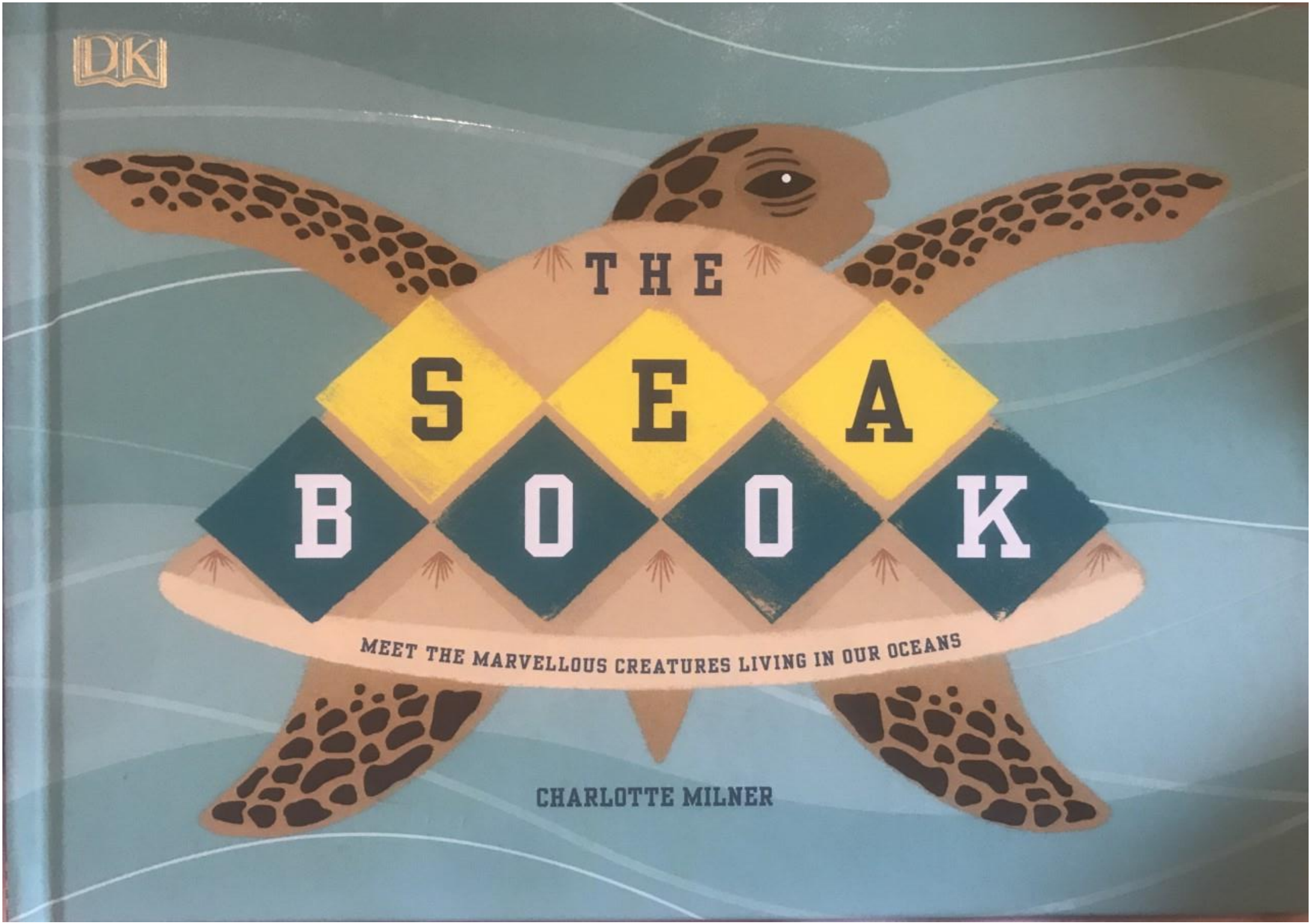

DK
THE
SEA
BOOK
MEET THE MARVELLOUS CREATURES LIVING IN OUR OCEANS
CHARLOTTE MILNER

WHAT DOES THE BOTTOM OF THE SEA LOOK LIKE?

Far from being flat, the sea floor is actually similar to the landscape we see above the waves. In the oceans, there are erupting volcanoes, deep trenches, and mountains taller than Mount Everest, the highest peak on land.

