



OUR SEAS

Whether our homes are near or far from the sea, our lives depend on our planet's oceans. Covering about 70% of the earth's surface, our seas supply half the oxygen we breathe, and provide food and livelihoods for more than a billion people.

They are also home to a wondrous array of wild species, from tiny plankton to the biggest creature that's ever existed – the blue whale. There are known to be more than 260,000 different species living in the seas, and we know that there are many yet to be discovered. Some scientists believe there are more than a million species in the seas, though human activity is driving some to extinction before we have had a chance to study them.

COASTAL SEAS

Although they make up only 10 per cent of the ocean, these shallow waters of coastal seas (within 230 km of land) are home to 90 per cent of all marine species. Here sunlight reaches the sea floor, so plants can grow. These provide food for animals, protection from predators and a safe place for animals to breed and raise young. The coastal seas are made up of many different ecosystems including coral reefs, river estuaries, rock pools, salt marshes, mangrove forests and fields of underwater sea grasses.

Every species in a coastal sea community is important to the rest. If one is taken away, it can cause big problems for the other species that needed them for food – and even for

those that were food for that species, since predators stop populations from getting too big and using up all of the resources. Food chains can be delicate and complex!

Fishing provides the main income for over 200 million people, so it's really important to humans that these coastal seas are supported to be healthy habitats in which fish can live and breed now and forever.

Pacific Herring move into shallow waters in spring to spawn. Allowing fish to safely breed and grow in our coastal seas would help increase fish populations throughout the ocean.



HIGH SEAS

Beyond the beaches and shallow coastal waters lie the high seas which cover more than 60 per cent of our planet's surface. This is by far the largest habitat on our planet, but also one of the least understood.

On average our oceans are 2.5 miles deep, and parts of the high seas are nearly 7 miles deep, forming the largest space for life on the planet. At present we have explored only 5% of the world's oceans.

PHYTOPLANKTON: TINY LIFE SAVERS

An expanse of seemingly empty ocean may contain much more life than it appears to the naked eye.

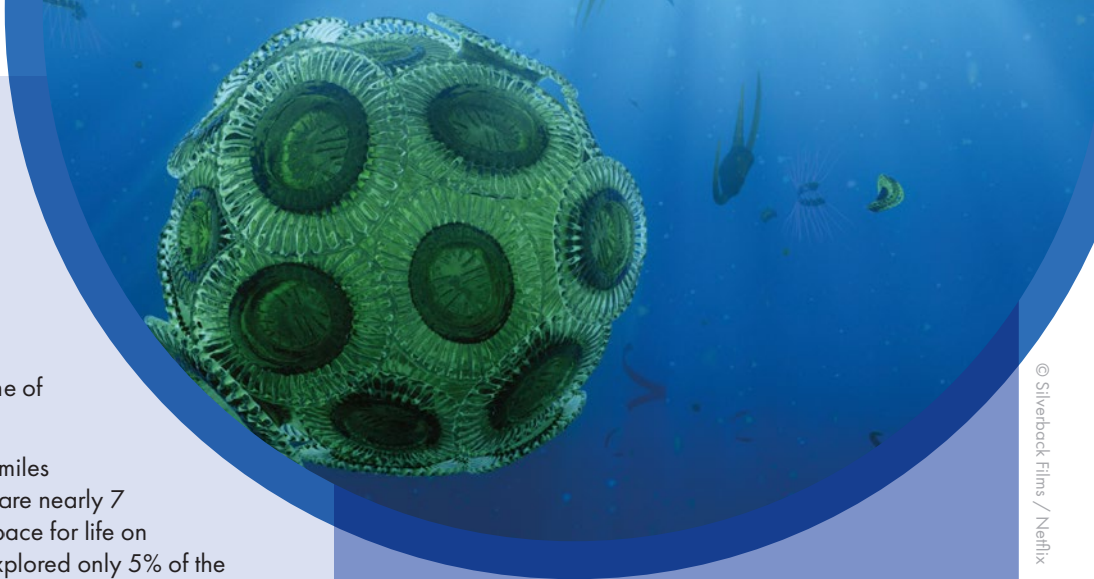
Phytoplankton are microscopic floating algae which drift on the ocean currents. Phytoplankton convert CO₂ to Oxygen and protect themselves from harmful UV rays by releasing a chemical that causes clouds to form overhead. These clouds play a role in slowing global warming by reflecting sunlight back into space. This role forming clouds mean that the oceans also drive weather systems that sustain life in other parts of the world.

