then this will affect all of the other living things that make up that ecosystem.

During our tour we are going to learn more about the way certain marine creatures depend on each other.

### What is a food chain?

A food chain is a way of describing who eats who in a certain environment. For example small insects are eaten by frogs and then frogs are eaten by rats. Food chains are linked to ecosystems because all the animals have to be found in the same area to interact with each other.

**So now we understand a bit more about ecosystems and food chains we can start our trip around Kelly Tarlton's SEA LIFE Aquarium and have a closer look at the different ecosystems in the displays.**

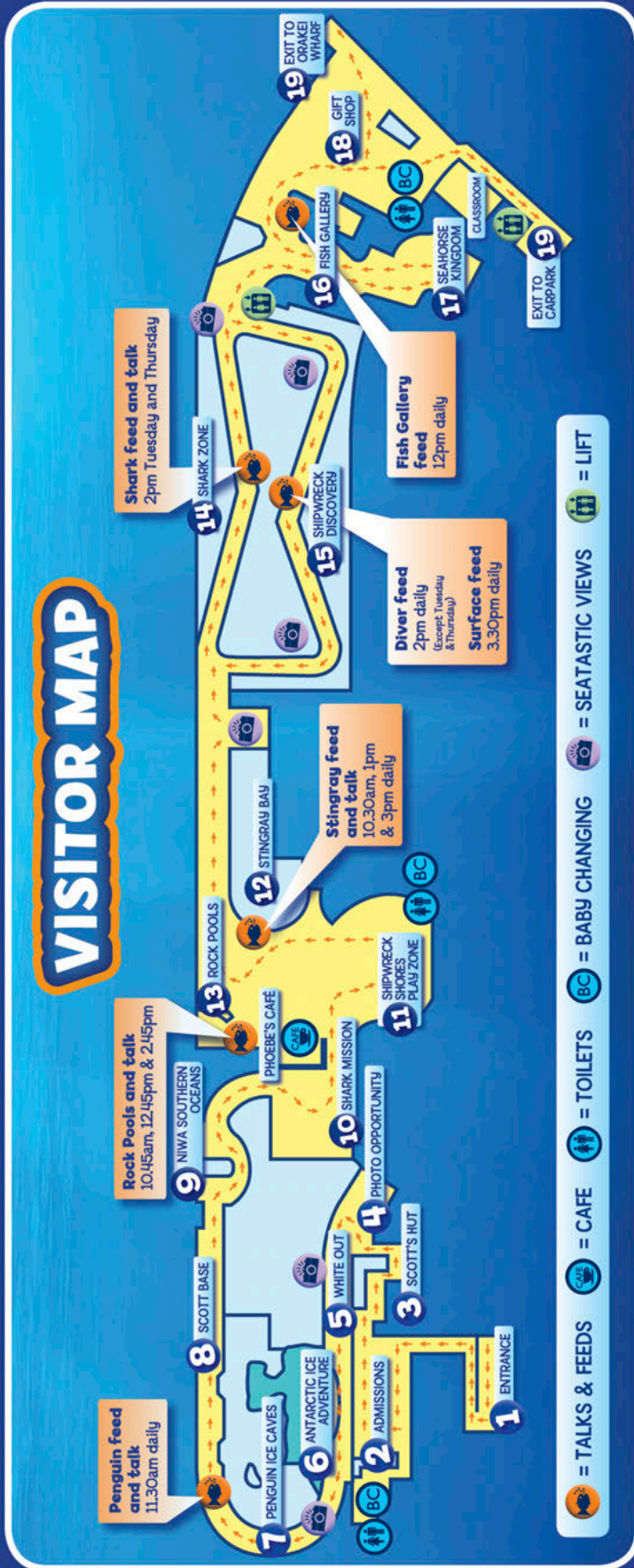
**Remember to hand out exploration sheets to each student - these will be needed for activities on the tour.**



# Teacher's map



## VISITOR MAP



# PENGUINS

## Visit Area: ANTARCTIC ICE ADVENTURE

The Gentoo and King penguins usually live in the snow and icy waters of sub-Antarctic islands. Their natural predators in the water are mainly sharks, seals and orca. In the wild, penguins would catch fresh fish daily. We feed them dead fish, but these are supplemented with vitamins once a day to make sure they receive enough nutrients.



