

## Sorting plastics for recycling

### What's the science?

Plastics have many advantages, including being lightweight, durable and flexible. However, there are many forms of plastic which makes it more difficult to sort and recycle than other materials. Most plastic isn't biodegradable and can take years to decay. Every year, around eight million tons of plastic waste enters the oceans. Animals can become tangled in the plastic or digest it causing many to die.

### What are scientists doing about it?

In 2016, scientists in Japan discovered an enzyme which could break down a type of plastic that is widely used to make plastic bottles and food containers. Researchers in the UK have also developed new methods to enable them to recycle bioplastics into new products. Companies such as Tetra Pak are developing sustainable packaging solutions made from plant-based materials.

### How could you explore this in the classroom?

- ▶ Provide learners with a selection of different plastics. Ask them to identify and group the plastics according to their properties and discuss which ones can be recycled. They could research which plastics are most commonly recycled, the percentage of these plastics recycled annually and how many years each type of plastic takes to decompose. They could compare this to how long it takes other materials to decompose such as paper. They could also look at their own plastic footprint.
- ▶ Introduce learners to the Tetra Pak website and explore the challenges of recycling. Use the website to investigate the different regional schemes to collect and recycle Tetra Pak packaging. Find out if your school currently does this. If not, you could explore the feasibility of this by sorting Tetra Pak items into separate bins for a week to find out how much there is. You could explore the 'Recycle at School' section of the website activities, quizzes and fun facts to develop learners' understanding of recycling plastics.
- ▶ Learners could develop their literacy skills by holding a debate about single-use plastic or the plastic tax. Alternatively, they could use persuasive writing to encourage people to reduce plastic use.

#### Curriculum links

Living things and their habitats; literacy; materials; research using secondary sources

**Sources** [What is the problem with plastic? | BBC Newsround](#) [Three incredible scientific solutions to plastic pollution | Eradicate Plastic](#) [UK researchers develop biopolymer recycling technique | Waste Today](#) [Plastic Recycling Process | Recycle More](#) [Plastics Challenge | Practical Action](#)

## How plastics can be melted and remoulded into new uses

### What's the science?

Plastics are polymers that have a huge variety of chemical compositions. This means that some plastics are easy to melt, while others are near impossible. The manufacturing of plastics is also causing major environmental challenges. Most plastics are made from chemicals derived from fossil fuels which contribute to carbon dioxide emissions.

### What are scientists doing about it?

Across the UK, nearly all councils provide plastics recycling collection making it easier for people to recycle their plastics. However, only some plastic products are recycled under these programmes. Scientists are developing new plastics that are more easily recycled, as well as searching for ways to recycle existing plastics more efficiently. Some innovators are developing bioplastics made from plant crops, to create materials that are more environmentally friendly.

### How could you explore this in the classroom?

- ▶ Learners could develop their research skills by watching videos and researching the process of melting plastics to remould and reuse them. They could make predictions about the melting points of plastics and other materials.
- ▶ Give the learners a selection of items that have been made from recycled plastic bottles (or images of items). Items could include plastic bottles that have been reused to show how they have been melted and remoulded. This could lead into a discussion about the recycling process. Learners could watch videos and research the different stages of recycling plastic bottles.
- ▶ If your school has playground equipment or surfaces that are made from recycled plastics then learners could explore recycled materials in the school environment.
- ▶ Learners could develop their maths skills by finding out the melting points of plastics. They could compare these to other solids including some they can melt in class, such as chocolate or butter. They could record the data in a bar chart. They could use their literacy skills to write an account about the journey of a plastic bottle that has been melted and remoulded to form a new product.

#### Curriculum links

States of matter; maths; materials; research using secondary sources; handling data; literacy

**Sources** [Plastic Recycling | British Plastics Federation](#) [Scientific advances can make it easier to recycle plastics | Phys.org](#) [Science to enable sustainable plastics | RSC](#) [History and Future of Plastics | Science History Institute](#)