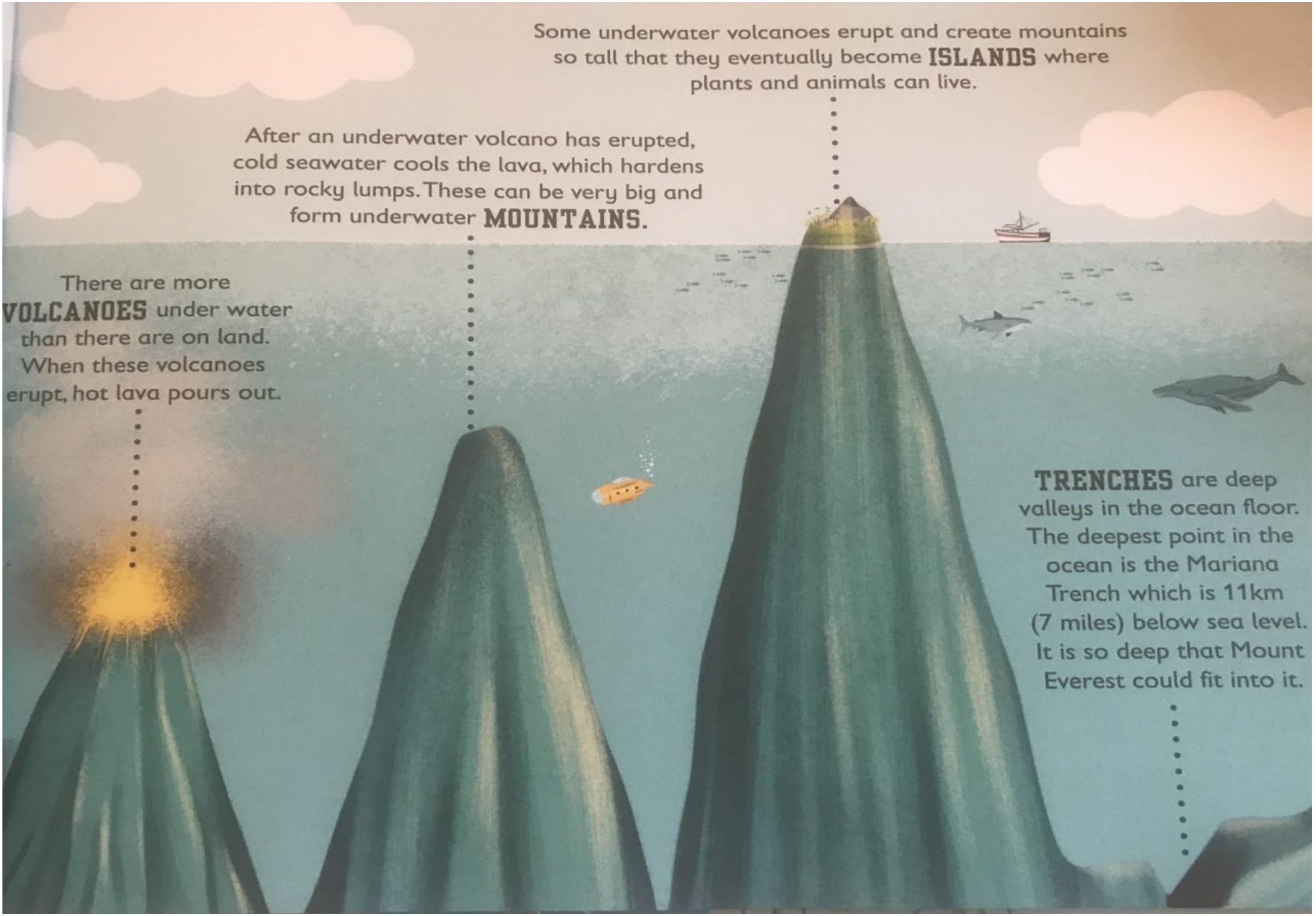
The sea is separated into four different zones:

SUNLIT ZONE – Many plants and sea creatures need warmth and light from the Sun to survive, so they live here, close to the surface.

TWILIGHT ZONE – Very little sunlight reaches down into water below 200m (650ft), so you won't find plants here. There are still plenty of animals, however, and many swim up to the sunlit zone at night to find food.

