

Lesson plan

People throw away thousands of tonnes of waste and rubbish each year, because they no longer need or want the objects.

We throw away objects made using raw materials that will eventually run out. Making these objects also uses energy, producing CO₂ emissions which are harmful to the environment.

We are currently producing more waste than ever before. It is important that we consider carefully the materials we choose to make products with and what we do with them after they have been used.

**Lesson time
60 minutes**

Resources you will need

- ✓ The upper key stage two lesson one presentation
- ✓ For activity one
 - ✦ A set of material word cards and a set of property word cards (included at the end of this document)
- ✓ For activity four
 - ✦ Activity worksheet for each pupil (included at the end of this document)
 - ✦ A variety of objects placed around the classroom which include at least one item made from wood, steel, aluminium, paper, cardboard, plastic, glass, rubber, stone and fabric.

Lesson one**SLIDE 2 — Learning objective**

Explain to the class that today we are going to be looking at different types of materials and their properties, considering the materials in the rubbish that we throw away and recycle.

Ask what 'properties of materials' means. Ask what categories are. Once you are happy the class understands, move to the next slide.

SLIDE 3 — Introduce the video (youtu.be/fTeRj_mGpSM) about SUEZ. Ask for thoughts about recycling and treating materials as useful commodities / items.

Refer to 'technologies evolving at a rapid pace' and explain that through technology, science and engineering, we are able to treat waste in many different ways, so it becomes useful. For example, using waste as a fuel to generate electricity or recycling waste to eventually become another product.

Discuss how the materials we recycle can be considered valuable items and why.

SLIDE 4 — Activity one

To identify current knowledge of properties and materials, match the material to the property card. This could be done as a whole class, with children moving around the class to find the person (properties) they think their material matches with or on tables as a small group matching activity.

When everyone has matched, share with the class. Do they think that's correct and what other properties could that material have? Explain the properties the children may not have known or guessed. If children have matched a material with a different properties card, discuss why.

SLIDE 5-8 — Activity two

Revisit properties, asking the class to fill in the missing words.

Give the class three minutes to work with a partner and come up with a sentence that includes an object, a material and a word to describe the properties. Share the sentences with the class and discuss.

For deeper learning, consider alternative materials for objects. What would the benefits and disadvantages be?

SLIDE 9-13 Explain that Science, Technology, Engineering and Maths have enabled us to change raw materials into different types of materials that we use to make different products.

Ask who knows what paper is made from. Did the class know we need to cut down 17 trees to make one tonne of paper? Ask why we need trees. What would be an alternative way of making paper? Explain that paper can be recycled around six times and ask if they think that is better for the environment.

Work through metal and plastic, emphasising that eventually these raw materials will run out, so we need to preserve the materials we have and recycle them. Discuss natural and man-made materials.

SLIDE 14-15 **Activity three**

Introduce the concept of categories. Can the class group the materials into man-made and natural materials?

SLIDE 16 Explain how materials are sorted into material categories at a materials recycling facility.

SLIDE 17 Emphasise that knowing the properties of materials like steel helps us to separate the material – show video youtu.be/t4PLxg06HBU.



SLIDE 18 **Activity four**

Introduce the worksheet and go through the example on screen. Ask the children to find four different objects around the classroom and then sketch them, name the material and add words to describe the properties of that material. They can then categorise them as recyclable / non-recyclable and man-made / natural.

SLIDE 19-20 **Summary**

Recap what they have learnt today and discuss the words they have used for different objects.

Extended learning opportunities

Knowledge on new materials and irreversible changes

- ✓ **Ruth Benerito** – scientist who developed wrinkle-free cotton
nyti.ms/17NERxC
- ✓ **Harry Brearly** – developed non-rusting steel, known as stainless steel
design-technology.info/inventors/page5.htm

Suggested reading

- ✓ ***Energy Island - How one community harnessed the wind and changed their world*** by Allan Drummond

Properties of materials

- ✓ www.theschoolrun.com/homework-help/materials

Cardboard

Steel

Soft

Hard

Paper

Plastic

Opaque

Transparent

Fabric

Glass

Flexible

Lightweight

Rubber

Wood

Shiny

Stretchy

Aluminium

Stone

Magnetic

Waterproof

Sketch an object	What type of material is it made from?	What words describe the properties of this material?		Is it man-made or natural material?