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Subject links:

Science, Geography, English, Design
Technology, Citizenship

Ages 7-11

Curriculum links:

Human impact, Economic activity, Natural resources,
Food, Group work, Presentation, Design

Ocean Literacy Principles:

6. The ocean and humans are inextricably interconnected

How do we use the sea?

Sustainability Goals:



Learning Objectives:

- To explore the positive benefits and negative impacts of industries and activities in the ocean
- To understand that different groups (stakeholders) have different opinions
- To work in a group to solve a problem

Resources provided:

- [How do we use the sea? Fact File](#)
- [Which industry? cards](#)
- [Marine industries worksheet](#)
- [Marine Industries poster](#)

Extra resources required:

- Poster sheets
- Colouring pens/pencils
- Mini whiteboards

Step 1

Background

Our ocean is important for many environmental, social and economic reasons.

Because of this, activities at sea can be busy with coastal communities, industries, recreational users and wildlife all competing for space. This can result in large pressures on coastal resources, conflict between users, and impacts on wildlife habitats. More information can be found in our [How do we use the sea? Fact File](#).

To give context on why the ocean is so important, complete the lesson [Ocean overview](#).

Step 2

Set the Scene

10 minutes – Activities at sea overview

Ask students to quickly discuss different ways we use the sea. Use the answers given to introduce and briefly discuss the lesson topic.

Explain that there are many groups, or stakeholders, who use the sea including governments, large and small-scale fishers, tourist industries, environmental NGOs, the scientific community, coastal inhabitants and some commercial industries.

Step 3

Activities

Activity 1: 15–20 minutes – Which Industry?

Split the class into 8 groups and hand out one of the [Which industry? cards](#) to each group. Explain that each industry has benefits for humans, but there are also environmental impacts associated with activities at sea. In their groups, students should read their card and try to guess the industry the facts relate to. Students should explore positives (i.e. food, energy, economic value, jobs) and negatives (i.e. habitat destruction through construction, species loss, pollution) of their industry. Students can start by using the information on the cards and add to this with their own thoughts and ideas. To help you guide students, find more information in the [fact file](#).

Activity 2: 30 minutes – Marine Industry Pros and Cons

Hand out the [Marine industries worksheet](#) to each student and display a digital version of the [Marine industries poster](#) on your whiteboard. Each group should give a quick presentation about their industry, informing others of key facts, positives and negatives learnt in Activity 1.

For each presentation, other students should write at least one positive and one negative next to the industry on the [worksheet](#). Depending on the age or ability of the group, you could write this on the board for students to copy or they could choose which positive/negative to write down from listening to the group presentations.

Step 4

Extend

45 minutes – Reducing impact through innovation

In the same groups, students should think about and discuss ways in which their industry could reduce its impact on the environment. Encourage students to think creatively and come up with inventions. They should design a group poster of their industry, including some key facts and positives/negatives from Activity 1 for background. The poster should focus on their group's ideas and inventions for reducing the industry's impact on the marine environment.

Step 5

Reflect

5 minutes

Why is it important to consider the opinions of other groups who use the ocean? Do you think it's important that the ocean is protected? Why? Name one way that a marine industry could reduce its impact on the environment.

Step 6

Follow up

To explore the fishing industry further, complete the lesson, [Let's Go Fishing](#). Explore how we can protect the ocean's biodiversity and valuable resources in the lesson, [What is an MPA?](#)

How do we use the sea?

Fact File



The ocean's natural services

The ocean is a vital support system for our planet.

- It plays a major role in the **water cycle**
- Marine plants and algae produce over 50% of the **oxygen** we breathe
- Marine habitats help to store **carbon**, which is vitally important in our fight against climate change
- The ocean regulates our **climate**
- Coastal habitats **protect** coastal villages and towns from storms and flooding



Eelgrass bed
© divedog via Shutterstock



Salt marsh habitat, Wales
© James Hime via Shutterstock



Ocean resources and human uses

The ocean provides us with many resources that we use in our daily lives, from food and medicine to fuel and electricity. Hundreds of people work in marine industries. With a growing population, the demand on ocean resources is increasing. Perhaps because the ocean is so vast, we underestimate humans' ability to have an impact on it, but these resources aren't limitless and harvesting them can cause damage to marine ecosystems. Read on to learn more about the different ways we use the ocean.

