



Lesson Plan 1: Marine conservation

Learning objectives

- To understand which species live in our seas, what we use the seas for and what dangers are present to the species living there.
- To understand what marine conservation is, what marine protected areas are and why they are helpful.

Main teaching points and questions (tick symbol) to engage/prompt the children - refer to background notes for more detailed teaching information

Activity 1: Introduction (5 minutes)

Choose four questions to ask the class. Discuss as a group.

1. What is 'marine' and where are the seas and oceans?
 - ✓ Has anyone been on holiday to a seaside? Where?
2. What does conservation mean?
3. What do we use the sea for?
 - ✓ Has anyone travelled by boat before? How?
 - ✓ Has anyone had fun in the sea? How?
 - ✓ Has anyone been fishing and caught their own dinner?
4. What lives in our seas?
 - ✓ What sea animals can you remember from films e.g. 'Finding Nemo'?
5. What do endangered and extinct mean?
 - ✓ Can you think of any endangered animals? E.g. pandas, tigers.
 - ✓ Why are they special?
6. Which animals that live in the sea are endangered and why are they endangered?
 - ✓ Can you think what they might be in danger from?
7. What is the solution? Marine protected areas - how do they work?

Activity 2: Worksheets (15 minutes)

Choose from one of the three activities: 'What am I?', 'Match the name with the picture', or 'Feed the turtle (maze)'.

Give out one worksheet to each child. Read the instructions and questions as a class and let them complete the worksheets alone.

Activity 3: Sharing and recap (5 minutes)

Ask one child from each table to tell you one thing they have learned today.

Further work

- Create a poster showing the differences between a marine protected area ('happy sea') and a heavily fished ('unhappy') sea.
- Create a poster to highlight the problems for a specific endangered marine species.
- If you have more class time let the children play snakes and ladders.





Background information

Introduction

The seas and oceans cover over 70% of the surface of the planet and equate to more than 90% of the globe's volume. Seas are saltwater systems that stretch from the warm tropical waters at the equator, to cold water in the poles, which turn to ice for part or all of the year. The deepest recorded point is in the Mariana trench in the western Pacific Ocean at 6.8 miles (10.9km).

Marine life

There are far more fish species than there are all other higher animals (amphibians, reptiles, birds and mammals) and it is thought that 70-80% of marine species are yet to be discovered. There are plenty of weird and wonderful sea animals that will excite and engage children and here are a few to help you out:

Sea turtles

There are seven species of sea turtle, six of which are classified as endangered or critically endangered. They are reptiles that have adapted to life at sea but they must return to the surface to breathe and they still come onto beaches to nest. Many turtles suffocate or starve to death when they get entangled in fishing gear or if they mistake a floating plastic bag as their favorite food, jellyfish.

Whales, dolphins and porpoises (cetaceans)

There are over 80 species of cetaceans living in our seas. These mammals live permanently in the water but must return to the surface to breathe. The biggest whale, the blue whale, can reach up to 30m long.

Sharks and sting rays

These fish all belong to the same family. They tend to be slow breeders and live for many years, so over fishing can have a big effect on their populations. The biggest fish in the sea is the whale shark, a gentle giant that lives in tropical waters and eats tiny zooplankton. Sharks have been given a bad reputation as man-eaters but in fact you are more likely to be killed by a defective toaster.

Jellyfish

Jellyfish have soft bodies and long, stinging, poisonous tentacles that they use to catch fish to eat. A jellyfish is 98% water and they are found in every ocean, from the surface down to the deepest depths. The biggest, the lion's mane jellyfish, can be up to 2m wide!





Fish

There are plenty of different types of fish to talk about – here are some that might crop up:

- ‘Nemo’, or clownfish/anemone fish, are common on tropical reefs. They are found living in or near anemones, which can be poisonous to other species, from which it receives protection and access to food. All clown fish are born male and develop female organs as they mature. They are eaten by various fish but their main threat comes from humans for the aquarium trade as marine animals are rarely bred in captivity.
- Seahorses are also a type of small fish that have armored plates all over their body instead of scales. There are about 50 different species of seahorses around the world. They live in seaweed beds in warm water and are very slow swimmers. Some are masters of camouflage which protects from enemies. The Australian leafy-sea dragon is one of the best camouflaged seahorses – check it out on Google.
- Bluefin tuna are large, predatory fish which can reach speeds of over 30 mph, which is as fast as a car. They are highly prized for sushi and as a result have been overhunted to the verge of extinction and are classified as critically endangered – rarer than a panda!
- Skipjack tuna are another, smaller species, which is not yet endangered. This is what we find in most tins of tuna in the supermarkets and you should choose pole and line caught tuna which has a lower environmental impact on other marine species like turtles and sharks. It is important to know the difference between different species of fish in order to make an impact each time we buy fish at a supermarket or restaurant. See the reference list for more help on choosing sustainably caught fish.

Human impacts

Humans are highly dependent on seas and there are an estimated 44 million people engaged in the primary production of fish worldwide, with global fish trade valued at \$92 billion and the entire seafood industry valued at \$200 billion annually. We use the seas for all sorts of reasons:

1. Travel

Ships, ferries, canoes, sail boats – humans have been travelling on water for centuries.





2. Tourism and leisure

Many recreational activities take place on or in the sea. For example fishing, scuba diving, snorkeling, swimming and sailing.