MIDNIGHT ZONE – Even though it is pitch black and cold, there are still fish and jellyfish living here, though fewer than in the zones above.

THE ABYSS – The deepest and darkest parts of the ocean are something of a mystery as few scientists have been able to explore water this deep. But some strange creatures have been found here.

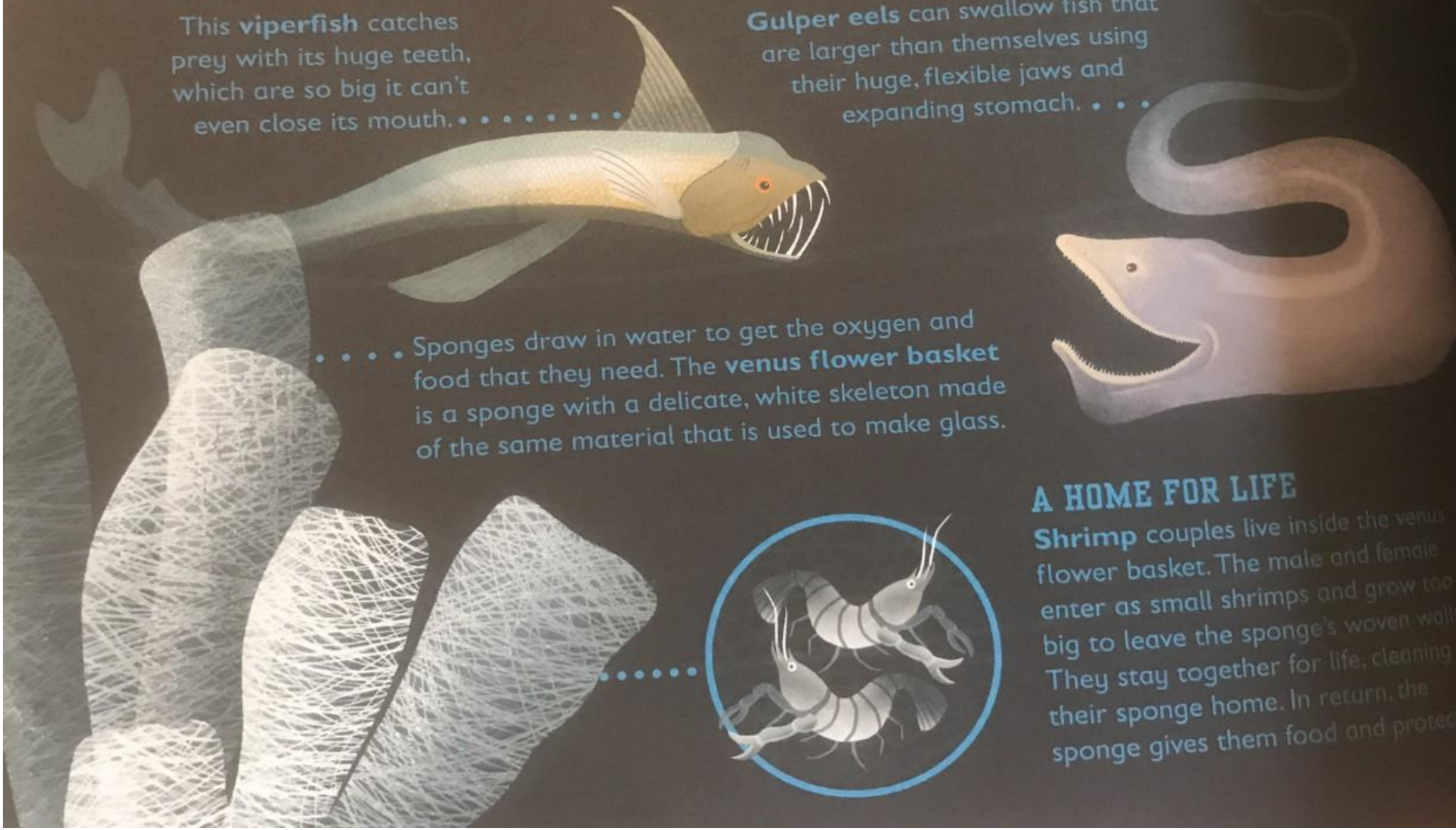

Some underwater volcanoes erupt and create mountains so tall that they eventually become ISLANDS where plants and animals can live.
After an underwater volcano has erupted, cold seawater cools the lava, which hardens into rocky lumps. These can be very big and form underwater MOUNTAINS.
There are more VOLCANOES under water than there are on land. When these volcanoes erupt, hot lava pours out.
TRENCHES are deep valleys in the ocean floor. The deepest point in the ocean is the Mariana Trench which is 11km (7 miles) below sea level. It is so deep that Mount Everest could fit into it.

