Norfolk County Council

Norfolk recycles

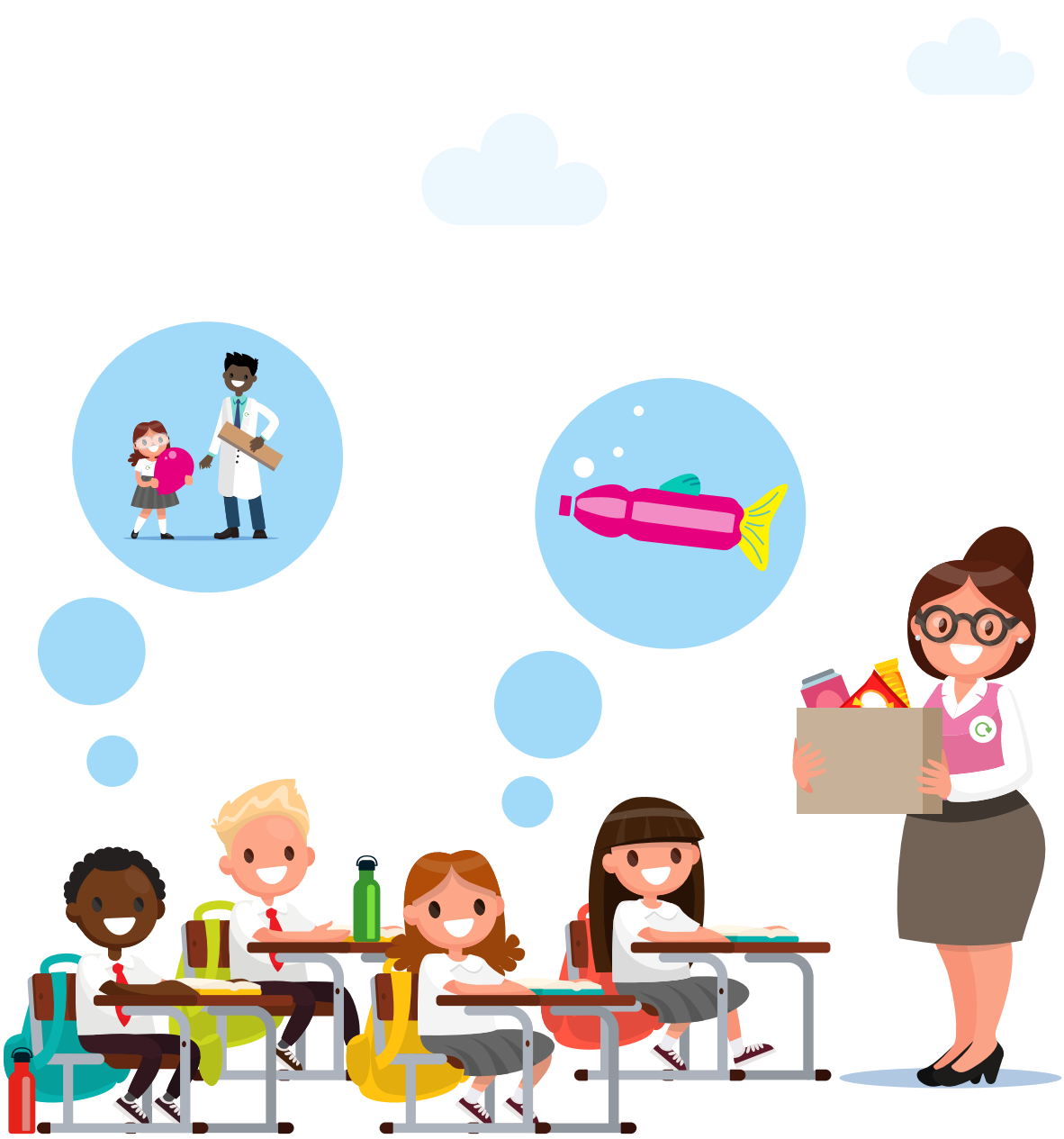
REDUCE SINGLE USE

ACTIVITY BOOKLET

www.norfolkrecycles.com

ACTIVITIES

In this booklet you will find a selection of optional assembly and activity ideas designed to support and enhance pupils' understanding of the issues surrounding single-use plastics. Most are curriculum linked and can be easily adapted to suit different age groups.



CONTENTS

INTRODUCTORY ASSEMBLY

RESOURCES

- **Examples of items made from single-use plastic**

  (e.g. disposable water bottle, cling film, snack wrappers, plastic cutlery, single-use carrier bag, packaged fruit/veg, plastic soap bottle, disposable coffee cup, balloons)

- **Picture resource**
  (please see page 7)

- **Examples of reusable plastic alternatives**

  (e.g. water bottle, sandwich wrap, reusable boxes, metal cutlery, shopping bag, fruit/veg in string bag, bar soap in box/paper wrapping, reusable coffee cup, fabric flag/bunting)

INTRODUCTION

Explain that too much rubbish causes problems for the environment and for wildlife and wastes precious resources so it's important that we tackle it.

