

Plastic Smart

Learn about the impacts of plastic on our planet and what we can do to creatively reduce, reuse & recycle!

Background Science

Increased awareness of plastic pollution in the oceans has become known as the 'Blue Planet Effect'. After David Attenborough presented the world in 2017 with images of Clownfish trying to build nests from waste polystyrene cups and turtles eating plastic shopping bags, there has been public outcry and political change. This effect has reached the classroom too and many children around Scotland are campaigning to rid their schools and communities of single-use plastics. This provides a great opportunity to learn about sustainable use of resources, food chains, and natural environments.

But why has plastic become so prolific? Single-use plastic has become a common material in modern life, used in everything from food packaging to cleaning products and so is incredibly useful. Consumption of plastic is ever-increasing; 300 million metric tons are used annually worldwide and approximately 8 million tons of this washes into the oceans. This has the immediate effects of polluting our oceans and trapping marine life. It also has a very long-lasting effect on our environment as it never fully decomposes, but breaks into progressively smaller pieces through exposure to UV light and wave action over thousands of years. Plastic doesn't break DOWN, it breaks UP! It is clear that microscopic plastic pieces are now present in all levels of the food chain; plankton have been found to consume micro fragments of polystyrene and plastics have also been found in sea salt used for cooking. The full environmental and health impacts of this are not yet known, as more time and study is required. (Check out this interesting video on what the future could hold though! <https://vimeo.com/300261023>)

In the UK, new policies have come into force to reduce the amount of single-use plastics. Since the plastic bag charge was introduced in Scotland, usage reduced by 80% in just one year. The plastic micro-bead ban came into force January 2018, preventing micro-plastics from being used in cosmetics and cleaning products and there are also proposed bans of plastic straws and cotton bud sticks in Scotland by the end of 2019.

As well as policy changes, there are lots of actions we can take individually or in school and community groups to reduce our plastic consumption and to limit its impact on the environment.

Curriculum Links

Planet Earth

I can use my knowledge of the interactions and energy flow between plants and animals in ecosystems, food chains and webs. I have contributed to the design or conservation of a wildlife area. **SCN 2-02a**

Biological Systems

I have contributed to investigations into the role of microorganisms in producing and breaking down some materials. **SCN 2-13a**

People, Place and Environment

I can discuss the environmental impact of human activity and suggest ways in which we can live in a more environmentally responsible way. **SOC 2-08a**

Art And Design

I can develop and communicate my ideas, demonstrating imagination and presenting at least one possible solution to a design problem. **EXA 2-06a**

Useful Web Links

The filmmakers of A Plastic Ocean have released the research they compiled during filming, which has a lot of useful information:

<http://plasticoceans.uk/programmes/science/the-science-behind-the-film/>

Classroom Activities

There is lots of scope for classroom activities and discussion about our role in reducing the impact of plastic on the environment. Ideally we can all reduce our demand for single-use plastics by replacing them with reusable alternatives: swapping plastic straws for metal, plastic toothbrushes for bamboo, and plastic shopping bags for upcycled fabric bags!

The next pages detail how to make an upcycled shopping bag from an old t-shirt, which can be a great goody-bag to fill with plastic-free alternatives, to form a 'Plastic-Free Toolkit'! There is also information about planning a beach clean, which can be a really great trip out of the classroom to continue learning!



A RUBBISH GAME!

Creating a rubbish decomposition timeline helps to contextualise the breakdown rates of different materials and emphasises the persistence of plastic in the environment.

Instructions for the game:

1. Split pupils into teams and give each team a bag of rubbish! This will include: a sock, a piece of fruit, a welly boot, a clear plastic drink bottle, straws, and a polystyrene cup. These items can be changed to reflect your school's rubbish items, if desired. Each item will have an information card describing the material the item is made from.
2. The object of the game is to match each item of rubbish with a timeline card denoting how long it takes to decompose.
3. Key discussion points are that the natural materials (fruit, cotton sock, rubber welly) take relatively short amounts of time to break down and decompose completely. In contrast, the synthetic materials (drinks bottle, straws, polystyrene cup) will only break down into microscopic pieces and will not decompose.

Example information and timeline cards are included at the end of this resource.

A RUBBISH GAME!