How do we use the sea?

Fact File

| Ocean industry | Human use | Possible threat |
|----------------------|---|--|
| Seafood | Billions of people all over the world rely on seafood for an income and as a source of food | Overfishing affects marine food chains and biodiversity, and it can cause fish populations to collapse. Destructive fishing methods can also badly damage seabed habitats. Intensive fish farming can cause reduction in water quality, and spread disease and parasites to wild fish. |
| Oil & gas | 99% of the oil and gas we use in the UK comes from under the sea. (1) The industry supports around 300,000 jobs in the UK and is important to the economy (2) | Drilling for oil and gas can pose serious threats, from construction of platforms, transporting of goods, creating pipes lines and through extremely destructive oil spills. The industry is also responsible for greenhouse gas emissions, contributing to climate change which in turn is having damaging effects on the ocean. |
| Shipping | 95% of goods moving in and out of the UK are transported by sea. (3) 20.7 million international passengers pass through UK ports each year (4) | Shipping can be associated with noise pollution, emissions, oil spills, container spills, dumping of rubbish at sea and chemical pollution. Shipping can also directly damage the environment through anchoring, shipwrecks, and direct contact with large marine mammals. Shipping is also associated with the movement of invasive species through ballast water, which is when ships store water to even out the weight of the boat. This water can be loaded on in one location and then discharged in another, meaning small animals and plants within the water can be transported to new areas. Biofouling – the accumulation of plants and animals on the hull of the boat – can also transport non-native species to new locations. |

1. wintershalldea.com 2021
2. Oilandgasuk.co.uk 2021
3. Foresight Future of the Sea 2018
4. Department for transport 2020

How do we use the sea?

Fact File

| Ocean industry | Human use | Possible threat |
|---------------------------|---|--|
| Marine aggregates | Sand and gravel is dredged from the seafloor to provide materials for construction, for coastal defences, and to increase the depth of shipping channels | Dredging physically damages seafloor communities of plants and animals where the material is removed and where it is deposited. |
| Offshore windfarms | Offshore wind powers the equivalent of 4.5 million homes a year (5) | Construction of wind farms can directly damage marine environments, migratory species, and cause noise pollution. |
| Aquarium trade | With an estimated 2 million people worldwide keeping marine aquariums, the aquarium trade is worth around £237 million (6) | Coral reef species make up the majority of the aquarium trade. Collecting these species in the wild can be very destructive to the habitat and non-target fish. Some fish that have been targeted are at risk of extinction. |
| Tourism | 60% of the world's population live within 60km of the coast, and many people use beaches and coastal waters for recreation and tourism. Coastal tourism is an important livelihood for many people in the UK and benefits the economy | Pressure from coastal development and recreational activities can cause harm to sensitive habitats. Activities on the ocean like boating can discharge oil, damage seabed habitats through anchoring and cause noise pollution. Coastal development on land reduces areas of natural coastal habitats. This reduction directly reduces biodiversity and also reduces vital functions these habitats provide, like helping protect land from erosion and helping to filter nutrient runoff from land. |
| Medicine | Many medicines are derived from natural sources on land, but the ocean is also a source of medicine. Many marine plants and animals are being studied to find new medicines | Healthy seas with healthy species are required to be able to derive medicine from the sea. If resources for medicines aren't harvested sustainably this could contribute to a decline in habitat health. |

5. renewableuk.com 2021

6. UNEP 2003

How do we use the sea?

Fact File



Protecting our ocean

To ensure a healthy ocean for the future, we must reduce habitat damage, ensure sustainable harvesting and protect vital ecosystems.

How can we protect the ocean?



