

BBC



Plastics

Teacher Resource





Plastics

Watch the film:

You might find it useful to watch the Plastics film before you read through the resources.

bbc.com/teach/terrific-scientific/KS2/zjq6gwx

Introduction

Plastic is a manufactured material. This means it is produced by humans, rather than by nature. It is a very versatile material and there are many different forms of plastic. Since it was first manufactured, the range of things made from plastic has increased massively. From its use for making everyday objects such as bottles, chairs and fabrics to its many medical uses, such as in the manufacture of replacement body parts, plastic has helped shape the modern world.

What we do with a plastic object once it is no longer needed is causing many problems. Not only does it form a large part of the rubbish that litters our streets, parks and beaches but it is the dominant material in landfill sites and often ends up dumped into the ocean.

The fact that plastic is so durable contributes to the problem. It is estimated that a simple plastic bottle may take as long as 450 years to rot away.

It is also causing problems for our wildlife. Some animals become entangled in it and some even mistake it for food. This can be fatal to the animal and even when it isn't, scientists are concerned it is ending up in the food chain and ultimately in our food.

Not all plastic is easy to see as it can sometimes be in the form of micro-fibres. This investigation tests the prediction that micro-fibres of plastic get into the water when synthetic clothes are washed.



Pre-activity discussion - questions to get the children started

- How many things can you list in one minute that are made from plastic?
- What properties can plastic have that makes it a useful material?
- What would they be made from if plastic had not been invented?
- Do you think using plastic to make clothing is a good/bad idea? Why?
- Some clothing is made from natural materials. What natural materials are used to make clothes?
- If you take up adventurous sports involving different types of motion such as paragliding, kayaking or skiing, do other types of forces play a larger part? What are these forces?
- Is it better to only make clothes from natural materials? And if so, why?



Learning intention

Children will:

- Understand that our actions can impact on wildlife for example wildlife getting tangled up in plastic rubbish or mistaking it for food.
- Recognise that changes such as introducing plastics to a habitat can sometimes pose a danger.
- Know that plastics can take a long time to disintegrate and when they do, micro-beads and micro-fibres of plastic are produced.
- Understand that micro-beads and micro-fibres can end up in the food chain.

Working scientifically, children will:

- Be introduced to the use of a control.
- Use knowledge of how solids can be separated from liquid to filter plastic fibres from the water.
- Compare their finding with the control.
- Plan an investigation to test if other manufactured fabrics leave plastic micro-fibres.
- Use scientific evidence to support their ideas.



Expected duration

Approximately 45 mins.

Equipment needed

- A synthetic fleece
- A bowl
- Warm or cold water
- A funnel
- A jug
- Two sheets of filter paper
- A magnifying glass and/or digital microscope

Health & safety

- Avoid using very hot water that could scald. Warm or cold water is fine.



The investigation – instructions

Work in small groups.

1. Free exploration

Use the magnifying glass or digital microscope to look closely at the fleece. Describe your observations.

2. Directed discovery

(a) Line the funnel with a piece of filter paper.

Half fill a bowl with warm tap water.

Hold the funnel over a bowl to catch the water. Use the jug to help transfer the water from the bowl and through the filter paper in the funnel.

Remove the filter paper from the funnel. Use the magnifying glass and/or digital microscope to look closely at the filter paper. This is a control. Why do you think you need to do this?

(b) Half fill the bowl again with warm water.

Dunk in the fleece so it is completely wet.

Take it in turns to give the fleece a good rub and squash under the water. Then lift the fleece out of the bowl and squeeze the water from it back in to the bowl. Get as much water out of the fleece as you can.

Look at what is left behind in the water.

Line the funnel with a clean piece of filter paper. Hold the funnel over a bowl to catch the water.



Use the jug to help transfer the water from the bowl and through the filter paper in the funnel.

Remove the filter paper from the funnel. Use the magnifying glass and/or digital microscope to look closely at the filter paper. Compare what you see on this filter paper to what is on the control paper.

3. Challenge

Sort clothes into different groups; those made from natural fabrics such as cotton and wool, those made from plastics such as polyester and those made from a combination of natural and manufactured fabrics.

Plan and carry out an investigation to see if all types of manufactured fabrics leave plastic micro-fibres in the water.

[Be aware that natural materials will also leave micro-fibres but these are not plastic]





Creative conclusions – findings from the experiment

All manufactured fabrics will leave some plastic micro fibres in the water.

Discuss further why it is still a good idea to recycle plastics to make fleece rather than just discarding it.

You could also broaden the discussion to include how we can reduce plastic waste and ask children to research how some people/companies are doing this.

Children could debate the pros and cons of a plastic tax.





Glossary

Filter	a device that allows only some things to pass through, usually made from paper or fabric with tiny holes (pores) like a sieve. It is usually used to separate an insoluble solid from a liquid.
Fleece	a plastic based fabric.
Manufactured	not natural - something that has been made by humans.
Micro-fibres	small strands of material, almost invisible to the naked human eye.
Plastic	a manufactured material.
Polyester	a plastic-based fabric.