

Sustainability

What is plastic waste?



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How can our school reduce its plastic waste?

Key question we will answer:

What is plastic waste?

Key geographical knowledge we will use: Human and Physical Geography

Key geographical concepts we will use: Place, Interdependence, Physical and Human Processes, Environmental Impact and Sustainable Development

Key question we will answer:

What can our school do to reduce plastic waste?

Key geographical knowledge we will use: Human and Physical Geography

Key geographical concepts we will use: Interdependence, Physical and Human Processes, Environmental Impact and Sustainable Development

Key question we will answer:

How can we plan and carry out effective ways to reduce plastic waste in school?

Key geographical knowledge we will use: Human and Physical Geography, Geography Skills and Fieldwork

Key geographical concepts we will use: Interdependence, Physical and Human Processes, Environmental Impact and Sustainable Development

Key question we will answer:

How can we record and evaluate the effectiveness of reducing plastic waste in school?

Key geographical knowledge we will use: Human and Physical Geography, Geography Skills and Fieldwork

Key geographical concepts we will use: Interdependence, Physical and Human Processes, Environmental Impact and Sustainable Development



Key vocabulary for this lesson:

synthetic – products that are made from chemicals or artificial substances rather than from natural ones

raw materials – materials that are in their natural state before they are processed or used in manufacturing

extracted – removed or taken out by effort or force

refinery – a production place that breaks down certain materials and makes raw materials into products of value

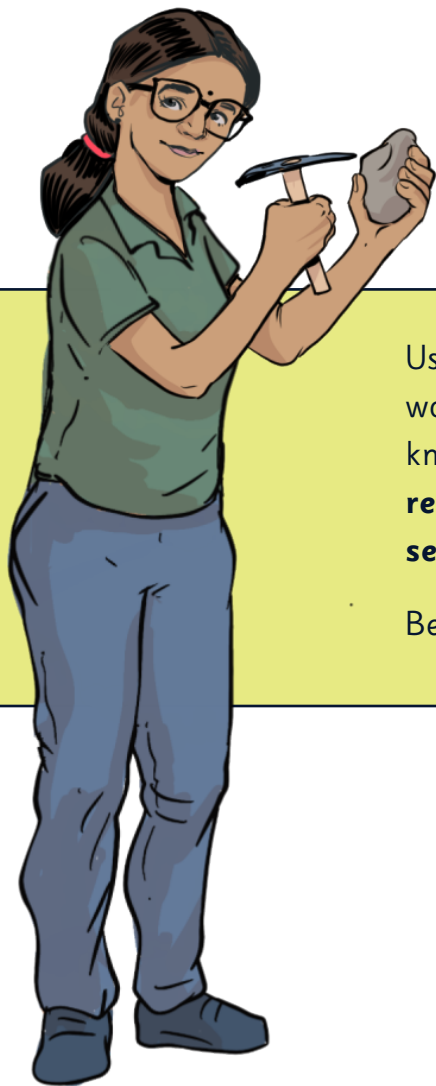
durability – a property of material meaning it can last a long time without being damaged

biodegradable – something that can be decomposed by bacteria or other living things

microplastics – tiny pieces of plastic that are less than 5 millimetres across



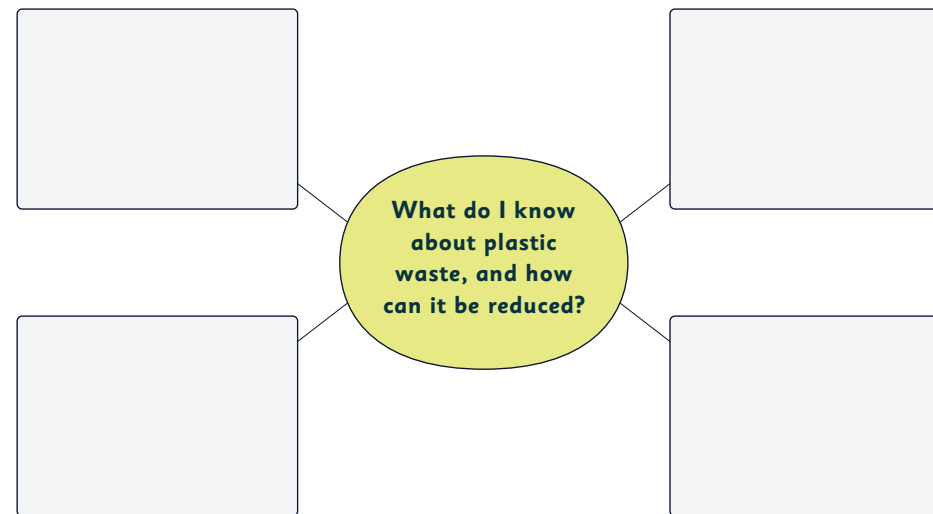
Pre-assessment mind map



Use the **mind map** on your pre-assessment worksheet to write down everything you already know about **plastic waste** and how it can be **reduced**. You can write **keywords, facts or sentences or draw pictures and diagrams**.

Be ready to **share your feedback** with the class.

Pre-assessment mind map



What is plastic?

Hi! My name is **Allisandra**. I am a **geographer**. I study the **Earth** and the **distribution of its land, features** and **inhabitants** as part of my job.

Plastic is everywhere, from our school water bottles to our home toothbrushes. Plastic is a **human-made material** that can be formed into almost any shape. Most plastics are **strong, long-lasting and lightweight**. They resist damage by water, heat, chemicals and electricity. Manufacturers often use plastics instead of more expensive materials and in many car body parts, **plastic replaces metal**.



History of plastic



Hi! My name is **Cian**. I am an **archaeologist**. I learn about the **past** by studying sites and excavating, classifying, recording and preserving objects.