Legislation and laws are in place to reduce threats. Many activities require licenses, like removal of any material, construction work, work which may include disturbing or collection of wildlife, any activity which may have contact with the seabed, and any activity that might deposit substances into the sea. These activities must pass several environmental criteria before being issued a license



Marine Protected Areas (MPAs) are similar to nature reserves. They are set up to protect specific species or whole habitats. MPAs can reduce destructive activities and protect and recover biodiversity. It's estimated that, within Europe, for every €1 invested into MPAs there could be a return of €3 due to the value of services they provide (7)



Fully Protected Marine Areas or No Take Zones are strict MPAs where all damaging activities are banned to allow habitats a chance to recover and thrive



Restoration projects aim to actively restore habitats through conservation work



Difficulties in protecting our ocean

Managing the ocean is tricky, as there are many stakeholders with conflicting interests and opinions, including governments, commercial industries, large and small-scale fishers, tourist industries, environmental NGOs, scientific communities and coastal inhabitants.

The ocean is a vast space and managing activities is logistically and financially difficult.

7. European Commission 2020

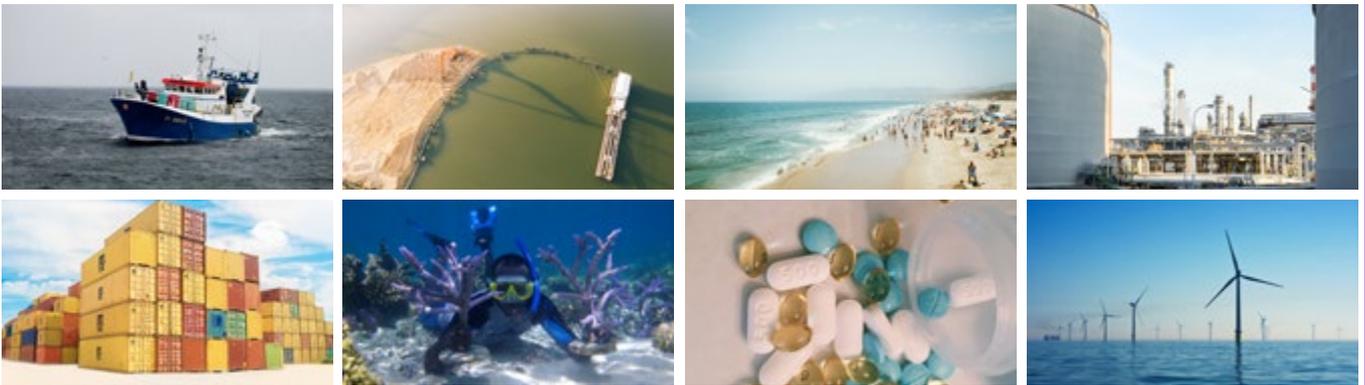
Millions of people work in this industry all over the world

This industry provides food for billions of people

Some methods used in this industry can cause damage to marine habitats

Some animals are becoming extinct because of bad practice in this industry

This industry uses big boats in the ocean, small boats along the coast and small structures on the coast



This industry is important in your daily lives

Adults use this industry to drive cars, buses and even planes

It's used to heat your home

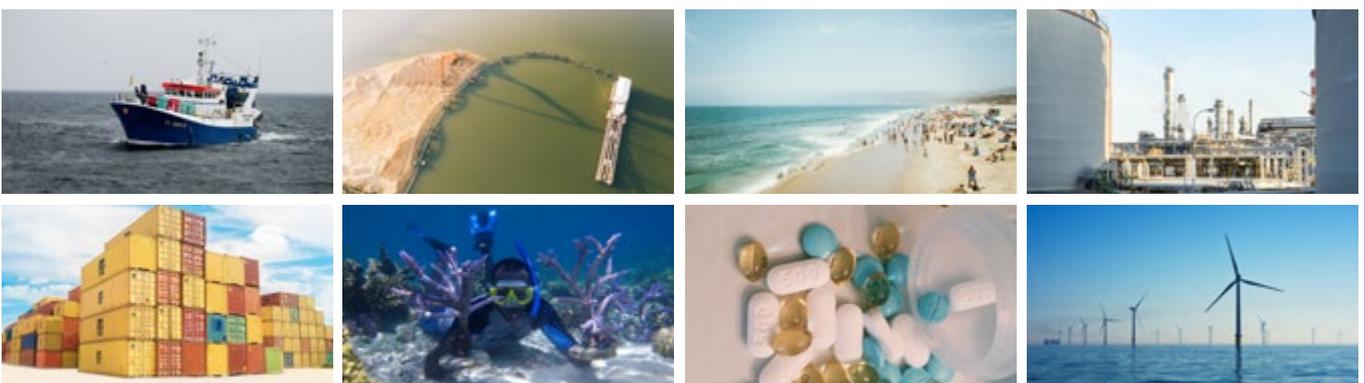
This industry is normally in the ocean but sometimes you can find this industry on land too

This industry provides a lot of money to the economy

When this industry is being built it can damage marine habitats

If there is an accident in this industry, it can cause serious damage to marine animals and habitats.

