Science

Properties and Changes of Materials

Properties of Materials

Aim

- I can compare materials according to their properties.

Success Criteria

- I can describe a material's properties.
- I can explain the uses of different materials based on their properties.
- I can sort and compare materials according to their properties.

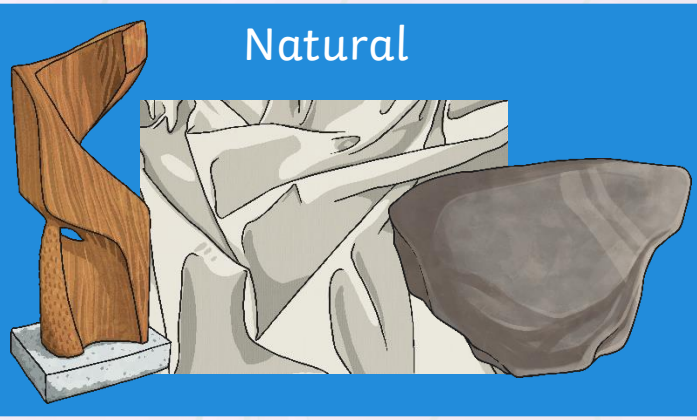
Describing Materials

Any substance that is used to make something is a material.

Natural materials such as stone, wood and cotton are used or worked with in the way they are found in nature.

Synthetic or human-made materials are made from natural materials, but are altered with the help of heat or chemicals. Some examples include plastics, polyester and Kevlar.

Natural



Human-made

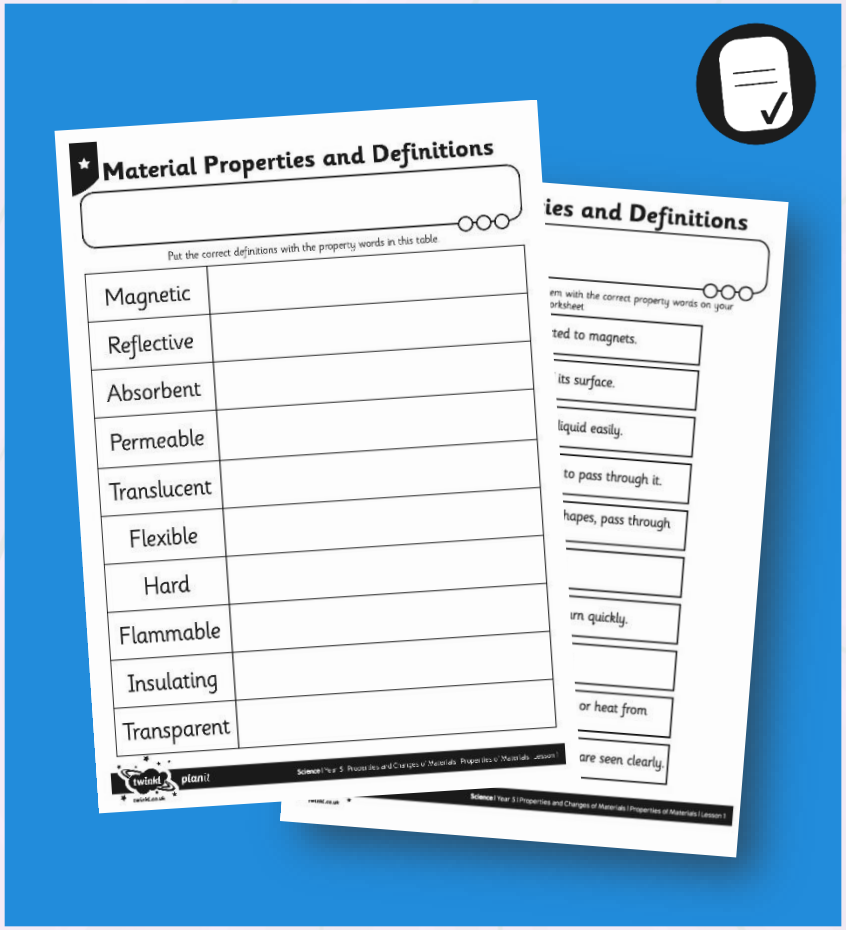
Properties Activity 1

The words used to describe a material are known as its properties.