The word 'plastic' comes from the Greek word "**plastikós**", meaning "**to mould or shape**". Indeed, some of the oldest use of natural plastic dates back to **3500 years ago in America**, where people used naturally occurring plastic from trees to create **rubber balls**! The first synthetic plastic was made in **1907** when a Belgian named **Leo Baekeland** invented what he called '**Bakelite**' in a lab in New York. People referred to it as "**the material of 1,000 uses**".



The life cycle of a plastic bottle

Let's watch a video to learn more about the life cycle of a plastic bottle:

https://www.youtube.com/watch?v=qUnoycPpGKc&ab_channel=Grammarsaurus



The life cycle
of a plastic bottle



The production of plastic

answers



Hi! My name is **Lula**, and I am an **environmental scientist**. I use my knowledge of the natural sciences to **protect the environment and human health**.

From the **video**, I'm sure that you said that creating plastic for the future has lots of problems. **Crude oil** is one of the main ingredients needed to make plastic and it is a **fossil fuel** which means there's a **limited supply**. In addition to this, plastic is **polluting the environment** because it takes so **long to decay**, and it **releases harmful toxins** during this process.



Stop and jot 1



Let's think about **plastic use in school**.

Use your stop and jot 1 worksheet to write down as many **uses as you can think of for plastic** in your school, at home and any other places you can think of.

Be ready to **share your feedback** with the class before **possible answers are revealed**.



Stop and jot 1

answers

School	Home	Other
stationery cutlery cups gloves wipes water bottles lunch boxes uniform tables chairs laminated displays art supplies	straws water bottles toothbrush food and drink packaging clothing and accessories furniture storage containers shopping bags household appliances sockets wire casing nappies	packaging construction electronics transport banknotes medical supplies

Did you think of any **other uses**?



Where does plastic waste come from?

Most plastic waste is **washed into the ocean from the land**. It is swept into **rivers** due to rain, overflowing storm drains or littering and is then transported out to **sea**.

However, a significant amount is **dumped directly into the ocean**. For example, in **2019** alone, **Greenpeace** found there were **640,000 tonnes of fishing gear** abandoned, lost or discarded into the oceans.

Plastic pollution in the ocean also comes from our **clothes**. Tiny **microplastics** are released when we run synthetic clothing through the washing machine. An average load of laundry might release around **700,000 micro-plastic fibres** into the water. These are too small to be filtered, so they end up collecting on riverbeds or washing out to sea.



Problems with plastic



Unfortunately, some of plastic's best properties, such as **durability and long-lasting life**, are the things that cause problems in the environment. Many plastics, such as **water bottles and packaging**, are designed to be used just once. This means that they are **single-use plastics**.

Unless **recycled**, they remain on our planet, clogging up landfills and making their way to the ocean, where they can harm **sea life**.

Plastic has been found near the summit of **Mount Everest**, inside the deepest point on Earth, the **Mariana Trench**, and in the **human bloodstream**.



How long does it take for single-use plastics to break down?