## Questions:

### What is the normal food for the King and Gentoo penguins?

Sometimes King penguins will eat squid, but most often, they eat small swarming fishes. At night these fish come to the surface to feed but during the day they swim about 250m below sea level, so penguins must dive for them. Gentoos mainly eat krill, which in turn eat phytoplankton. Krill is also a main food source for baleen whales and seals.

### Do penguins have any natural land enemies?

Yes, giant petrels, Antarctic skuas, and predatory gulls all attack penguins.

### What is the conservation status of King and Gentoo penguins?

The Gentoo penguins are 'near threatened'. This means there is a threat of extinction in the near future. The King penguins are not threatened as yet. The Emperor and Adelie penguins from Antarctica

are in more danger than our sub-Antarctic species.

### What sort of problems have humans caused penguins in recent years?

Maybe the question should be, what problems haven't they caused penguins? Oil spills, over-fishing, the influence of Antarctic stations, global warming/ greenhouse gases, the ozone hole and tourism have all had a negative effect on penguin populations. Climate change affects penguin colonies through melting ice and warming water, which kills their food source (krill) and destroys or diminishes their environment. Ice fish are also a very important component of the local food chain, and with them being severely over-fished, the Antarctic food web could collapse.

**FACT**  
Tourists threaten penguin colony safety

**FACT**  
Fishing for krill threatens the food chain



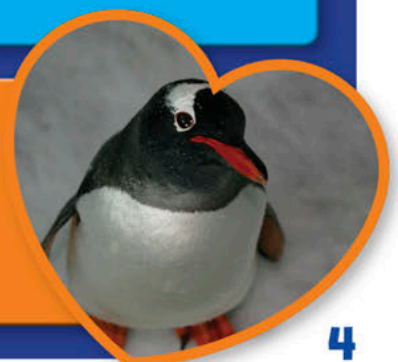
## Activity: Penguin Pose

Find out how tall you are compared to the King and Gentoo Penguins. Measure yourself against the height chart of penguin varieties on the wall. Make a line drawing of it on your exploration sheet, and record the penguin's species name and height.

**PROTECT**

## You can help!

Penguins can often be hurt by plastic rubbish and fishing nets in the ocean. Remember to keep our oceans clean and dispose of your rubbish wisely.



# JELLYFISH

## Visit Area: NIWA SOUTHERN OCEANS

Jellyfish are not actually fish - they have no blood, no heart and no brain. In fact, a jellyfish's body is 95% water. Species can be found in every ocean with some living in deep water and others preferring very shallow water.



## Questions:

### Why are jellyfish so important to many ecosystems?

Lots of animals eat jellyfish, making them an important part of the food chains in many different ecosystems. The Leatherback Sea Turtle survives nearly entirely on jellyfish.

### But what do you think jellyfish eat?

Jellyfish can eat small fish and crustaceans but mostly they eat plankton - tiny plants and animals which drift through the water. They use their long, poisonous tentacles to catch and kill their prey.

### If the conditions are right jellyfish can reproduce very quickly, leading to huge groups in one area. Why might this be a problem?

Like all animals jellyfish live in careful balance with the others in their ecosystem. Too many jellyfish all feeding at once may mean there is less plankton available for the other creatures that rely on it.

Jellyfish also eat fish eggs so if more are being eaten there is a greater risk that fewer fish will hatch.

### Do you think jellyfish pose a danger to humans?

Most jellyfish have very mild stings which are harmless. But some, like the Box Jellyfish from the waters around Australia, have a sting so strong that it can be fatal to humans that come into contact with it!

### FACT

There are about 200 species of jellyfish.

### FACT

Jellyfish have existed for 650 million years!

### FACT

A jellyfish uses its oral arms to sweep food into its mouth.



## Activity: Jellyfish anagrams

Ask students to solve the clues and unscramble the words describing how a jellyfish catches and eats its prey. The correct answers are 1. Tentacles 2. Oral arms 3. Mouth.

**PROTECT**

## You can help!

We can help by supporting campaigns to set-up Marine Conservation Zones across the globe.





# CLOWNFISH

## Visit Area: SHIPWRECK SHORES

Clownfish live on sheltered coral reefs found in the warm tropical waters of the Indian and Pacific Oceans. Within their habitat they find a very unusual place to hide - amongst the poisonous tentacles of sea anemones!



## Questions:

### What do clownfish eat?

Clownfish aren't fussy eaters, they are what's known as omnivores which means that they will happily eat meat and plants.