4 weeks



1 year



100 years



200 years



450 years



Forever?

Make your own shopping bag!

This is a fab way to reuse old clothes that may no longer be suitable to wear and reduce demand for plastic bags in the process!

Step 1:

Choose an old t-shirt that can no longer be worn and cut off the sleeves. Place these to one side.



Step 2:

Cut around the collar of the t-shirt. This creates the 'handles' of the bag.



Step 3:

Holding the front and back of the t-shirt together, make 2 inch strips along the bottom.



Step 4:

Take each pair of strips (one from the front and one from the back) and tie them in a double knot. Do this along the length of the t-shirt. This creates a seam! The discarded sleeves can be used to make pom-poms, tassels or other decoration.

Organise a beach clean!

This is a lovely way to get pupils out of the classroom to understand the breadth and impact of plastic pollution. It can also tie in to various citizen science projects that run on this subject. If your school is not conveniently located for travelling to the beach, a litter pick up around school or a local park is a good alternative.

Things to think about:

In advance of the beach clean, there is good opportunity to ask pupils what type and quantity of rubbish they expect to find on the beach. Ask pupils to design a beach litter survey sheet, so that they can tally up certain types of litter when they find it. Try and break it down into categories, for example:

| Plastic type | |
|-----------------|--|
| Bags | |
| Toothbrushes | |
| Bottles | |
| Cotton buds | |
| Unidentifiable! | |

Another thing to be sure of is carefully choosing your beach location and checking tide times before planning your trip. Some beaches still have sufficient space to clean while the tide is high.

Kit List:

- Bin bags
- Hand sanitiser
- Litter pickers
- Gloves
- Survey forms
- Risk assessment

The local council can provide a lot of support for beach cleans. They are often able to provide litter pickers and collect rubbish post-clean to save you having to dispose of it!

Surfers Against Sewage provide a comprehensive guide to organising public beach cleans, which can be used as a framework to plan your own beach clean!
<https://www.sas.org.uk/our-work/beach-cleans/organise-beach-clean>



Pledge card

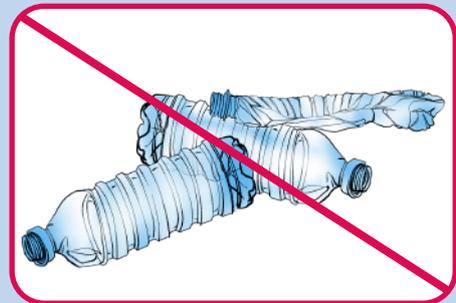
Pledge cards can help pupils to think about their personal impact, in terms of plastic use, and be creative in finding ways to reduce it. Pupils can design their own pledge card, which can then be displayed through the school to show what each class is doing to live more environmentally-friendly lifestyles.

MY PLASTIC SMART PLEDGE!