As well as doing this amazing job, phytoplankton are food for **zooplankton** (simple water-dwelling creatures), such as **krill**, which are the most numerous animals on earth. These in turn provide food for many sea creatures including the biggest animal that has ever lived on earth – the **blue whale**.

THE MYSTERIOUS DEPTHS

We used to believe that very little lived in the cold, dark depths of the ocean. The more we explore, the more we realise that there is actually a lot of life down there – though not as we know it! Strange creatures roam, adapted to the pressure of the deep ocean, and often creating their own lights to lure prey. We have even found that coral reefs are not restricted to shallow coastal waters.

Much deep-sea life depends on 'marine snow' consisting of the remains of dead creatures and the poo of living ones which drifts down from the more heavily populated surface waters. In the total darkness of the deep ocean floor volcanic vents release super-hot, mineral rich water. Around these vents a huge abundance of life thrives. Strange creatures survive here by feeding on bacteria that get their energy from the chemicals flowing from the vents. We only found out that these unique habitats existed about 50 years ago, and there may be many more across the ocean floor.



Phytoplankton support the entire food chain of the open ocean, and produce half the oxygen in the air we breathe. No matter how far from the ocean you live you can thank these little plants for every other breath you take.

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WHAT'S THE PROBLEM?

Despite the vastness of the oceans, human activity is devastating ocean ecosystems. **Illegal fishing** and **overfishing** means that fish can't build up their numbers and whole populations are being wiped out, causing problems to the whole community of creatures and plants in that ecosystem, and the humans who depend on them for a living.

Noise from human activities cause problems for ocean wildlife too. The noise from a ship's propeller can travel 100km through water, and can disturb fish and stop them communicating and breeding. Noise from mining can cause problems in the same way, as well as destroying habitat and risking pollution that can kill wildlife. Scientists and conservationists now argue for 30 per cent of the high seas to be protected from fishing and mining through 'Marine Protected Areas' which all countries agree to leave alone as spaces for nature.

The effects of human activity are felt in the remotest parts of the high seas. Every year almost 9 million tons of plastic enters the ocean. That's the same as a rubbish truck emptying its load every minute. In the middle of the Pacific a huge area of plastic rubbish, twice the size of France, is kept in place by the swirling currents. Plastic chokes the

oceans and harms marine life. Blue whales have been washed up dead on seashores with pieces of plastic in their stomachs which they probably mistook for squid.


Climate change is also harming ocean life. Warmer water can absorb more CO₂ from the air, and this makes the ocean more acidic than before. This means the conditions are changing from those in which sea creatures evolved, and in some cases it stops them from being able to build their shells or exoskeletons.

There is much that needs doing in the oceans. We need to act. The quicker we act, the better the chance that damaged marine ecosystems – the fish we catch for food, the cold-water corals and hydrothermal vents, the vast pods of whales and mysterious deep-sea creatures – will recover fully. The result will be a healthy ocean that provides food and jobs for people as well as homes and food for wildlife well into the future.

WHAT CAN WE DO?

We can keep enjoying the riches of the oceans, but only if we look after them and don't take too much from them. One way to protect the future of the oceans is for countries to create **Marine Protected Areas (MPAs)** in their coastal waters where no fishing is allowed. These safe spaces will mean that there are always places for fish to grow big and reproduce, and as well as ensuring that fish species don't die out this will mean we'll actually catch more fish than we do at the moment. The seas will recover, there'll be more fish in the sea, and we'll catch more too – it's win-win all round!