### Why would a clownfish choose to live amongst an anemone's tentacles?

As a small fish clownfish are low down the food chain, meaning there are lots of predators who want to eat them. By hiding in the anemone's poisonous tentacles they have added protection from predators.

### What do you think the anemone gets from this relationship?

Clownfish eat the harmful algae and parasites from the anemone's tentacles, helping it to stay healthy.

Some people have even suggested the bright orange colour of clownfish helps attract other fish towards the anemone – providing it with a meal in return!

### The two animals depend on each other, so what do you think would happen to the clownfish if the number of anemones went down?

If the number of anemones went down then the number of clownfish would go down too as they would have less food and protection.

**FACT**  
All clownfish are born male!

**FACT**  
If a female dies, a male clownfish in the group can change sex to take her place.



## Activity: Colourful clownfish

It is believed that the bright orange and white colours of the clownfish attract prey towards the anemone. Ask students to draw the pattern of the clownfish they see onto their exploration sheet.

**PROTECT**

## You can help!

Don't touch anything if you go snorkelling and never buy products made from coral or other marine creatures.



# RAYS

## Visit Area: STINGRAY BAY

Rays are strange flat looking creatures that use their wings to glide through the ocean. They live in oceans and seas all over the world, mostly on or near the seabed. Some species choose a habitat close to the shore, whilst others live over 3,000 metres beneath the surface in the deep ocean!



## Questions:

**Rays are known as 'consumers', meaning that they can't produce their own food. So what do you think they eat?**

Short and Long-tailed Stingrays all like to eat small bony fish, squid and crustaceans. Other larger species of ray like the Manta Ray are what's known as 'filter feeders'. This means that they swallow lots of water and then filter out tiny fish and plants known as plankton.

**How high up the food chain do you think rays are?**

Even the largest species of ray, the Manta Ray, has predators above it in the food chain. Rays are commonly eaten by active predators like the Hammerhead Shark, Great White Shark and Killer Whale.

**How do you think the flat shape of rays can help them catch food?**

Most rays use their flat bodies to float close to the

sea floor. This means that they can suck their food off the ground. Their flat shape also helps them to avoid predators by burying themselves in the sand.

**How do you think the colour of their skin helps them to survive in their habitat?**

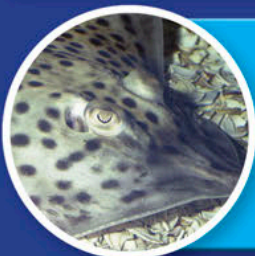
The brown and olive colouring on their skin helps to camouflage them once they settle on the ground. This makes them invisible to predators.

**Do you think rays always use their eyes to hunt?**

Scientists don't think so. Rays use special sensors called ampullae of Lorenzini, which can detect the tiny electrical charges given off by their prey.

**FACT**  
Rays are a member of the shark family.

**FACT**  
A Manta Ray can weigh up to 1,300kg. That's the same as a young elephant!



## Activity: Which ray?

Ask students to look at the information boards around the display and try to identify the different species of rays. Discuss how they differ.

**PROTECT**

## You can help!

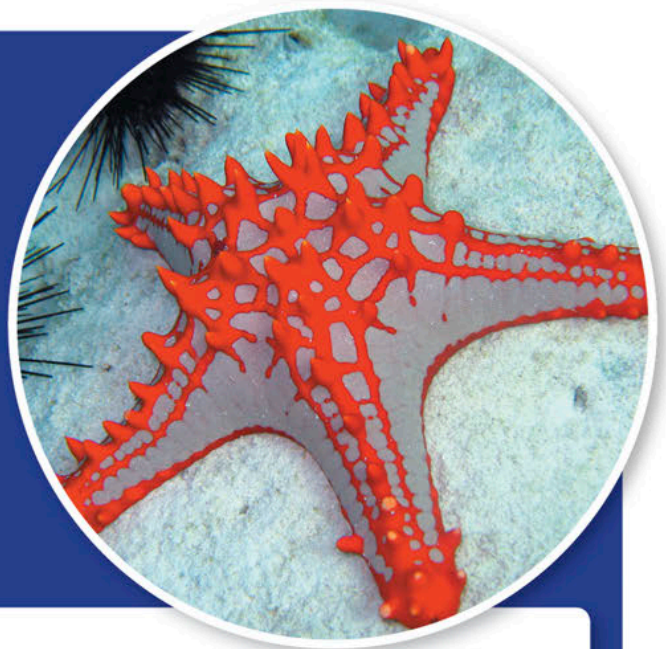
We can help by supporting campaigns to set-up Marine Conservation Zones across the globe. Try to avoid eating skate as it's an endangered species of ray.



