



MARINE
CONSERVATION
SOCIETY

John Cameron

Subject links:

Science, Geography, Citizenship,
Maths

Ages 5-7

Curriculum key words:

Human impact, environment, landscapes, physical
processes, maps, data, Statistics

Ocean Literacy Principles:

6. The ocean and humans are inextricably interconnected

Learning objectives:

- To develop map reading skills by exploring how your school connects to the ocean
- To begin to understand what happens to waste after it has been used
- To interpret and analyse data by looking at beach clean results

Resources provided:

- [Marine Litter Fact File](#)
- [Marine Litter Image Reel](#)
- [Your school and the ocean worksheet](#)
- [Beachwatch reports](#)
- [Sources poster](#)
- [Curriculum links](#)

Extra resources required:

Computer with access to
Google Earth

Travelling from source to sea

Sustainability Goals:

12 RESPONSIBLE
CONSUMPTION



14 LIFE
BELOW WATER



Step 1

Background

Litter reaches the ocean in a number of ways: it's washed in from our rivers, is left on our beaches, or is cast overboard from boats. It not only makes the marine environment look unpleasant, but it impacts the health of thousands of marine animals every year, usually by ingestion, entanglement or suffocation. Chemicals used in, and absorbed by, plastics also negatively impact animals' health. You can find more information in the [Marine Litter Fact File](#).

This lesson will give students an overview of how our waste finds its way to the sea. It's estimated that 80% of litter in the ocean comes from inland sources, illustrating that no matter where we live, our actions have an impact on marine life.

Step 2

Set the scene

5-10 minutes - Introducing marine litter

Use the [image reel](#) to show photos of litter on beaches and in the sea. What types of litter can be seen? Ask students how they feel when looking at these images. Explain that today you're going to be learning how litter ends up in the ocean.

Step 3

Activities

Activity 1: 20-30 minutes – How does my school connect to the sea?

Find out how your local area is connected to the ocean. As a class, use [Google Earth](#) to find your school. From your school's location, find the nearest river and follow it on its journey to the sea, explaining to students how all rivers eventually reach the ocean. Top tip: it might help to practise using Google Earth in advance to save time. Once you find your nearest river, click on 'more information' to find the name of the river's mouth. This will often lead to another river. Keep repeating this step until you find the mouth of the estuary. Students should use the [your school and the ocean worksheet](#) to record key information and locations on the map.

Activity 2: 15 minutes – From source to sea

Print out the [sources poster](#). In small groups, students should study the various litter items and the possible sources of litter. Groups should work together to match the litter item to its source and discuss how each item could travel from source to the sea. Have a class discussion to check understanding and share additional information from the [fact file](#).

Step 4

Extend

15-20 minutes - Beach clean data

Marine Conservation Society staff and volunteers organise beach cleans to record the types of litter found on our beaches. We use this data to help raise awareness and campaign for change. As a class, analyse and interpret the latest [Beachwatch report](#). What were the most commonly found litter items? What are their most-likely sources? How could they harm wildlife? How could we try to reduce the numbers of these items on the beach?

Step 5

Reflect

5 minutes

How is your local school connected to the ocean? Can you remember one way litter reaches the ocean? What were the top three items found on our beaches last year? Can you think of one way to reduce the amount of litter in the sea?

Step 6

Follow up

Our lesson, [How clean are our seas?](#) explores how marine litter is affecting wildlife and the environment. Learn more about how we can reduce litter in the community in [Taking action on litter](#).

Curriculum links

England

Geography

- Key physical features, including: beach, cliff, coast, forest, hill, mountain, sea, ocean, river, soil, valley, vegetation, season and weather.
- Use world maps, atlases and globes to identify the United Kingdom and its countries, as well as the countries, continents and oceans studied at this key stage.

Citizenship

- To realise that people and other living things have needs, and that they have responsibilities to meet them.
- What improves and harms their local, natural and built environments and about some of the ways people look after them.

Maths

- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.
- Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.

Wales

Humanities

- I am beginning to understand that my actions and those of others have causes and effects.