drinking straw
200 years

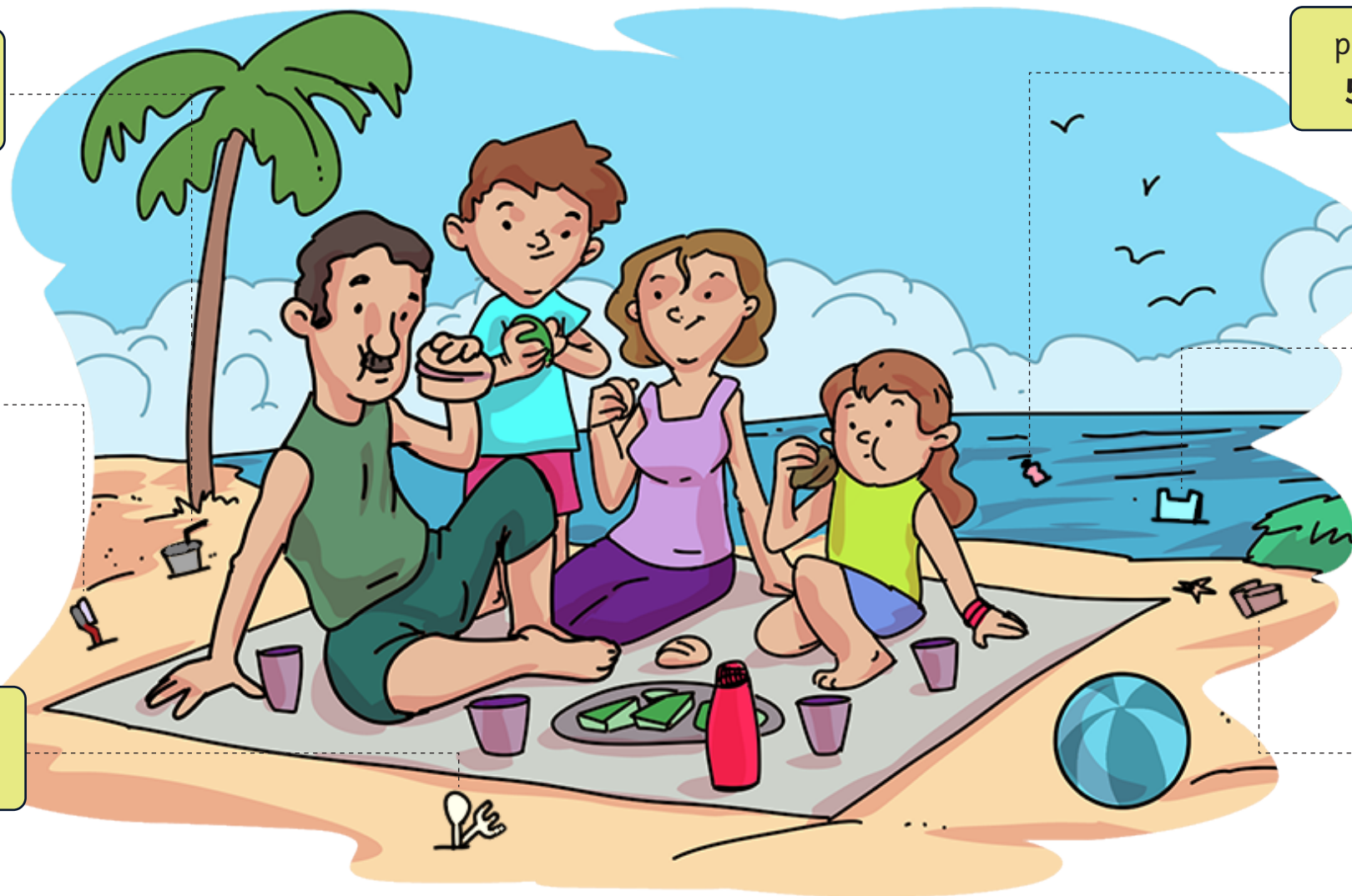
toothbrush
500 years

plastic cutlery
400 years

plastic bottle
500 years

plastic bag
400 years

plastic cup
100 years



Problems with plastic in our oceans



Hi! My name is **Florence**. I am a **countryside ranger**. I study animals and their habitats as part of my job.

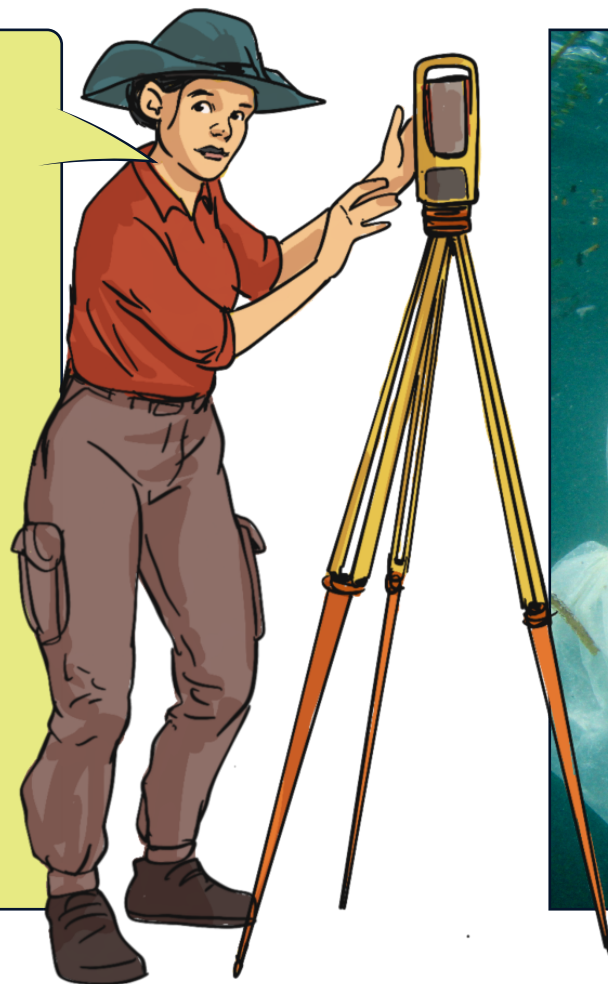
Did you know that **8 million tonnes of plastic** end up in our planet's beautiful blue oceans every year? 8 million tonnes of plastic is equivalent to stacking five plastic shopping bags of rubbish on top of each other on every metre of coastline in the world!



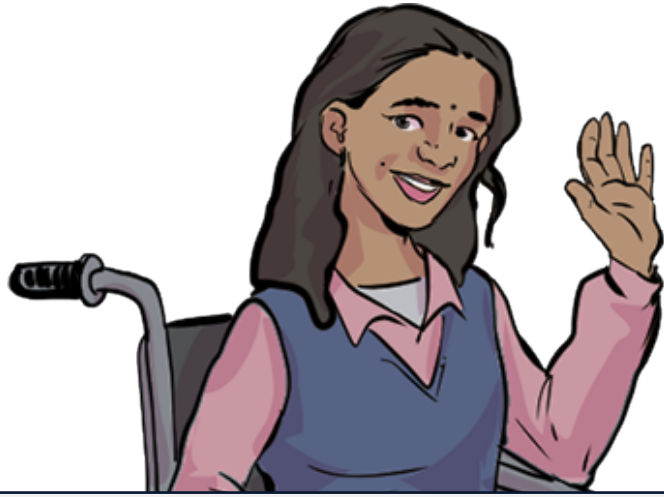
Problems with plastic in our oceans

Plastic can take over **400 years** to **decompose**. Even then, it **doesn't break down completely**. It gets smaller and is swallowed by **fish, other marine animals and birds**.

Shockingly, over **700 species of marine animals** have been reported to have eaten or been entangled in plastic, and scientists think that the **amount of plastic in the ocean may triple by 2060!**



Problems with plastic in our oceans



Many **sea creatures** can't distinguish common plastic items from food. Animals who eat plastic often starve because they can't **digest it**, and it fills their stomachs, preventing them from eating real food.

Birds and larger animals often become **trapped** in plastic bags, fishing lines and other waste. **Sea turtles** specifically are high risk; they mistake plastic bags for **jellyfish** and frequently are trapped in plastic, restricting their growth and movement.