DARK AND DEEP

Deep in the ocean is a place like no other. Here, there is no natural light, it is very cold, and the weight of the water above creates immense pressure. Like a different planet, we have barely begun to explore the deep ocean and the strange creatures that live there.

This **viperfish** catches prey with its huge teeth, which are so big it can't even close its mouth.

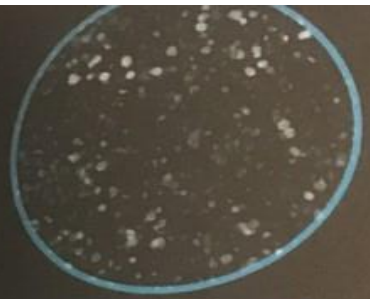
Gulper eels can swallow fish that are larger than themselves using their huge, flexible jaws and expanding stomach.



Sponges draw in water to get the oxygen and food that they need. The **venus flower basket** is a sponge with a delicate, white skeleton made of the same material that is used to make glass.

A HOME FOR LIFE

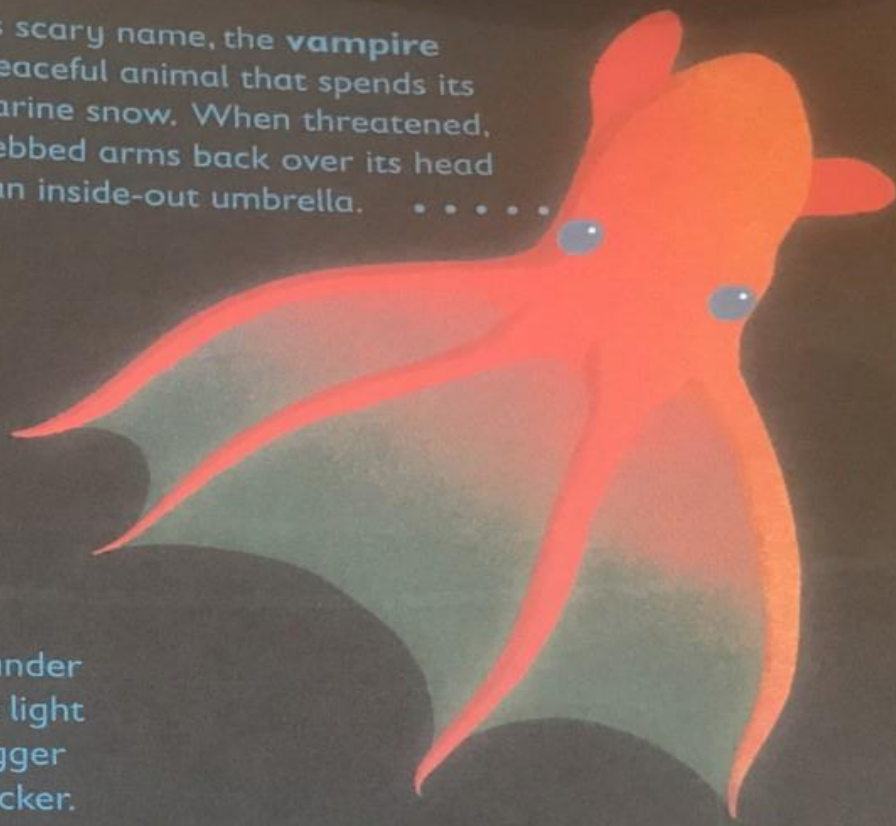
Shrimp couples live inside the venus flower basket. The male and female enter as small shrimps and grow too big to leave the sponge's woven walls. They stay together for life, cleaning their sponge home. In return, the sponge gives them food and protection.



DOES IT SNOW UNDERWATER?