Each material has its own set of properties.

These properties make different materials useful for different purposes.

Can you match the properties with their definitions on your Material Properties Activity Sheet? You may need to create some definitions of your own!

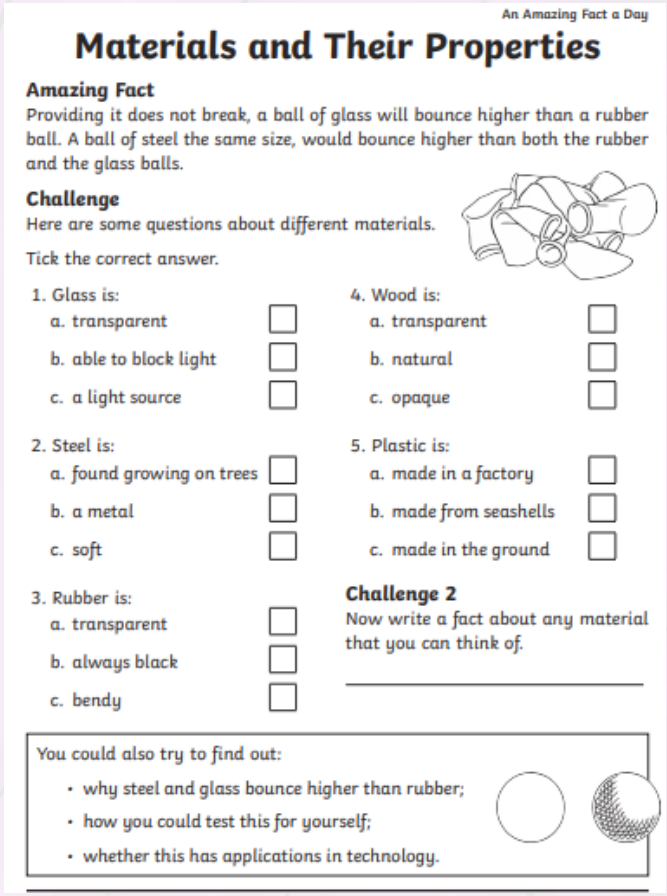


Using Materials

Why is it useful to know the properties of a material?	It is useful because if you know the properties of a material, you can then choose the best material for a purpose.

Materials and their properties
Activity 2

In this activity you will find some questions about a variety of materials. Have a go at answering the questions. You may need to do some of your own research.



An Amazing Fact a Day

Materials and Their Properties

Amazing Fact

Providing it does not break, a ball of glass will bounce higher than a rubber ball. A ball of steel the same size, would bounce higher than both the rubber and the glass balls.

Challenge

Here are some questions about different materials.

Tick the correct answer.

1. Glass is:
   - a. transparent ☐
   - b. able to block light ☐
   - c. a light source ☐

2. Steel is:
   - a. found growing on trees ☐
   - b. a metal ☐
   - c. soft ☐

3. Rubber is:
   - a. transparent ☐
   - b. always black ☐
   - c. bendy ☐

4. Wood is:
   - a. transparent ☐
   - b. natural ☐
   - c. opaque ☐

5. Plastic is:
   - a. made in a factory ☐
   - b. made from seashells ☐
   - c. made in the ground ☐

Challenge 2

Now write a fact about any material that you can think of.

_____

You could also try to find out:

- why steel and glass bounce higher than rubber;
- how you could test this for yourself;
- whether this has applications in technology.

Selecting an object and identifying it's properties
Activity 3

Now that you have identifies the properties of different materials and come to understand their uses try this activity.

Select an object and identify what it is, what it is used for, which materials are used to create it and explain why you think these materials have been used.