Plastic waste on a global scale

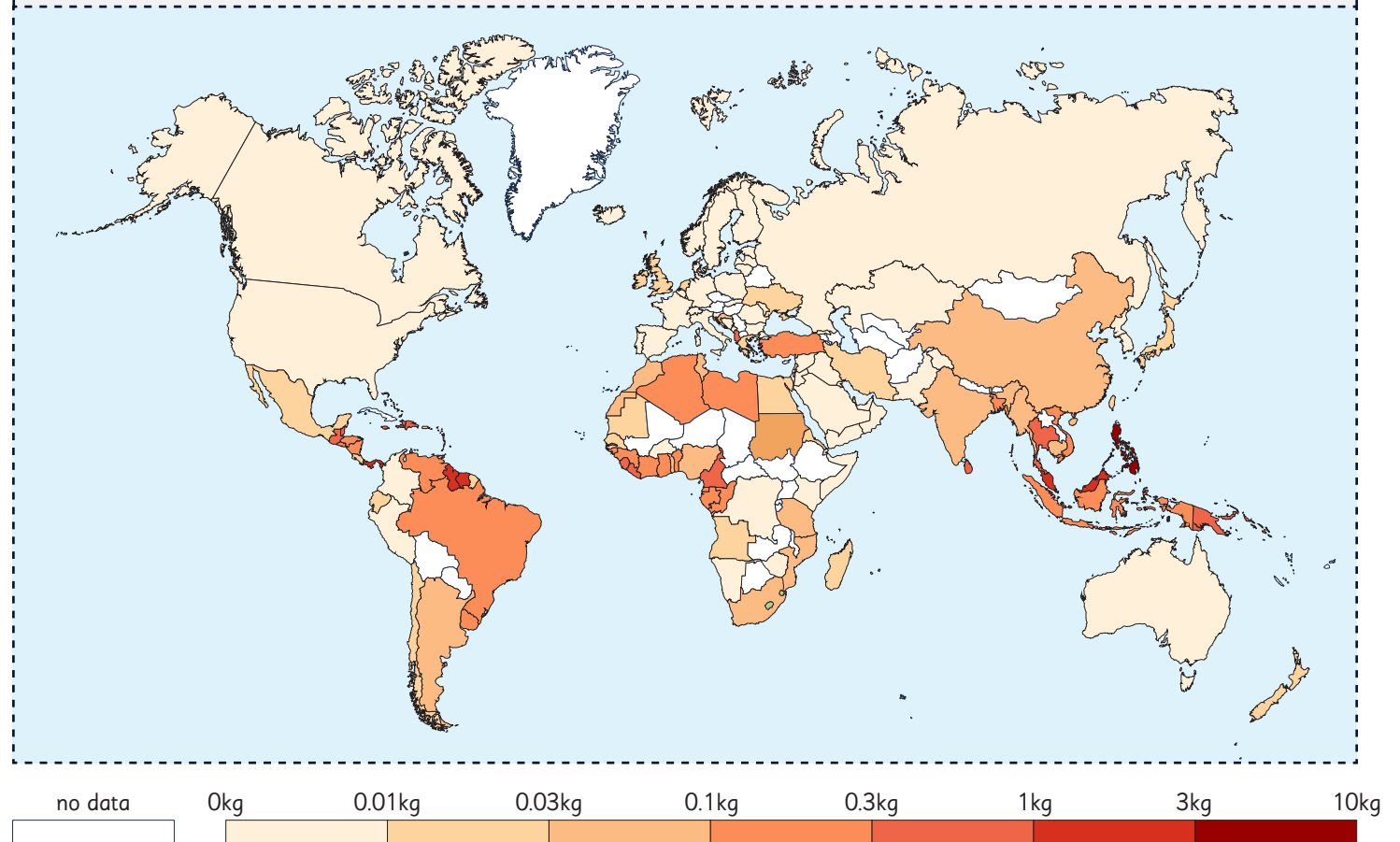
Discuss the map which shows **plastic waste emitted to the ocean** by each country per capita (for each person) in 2019 with your learning partner.

Consider which **countries emitted the least and the most** and the potential reasons for this.

Be ready to **share your feedback** with the class before the **answer is revealed**.

Plastic waste emitted to the ocean per capita, 2019

This is an annual estimate of plastic emissions. A country's total does not include the waste exported overseas and may be at higher risk of entering the ocean.



Plastic waste on a global scale

answers

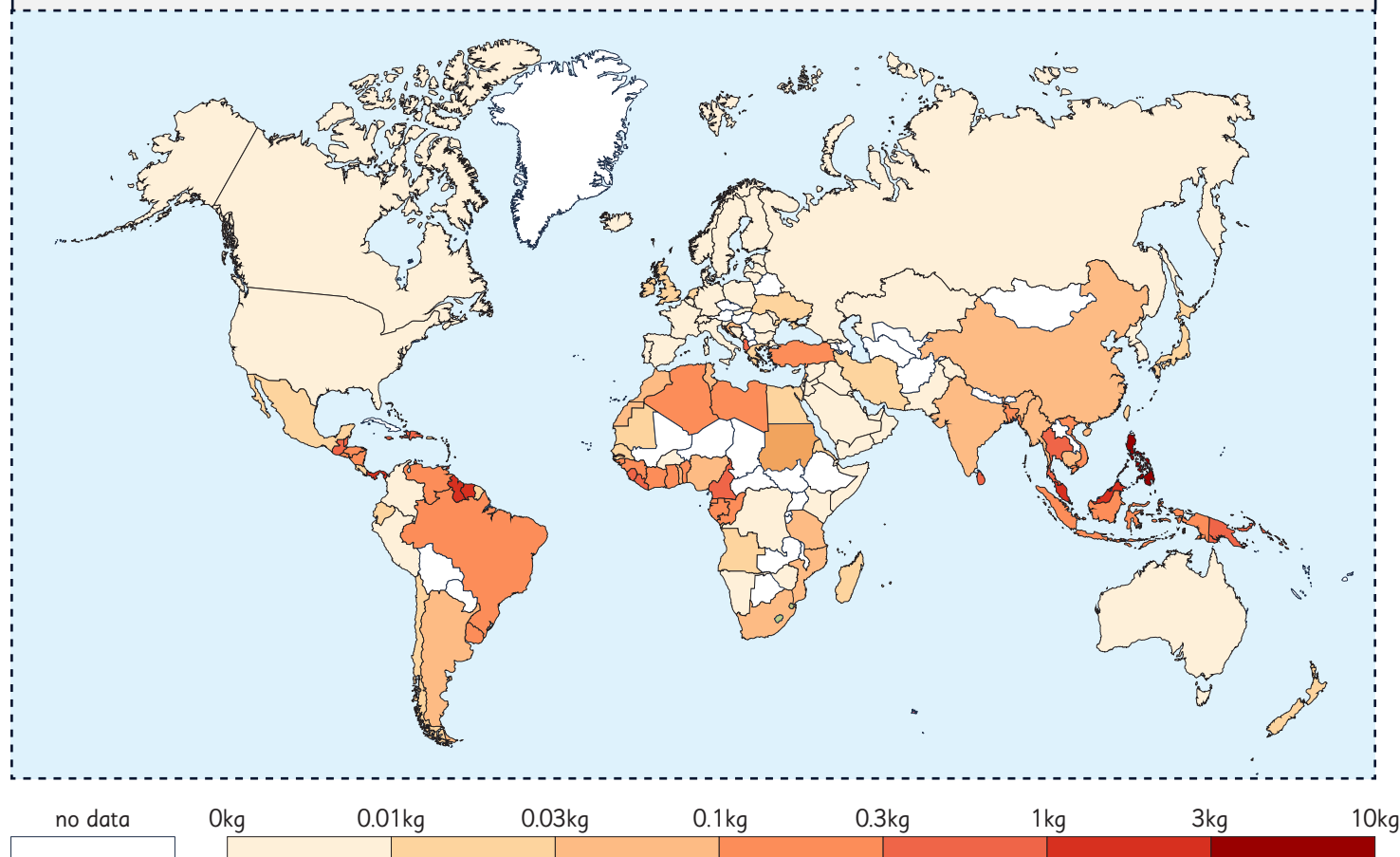
It appears that the **world's largest countries** (like Canada, Russia, and the USA) do not emit as much plastic waste as many of the world's **smaller countries** like the Philippines and much of South East Asia.