PLASTIC

Today we're going to talk about one type of rubbish in particular – plastic. Since it was invented in 1907 (just over 100 years ago) 8.3 billion tonnes of plastic has been created:

- **That's the same as 18 x the weight of the entire population**
- **8.3 billion tonnes of lego bricks could cover the entire surface of the earth 16 times**

Out of that 8.3 billion tonnes of plastic:

- **9% has been recycled**
- **11% has been incinerated (this is the only way to fully destroy it)**
- **80% is still in the environment (could be in landfill, the oceans or the countryside)**

You could demonstrate percentages by asking pupils to all stand up to represent the 8.3 billion tonnes of plastic and then getting some to sit down to demonstrate each proportion.

INTRODUCTORY ASSEMBLY

PROBLEMS

So why is all this plastic a problem? Take ideas (You could use the visuals provided as prompts/to support)

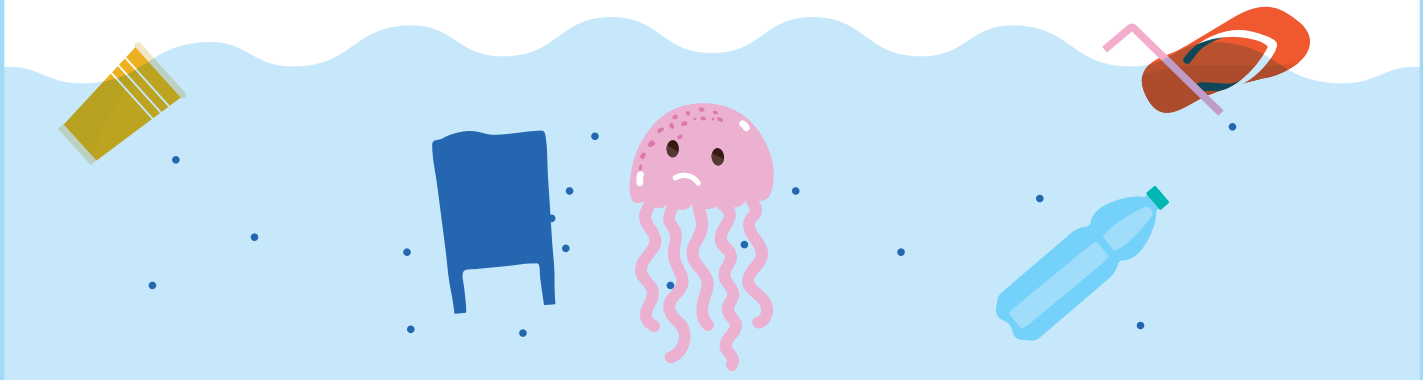
- ✖ **Uses fossil fuels to make – finite resource, pollution & water consumption in extracting oil and in plastic production process**
  - Huge carbon footprint
- ✖ **Pollutes oceans and beaches**
  - Plastic doesn't decompose (break down) in a natural way, just get smaller and smaller and can't be cleaned up – micro plastics
  - Lasts forever
- ✖ **Poses a danger to wildlife and sea creatures**
  - Damages habitats
  - Causes death/injury by animals getting caught in it
  - Sea creatures mistake it for food and eat it (you could use a plastic bag to demo how it looks like a jelly fish)

SINGLE-USE PLASTIC

Most of this plastic waste is 'single-use plastic'. What do I mean by that?

- **Definition: single-use plastics, or disposable plastics, are only used once before they are thrown away or recycled**
- **Show some examples of items made from single-use plastics – put your hand up if this is something you use**

It's this type of plastic that's causing the biggest problems so we need to do something about it.



INTRODUCTORY ASSEMBLY

SOLUTIONS

The great news is that we can all help to do something about it (seems like a huge problem but lots of little changes can make a huge difference). What could we do:

- ✓ **We can recycle as much plastic as we can - but plastic can only be recycled 3-4 times before it reaches the end of its life, plus a lot of single-use plastic is not recyclable**
- ✓ **Reducing and reusing is great – finding alternatives to the items made from single-use plastic:**
  - Take an item made from single-use plastic and ask a pupil to come and select a waste free/reusable equivalent from the examples

Cover:

- **Things relevant to them such as water bottles, sandwich wraps**
- **Lunchtime things like plastic cutlery**
- **Shopping (help parents with this one) carrier bags, packaged fruit/veg**
- **Items adults use like coffee cups**
- **Decorations like balloons – could use flags or bunting as alternatives**
- **Talk about tricky items that there aren't easy zero waste equivalents for – sweets, biscuits etc. What could you do? Make your own, look for alternative snacks that don't have plastic packaging or buy bigger packs and decant some into reusable tubs**

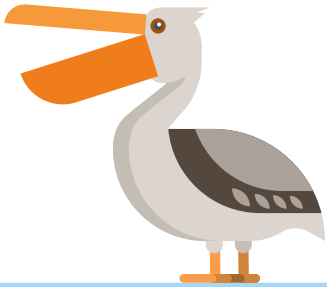
NEXT STEPS

The school eco-council are going to be looking at the single-use plastic we have in school and finding ways to cut it down, and eventually get rid of it altogether, so we can become a single-use free school.