When seas are within the border of a country, that country can set rules on who can use the waters for fishing, mining and transport of goods in ships, and how much they are



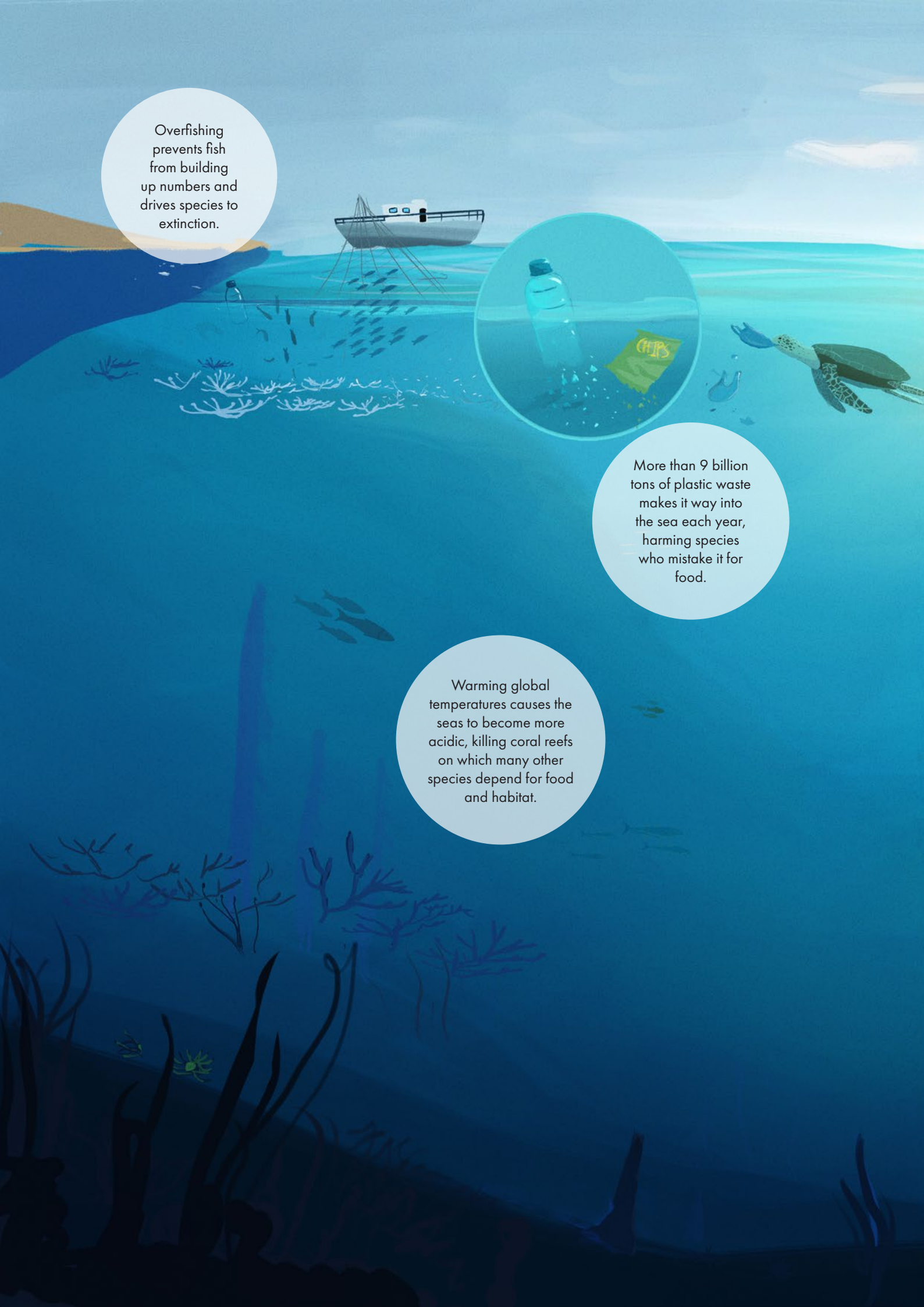
Whales and other big sea creatures help sustain phytoplankton and therefore all life in the ocean by fertilising the surface waters with their poo, and by mixing air into the water when they break the surface.