Maths

- I can use mathematical language to describe quantities, and to make estimates and comparisons such as 'more than', 'less than' and 'equal to'.
- I am beginning to represent and interpret data, using a range of methods.

Scotland

Social sciences

- I explore and discover the interesting features of my local environment to develop an awareness of the world around me.
- I explore and appreciate the wonder of nature within different environments and have played a part in caring for the environment.

Science

- I have contributed to discussions of current scientific news items to help develop my awareness of science.

Maths

- I am developing a sense of size and amount by observing, exploring, using and communicating with others about things in the world around me.
- I have explored a variety of ways in which data is presented and can ask and answer questions about the information it contains.

Marine Litter Fact File



From source to sea

It is estimated that 11 million tonnes of plastic ends up in the sea worldwide each year (1), and that 80% of litter found in the sea is from inland sources (2).

Sources on land can include intentional and accidental littering, items flushed down toilets, sinks and drains, windblown litter from bins and landfills, and litter carried by rainwater into drains, rivers and eventually the sea. Litter is also a problem at sea, with sources like fishing, sailing, speed boats, commercial ships and container spills causing litter pollution.



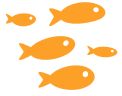
Litter timeline

Litter in the ocean takes longer to degrade than litter on land, but will eventually start to break up due to wave action, currents, saltwater and sunlight. Degradation time varies greatly depending on the properties of the litter.

Microplastics are a serious environmental issue. They are plastics that have broken up into pieces less than 5mm. However, some plastics enter the environment this size already - like microfibres and plastic nurdles. Nurdles are the small plastic pellets used in the production of plastic products.

1. Pew, 2020
2. Europa, 2016

Marine Litter Fact File



Marine life and litter

Litter items can cause harm to all sorts of marine life, from tiny plankton to huge whales.

Animals can become entangled in litter, causing injury, reduced mobility and even death. Ingestion of litter, particularly plastic, is very problematic for marine life as they are unable to digest it. Large amounts of plastic ingestion can lead to starvation, as there is no room left for food. One study found 100% of turtles sampled to have plastic in their stomach (3). In some areas, the extreme amount of plastic on the sea floor can suffocate the animals and plants living there.

Invasive species

Ocean currents can move plastics around the world. Small animals and plants can hitch a ride on the surface of plastic and travel with the currents, introducing non-native species to new areas. The introduction of non-native species could cause harm to the ecosystem.

Plastic chemicals

Several chemicals used in the production of plastic materials are carcinogenic. Toxic contaminants can also accumulate on the surface of plastic materials that have broken up and been underwater for a long time. When marine animals ingest plastic accidentally, these toxic contaminants enter their digestive systems and could build up in the food web over time.



Gannet carrying fishing rope
📷 JHS Archer-Thomson



Microplastic pieces within seaweed
📷 Natasha Ewins

Marine Litter Fact File



Litter surveys

Litter surveys are not only important for clearing rubbish, but also for gathering data on the types of litter polluting our environment. [Beachwatch](#) is our national beach clean and survey initiative, and has been running for nearly 30 years. Our brilliant volunteers head out to beaches across the UK to clean and survey our coastline, collecting and recording the rubbish they find within a 100m stretch of beach. This litter data helps inform our campaigns and lobby government, and has led to influential changes like the UK-wide carrier bag charge, microbead bans and changes to wet wipe packaging.

We also use the data to determine the sources of litter. For example, if a significant amount of sewage-related debris (SRD) is found in an area, we work with local sewage treatment companies to try to improve treatment plants, and with communities to raise awareness of what should and shouldn't be flushed down the toilet.



Reducing litter

We all need to do our bit to reduce litter in the environment. By rethinking how we shop and what we use in our daily lives, we can all make a difference. Refusing unnecessary plastic and other materials, reducing the amount of products we consume, and repairing rather than replacing are all important actions we can take. Through education, we can help raise awareness, encourage positive consumer behaviour, and campaign for change from businesses and the government.