INTRODUCTORY ASSEMBLY

Picture resource

"HELP ME, HELP MY FRIENDS"



SINGLE-USE PLASTIC AUDIT

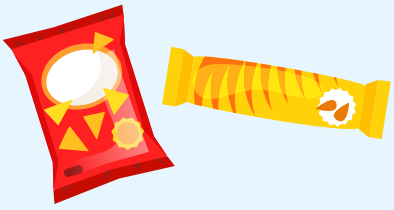
The audit is designed to identify the items of single-use plastics that are used in school throughout the entire day. There are a few different areas and times of day to think about:

LUNCHTIME

This is likely to be the time of day when most single-use plastics are used. The kitchen may use cling film during food preparation/storage, school packed lunches may provide items packed in plastic bags/single-use pots and home packed lunches could also contain lots of disposable plastics

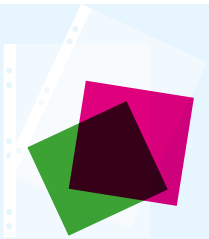
BREAK TIMES

Also a potentially wasteful time if snacks are sold packaged in plastic or children bring in plastic wrapped cereal bars or similar



OTHER AREAS

Old laminated display materials and plastic film from paper reams are examples of some of the other single use plastics found in schools



SINGLE-USE PLASTIC AUDIT

RESOURCES

- ✓ **Tally sheets (please see pages 12–15)**
- ✓ **Clipboards**
- ✓ **Pencils**

PREPARING FOR THE AUDIT

The audit will need to be planned in advance and everyone in the school, both pupils and staff (including teaching staff, office staff, MSAs, kitchen staff and the site manager/ caretaker), will need to be aware that it's happening.

Before undertaking the audit, explain to the pupils that they're going to help to find ways to reduce the amount of single-use plastic used in school. Before they can work out how to do this, they will need to know what the problems are.

Ask the pupils for their ideas about the types of single-use plastics that they think are thrown away:

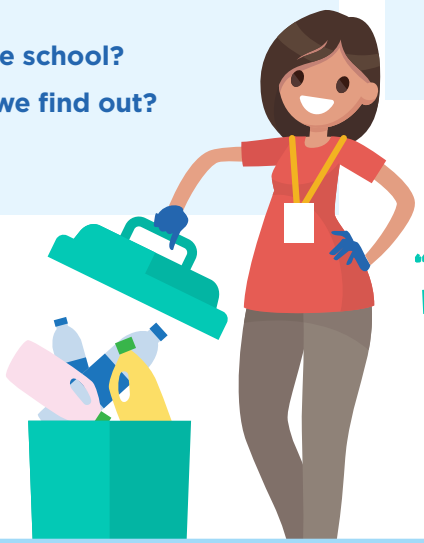
- **What time of day does this happen?**
- **Where in the school?**
- **How could we find out?**

RUNNING THE AUDIT

Introduce the idea that members of the eco-council will record exactly what single-use plastics are being thrown away by keeping a tally at different points throughout the day

- **Pupils will not be sorting through bins or touching the rubbish**
- **They will simply stand near the bins and note down what they can see when other pupils come to dispose of their rubbish**
- **You could use some example items from a lunchbox to demonstrate how this will work**

As you run the audit you may wish to ask pupils to put any single-use plastics into clear bin bags, separate from any other types of waste, so that you can show them the volume of single-use plastics that are being used.



"HAVE A LOOK IN THE BINS!"

SINGLE-USE PLASTIC AUDIT

LUNCHTIME

Using the tally sheets provided (or similar) draw up a rota and allocate pupils from the eco-council time slots to stand near the bins in the lunch space to monitor what plastics are being thrown away. They should do this simply by looking at what is being thrown away and marking it on their tally sheet – they are not expected to touch or sort through the waste in anyway.

In order to identify the true source of the plastic waste, you may wish to ask pupils having school packed lunches to empty their rubbish into a different bin to those having home packed lunches, so it is easier for the pupils keeping the tallies to differentiate between the two.