Overcrowding and poorer recycling standards could be factors. Some countries have **no data to show**, such as much of central Africa, which could suggest that **plastic waste is not carefully monitored and controlled**.

The UK emits **more plastic than most of Europe**, showing an alarming **0.03kg per capita**. Much more work needs to be done to improve this figure, and we all have a **crucial part** to play!

Plastic waste emitted to the ocean per capita, 2019

This is an annual estimate of plastic emissions. A country's total does not include the waste exported overseas and may be at higher risk of entering the ocean.



Plastic waste on a global scale

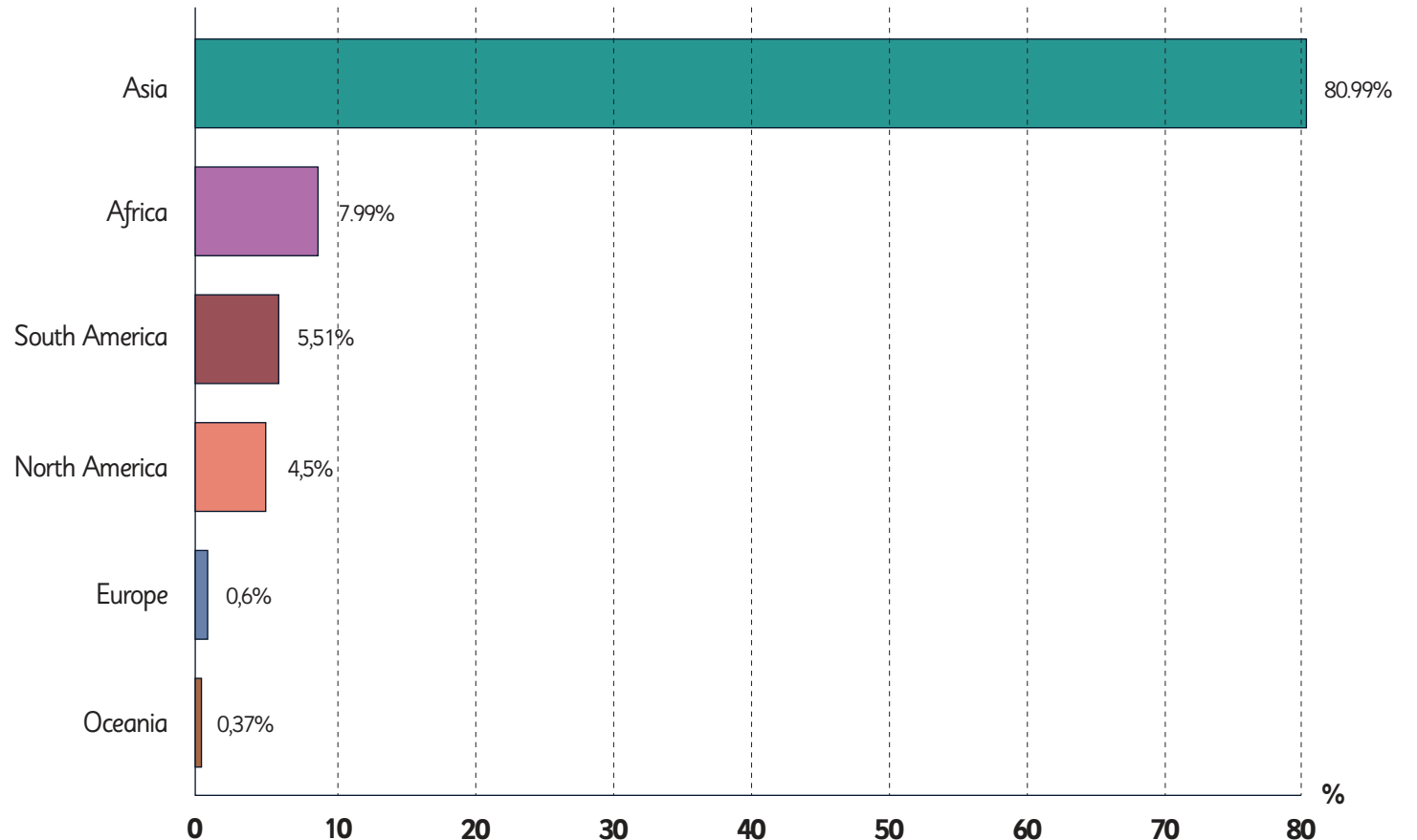
answers

As we saw in the previous map, **Asia** emits the most plastic waste into the ocean (80.99%). The Philippines accounts for over one-third (36%) of this plastic waste.

