

# Embracing Environmental Issues in your Curriculum

Proposal: to increase students awareness of climate change and the threats facing our ocean ecosystems.

## ▶▶ Aim

To raise awareness amongst students of the impacts of climate change on marine ecosystems resources, and the solutions to slow down global warming linked to human activities.

## ▶▶ Background

### ▶ Oceans for Climate

Our climate depends on the ocean. Winds and currents have an impact on the temperature, precipitation and humidity we experience wherever we live. Climate is an average of all of these taken over time. The ocean is part of the water cycle, water evaporates from the oceans condenses into clouds and precipitates over high land.

The Gulf Stream is for example a current that influences the mild climate that is experienced by many regions in the northern hemisphere.

The ocean acts as a giant sponge absorbing many gases from the atmosphere. This will impact the chemical composition of the air we breathe. Today we are concerned about how much more carbon dioxide the ocean will be able to absorb to keep the green house effect stable.

### ▶ Oceans as a Producer

Marine plants, through photosynthesis, are the biggest producers of oxygen which is essential for all life on our planet. They produce 75% of the oxygen we breathe.

The phytoplankton, microscopic algae, and seaweeds are the first link in nearly all marine food chains. These tiny plants and animals are the main food source for some of the worlds biggest animals such as the blue whale and the whale shark.

### ▶ Oceans for Food

The oceans are also an important source of food for humans. Fish and shellfish are a great source of protein. Seaweeds are used in many foods as well - even ice cream! In some poorer countries the oceans are the main source of food for the whole community without which they would not survive.

### ▶ Oceans for Water

In some countries where fresh water is scarce. Seawater can be desalinated and used as drinking water. The excess salt can then be collected and used for cooking or as a commodity to sell.

Many power stations are situated on the coast and use the seawater to cool the reactors.

Beneath the ocean floor, natural resources such as oil, gas, minerals and gold lay hidden. These should be carefully exploited to avoid major damage to marine environments.

### ▶ Oceans as a dumping ground

The oceans are so huge that for many years they were used as a dumping ground for all sorts of waste and industrial by-products. Until now the ocean has been able to deal with all that we have thrown at it but things are changing. The pH level of the ocean is dropping especially as carbon dioxide levels in the atmosphere are going up. We are witnessing ocean acidification. Many marine animals use calcium carbonate in their bodies to make shells and skeletons. As the ocean becomes more acidic these animals may find it difficult to survive.

Heavy metals are also passing up through the food chain through bioaccumulation. These slowly poison marine creatures and can affect their reproduction. This will also have major implications for the seafood consumption.

### ▶ Oceans for fun

Many of us use the oceans for recreation. Diving, sailing, surfing, fishing and swimming to name but a few. If we don't look after the oceans this could become a thing of the past.

## ▶▶ What can you do in school?

The ocean is a great topic to engage pupils. It can be spread over many subjects as it encompasses many different aspects.

By looking at the oceans from different angles the students will gain a wider overview of what the problems, threats and possible solutions are.

## ▶▶ Summary of threats to the Oceans

- ▶ Overfishing
- ▶ Pollution
- ▶ Leaching of nutrients from the land (e. g fertilisers)
- ▶ Over exploitation
- ▶ Fish farming
- ▶ Oil pollution
- ▶ Climate change

## ▶▶ Example curriculum topics

Food chains in the ocean	Biology
Identification and classification	Biology
Habitats and ecosystems	Biology
Geographical locations/names of oceans	Geography
Water cycle	Geography/biology/chemistry
Water chemistry	Chemistry
How we use the ocean	Sociology/geography/biology
Threats to the ocean	Sociology/geography/biology/chemistry
Weather	Geography/physics/chemistry
Fishing industry	Sociology/geography
Understanding environmental vocabulary	All languages
Ocean literature/poetry	Literature
Explorers	History
Music (whale song, sound of the sea.)	Music
Ocean art	Art

## ▶▶ How can you work with this?

- ▶ Practical experiments
- ▶ Sampling
- ▶ Research
- ▶ Chemical analysis of samples
- ▶ Go to your local aquarium to see marine life/ education programme
- ▶ Follow the EUR-OCEANS educational programme online ([www.eur-oceans.info](http://www.eur-oceans.info))

Final group tasks (assignments) to bring together all their knowledge.

- ▶ Film making
- ▶ PP presentation
- ▶ News article
- ▶ Plays
- ▶ Posters
- ▶ Writing to politicians

- ▶ Exhibition
- ▶ Leaflet
- ▶ Descriptive writing
- ▶ Models (using recycled materials)

## ▶▶ How can you use your local Aquarium to help teach this topic?

- ▶ Aquaria have expert teaching staff that can give presentations and workshops on these topics.
- ▶ Aquaria have links to scientists that are researching climate change. They can organise lectures and Q & A sessions.
- ▶ Go and visit your local aquarium and see the marine life that will be directly affected.