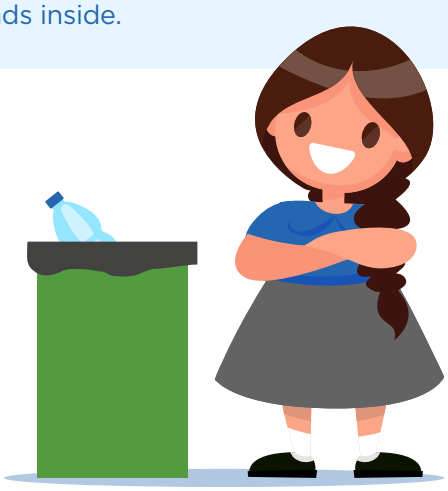
Pupils having hot dinners wouldn't usually produce any plastic waste (although please use your discretion if this is different in your school), however some may be created during the preparation of these meals. To gain a fuller picture you may therefore wish to speak to kitchen staff about any single-use plastics they use, such as clingfilm to cover food for storage, or plastic packaging in which food is delivered to the school.

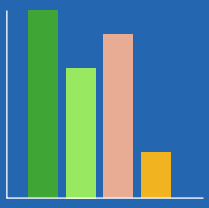
BREAKTIME

This should be monitored in a similar way to lunchtime, with pupils being asked to stand near bins and keep a tally of what plastics are being thrown away. Again, pupils are not expected to touch any of the waste.

OTHER AREAS

Work out where all the other bins are in school (include classrooms, staffroom and offices but not toilets or medical rooms). Allocate members of the eco-council specific rooms/bins to check and, towards the end of the school day, ask them to take their tally sheets and record what they can see in the bins. They don't need to empty the bins or put their hands inside.





Once you have completed the tally sheets, you may wish to input the data into spreadsheets and convert it into graphs. This will make it easier for the pupils to work with during the action plan session.

SINGLE-USE PLASTIC AUDIT

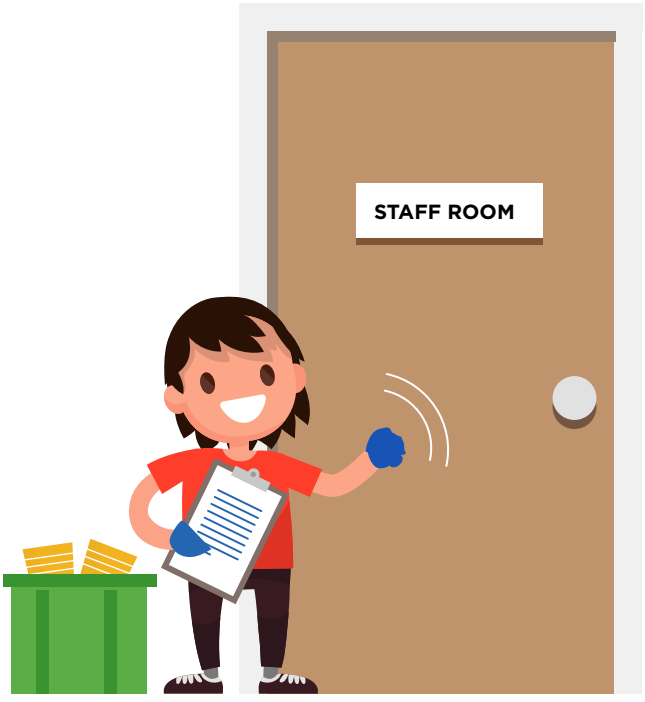
AUDIT OF SUPPLIERS

This is a much wider audit as it may incorporate several areas of the school from which supplies are ordered. It is recommended that relevant members of staff are asked to keep a record of any products that arrive at the school in plastic packaging during a given period of time.

When an item is identified as being packaged in single-use plastic, suitable plastic free alternatives should be investigated.

Once this is completed, members of the eco-council can then collect the results to feed them into the action plan (when applicable).

"PLEASE NOTE: ANY MEDICAL SUPPLIES ARE EXEMPT FROM THIS AUDIT"



The main areas to look at are:

- **The kitchen**
  - What foods arrive at school pre-packaged?
  - Are there any viable plastic free alternatives?
  - Could your current supplier eliminate any of the packaging at source?
  - If completely plastic free isn't an option for certain products, is there scope for buying larger packs to reduce the overall plastic wastage?
- **Offices**
  - Does the office paper come wrapped in plastic? Could this be changed to reams that are wrapped in paper?
  - Are there any other items of stationery that come wrapped in plastic?
- **Staffroom**
  - Are tea and coffee supplies packaged in plastic? Is there an alternative available?
  - Are disposable plastic cups provided for a water dispenser?
- **Cleaning products**
  - Is there any scope for changing disposable cleaning wipes, for example, to reusable cloths?
  - Could any products supplied in plastic packaging be substituted?