3. Commercial fishing

Valued at \$200 billion, the seafood industry takes cod, tuna, haddock, shrimp and many others for human consumption. There is a high demand in certain areas for shark fin soup, considered a delicacy in some cultures, but the practice of finning (whereby the fin is removed from the living shark whose body is thrown overboard) is inhumane as well as illegal in many countries.

4. Resources

Aside from fish, other resources are taken from the seas such as oil, sand or gravel extraction for development, and even sea water for forest fires. The aquarium trade has a huge impact on our seas as most marine species are difficult to breed in captivity. The oceans play a large part in natural cycles too, like the water cycle, and help to regulate the climate by storing carbon.

Many human activities are having a direct impact on these ecosystems and it is important to protect and conserve them. Some of the threats are discussed in further detail below.

Threats

- **Overfishing**


Some fish are getting caught faster than they can reproduce because we have developed such efficient fishing equipment and techniques. This results in continually declining stocks which reach a point where they can no longer breed efficiently and therefore are unable to recover. This is an unsustainable practice but sadly 75% of the world's fish stocks are already considered fully or over-exploited.

Blue fin tuna is one case where they are now so rare they are now classified as endangered as a direct result of overfishing.

- **Destructive fishing methods**

Some methods of fishing have a particularly negative effect on the environment. This includes bottom trawling, which destroys the entire seabed, or using generalist fishing gear which catches many non target species (known as by-catch) such as turtles, dolphins or seahorses, along with the target species. The by-catch is thrown back to sea dead. Dynamite fishing is an illegal practice in which dynamite is detonated, killing the fish which then float to the surface and can be collected up. This obviously also destroys the habitat in which the fish live. Cyanide poisoning is another illegal method of fishing. The cyanide stuns the





fish so that they float to the surface but can be collected alive but unfortunately kills coral reefs and other organisms too.

- **Climate change**

Changing sea temperatures will alter the composition of life that can live within particular marine habitats. For example, coral reefs will begin to die or no longer function if temperatures rise by just 1°C above the long-term average.

- **Pollution**

We are polluting the planet both visibly (plastic bags, trolleys, bottles) and invisibly with chemicals and agricultural runoff.

- **Habitat destruction**

Many marine and coastal habitats are affected by development of cities, hotels or even for farmed prawns. The development both physically limits the space available to marine life as well as depositing sediments over fragile habitats, like mangroves, sea grass beds and coral reefs, which can suffocate them.


Solutions

Marine Protected Areas (MPAs) are areas of sea that are legally protected from harmful human activities. They provide a significant contribution to the conservation of species and habitats and they can restore the structure and function of the ecosystem. MPAs exist all over the world to protect the species that live within them from a variety of activities. The level of protection can vary from a complete ban on all harmful activities, to just one restricted activity, or a seasonally restricted fishing season to limit activities during peak breeding times.

MPAs are also called 'marine reserves', 'no take zones' and 'marine conservation zones'. Currently, only 1.42% of the world's oceans are being protected to some extent with less than 0.5% designated as fully protected marine reserves. MPAs are an important management tool for coral reefs and for rare or delicate species. Coral reefs occupy less than 1% of the seabed and yet are home to 25% of all marine life, including the spawning grounds of commercial fish species.

Unfortunately wider problems such as pollution and climate change are neither controlled nor deterred by the presence of an MPA. The protected area does not have a physical barrier depicting its boundaries and therefore fish and other mobile marine life are able to move freely in and out of the protected area. It works because the protected area acts as a refuge to the fish populations to breed and grow safely without the risk of being fished. Once the populations have grown, they naturally move outside the invisible





boundaries of the MPA and replenish the surrounding stocks, providing a new opportunity for sustainable fishing practices by fishermen.

MPAs vary in size but are more effective the larger they are as populations within the protected area tend to be more stable before spilling into the surrounding waters. Consequently, there is a call for a global network of MPAs to provide safe havens for marine species at regular intervals, thereby ensuring the continued protection of our biodiversity and the livelihood of thousands. By teaching your class about the importance of protected areas, you can help inspire the next generation of marine conservationists.

References: You can find out more about these issues by following the links.

Threats to the marine environment

www.zsl.org/conservation/regions/habitats/marine/project-ocean/index,221,ZI.html

Destructive fishing practices

www.zsl.org/conservation/regions/habitats/marine/project-ocean/destructive-fishing,1587,AR.html

Marine protected areas

www.zsl.org/conservation/regions/habitats/marine/
www.zsl.org/conservation/regions/habitats/marine/index,219,ZI.html

Sustainable fish and how to make the right choice

www.zsl.org/conservation/regions/habitats/marine/project-ocean/sustainable-fish,1584,AR.html
www.fishonline.org

Tuna

www.zsl.org/print/conservation/regions/habitats/marine/project-ocean/bluefin-tuna,1591,AR.html

Seahorses

www.zsl.org/conservation/regions/asia/project-seahorse/

Sharks

www.sharktrust.org

List of endangered fish and marine animals (including sea turtles and cetaceans)

www.worldwildlife.org/species/index.html

TED talk on marine protected areas (Sylvia Earle – Prize wish to protect our oceans)

www.ted.com/talks/sylvia_earle_s_ted_prize_wish_to_protect_our_oceans.html