This industry releases carbon emissions contributing to climate change when its product is used



This industry helps to connect countries all around the world

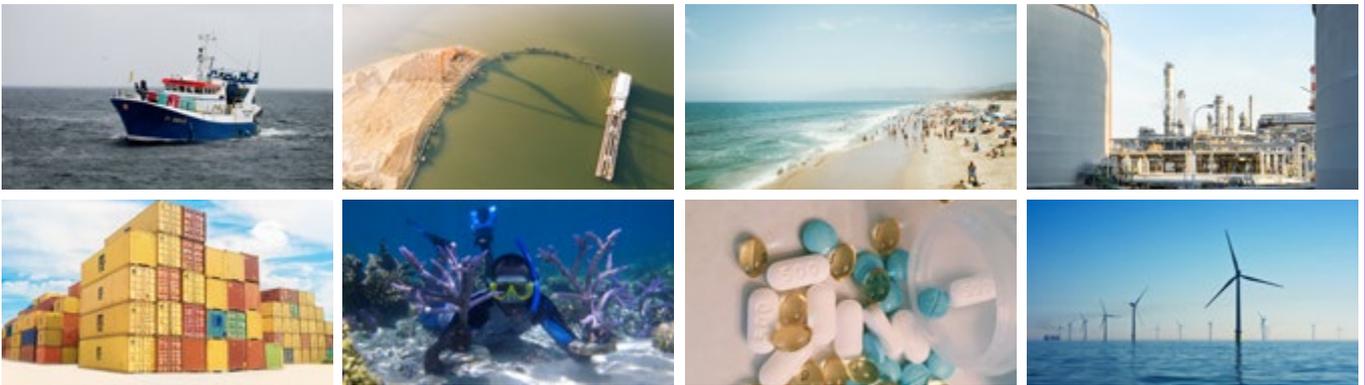
You will have clothes, toys, furniture, books and even cars at home because of this industry

This industry helps lots of people to travel and go on holiday

This industry is very noisy for animals in the ocean

When accidents happen this industry can cause a lot of pollution

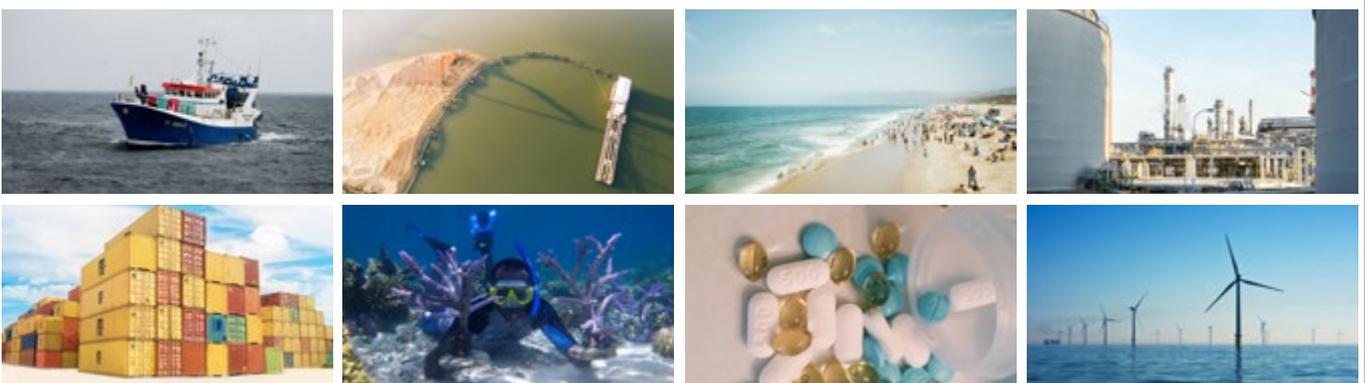
This industry can spread invasive species around the world. Do you know what 'invasive' species means?