# ROCKPOOL

## Visit Area: ROCKPOOL

Rockpools are very difficult places for creatures to survive - with huge waves, strong currents, changing water temperatures, harsh sunlight and lots of predators! Creatures commonly found in this habitat include starfish, anemone, crabs, kina and Spotties.



## Questions:

### Looking at the rockpool ecosystem, which creature is most common?

The most common creature is actually one we can't see without a microscope – plankton. Plankton is made up of the smallest animals and plants in the sea and floats around wherever the current takes it!

### Why is something as tiny as plankton so important to the food chain?

Plankton is very important to the food chain because it can turn sunlight into chemical energy (in a process called photosynthesis). Because of this, plankton is known as a primary producer.

### What do you think eats plankton?

Mussels eat plankton. They feed by opening their shell a little, sucking in water, filtering out the tiny plankton and then releasing the water again. Their tough shells help mussels to protect themselves from predators, but that doesn't stop all creatures from managing to eat them!

### Which animal in the rockpool do you think likes to eat mussels?

Starfish eat mussels and they do it in an unbelievable way! The starfish uses the suckers under its arms to pull open the mussel's shell. Then it pushes its stomach inside and covers the mussel until it dissolves. If the mussel is diseased or poisonous the starfish can detach its stomach and grow a new one!

### What do you think would happen to this ecosystem if all the mussels were removed?

Without mussels in the food chain starfish wouldn't have enough food to survive. If the starfish started to die out this would also affect the amount of food available to the crab. So we can see that each creature in the food chain is crucial to the survival of the whole ecosystem.

**FACT**  
If the Sea Anemone is not eaten or destroyed it can live for decades.



## Activity: Rockpool food chain

Ask students to put the rockpool food chain in the correct order on their exploration sheet. Students can then touch creatures under the guidance of a SEA LIFE expert.

**PROTECT**

## You can help!

We should always take our litter home after we've visited the beach. We should also be respectful of any animals we might find in a rockpool and make sure that they are never disturbed.



# SHARKS

## Visit Area: SHARK ZONE

There are over 350 species of shark in the world, living in all kinds of different habitats from warm tropical waters to icy polar seas. Some live in the deep, dark waters of the ocean, while others prefer sunlit waters close to the surface.



## Questions:

**The gigantic Whale Shark can grow up to 14 metres long! That's about the same length as a large double decker bus! What do you think a shark as big as this eats?**

Bizarrely this shark eats the oceans' smallest animals – plankton (tiny animals and plants that float around in the ocean). Whale Sharks swallow lots of water and then filter all the plankton out before the water passes out through slits on their side called gills.

**The Sevengill Shark prefers shallow coastal waters to the deep ocean. What do you think they prefer to eat?**

Sevengill Sharks like small bony fish, squid and octopus. Lots of people are scared of sharks attacking them, but only Great White, Bull and Tiger Sharks can be considered actively dangerous. Even attacks by these species are generally thought to be cases of mistaking humans for more common prey like seals.

**Where do you think most sharks appear on the food chain?**

Most sharks are 'apex predators'. This means that they are at the top of the food chain so they don't have to worry about being eaten by other animals. But believe it or not, even sharks have predators in some waters – like Killer Whales!

**Humans have 5 senses - sight, smell, hearing, touch and taste. How many senses does a shark have?**

A shark has 7 senses. The small freckles on the end of its nose are called the ampullae of Lorenzini and allow the shark to sense the electrical currents given off by other animals. Like most fish, sharks also have something called a lateral line that helps them detect movement in the water.

**FACT**  
Great White Sharks eat 11 tons of food a year. That's roughly the same weight as a bus!



## Activity: Seven senses

Sharks are incredible hunters. Their sense of smell is 10,000 times better than a human's and their other senses are pretty amazing as well. Ask students to link each sense to the relevant organ on their exploration sheet.

**PROTECT**

## You can help!

We can help sharks by supporting campaigns to set-up Marine Conservation Zones across the globe. We should also never buy products made from sharks or eat shark fin soup.