No, but the remains of marine creatures sink from waters above like a shower of snowflakes. This is called **marine snow**.

Despite its scary name, the **vampire squid** is a peaceful animal that spends its life eating marine snow. When threatened, it turns its webbed arms back over its head like an inside-out umbrella.



When the **atolla jellyfish** is under attack, it puts on a magnificent light display. This attracts other, bigger animals that may eat the attacker.

Some animals glitter and glow in the darkness. This ability to create light is called **BIOLUMINESCENCE**.

The **anglerfish's** fin extends over its head and acts like a fishing rod with a "glow" on the end to lure prey into its big mouth.

The **venus fly trap anemone** uses its tentacles to trap marine snow and small creatures to eat.

CORAL REEF CITY

Coral can be found in the tropics, where the seawater is warm, clear, and shallow. Like buildings in an underwater city, coral provides homes for thousands of marine animals. Coral reefs are bursting with so much life that scientists are discovering new species of animals there all the time.

WHAT IS CORAL?

While it might look like a plant, coral is actually made up of lots of tiny animals called polyps.

Polyps look like tiny anemones. Many of them live close together and make each large, rocky coral structure.

THE DAY SHIFT

In the day, the coral reef residents are out searching for food while dodging predators. Coral provides food for many colourful fish, as well as a place for them to hide.

Some **parrotfish** feed on coral. They have strong, joined teeth like a bird's beak. Parrotfish use this "beak" to grind up the hard, rocky coral.

These **butterflyfish** spend their days nibbling at coral and searching for a partner who they will stay with for life.

Angelfish have flat bodies for hiding in the narrowest of gaps.

Male adult angelfish are territorial. Young angelfish have different colours and markings so that the male adults don't confuse them with an adult rival who they might chase away.

THE NIGHT SHIFT

Like a game of hide and seek, daytime colourful fish hide in the coral at night where they can sleep without being seen. Hungry reef sharks and other night-time predators are the "seekers". They come out at night to look for food.

Whitetip reef sharks eat fish, octopus, and crab. They have slender bodies to wriggle into narrow spaces and grab prey.

Squirrelfish come out of hiding at night. Their large eyes help them to spot prey in the dark.

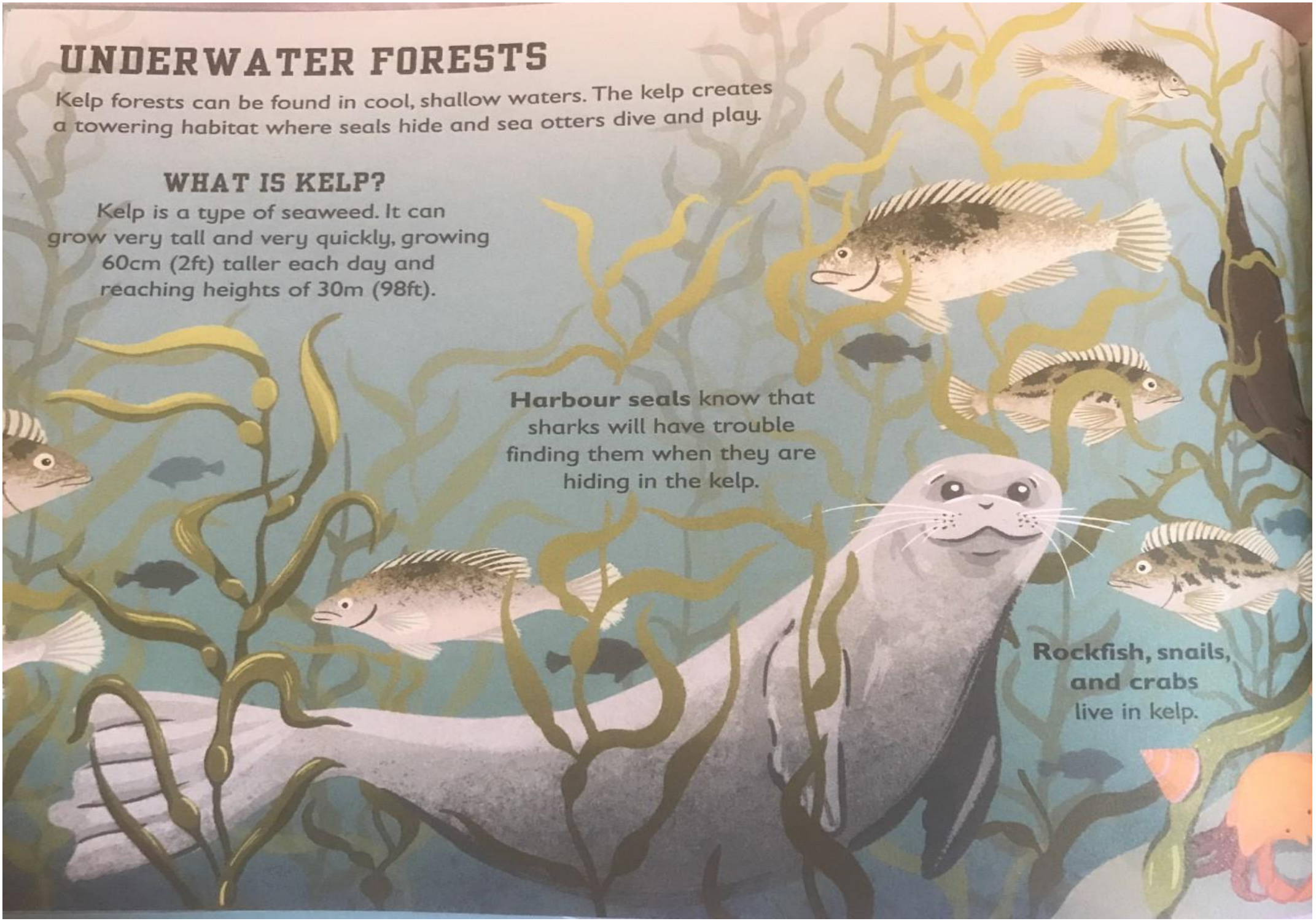
At night, parrotfish create slimy cocoons that they sleep in. This might help stop predators from smelling and finding them.