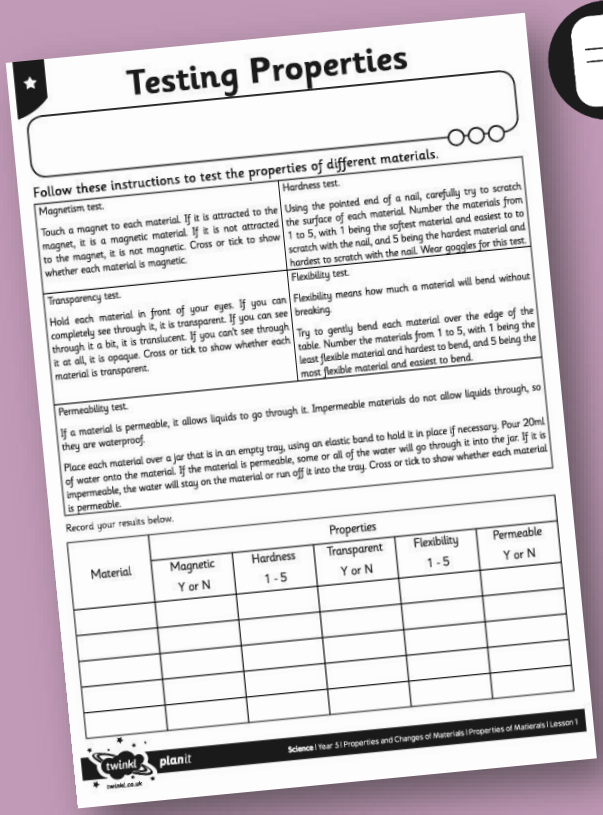
Try to refer back to the previous activities, including the new vocabulary we have covered here.

What object is it?	What is it used for?
What materials are used?	**Why choose those materials?**

Testing Properties
Extension Activity

Have a look at some of the tests that have been devised to understand a materials particular properties. Then try and create your own magnetism and transparency test explaining in each box what you would do.

Finally, if you have any of the equipment needed to conduct some of these tests then select an object from home (with permission) and have a go at testing an object yourself, recording your results in the table provided.



Testing Properties

Follow these instructions to test the properties of different materials.

Magnetism test.

Touch a magnet to each material. If it is attracted to the magnet, it is a magnetic material. If it is not attracted to the magnet, it is not magnetic. Cross or tick to show whether each material is magnetic.

Hardness test.

Using the pointed end of a nail, carefully try to scratch the surface of each material. Number the materials from 1 to 5, with 1 being the softest material and easiest to to scratch with the nail, and 5 being the hardest material and hardest to scratch with the nail. Wear goggles for this test.

Transparency test.

Hold each material in front of your eyes. If you can completely see through it, it is transparent. If you can see through it a bit, it is translucent. If you can't see through it at all, it is opaque. Cross or tick to show whether each material is transparent.

Flexibility test.

Flexibility means how much a material will bend without breaking.

Try to gently bend each material over the edge of the table. Number the materials from 1 to 5, with 1 being the least flexible material and hardest to bend, and 5 being the most flexible material and easiest to bend.

Permeability test.

If a material is permeable, it allows liquids to go through it. Impermeable materials do not allow liquids through, so they are waterproof.

Place each material over a jar that is in an empty tray, using an elastic band to hold it in place if necessary. Pour 20ml of water onto the material. If the material is permeable, some or all of the water will go through it into the jar. If it is impermeable, the water will stay on the material or run off it into the tray. Cross or tick to show whether each material is permeable.

Record your results below.

Material	Properties				
	Magnetic Y or N	Hardness 1 - 5	Transparent Y or N	Flexibility 1 - 5	Permeable Y or N

Aim

- I can compare materials according to their properties.

Success Criteria

- I can describe a material's properties.
- I can explain the uses of different materials based on their properties.
- I can sort and compare materials according to their properties.


twinkl.co.uk