SINGLE-USE PLASTIC AUDIT

LUNCHTIME TALLY SHEET

Which type of lunch are you looking at? (Please tick)

- ☐ School packed lunches
- ☐ Home packed lunches
- ☐ Other _____

Please keep a tally of all the pieces of plastic that are being thrown away:

ITEM	TALLY	TOTAL
Cling film/plastic film		
Plastic bag		
Plastic bottle		
Drink pouch		
Plastic cup		
Yoghurt pot/tube		
Plastic pot		
Crisp packet		
Biscuit/cake wrapper		
Snack wrapper (peperami, cheese etc)		
Plastic knife/fork/spoon		

SINGLE-USE PLASTIC AUDIT

BREAKTIME TALLY SHEET

Please keep a tally of all the pieces of plastic that are being thrown away:

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Cling film/plastic film		
Plastic bag		
Plastic bottle		
Drink pouch		
Plastic cup		
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Plastic pot		
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Snack wrapper (peperami, cheese etc)		
Plastic knife/fork/spoon		

SINGLE-USE PLASTIC AUDIT

OTHER AREAS TALLY SHEET

Please keep a tally of all the pieces of plastic that are being thrown away:

ITEM	TALLY	TOTAL
Cling film/plastic film		
Plastic bag		
Plastic bottle		
Drink pouch		
Plastic cup		
Yoghurt pot		
Yoghurt tube		
Plastic pot		
Crisp packet		
Biscuit/cake wrapper		
Snack wrapper		
Plastic knife/fork/spoon		
Laminated paper		
Coffee cup lid		
Plastic wallet		

SINGLE-USE PLASTIC AUDIT

SUPPLIER AUDIT SHEET

CURRENT SUPPLIER	PRODUCT DETAILS	NOTES & SUGGESTED ALTERNATIVES

GENERAL ACTIVITIES

These activities could be used as part of a PSHE session or to support the school's work as part of the wider curriculum.

PLASTIC SORT

This activity would work well with slightly younger children.

Have a selection of single-use plastic items and reusable items (use either clean real examples or the picture cards provided on pages 17–18). Ask the children to sort the items into 2 hoops to show which items you only use once, and which items can be used again and again.

Look at the things in the 'items you only use once' hoop and ask them if they can think of something that you could use instead? Could they maybe find something in the 'reusable hoop'?

SINGLE-USE SWAPS

Show a selection of single-use plastic items (e.g. cling film, disposable bottle, plastic carrier bag, wet wipes etc).

- **Why do we use them? (convenience, to keep food clean, just because they're there)**
- **Are there alternatives we could use?**

MATCHING PAIRS GAME

In pairs/small groups give the children a set of the single-use swaps matching pairs cards (pages 17–18). Can they match the single-use plastic items to an appropriate reusable alternative?

- **Turn all the cards face-down, keeping the red (single-use items) cards separate from the green (waste free alternatives) cards**
- **Take it in turns to turn over 1 red and 1 green card**
  - If the green card shows a waste free alternative for the single-use item shown on the red card, keep them both
  - If they don't 'match', then turn them both face-down again
- **Continue until all the cards have been matched correctly**

Can anyone suggest any different waste free swaps for any of the single-use plastic items?

Based on what they've learnt from the game, could they design a single-use swap poster?

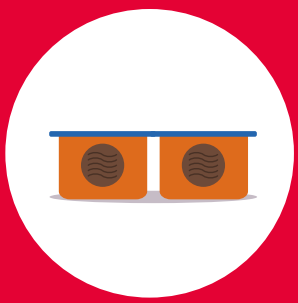
- **Extend them by asking them to research and add a related fact to their poster**

MATCHING PAIRS GAME

Resource sheet

DISPOSABLE BOTTLES

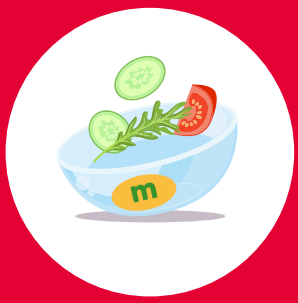
SANDWICHES IN CLINGFILM



SNACK BISCUITS IN PLASTIC WRAPPER

DISPOSABLE PLASTIC CUTLERY

BAGGED FRUIT



DISPOSABLE PLASTIC BOWL

PLASTIC CARRIER BAG

DISPOSABLE CUPS

INDIVIDUALLY WRAPPED CHEESE SNACK

WET WIPES

MATCHING PAIRS GAME

Resource sheet

 REUSABLE DRINK BOTTLES	 SANDWICHES IN BEESWAX WRAP
 HOMEMADE CAKE/ BISCUITS IN REUSABLE TUB	 METAL CUTLERY
 LOOSE FRUIT	 REUSABLE BOWLS
 REUSABLE SHOPPING BAG	 REUSABLE CUPS
 CHEESE CHUNKS IN REUSABLE TUB	 FLANNEL & WATER

DESIGN & TECHNOLOGY

NATIONAL CURRICULUM AIMS

Critique, evaluate and test their ideas and products and the work of others

- *Investigate and analyse a range of existing products (Evaluate)*

Build and apply a repertoire of knowledge, understanding and skills in order to design products for a wide range of users

- *Use research to inform the design of innovative, functional, appealing products that are fit for purpose (Design)*

PACKAGING

Look at a range of foods that use plastic packaging (use either the picture sheet provided on page 20 or real examples):

- **Bagged bananas/apples**
- **Soft fruit in punnet (strawberries, raspberries, blueberries etc) with plastic wrapping**
- **Can multipack wrapped in plastic**
- **Pre packed sandwiches wrapped in plastic**

Why do these foods have plastic packaging?