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allowed to do these things. The high seas are international waters, owned by no one, and therefore open for anyone to use as they want. This means that they are also the least protected waters, open to damage by over-fishing, mining, shipping and pollution. **Less than 2% of the world's international waters have any form of protection.** In the past – when there were fewer humans on the planet – fish populations seemed limitless and oceans too big to pollute, but with human impacts now extending to the most remote and deepest parts of the oceans, action is needed to stop the damage before it is too late. If we want to keep our oceans healthy, we need an **international treaty** to protect them for generations to come.

The choices we make when buying seafood can help ensure a good future for our oceans and seas – and for us! Check labels for information about how fish or shellfish was caught or farmed, and try to avoid species that are known to be in trouble. You can find a local sustainable seafood guide to help you decide what it is OK to eat.

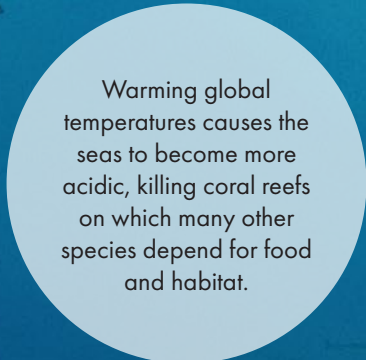
| Good | Bad |
|---|---|
| From a sustainable fishery (eg MSC certified) | No accreditation – could be from over-fished waters |
| Line Caught | Trawled / long line / gill net |
| Locally sourced | Imported from other countries |
| Hand gathered shellfish | Dredged shellfish |
| Organically farmed | Intensively farmed |



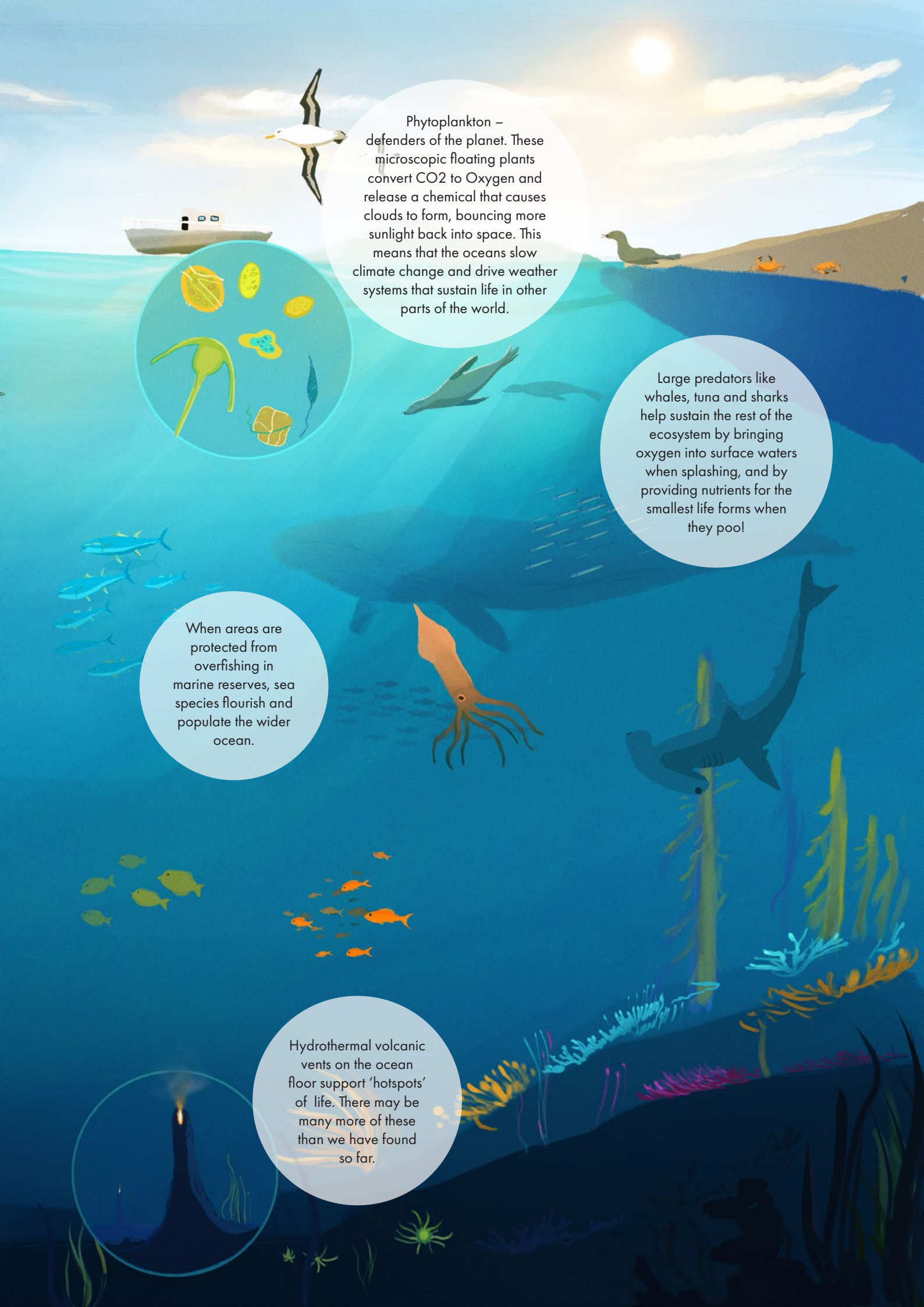
Overfishing prevents fish from building up numbers and drives species to extinction.