UNDERWATER FORESTS

Kelp forests can be found in cool, shallow waters. The kelp creates a towering habitat where seals hide and sea otters dive and play.

WHAT IS KELP?

Kelp is a type of seaweed. It can grow very tall and very quickly, growing 60cm (2ft) taller each day and reaching heights of 30m (98ft).



Harbour seals know that sharks will have trouble finding them when they are hiding in the kelp.

Rockfish, snails, and crabs live in kelp.

Sea otters dive down to find purple urchins – their favourite food.

WITHOUT OTTERS, urchins are without their main predator, so their numbers rise. In the past, when otters have been hunted, urchins have eaten away and destroyed many kelp forests along the North American coast.

Sea urchins are animals that eat lots of kelp. They have spikes for protection.

WITH OTTERS around, urchins stay under control. Today, sea otters are protected on the North American coast, and their numbers are rising. This means the kelp forests are recovering too, giving shelter and food to lots of other animals.

WHAT IS THE BIGGEST FISH IN THE SEA?

Whale sharks are the biggest fish in the sea, but their favourite meal is the smallest of sea creatures – plankton. Whale sharks belong to a group of fish with a fierce reputation, but these huge **SHARKS** are gentle giants.

Whale shark

Sharks don't have hard bones in their bodies. Instead, they have **CARTILAGE**, which is much lighter for swimming. You can find cartilage in your own ears and nose.

The whale shark can grow 15m (50ft) long, maybe longer.

MEET THE SHARKS

Not all sharks look like the famous great white. There are over 500 species and they all look very different.

Goblin shark

Great white shark

Zebra shark

All sharks are meat-eaters and their super senses, especially their fantastic sense of **SMELL**, make them experts at finding prey.

Sharks have **EARS** inside their bodies, but their hearing is much better than ours.

Most sharks have five pairs of **GILLS**, but a few have six or seven. Some sharks, like the whale shark, have to keep swimming to breathe.

Young zebra sharks are striped but the adults are spotty.

Angel shark

Wobbegong shark

RIGHT TOOL FOR THE JOB

These sharks have some strangely shaped heads that help them to find and catch prey.

Hammerhead sharks pin down stingrays with their T-shaped heads. Their wide-set eyes give them excellent vision.

Sawsharks slash fish with their saw-like snout and sharp teeth.