- **To prevent damage**
- **To keep them clean**
- **Waterproof**
- **For convenience**

In small groups ask the pupils to each look at one item and discuss whether they think all the packaging is necessary.

Ask pupils to feedback their ideas to the class. Try to cover:

- **Some packaging is not necessary, for example plastic holding a multipack together as the items within are already adequately packaged**
- **Some packaging may be necessary to prevent the food from being damaged during transit either between supplier and retailer or retailer and consumer**
- **Without adequate packaging, more food waste could be created**
- **Where packaging is necessary, does it have to be plastic or are suitable alternatives available?**

Can the pupils redesign the packaging for one (or more) of the items so that no single-use plastic is used?

DESIGN & TECHNOLOGY
Resource sheet

ENGLISH

NATIONAL CURRICULUM AIMS

Develop the habit of reading widely and often, for both pleasure and information

- *Retrieve, record and present information from non-fiction*
- *Provide reasoned justifications for their views*

Write clearly, accurately & coherently, adapting language & style for a range of contexts, purposes & audiences

- *Writing composition*
- *Vocabulary, grammar and punctuation*

SHOULD SINGLE-USE PLASTICS BE BANNED?

This activity asks the children to research and consider both the pros and cons of single-use plastic, then present their ideas in the form of a balanced argument.

Introduction

Explain to the pupils that when plastic was first invented in 1907 it was considered a huge breakthrough and for many years only the benefits of plastic were perceived '(please see page 4 of the Resource Pack for further information). As time has passed, we have become increasingly aware of the damaging consequences of plastics on the environment, mainly due to the fact that they don't breakdown in a natural way.

In the modern world single-use plastic plays a huge part in our everyday lifestyles and, although we now know that it brings with it many problems, we must also consider the positives.

Research

Ask the pupils to use a range of resources, including the picture resource, infographic, magazine article and newspaper extract provided on pages 23–26 and/ or their own independent research, to begin to highlight some of the pros and cons of single-use plastic.

Writing

Using the results from their research, pupils should write a balanced argument, clearly presenting ideas from both sides, as to whether they think that all single-use plastics should be completely banned.

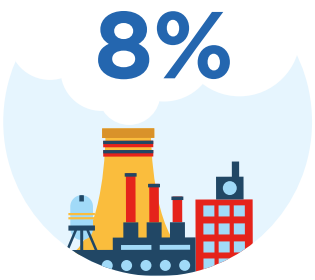
What conclusion will they draw and what is their proposed resolution?

ENGLISH

WARNING LETTER

Imagine you're someone in the future, living in the year 2050. Using information about scientific predictions (the infographic provided on page 23 may be a useful starting point) and your own imagination, write a warning letter to people today explaining what problems we're going to cause if we continue to waste plastic at the rate we currently are.

ENGLISH
Infographic



Plastic is made from fossil fuels (a non-renewable and finite resource) – 8% of the world's crude oil is used for producing plastic

Around 8 million tonnes of plastic flows into the sea every year

Around 50% of the plastic items produced are designed to be single-use and get thrown away almost immediately

Plastic doesn't degrade in a natural way – it breaks down into increasingly smaller pieces called micro-plastics

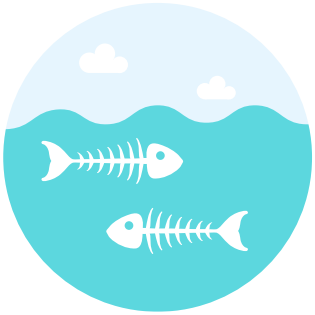
Micro-plastics can never be properly cleaned up

Sea creatures and birds can get caught in plastic waste or be injured by it

Fish and marine creatures ingest plastic

This can cause them harm or to choke

The plastic they eat could get into the human food chain



Plastic destroys marine habitats

663 species of animals and birds around the world are harmed by plastic every year

It is predicted that if nothing changes in our plastic consumption habits, by 2050 there will be more plastic in the oceans than fish

No ocean on Earth is unaffected by plastic pollution

ENGLISH
Resource sheet

"USE IMAGES LIKE THESE TO HELP YOU"

ENGLISH
Resource sheet

INDEPENDENT

5th July 2019, by Manoj Dora and Eleni Iacovidou

Why the answer to saving the environment isn't getting rid of all plastic food packaging

Plastic packaging does more than keep our food fresh on the shelves. Manoj Dora and Eleni Iacovidou explain that instantly reducing it isn't as sustainable as you might think.