Our homes, businesses, shops, roads can be made from products from this industry

Products from this industry are also used to help protect the coast from storms

This industry causes a lot of damage to habitats on the seafloor



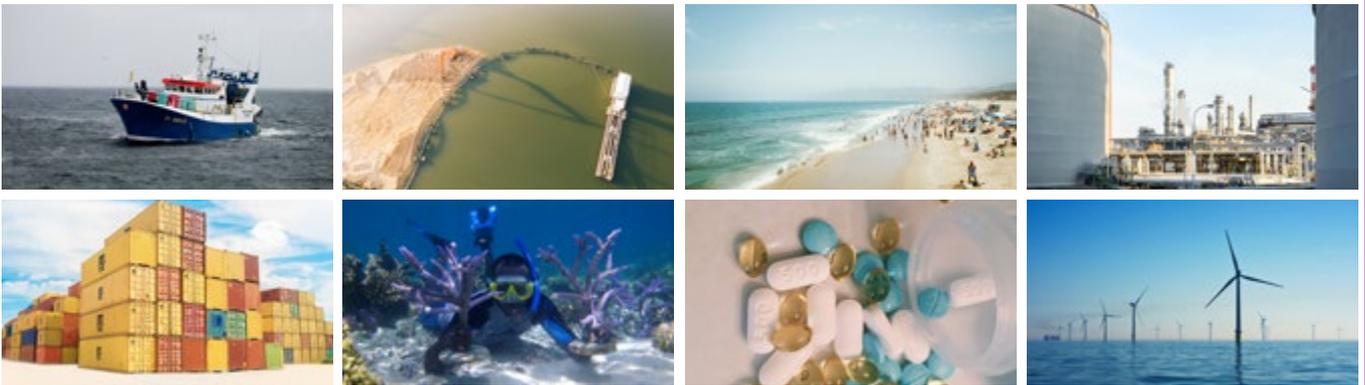
This industry is really important. You might benefit from this industry at home and school

This industry can also help to provide habitat for marine plants and animals

Some people don't like the look of this industry

When this industry is being built it can damage the marine habitat

When this industry is being built it is really noisy for animals living in the sea



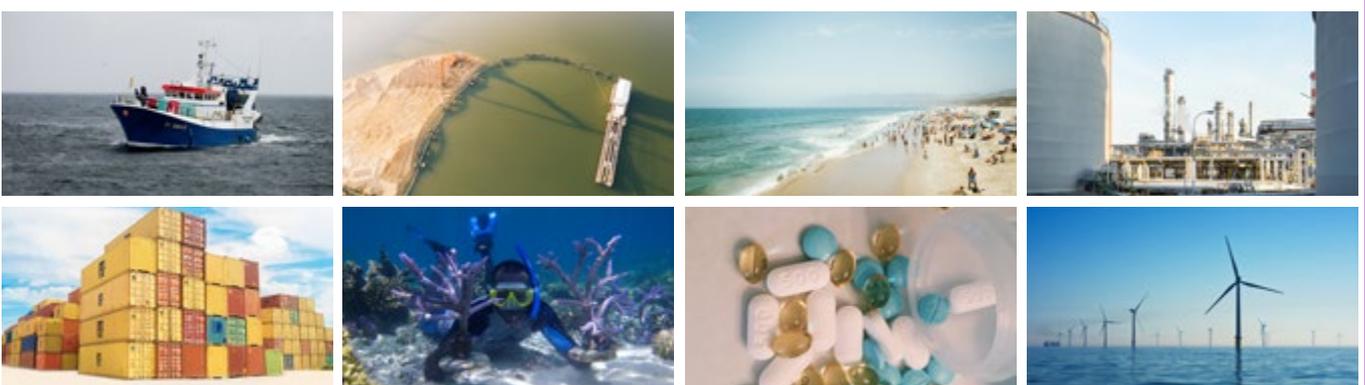
This industry helps to educate people about the ocean

For some people this industry might be their only experience of the ocean

This industry supplies 'products' to businesses and some houses all over the world