Oceania and Europe are by far the best at reducing plastic waste in the oceans. The gap between all other continents and Asia (the world's largest continent) appears significant. Africa emits over **70% less plastic waste** than Asia alone.

Share of global plastic waste emitted to the ocean, 2019

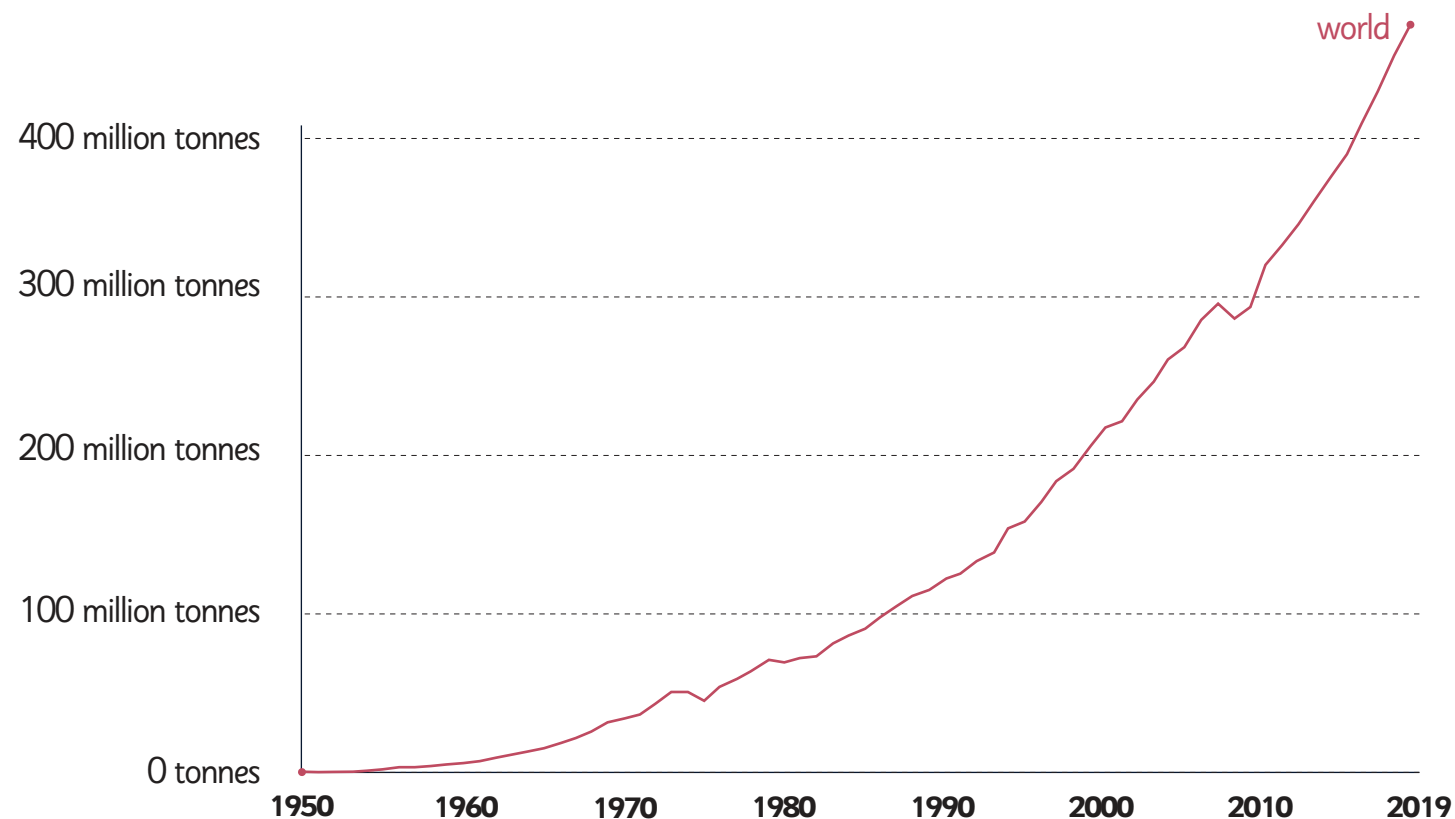
This is an annual estimate of plastic emissions. A country's total does not include the waste that is exported overseas and that may be at higher risk of entering the ocean.



What is this graph showing?

Discuss with your learning partner what you think this **graph** indicates. Look at each axis and consider the **type of graph shown** before making your choice.

Be ready to **share your feedback** with the class.