More than 9 billion tons of plastic waste makes its way into the sea each year, harming species who mistake it for food.



Warming global temperatures causes the seas to become more acidic, killing coral reefs on which many other species depend for food and habitat.



Phytoplankton – defenders of the planet. These microscopic floating plants convert CO₂ to Oxygen and release a chemical that causes clouds to form, bouncing more sunlight back into space. This means that the oceans slow climate change and drive weather systems that sustain life in other parts of the world.

Large predators like whales, tuna and sharks help sustain the rest of the ecosystem by bringing oxygen into surface waters when splashing, and by providing nutrients for the smallest life forms when they poo!

When areas are protected from overfishing in marine reserves, sea species flourish and populate the wider ocean.

Hydrothermal volcanic vents on the ocean floor support 'hotspots' of life. There may be many more of these than we have found so far.

THE GREAT BARRIER REEF

Coral reefs have been called the rainforests of the ocean because they are so rich in biodiversity. They are home to a quarter of all marine life. The largest coral reef system on our planet is the Great Barrier Reef in Australia. It stretches for more than 2000 km and can even be seen from space. This system of reefs and islands provides refuge to an amazing variety of marine plants and animals. It is home to more than 3000 types of shell and over 1600 fish species, as well as over 600 different corals.

The Great Barrier Reef has built up over millions of years, but today its future is at risk, and this is due to human activity. Pollution and overfishing have affected the delicate balance of the environment. As we burn fossil fuels the water temperatures are rising and the seas are becoming more acidic. This causes corals to bleach and die. In 2016 more than half the corals in some parts of the northern Great Barrier Reef turned white through coral bleaching. Globally, over the last thirty years the world has lost half of its coral.

The Great Barrier Reef is one of the world's most popular tourist attractions. It brings in well over US\$5.7 billion per year. But its value goes beyond that. A world without coral reefs would be a much poorer place for us all. We can take steps to stop climate change and protect the natural wonders of our coral reefs.



