

Fishing For Litter



Marine Litter

The Plastic Problem



Tiree, Scotland Credit: Ocean Gives
(<https://www.facebook.com/OceanGives>)



Municipalities for Sustainable Seas



Recommended
Duration:
Number of participants

Ages 7-11 years
90 minutes
Max 33 pupils

Overview:

In Marine Litter - The problem with Plastic students sort and classify different types of litter, and make a degradation timeline to help them better understand what happens to litter once it's been discarded into the environment.

Learning Objectives:

I understand that litter carelessly deposited by humans on land can end up in the ocean. I can categorise different litter types based on their material properties and characteristics. I can identify a particular set of material properties of plastic which means it lasts longer than other materials and can pose a hazard in the natural environment.

Curriculum Links:

Science, Material Science, and Topical Science.

Preparation and resources:

Resources Provided:

[Glossary](#)

[Keep Britain Tidy Litter Pick Risk Assessment](#)

[Sources of Litter Image Reel](#)

Resources Needed:

Examples of common types of marine litter:

Plastic cutlery/straws	Plastic bottle and lids
Old food containers	Sweet and crisp wrappers
Take away cups/lids	Old food
Plastic Bag	Wet Wipes
Paper Bag	Rope and Net trimmings
Wood	Metal cans and tins
Wool gloves	Rags

*Based on Marine Conservation Society Beach Watch 2022 and EU top ten single-use plastics.

Ask pupils to collect some common types of litter made of different types of materials. They can do this by participating in a local beach clean, community litter pick, or finding litter items in a school or domestic setting. Clean all items before bringing them to the classroom.

Follow appropriate health and safety guidelines for litter picking.

[Keep Britain Tidy Litter Pick Risk Assessment](#)

Setting the Scene:

Marine litter is human solid waste found in the sea or on the beach. It comes from littering on land, windblown litter from open bins and [landfills](#), and flushing items down the toilet. Once in nature, litter is carried into streams and rivers, through drains into the sea, and onto beaches. Most of the litter found on the beach is plastic. Plastic does not rot or [biodegrade](#), it stays in nature for hundreds to thousands of years. Plastic litter on the beach looks awful, it can damage the homes of wildlife that live near or in the sea and harm wildlife that eat it or get [entangled](#) in it.

Activity one: Marine Litter: Where Does it Come From?

15 minutes

Class Activity

Lay out the most common types of marine litter collected by the class.

Look at the [Sources and Sink Litter Image Reel](#). Print out the [Source of Litter labels](#) and place the litter item under the correct source.

Discussion and Observations:

The group should now be aware that litter comes from human activities. The last slides on the [Sources and Sink Litter Image Reel](#) show plastic litter at the beach and in the ocean. Can they identify the types of litter? Can they identify the material most of the litter is made from, i.e. Plastic?

Activity Two: Material Properties

30 minutes

Class Activity

Pupils categorise different litter types based on their material properties and characteristics and identify a particular set of properties of plastic that make it useful, but also a hazard in the natural environment.

Part one: Materials

Lay out the most common types of litter collected by the class.

Explain that the stuff things are made from are called materials. A glove is made from wool, a bench is made from wood, a tin of cat food is made from metal, and food wrappings and bottles are made from plastic. Can the pupils think of any other examples?

Group items using [printables](#) that are made of the same materials, for example, [plastic](#), [paper](#), [wood](#), [metal](#), [wool](#), and [fabric](#).

Ask pupils to identify the most common litter material, this is usually plastic.

Part Two: Material Properties

Describe each material. Is it heavy or light? Strong or weak? Hard or soft? Bendy or Rigid? Waterproof or absorbent?

The words we use to describe these items are called their [Material Properties](#).

Complete the [worksheet](#) by investigating the material properties of each material.

Observation and discussion:

Look at the material properties of plastic, using some examples from litter collection.

Why is plastic used in so many products? What makes it so fantastic?

DISCUSSION IDEAS:

Light	Easy to carry around
Strong	Difficult to break
Durable	Long Lasting
Waterproof	Protects from water
Mouldable	Made into any shape* When heated

FANTASTIC PLASTIC:

Many items are made from plastic because it is easy to make, lasts a long time, and has many different uses; drink and food packaging, toiletries, and toys, it is also used to make car parts and specialised equipment in hospitals.

Part Three: Degradation Timeline

How long can litter stay in nature before it rots away?

30 minutes

Class Activity

Create a timeline with the [printables](#) provided by arranging numbers of years from 1 to 1 million years.

Note: Estimated degradation times may vary due to composition and environment. Plastic degradation times are predictions.

Select one common piece of beach litter, for example, a plastic bag. Discuss the properties of a plastic bag and ask the students to match the bag to its degradation time. Ask each pupil to pick a piece of litter, place it on the timeline, and ask the other pupils to call out 'higher' or 'lower' using a plastic bag as a reference.

Discussion and Observations:

Once the timeline is complete, present the [Degradation Timeline PowerPoint](#) to reveal the answers. Use the [Degradation Timeline PowerPoint](#) with the [Degradation Table](#), and discuss how each material degrades in nature and its hazards to wildlife.

Note: Plastic does not rot or [biodegrade](#) like natural materials like wood, paper, fruit, and vegetables, or [corrode](#) like metals. Instead, it becomes weak and gradually breaks down by exposure to sun rays, hitting off rocks, or scratching and nibbling by animals, into smaller and smaller pieces are known as microplastics. Harmful and toxic chemicals stick to microplastics. Microplastics get eaten by fish and other sea creatures that mistake them for food. These dangerous chemicals enter the food chain and can ultimately end up in the food we eat.

