



MARINE
CONSERVATION
SOCIETY

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Source to sea

Sustainability Goals:



Subject links:

Science, Geography, Citizenship,
Maths, ICT

Curriculum key words:

Human impact, modern world, digital skills, maps, data,
statistics, community, environment, responsibility

Ocean Literacy Principles:

6. The ocean and humans are inextricably interconnected

Learning objectives:

- To develop map-reading skills by exploring how your local area connects to the ocean
- To start developing an understanding of what happens to litter after it's been discarded
- To interpret and analyse data by looking at beach clean survey results

Resources provided:

- [Marine Litter Fact File](#)
- [Your school and the ocean worksheet](#)
- [Marine Litter Image Reel](#)
- [Beachwatch reports](#)
- [Beach clean data worksheet](#)

Extra resources required:

- Computers with access to Google Earth
- Maps of local area

Ages 7-11

Step 1

Background

Litter reaches the ocean in a number of ways: it's washed in from our rivers, it's left on our beaches, or it's 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.

It's estimated that 80% of litter in the ocean comes from inland sources, showing that no matter how far we live from the coast, our actions can have an impact on our seas. Find more information in the [fact file](#).

Step 2

Set the Scene

20 minutes – How does my school connect to the sea?

Explain to the group that this lesson will focus on how litter reaches the sea. To do this, you're going to map how your local area connects to the ocean.

First, use a satellite mapping software like Google Earth to find your school. From your school, find the nearest river and follow it along to the next river, then the next, until it eventually meets the sea. At each stage, fill in the [your school and the ocean](#) sheet. There are different worksheets depending on whether students are completing the activity in pairs or together as a class.

Step 3

Activities

Activity 1: 20–30 minutes – From source to sea

As a class, have a look at the slide titled 'sources' in the [image reel](#). Ask pupils to consider how each of the sources pictured – littering, being flushed down the toilet, rain and stormy weather, boats, rivers, drains, wind and overflowing bins – might impact rubbish reaching our seas.

Using printed or digital maps of your local area, pupils should work in pairs to identify possible local sources of litter, including businesses, communities and natural features in the area. These could be schools, hospitals, houses, shopping centres, farms, streams, rivers and more.

Activity 2: 15–20 minutes – Beach clean data

Beach cleans at the Marine Conservation involve surveying the litter found in a 100m stretch of beach. We use this data to help raise awareness of marine litter and to campaign for change among consumers, businesses and governments.

To find out what kind of litter is being found around the UK, pupils should analyse the latest [Beachwatch report](#) and record their findings on the [beach clean data worksheet](#). Those finished first could answer questions A–D for another litter item of their choice.

Step 4

Extend

30–45 minutes – Raising awareness in your community

In small groups, pupils could create a campaign around one of the most-commonly found items on our beaches. The campaign should focus on raising awareness of the problem in your local area. Thinking back to Activity 1, are there any local businesses or community groups that might use this item? Think about what changes could be made to reduce it being found in the environment. You could make this activity a competition, with the winning group presenting their campaign at an assembly to the rest of the school.

Step 5

Reflect

5 minutes

How is your school connected to the ocean? Can you remember one way litter reaches the sea? What are three of the top items found on UK beaches? How could we reduce the amount of litter in the sea?

Step 6

Follow up

[The plastic problem](#) explores the materials and properties of litter items and includes a degradation investigation plan.

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.



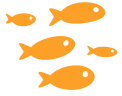
Litter timeline

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.



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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:

The coordinates for our school are:

The village or town our school is in is called:

Our nearest river is called:

The mouth of the river is:

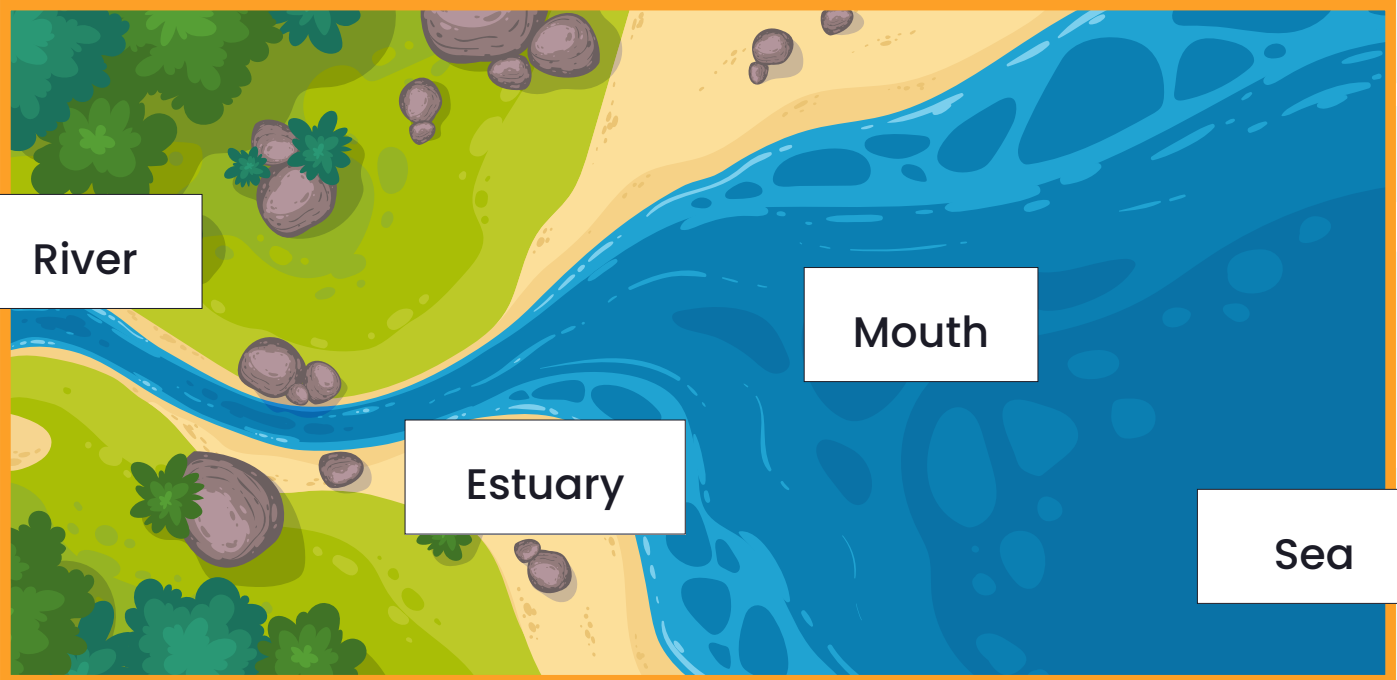
What is the name of the estuary?