My name is

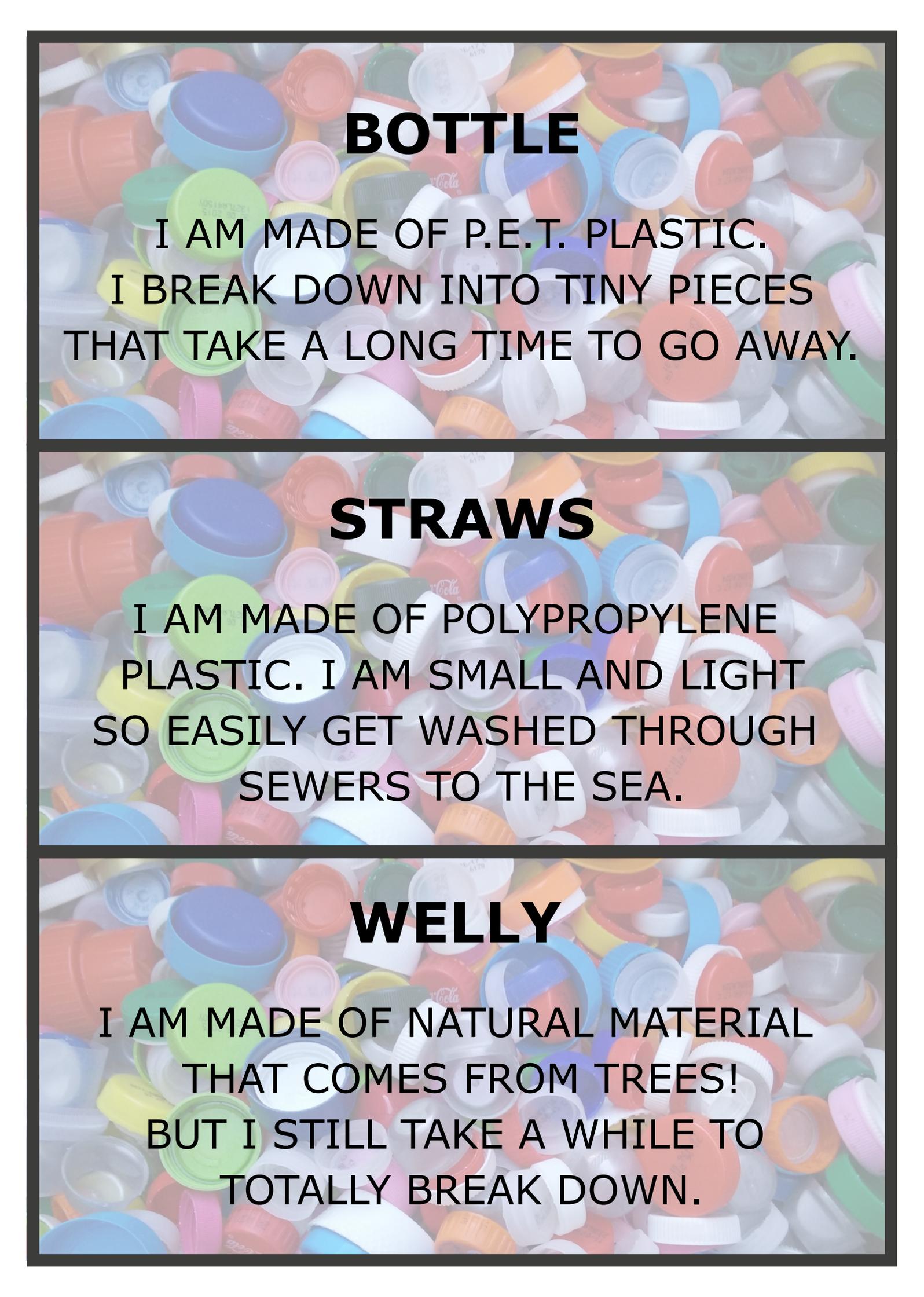
I pledge to:

- Use a bamboo toothbrush instead of plastic
- Use a canvas bag instead of a plastic one
- Take part in a beach clean event
- Take 5! Pick up 5 pieces of litter each time I'm out
- Tell one friend about plastic pollution in the ocean



Depending on school budget, this can form part of the 'Plastic Free Toolkit' alongside bamboo toothbrushes, metal straws, re-usable water bottles to be kept in the pupils' reusable t-shirt shopping bags!





BOTTLE

I AM MADE OF P.E.T. PLASTIC.
I BREAK DOWN INTO TINY PIECES
THAT TAKE A LONG TIME TO GO AWAY.

STRAWS

I AM MADE OF POLYPROPYLENE
PLASTIC. I AM SMALL AND LIGHT
SO EASILY GET WASHED THROUGH
SEWERS TO THE SEA.

WELLY

I AM MADE OF NATURAL MATERIAL
THAT COMES FROM TREES!
BUT I STILL TAKE A WHILE TO
TOTALLY BREAK DOWN.

A dense, colorful background of various plastic bottle caps in shades of blue, green, orange, white, and pink. The caps are scattered and overlapping, creating a textured, busy appearance.

POLYSTYRENE CUP

I BREAK DOWN INTO TINY PIECES,
BUT NEVER COMPLETELY GO AWAY.
I END UP IN THE OCEAN WHERE FISH
AND BIRDS EAT ME.

COTTON SOCK

I AM MADE OF NATURAL FIBRES.
I AM BIODEGRADABLE AND BREAK
DOWN FASTER THAN SYNTHETIC
MATERIALS.

FRUIT

I AM COMPOSTABLE AND CAN BE
BROKEN DOWN BY BUGS
AND BACTERIA.



**4
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**1
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**200
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**450
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FOREVER?