Plastics will “disappear” from the naked eye in that many years, but will last in the environment forever.

Reflect

Ask the pupils to relate this to marine litter. What happens to plastic that ends up on the beach or in the ocean? How does plastic litter affect marine wildlife? What can they do to prevent plastic in the marine environment?

Further Learning:

[KIMO Lesson Plan: Marine Litter: Lost at Sea](#)

Recommended 7-11-year-olds with recommendations for simple fun activities for 5-7-year-olds.

Plastic Lost at Sea explores what happens to marine litter in the ocean through three interactive activities; two simple floating and sinking experiments, and an interactive exercise, '[Plastic Adrift](#)', which simulates a real-life event in 1992 where 29,000 rubber ducks were lost at sea.

[KIMO Lesson Plan: Marine Litter: Marine Wildlife](#)

Recommended for 5-7-year-olds.

Marine Litter and Marine Wildlife explores the effect of plastic litter on seabirds in a two-part hands-on team activity. Students pair up as seabird parents and participate in a feeding frenzy. Will they manage to feed their young, and what happens if they eat plastic marine litter by mistake?

DEGRADATION TABLE:

TIME TO DEGRADE (YEARS)	MATERIAL	EXAMPLE	DEGRADES INTO?	HAZARDS
Months	Organic	Food, Garden waste	Biodegrades into soil.	No hazards to wildlife
1	Natural fibre	Wool glove, cotton T-shirt	Biodegrades into soil.	Entanglement.
30	Plastic	Bags	Degrades into microplastics	In water plastic bags look similar to jellyfish and are mistaken for food by marine animals such as turtles, which can lead to choking and death.
30-40	Plastic Fibres	Clothes, braided fishing nets and ropes	Degrade into microfibres	Discarded, lost, or abandoned, fishing ropes and nets in the marine environment are called Ghost Gear. This gear continues to fish and trap animals, entangling and killing them and damaging where they live, making it the most deadly form of plastic pollution in the ocean.
50	Metal	Tin cans	Rusts into minerals	Animals looking for food can get trapped in old tins and cans, and get injured by their sharp edges.
200	Metal	Aluminum Cans	Corrodes into minerals	Aluminum degrades slower than tin or steel because aluminum does not rust like steel and takes longer to corrode.
450	Plastic	Bottles and Containers	Degrades into microplastics	Plastic* breaks down into smaller and smaller pieces known as microplastics. Microplastics get eaten by fish. Microplastics contain harmful chemicals that enter the food chain and ultimately the food we eat.
600	Plastic	Monofilament Fishing nets and lines	Degrade into microfibres	Entanglement. Monofilament fishing lines are so thin that animals don't see it until too late. The RSPB reports that fishing tackle-related injuries were the biggest single cause of swan rescues – estimated at 3,000 a year.
1,000,000	Glass	Bottles and jars	Degrades into sand	Entrapment and cutting.

*Plastics will “disappear” from the naked eye in that many years, but will last in the environment forever.

Glossary:

Biodegrade

(of a substance or object) become rotten or decayed by bacteria or other living things such as fungi and insects.

Corrosion

Corrosion is the gradual destruction of materials (usually metals) by chemical reactions with their environment. The most common causes of corrosion are contact with water and air (oxygen).

Durable

Something durable is strong and lasts a long time without breaking or becoming weaker.

Entangle

cause to become twisted together with or caught in.

"fish attempt to swim through the mesh and become entangled"

Entanglement

is the action or fact of entangling or being entangled.

"many dolphins die from entanglement in fishing nets"

Landfill

the disposal of waste material by burying it in large dug-out pits or holes in the landscape.

Material Properties

A property is anything that describes a material or substance. It is a characteristic of that material, for example, how hard the material is, or its colour. Hardness is a property of steel; in other words, steel is hard.

Microfibres

Microfibres are tiny and fine particles of synthetic fabrics that get released into the environment when man-made fibres such as polyester and nylon degrade.

Microplastics

Microplastics are tiny plastic particles and fibres smaller than 5 millimetres. Microplastics are formed in the oceans when sunlight, chemical reactions, waves, and water currents break down or fragment large plastic items, called **macroplastics**. Some microplastics are made intentionally, such as preproduction pellets, which are tiny beads of plastic that are used to manufacture larger plastic items, and microbeads for toothpaste, scrubs, and skincare products.

Mineral

They are found on Earth's surface as well as deep underground. Minerals are naturally occurring inorganic substances meaning that they do not come from an animal or a plant. They have a well-defined chemical composition and a specific crystal structure that occurs in nature as a pure form. Examples include metals such as iron, aluminum, and copper, and non-metals such as quartz, clay, and salt.

Monofilament fishing nets and lines are made from a single fiber of plastic material, usually nylon.

Multifilament or Braided fishing nets and ropes constructed from multiple strands of fibers braided together

Rust

Rust forms due to a chemical reaction that takes place when metals such as iron are exposed to air and water. It is reddish-brown.

SOURCES OF LITTER

PICNIC	PACKED LUNCH
TAKE-AWAY	CAFE
SUPERMARKET	FISHING
BATHROOM	

PLASTIC

PAPER

WOOD

METAL

WOOL

FABRIC

Material Worksheet Properties:

[illegible]

Litter Degradation Timeline:

MONTHS

1 YEAR

30 YEARS

50 YEARS

80 YEARS

200 YEARS

450 YEARS

600 YEARS

1,000,000 YEARS