Plastic packaging is used in the food supply chain because it supports the safe distribution of food over long distances and minimises food waste by keeping food fresh for longer

There has been a surge in awareness of the damage that plastic pollution does to our planet since the invention of plastic, and this has spurred a number of campaigns to remove single-use plastics from our daily lives.

And of course, this extends to food packaging.

Many people bemoan the large amount of packaging that supermarkets use, particularly for fruit and vegetables, most of which have their own natural protection. Nonetheless, a major reason that supermarkets use so much packaging is to protect food and prevent waste – particularly with fresh food. Removing plastic entirely from our food supply may not be the best solution when it comes to protecting the environment and conserving valuable resources.

Food supply chains are complex networks with lots of parts. Food typically travels from the fields where it is produced to a storage facility for processing. Then it's packaged, transported and distributed to shops, where it is marketed, before being bought and consumed. This takes a varying amount of time, depending on where it is farmed and how long it stays in someone's fridge or cupboard.

Plastic packaging is used in the food supply chain because it supports the safe distribution of food over long distances and minimises food waste by keeping food fresh for longer.

A 2016 study of food waste found that 88 million tonnes of food is wasted every year in the EU – that's 173kg per person and equals about 20 per cent of food produced. Minimising this wastage is crucial for environmental protection, as well as food security. Plastic packaging may be a necessary evil to reduce this high level of waste.

A number of factors must be taken into account when determining how useful plastic packaging is in the food supply chain, as it has the potential to preserve food and prevent its wastage.

For example, the use of just 1.5g of plastic film for wrapping a cucumber can extend its shelf life from three days to 14 days and selling grapes in plastic bags or trays has reduced in-store wastage of grapes by 20 per cent.

A lot of food is air freighted, so prolonging its shelf life has important benefits for the environment. Recent estimates suggest that the carbon footprint of food waste generated can be three times higher than that of plastic.

Furthermore, plastic packaging is more flexible and lighter than alternatives such as glass and card. This reduces transportation costs and the carbon emissions that come with them.

Simply removing plastic from food packaging is not as sustainable as you might think. There are lots of cases where plastic packaging can be beneficial at reducing waste. But food sellers need to think of ways to reduce and reuse the plastic where possible.

Plastic itself is a very useful material. We need to use it more effectively and more sparingly in some cases but we shouldn't get rid of it altogether.

Edited extract

For the full article visit: www.independent.co.uk/life-style/food-and-drink/plastic-packaging-food-waste-global-warming-carbon-footprint-a8968541.html

ENGLISH
Resource sheet

NATIONAL GEOGRAPHIC

7th October 2019, by Sarah Gibbens

Can medical care exist without plastic?

Hospitals are filled with sterile single-use plastic. Environmental advocates are looking for less wasteful ways to keep healthcare hygienic.

Single-use plastic is facing more scrutiny than it ever has, and the medical industry could be the area where individual consumers have the least say.

It is estimated that 25 percent of the waste generated by a hospital is plastic.

Single-use plastic can be an attractive option for hospitals—cheap, durable, and easily tossed out—and each new fresh plastic container or covering offers a newly sterile environment. That's why clinicians cover themselves and everything they use in plastic.

Yet for all the ways plastic has revolutionised the medical industry over the past century, it's now being scrutinised for what happens after it's done its job. Plastic can easily end up in marine environments, where it breaks down into tiny particles called microplastics. And the fossil fuels required to produce those plastics can contaminate air and water.

Increasingly, say medical care providers, the unfettered use of plastic is conflicting with a doctor's promise to do no harm – but is avoiding plastic even possible?

Fresh, clean plastic

A fact sheet published by the American Chemistry Council, a plastic trade group, says: "Single-use plastics are the cleanest, most efficient way," to facilitate health and hygiene in hospitals.

But those working to make hospitals more sustainable say plastics have been overused.

A survey of 332 hospitals looked at common single-use plastic items in operating rooms that had been successfully replaced by reusable items. Tools like surgical basins and sterilisation wraps could be reused and would reduce waste by several tonnes per year.