© Natasha Ewins



© Aled Llywelyn

Marine Litter Fact File



Recycling

Even if we reduce the number of items we use, we will still need to throw some away. This is where efficient recycling is key. Download a guide from your local council to help students understand what can be recycled at home and at school. Many items can be recycled, but if your local council has limited recycling options check out [Terracycle's website](#) for local drop-off points.

Plastics can only be recycled at best 2-3 times before they lose their strength, so we still need to move away from plastics to materials that can be recycled time and time again. We need to change how products are recycled, and how we incentivise best practice to ensure materials and resources are valued. This could include redesigning products or calling for economic incentives like Deposit Return Schemes (DRS), where a small deposit is paid when consumers buy a single-use drinks container and is refunded when they return it to a store or dedicated recycling point.



Circular economy

We currently have an economy which is linear, which means we make, use and dispose of products using up finite resources. It's estimated that only 9% of all plastic ever made has been recycled (4), so we know that recycling alone isn't the solution. Instead we need to move towards a circular economy, where products are designed to be used time and again, repairable, or re-purposed as new products. The whole life cycle of the product has been considered, so very little ends up in landfill.



Litter collected at a beach clean
📷 Natasha Ewins



Single-use plastic straws
📷 Natasha Ewins

4. Geyer *et al.*, 2017

Your school and the ocean

Name:

Our school's name is:

Our nearest river is called:

The river meets the sea near:

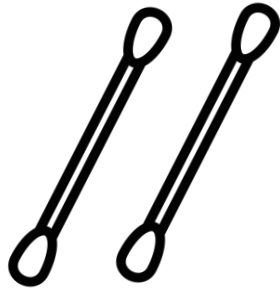
The name of the sea in this area is:

On the map mark roughly where your school is and where your nearest river meets the sea

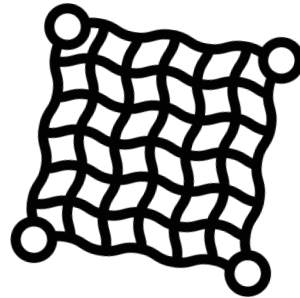


Litter items

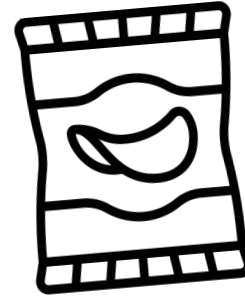
How does litter reach the ocean?



Cotton buds



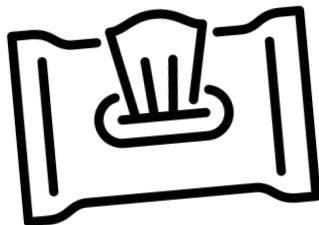
Fishing net



Crisp packet



Drinks can



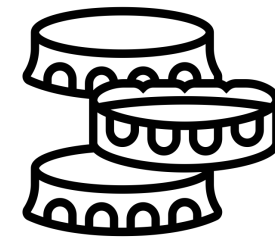
Wet wipe



Balloon



Polystyrene cup



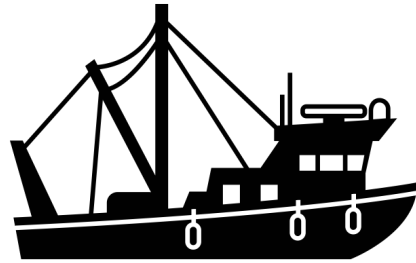
Bottle caps/lids

Sources

How does litter reach the ocean?



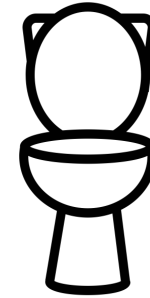
Litter dropped in towns and cities



Fishing boats



Overflowing bins



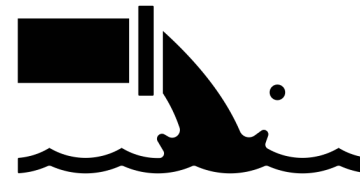
Flushed down the toilet



Wind



Rain



Sewers



Rivers

Example journeys

How does litter reach the ocean?