This industry can cause a lot of damage to marine habitats

Some animals are becoming extinct because of bad practice in this industry

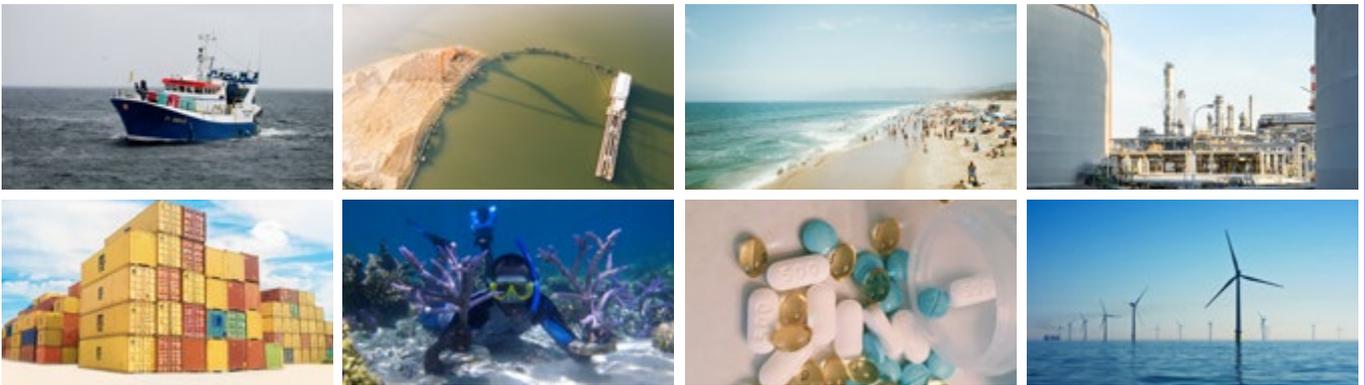


This industry is very important for the economy

People enjoy holidays through this industry

This industry can cause damage to marine habitats when it builds buildings and structures along the coast

If too many people visit fragile habitats they can harm them

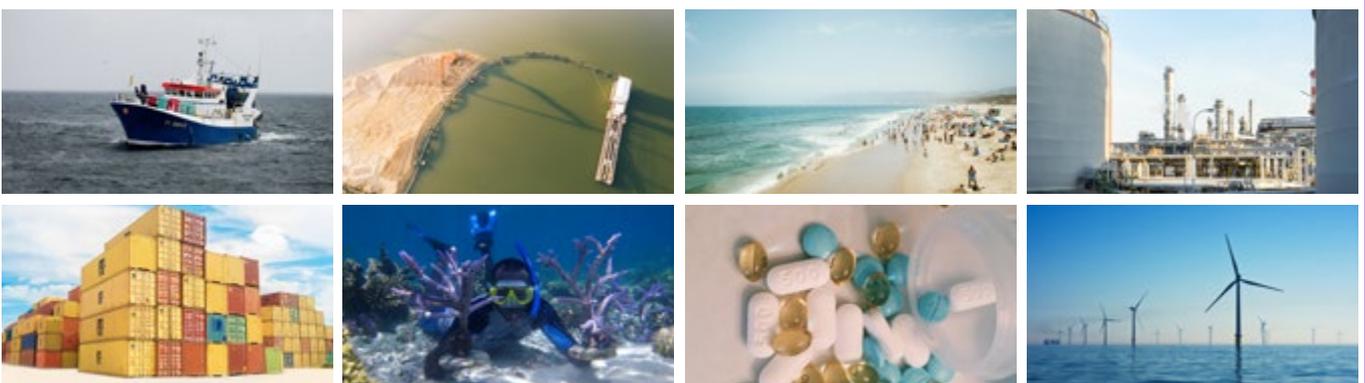


This industry is fairly new

This industry helps people live healthy lives

Some ingredients from used by this industry come from the sea

It's important this industry is managed so it doesn't damage habitats, plants and animals





Positive...

Negative...



Positive...

Negative...



Positive...

Negative...



Positive...

Negative...



Positive...

Negative...



Positive...

Negative...



Positive...

Negative...



Positive...

Negative...