FACILITATOR INSTRUCTIONS

KEY MESSAGES

PROBLEMS FACING OCEANS

- Overfishing of coastal waters, preventing fish populations from recovering what is taken out
- Lack of ownership of high seas leading to lack of protection from over-fishing, mining and shipping
- Noise pollution from ship propellers and drilling for oil and gas disrupting wildlife
- Plastic pollution making it into the oceans
- Rising temperatures and CO2 levels causing changes to the ecosystem damaging some wildlife – eg bleaching coral

SOLUTIONS

- International treaty protecting high seas from over-fishing and mining
- Marine Protected Areas (no fishing, mining or shipping) in coastal waters allowing space for fish stocks to recover and repopulate the ocean
- Reduced plastic use and recycling of whatever we do use
- Reduced use of fossil fuels to slow global warming

SDGs LINKS

Goal 14: Conserve and sustainably use the oceans, seas and marine resources

<https://www.un.org/sustainabledevelopment/oceans/>

Ensuring a healthy and productive future for our oceans also contributes to other SDG goals, including the following:

GOAL 1: No Poverty

GOAL 2: Zero Hunger

GOAL 3: Good Health and Well-being

GOAL 8: Decent Work and Economic Growth

GOAL 12: Responsible Consumption and Production

GOAL 13: Climate Action



GUIDED DISCUSSION PROMPTS

Use these prompts to generate a class or small group discussion based on the Our Oceans briefing, or videos on ourplanet.com.

Can you describe the ocean that you have just seen?

What does it look like? What surprised you most?

Allow children to convey their sense of wonder at these underwater places that they will probably never have seen. To create a relaxed group setting, give children time to talk together in pairs, before sharing their thoughts with the whole group.

Which is your favourite sea creature and why?

What does the sea give us?

The sea gives us food, but it also provides us with water activities and beaches to play on. Millions of people depend on the sea to earn their living. Even if we don't live near the sea, it plays a big part in our lives.

Why do we need our oceans?

They provide us with food, they supply us with clean air to breathe, they soak up dangerous carbon dioxide in the earth's atmosphere and they help to regulate our climate.

What do you think is harming high seas and the wildlife that live there?

Over-fishing, mining, shipping, pollution

How can we look after the seas?

It is important to help children understand that we can all do something about the challenges that our planet faces. Reducing our carbon footprint and saving energy, is a small step that can make a big difference. We can also make sure we eat fish with an MSC label, keep beaches clean, use less plastic, and support organisations that are working to protect the seas.

Imagine it is 2030 (12 years time). What do you hope oceans would be like? What would you want to be different about how we treat them?

Lots of fish, big variety of different marine creatures, clean, areas with no fishing (MPAs), lots of fish being caught to eat – but enough left behind to keep the population healthy.

Why are Marine Protected Areas (MPAs) important?

MPAs provide safe areas where animals and plants are protected so that the oceans can be replenished.

Why is no one stopping these things happening?

International waters belong to no country so no one has responsibility to protect.

What do you think could be done to make things better?

International treaties on use of the high seas, including protected areas (MPAs).

Useful Links

Explanation of the three principles of sustainable fisheries:

<https://20.msc.org/what-we-are-doing/our-approach/what-is-sustainable-fishing>

More resources on sustainable fishing and MPAs can be found on the MSC website – including films and worksheets:

<https://fishandkids.msc.org/en/teachers/whole-school-resources/marine-sustainability>

ACTIVITIES

| ACTIVITY IDEA | SUGGESTED AGE | SUBJECTS |
|--|---------------|---------------------------------------|
| Work collaboratively to create a sea mural. | 6 – 8 | Art Geography |
| Design a poster or storyboard a TV campaign aimed at persuading people to buy responsibly sourced seafood. | 7 – 14 | Art Literacy Citizenship |
| In groups, make a board game based on the environmental issues faced by the coastal seas. | 7 – 14 | Art & Design Literacy Geography |
| We are still discovering new species in the deep sea. Research real recent discoveries. Imagine and draw a creature that you might discover. What are its characteristics and why has it evolved in that way? Remember to give it a name! | 7 – 11 | Art Science |
| Imagine you are world leaders, and work together to come up with an agreement about how you will work together to look after the oceans. Remember – you still want to be able to benefit from the sea, but you need to ensure that those benefits are still available in the years to come. When you have come up with your treaty, hold a press conference to answer questions from other groups. | 11 – 14 | Citizenship Geography Drama |