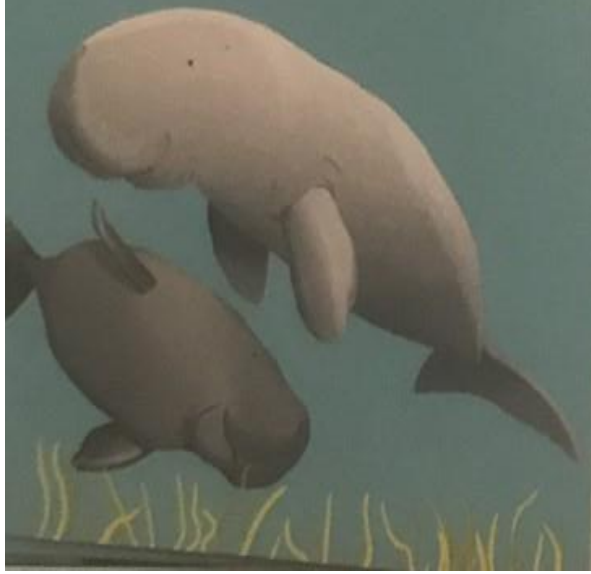
Cookiecutter sharks bite chunks out of large fish and dolphins, leaving them with a cookie-shaped bite mark.

MEET THE MAMMALS

Most mammals give birth to their babies, need air to breathe, and are warm-blooded. This group of animals, which includes humans, is mostly found on land, although some mammals live in water. Aquatic mammals have **fins** and **flippers** for swimming, and thick, fatty **blubber** or special fur to keep them warm.

DUGONGS

Also known as sea cows, dugongs spend their lives grazing on sea grass. These peaceful plant-eaters greet each other with kisses and keep their calves close to them for two years.



BALEEN WHALES

Whales that don't have teeth are called baleen whales. Instead of using teeth to eat its food, a baleen whale has a mouth like a sieve, which filters food from the water.

A **blue whale** is a type of baleen whale and is the biggest animal in the world. It can grow up to 30m (100ft) long. That's even longer than the biggest dinosaur.

All whales come up to the water's surface to breathe through their blowholes.

Baleen plates look a bit like broom bristles. They trap plankton and small fish in the whale's mouth while letting water back out.

Blue whales are very loud. They can hear each other's calls from 1,500km (930 miles) away.

Dolphins

An **orca** is a type of dolphin.

TOOTHED WHALES AND DOLPHINS

Some whales have teeth and eat fish, squid, and mammals. Dolphins are small, toothed whales that live together in groups called pods. A pod of dolphins talk to each other in clicks and squeaks. They work together to find food, and help one another when one of them is sick or injured.

A LIFE ON THE ICE

The North Pole is located in the middle of the Arctic Ocean where it is extremely cold. Here lots of seawater freezes, making floating blocks of ice called **PACK ICE**. This floating ice is home to many marine animals. The **FOOD CHAIN** below shows how Arctic animals depend on the ice and each other for food and survival.

Plankton grows in and on the under-surface of pack ice.

Krill are small, shrimp-like animals that eat plankton.

Cod and lots of other fish eat krill.

Narwhals and **beluga whales** are types of toothed whales.

A narwhal has a single, long tusk, which is why it has become known as the unicorn of the sea.

Ringed seals have strong claws to make breathing holes in the ice.

Baby walruses and seals are called **pups.** Their mothers look after them on the ice.

Walruses have huge tusks, which they use to pull themselves out of the water and onto the ice.

Seals and other mammals like beluga whales and narwhals eat the fish.

Polar bears are at the top of the Arctic food chain. They hunt from the ice, looking for seals to eat.

Polar bears are good swimmers with a strong sense of smell. They can sniff out food below a metre of snow.

CHANGING SEAS

The sea is getting warmer. This changes habitats and makes it difficult for marine animals to survive.

WHY IS THE SEA GETTING WARMER?

To make electricity and use vehicles, we burn fossil fuels such as oil. Burning these creates a gas called **carbon dioxide.**

If there is lots of carbon dioxide in the atmosphere, planet Earth gets warmer. This is called **global warming.**

Global warming heats up the sea too and this can be harmful to the plants and animals that live there.

Find out how global warming can affect the lives of some familiar animals...