What is the name of the nearest town to the estuary?

How far is your school to the mouth of the estuary?

What is the name of the sea in this area?

What is the section of ocean nearest to you called:



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

Your school and the ocean

Name:

Our school's name is:

The coordinates for our school are:



Find your school on google earth by typing in your school name in the search function. Find the coordinates in the bottom right hand corner.

The village or town our school is in is called:

Our nearest river is called:



Zoom out to find the nearest river to your school

Did you know?

The place where a river enters a lake, larger river, or the ocean is called its mouth. We are going to follow your river on its journey to the sea.



In the search bar on google earth type in the name of your nearest river. Click more info to find out where the mouth of the river is.

The mouth of the river is:

You're getting closer to the sea! The river mouth may lead you to the sea or it might flow into another river. If it leads you to another river you will need to search again for the mouth of the second river until you reach the sea.

Did you know?


When the mouth of the river meets the sea, this is called an estuary.

What is the name of the estuary?

What is the name of the nearest town to the estuary?

 Use the measurement tool on google earth

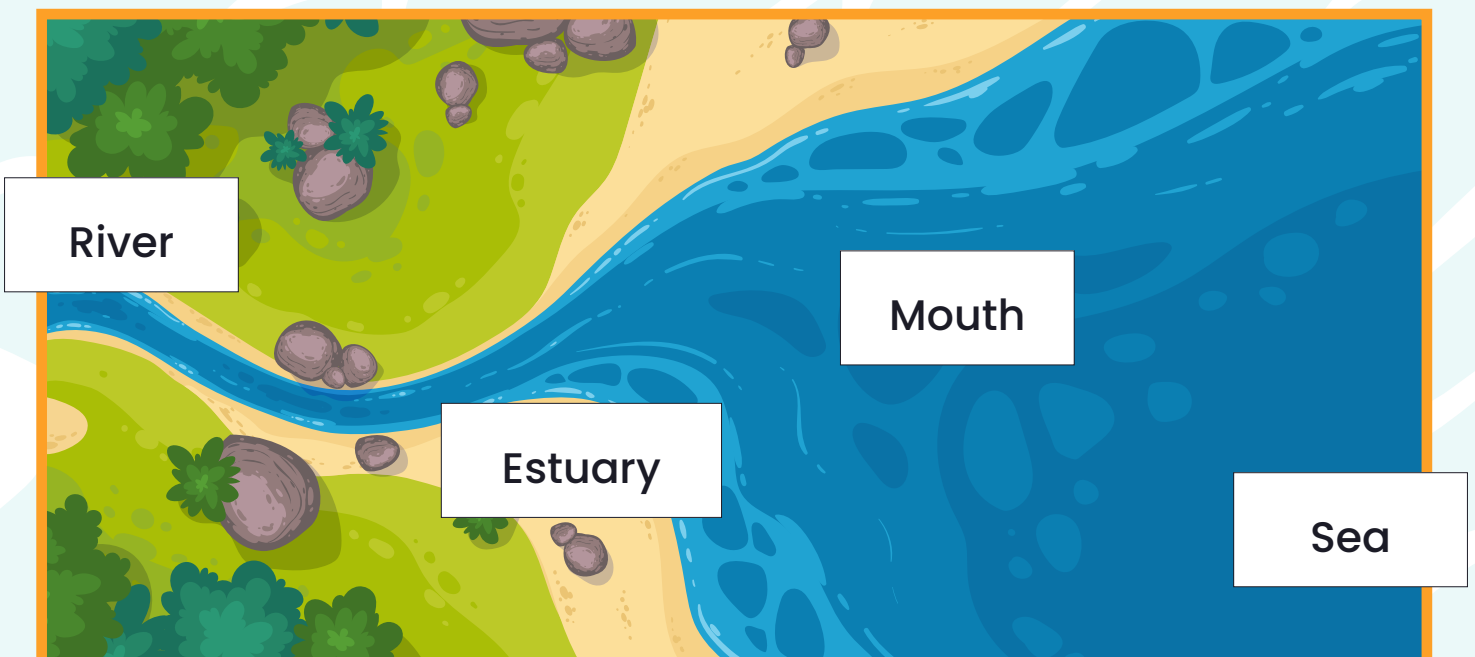
How far is your school to the mouth of the estuary:

 Zoom out to find the name of the sea closest to your school. The sea is the are of the ocean closet to and surrounding land.

What is the name of the sea in this area?

 Zoom out even more to find the name of the ocean closet to you.

What is the section of ocean nearest to you called:



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



What was the second most-common litter item found on UK beaches?

Where might this item have come from?

How could this item harm wildlife?

How could we try to reduce this kind of litter being found on our beaches?