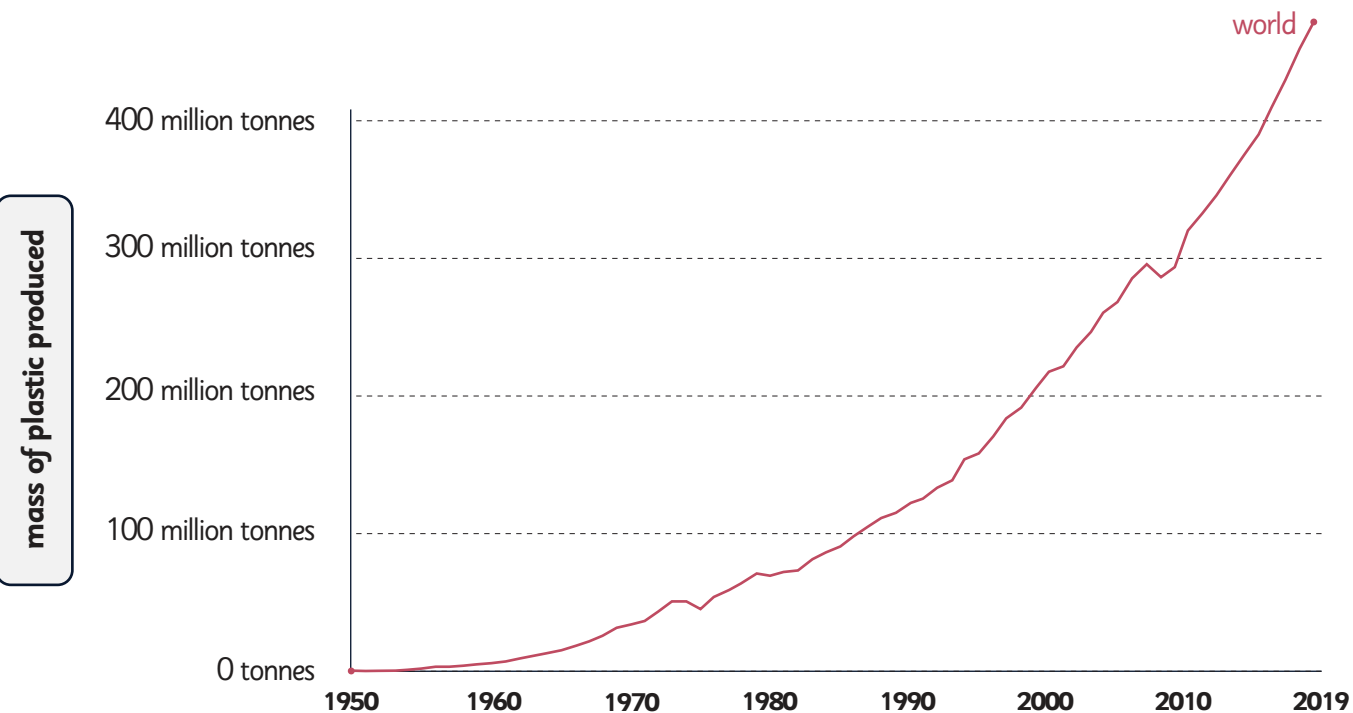
What is this graph showing?

answers

This line graph shows **global plastics production**. In **1950**, the world produced only **2 million tonnes of plastic annually**. Since then, annual production has increased, **reaching 460 million tonnes in 2019 and rising!**

Global plastics production

Plastic production refers to the annual production of polymer resin and fibres.



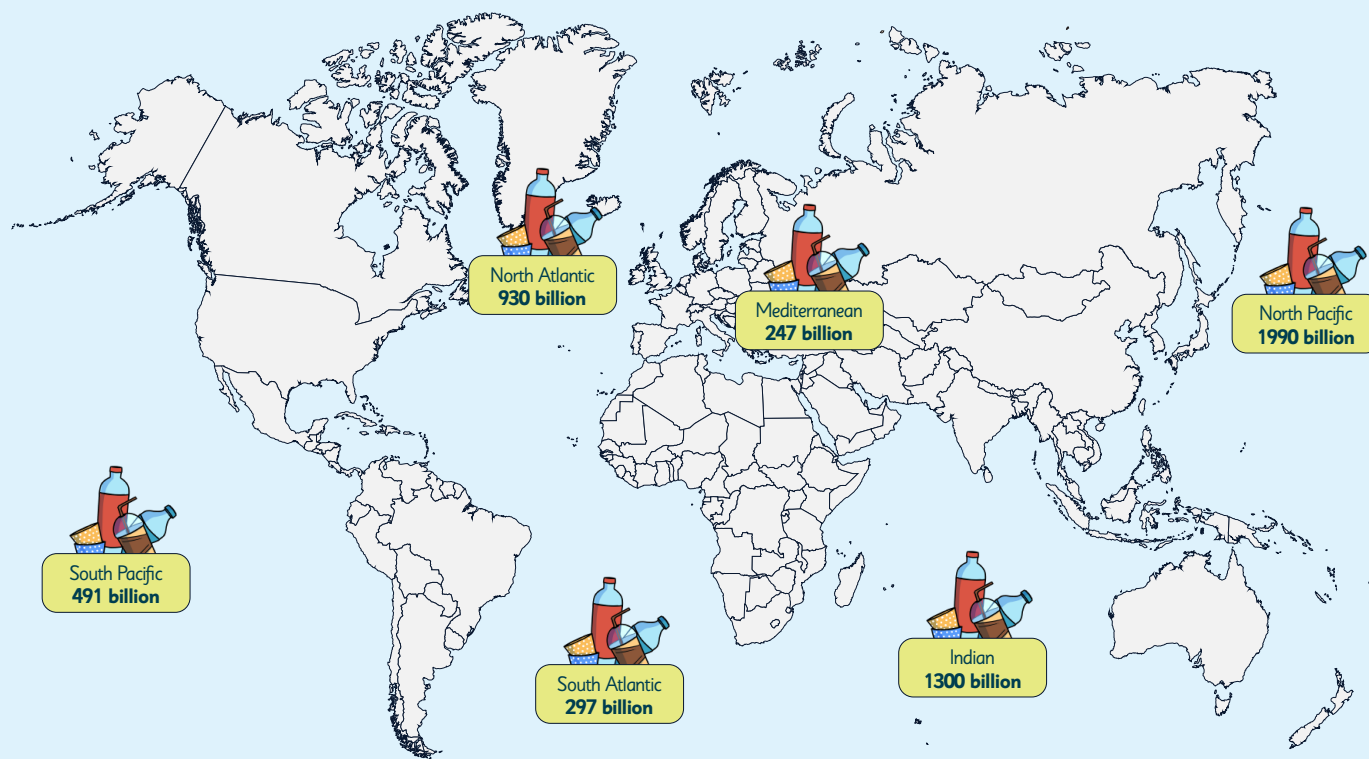
Global garbage patches

In terms of the specific oceans, the **worst affected region** is the **North Pacific Ocean**, where it is estimated that nearly **two trillion pieces of plastic** are present.