Edited extract

For the full article visit: https://www.nationalgeographic.co.uk/environment-and-conservation/2019/10/can-medical-care-exist-without-plastic

ART & DESIGN

NATIONAL CURRICULUM AIMS

Become proficient in a range of craft and design techniques

- *Improve mastery of techniques, including sculpture, with a range of materials*

Produce creative work

- *Use a range of materials creatively*

SINGLE-USE SEA CREATURES

"SEE SOME EXAMPLES OVERLEAF"

Use a selection of single-use plastics to create artwork or sculptures of sea creatures:

Plastic bottles make great bodies for fish

- Fill them with flimsy plastic bags, sweet wrappers, plastic straws etc to add colour. This will also highlight that sea creatures can mistake small pieces of plastic for food and eat them
- Cut fins and tails out of slightly thicker plastic from items such as crisp multipack bags or larger sweet bags, and stick them on
- Bottle lids can make great fish eyes

Cut the end off a large plastic pop bottle and use it to create a jellyfish body

- Cut plastic bags into strips and stick around the bottom of the body to make tentacles
- Alternatively, to make a smaller/ simpler version, try using an upturned yoghurt pot for the body

Make a collage out of single-use plastic items to create a picture of an animal, sea creature or bird

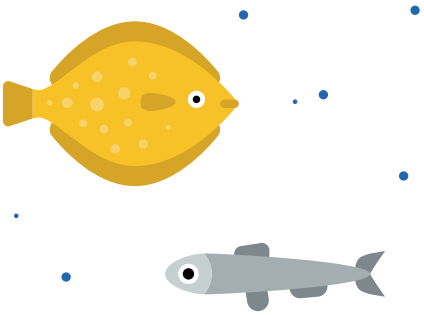
- For younger children, you could give them a cut-out fish shape and ask them to cover its belly with plastic items

Extension

Ask the pupils to research and add facts about how damaging plastic can be in the oceans or environment.

ART & DESIGN

Plastic jelly fish



Sea creature collage

Bottle fish

SCIENCE

NATIONAL CURRICULUM AIMS

Develop understanding of the nature, processes and methods of science to answer scientific questions about the world around them

- *Working scientifically (Everyday materials and their properties)*

MATERIAL PROPERTIES INVESTIGATION

This activity asks pupils to work in small groups to investigate the properties of a selection of materials and look at their subsequent suitability for a range of different purposes. This will help to give pupils an insight into why plastic is so widely used, as well as asking them to consider some viable alternatives.

Introduction

Present the pupils with a selection of materials to investigate including:

- **Glass** (save this for demonstration purposes only and don't give to the pupils)
- **Hard (rigid) plastic**
- **Soft (flexible) plastic**
- **Paper**
- **Fabric**
- **Metal**
- **Wood**

Explain to the pupils that all these materials have different properties (strength, transparency, flexibility etc) and that their varying properties make them suitable for different purposes.

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Testing the properties

It's going to be their job to test the following properties of each material (demonstrate how to test each of these using the glass).

Are the materials:

- **Waterproof:** use pipettes to drop water on one side, lift it up – is it wet underneath too?
- **Rigid:** hold by one end – does it keep its original shape?
- **Transparent:** can you see through it?
- **Strong:** are you able to tear it easily?
- **Flexible:** gently try to bend it
- **Shatterproof:** drop it onto a hard surface to see if it breaks (use a video to show how glass shatters). See an example here: **www.youtube.com/watch?v=t2NSxiFo1go**

Pupils can record their results in the properties table provided on page 31.

Identifying purposes

Once the experiment is complete, and the properties table has been filled in, ask them to use this information to decide which materials are most suitable for each of the following purposes:

- **To contain liquid** (bottle) – it needs to be waterproof, rigid, transparent, strong (plastic/glass/metal)
- **For carrying things** (shopping bag) – it needs to be strong, flexible, shatterproof (plastic/fabric)
- **For eating food** (cutlery) – it needs to be rigid, strong, shatterproof (plastic/metal/wood)

They can use the purposes table provided on page 32 to help with this.

Conclusion

Discuss the fact that different types of plastic are suitable for all these purposes because they have a wide range of properties. Explain that this is a big part of the reason why plastic is so widely used.

Would any of the other materials be suitable to use instead of plastic for these things? Which materials would be most suitable to make the items reusable?

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Investigating material properties

PROPERTIES TABLE

Carry out experiments to find out the properties of each of the materials listed in the table.

MATERIALS	WATERPROOF	RIGID	TRANSPARENT	STRONG	FLEXIBLE	SHATTERPROOF
Glass	✓	✓	✓	✓		
Hard plastic						
Soft plastic						
Paper						
Fabric						
Metal						
Wood						

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PURPOSES TABLE

Use what you have learnt about the properties of the materials investigated to complete this table.

Which materials would be suitable for creating a drink bottle, shopping bag and cutlery? Does it have to be plastic?

MATERIALS	DRINK BOTTLE (waterproof, rigid, transparent, strong)	SHOPPING BAG (strong, flexible, shatterproof)	CUTLERY (rigid, strong, shatterproof)
Glass			
Hard plastic			
Soft plastic			
Paper			
Fabric			
Metal			
Wood			