MELTING ICE

As the sea gets warmer, it melts sea ice, destroying the homes of polar animals. This polar bear depends on sea ice for raising her young and hunting for seals. Without sea ice, she will find it hard to catch seals to eat.

SEA LEVELS RISING

When polar ice melts, it creates more water, making sea levels rise. If this continues to happen, it could mean that many beaches become submerged. This sea turtle has travelled far to lay her eggs on the same beach where she hatched. She can't find the beach because it is now under water.

WHITE SEAS

Warmer seas can make corals turn white, causing it to be very unhealthy, or even die. This is called coral bleaching. These parrotfish can't find food because the coral they like to nibble on is bleached. Like the parrotfish, lots of other animals on the reef will struggle to find food too.

PLASTIC PROBLEMS

If we don't get rid of rubbish properly by recycling it or putting it in a bin, it can end up in the sea. Light plastic is a particular problem because the wind blows it into rivers and seas. Sadly, tonnes of rubbish, including plastic, has already got into the sea and it is harming marine life.

Plastic takes a very long time to break down. So when plastic gets into the sea, it can stay there and harm animals for many years, even if it breaks into tiny pieces.

Albatrosses snap up food from the sea's surface. They accidentally catch plastic too and feed it to their chicks.

Leatherback sea turtles eat plastic bags by mistake because they look a lot like their favourite food – jellyfish.

Many marine animals mistake plastic for food. If they eat a lot of plastic, it can block their stomachs. This stops them from feeling hungry and means they could starve.

After a long time, plastic does break into smaller parts. But these tiny bits of plastic get mixed up with plankton.

When plankton-eating animals swallow plastic, it then gets inside the meat-eaters who eat the plankton-eaters, eventually affecting the entire food chain.

Animals can get stuck in plastic bags and fishing nets. This can prevent them from being able to breathe or catch food.

HOW CAN YOU HELP?

With the sea getting warmer, overfished and littered, it can all seem very scary. But when everybody does a little bit to help, we can make a big difference.

Go on a beach clean-up walk to pick up rubbish. Taking just two minutes to pick up litter will really help. Just remember to use gloves and have an adult's help.

Take litter home from the beach and recycle what you can.

The more we know about sea animals, the more we want to protect them. Visit the seashore, read about marine life, and share what you learn with your family, friends, and classmates.

Shells are homes to animals like the hermit crab. Leave plenty of shells on the beach and never buy shell souvenirs.

LIVE WITH LESS PLASTIC

We once lived in a world where plastic didn't exist, but now we find it almost everywhere. It is very challenging to cut plastic out of our lives completely, but we should recycle what we do use. There are lots of simple ways to use less plastic and to reduce the amount that gets into the sea.

Carry a reusable water bottle with you. Fill it up on-the-go to avoid buying drinks in plastic bottles.

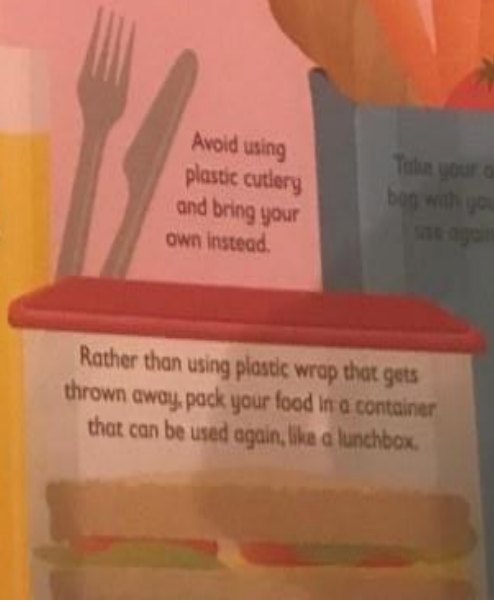
Say no to plastic straws. You might not need one or you can use paper straws instead.

When you are out food shopping, help choose foods without packaging. Fruit and vegetables don't need to be in plastic, so just pick them up loose instead.

Take your own shopping bag with you that you can use again and again.

If you want to buy a hot drink when you're out, take a reusable mug with you. A lot of paper cups have a plastic lining that makes them difficult to recycle.

Avoid using plastic cutlery and bring your own instead.



Rather than using plastic wrap that gets thrown away, pack your food in a container that can be used again, like a lunchbox.