The so-called “**Great Pacific Garbage Patch**”, floating off the coast of California, is more than **four times the size of Germany**.

Contrary to popular belief, only a **small proportion of plastic waste floats**. Most either sinks or is washed ashore.

Pieces of plastic pollution in our oceans



True or false activity

Let's test your **knowledge of plastic!**

Read the statements below with your learning partner and decide whether they are **true or false**.

Be ready to **share your feedback** with the class.

True**False**

A plastic toothbrush will take **200 years** to break down.

☐☐

By **2060**, the amount of plastic in the **oceans** may have tripled.

☐☐

The plastic eventually **breaks down completely**.

☐☐

A plastic island in the Pacific Ocean is **four times the size of Germany**.

☐☐

All plastic waste is dumped **directly into the ocean**.

☐☐

True or false activity

answers

True

False

A plastic toothbrush will take **200 years** to break down.

☐


False. A plastic toothbrush will take 500 years to break down.

By **2060**, the amount of plastic in the **oceans** may have tripled.


☐

True.

The plastic eventually **breaks down completely**.

☐


False. It breaks down into smaller pieces called microplastics.

A plastic island in the Pacific Ocean is **four times the size of Germany**.


☐

True. The Great Pacific Garbage Patch is a patch of rubbish that is 1.6 million sq. kilometres big. This is four times the size of Germany.

All plastic waste is dumped **directly into the ocean**.

☐


False. The majority of plastic waste ends up in the ocean after washing into rivers.



Activity 1



Key Geographical Skills: Place Knowledge, Human and Physical Geography
Key Geographical Concepts: Place, Space, Scale, Interdependence, Physical and Human Processes, Environmental Impact and Sustainable Development

What is plastic waste?

Imagine you are the manager of the **local tourist office**. Tourism brings much-needed money into your quiet seaside town, but the beaches are **full of litter**, and most of it comes from **food packaging and plastic bags** that people leave behind. You are worried that **unsightly rubbish** on the beach will keep tourists away.

Imagine you are the manager of the **local tourist office**. Tourism brings much-needed money into your quiet seaside town, but the beaches are **full of litter**, and most of it comes from **food packaging and plastic bags** that people leave behind. You are worried that unsightly rubbish on the beach will keep tourists away.

Write a **letter** to the council explaining that they should do more to clean up the beaches and provide better **rubbish disposal and recycling services** on your activity 1 worksheet.

Key Geographical Skills: Place Knowledge, Human and Physical Geography
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What is plastic waste?

Imagine you are the manager of the **local tourist office**. Tourism brings much-needed money into your quiet seaside town, but the beaches are **full of litter**, and most of it comes from **food packaging and plastic bags** that people leave behind. You are worried that **unsightly rubbish** on the beach will keep tourists away.

Write a **letter** to the council explaining that they should do more to clean up the beaches and provide better rubbish disposal and **recycling services**. Use the **word bank** to help you.

Dear local council,

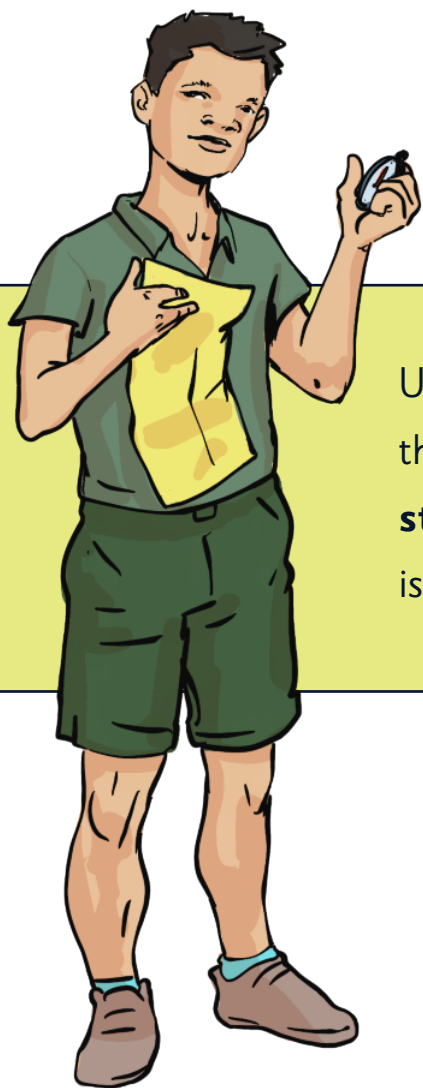
word bank

disgrace	microplastics	biodegradable	tourism	recyclable	environment
pollution	toxic	decompose	packaging	sustainable	detrimental

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Challenge



Use the **knowledge** you gained from this lesson to decide whether each **statement** on your challenge worksheet is true or false.

Key Geographical Skills: Place Knowledge, Human and Physical Geography

Key Geographical Concepts: Place, Space, Scale, Interdependence, Physical and Human Processes, Environmental Impact, Sustainable Development

Challenge



Jamie says, "There is **no point in recycling**. It doesn't make a difference!"



Angie says, "Ocean plastic pollution is a problem created outside the UK."



Elijah says, "Putting **non-recyclables** in the recycling bin will **contaminate** everything."



Attia says, "Bamboo is a good alternative material as it is **100% decomposable**."

Read each of the **children's statements** below and decide whether each one is **true or false**. Explain your choice using your knowledge from this lesson.

Jamie:

Angie:

Elijah:

Attia:

