

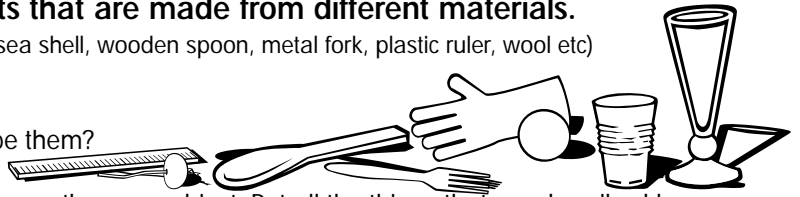
investigation 1

Collect together some objects that are made from different materials.

(ball, cup, glass, rubber glove, conker, sea shell, wooden spoon, metal fork, plastic ruler, wool etc)

Pick them up and feel them.

Can you think of words that describe them?



Some of these words will describe more than one object. Put all the things that are described by one word in one group (for example all the "soft" things). What word describes the things left over?

Now think of two more groups.

investigation 2

List all your objects. Tick the words that describe them.

Can you think of the opposite words?

	absorbent	elastic	electrical conductor	flexible	magnetic	hard	transparent	strong
1. rubber glove	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	waterproof							

investigation 3

The words that describe materials are their properties. These are things that do not change unless you change the material. (Big & small are not properties as you can cut materials to make them smaller).

WOULD YOU MAKE:

No? What property is needed?

What would be a good material?

A METAL window?	transparency	glass
A STRING chair?		
A PLASTICINE knife?		
A PAPER bucket?		
A PLASTIC magnet?		
A METAL overcoat?		
A GLASS football?		

investigation 4

Design an umbrella. What properties would it need?

WATERPROOF - glass is waterproof - could you make a good umbrella from glass?

TOUGH - metal is tough - could you make a good umbrella from metal?

FLEXIBLE - what materials could you make an umbrella from.

USE THE BACK OF THIS SHEET TO DESIGN AN UMBRELLA. LABEL THE MATERIALS AND THEIR PROPERTIES

This worksheet looks at the characteristics of materials and asks children to distinguish between the names of materials and their properties. This knowledge should help them recognise what needs to be considered when a material is chosen for a particular use.

investigation 1

EQUIPMENT NEEDED:

Collect together some objects that are made from different materials. Objects made from just one material are best. (e.g. rubber ball, cup, glass, rubber glove, conker, sea shell, wooden spoon, metal fork, plastic ruler, section of carpet, twig etc)



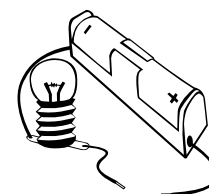
Ask the children to pick them up, feel them and think of words that describe them. Encourage children to choose words like "hard" or "transparent" that will not change. These words are the properties. Words like "big", "long" or "yellow" are things that can be changed and do not describe the properties of the materials.

Ask the children to choose two groups to sort the materials into. You may have to prompt some of the groups for example by bending a ruler to suggest flexible & rigid.

investigation 2

EQUIPMENT NEEDED:

magnet, bowl of water, light bulb & battery connected to form a circuit
List the objects then tick which properties apply.



TESTS FOR PROPERTIES:

Ask the children to conduct the following tests in order to fill in the table. They could first make predictions by ticking the boxes in pencil.

Absorbent: Does the material change when dipped in water?

OPPOSITE: **Waterproof**

Elastic: Does the material stretch then return to shape?

OPPOSITE: **Plastic** (does not return to shape)

Electrical Conductor: Does electricity flow when the material is used to complete a circuit?

OPPOSITE: **Insulator**

Flexible: Does the material bend without breaking?

OPPOSITE: **Rigid**

Magnetic: Is a magnet attracted to the material?

OPPOSITE: **Non- Magnetic**

Hard: Try scratching the surface of the material? Or drop a ball bearing on it

OPPOSITE: **Soft**

Transparent: Can you see through the material?

OPPOSITE: **Opaque**

Strong: Can you brake the material?

OPPOSITE: **Weak**

investigation 3

EQUIPMENT NEEDED:

None

This activity is designed to help children understand the difference between properties and materials and that you may need to consider more than one property to choose the right material.

Would you make...

What property does it need?

What would be a good material?

A chair from string?

rigid

wood, plastic or metal

A knife from plasticine?

strong

metal

A bucket from paper?

waterproof

metal or plastic

A magnet from plastic?

magnetic

iron or steel

A coat from metal?

flexible

fabric

A ball from glass?

tough

plastic or rubber

investigation 4

Design an umbrella. What properties would it need?

WATERPROOF - glass is waterproof - could you make a good umbrella from glass?

TOUGH - metal is tough - could you make a good umbrella from metal?

FLEXIBLE - what materials could you make an umbrella from.

Younger children should have spent time experiencing some testing of the simple properties of materials. The activities offered here try to build on that experience and give the opportunity to develop the skills of investigating, whilst tackling the testing of properties. Certain materials have properties that are appropriate for specific uses and by comparing these, the idea is introduced that whilst some materials are reasonable for the use, others might do the job better.

Some materials can be changed in shape, a property suited to specific uses

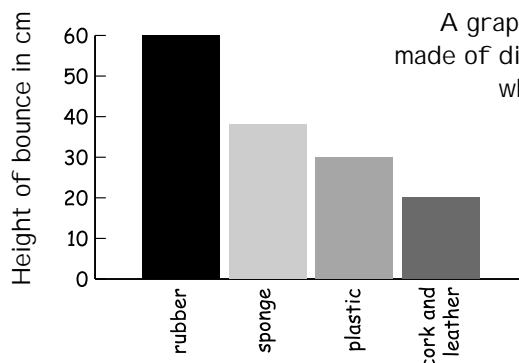
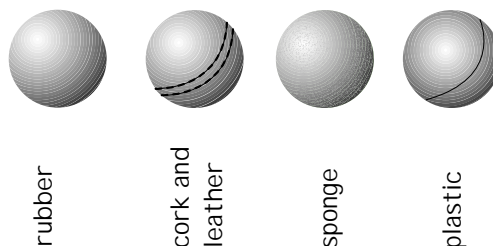


Graphing package

(a) **Balls are made from a variety of materials Investigate**

Which is the bounciest ball? Look at balls made from a variety of materials and discuss the different uses and properties, including sizes. The children can decide what they want to test eg, 'the bounciest football', 'the bounciest small ball'. What do they think 'bounciest' means? A ball that bounces the highest, or one that bounces for the longest time? The possibilities and variables are numerous, so they need to be made more specific. This is where the children learn to plan. The results will make a good bar graph.

Choose balls that are the same size. How high did they bounce?



A graph to show the height balls made of different materials bounce when dropped from 1 metre

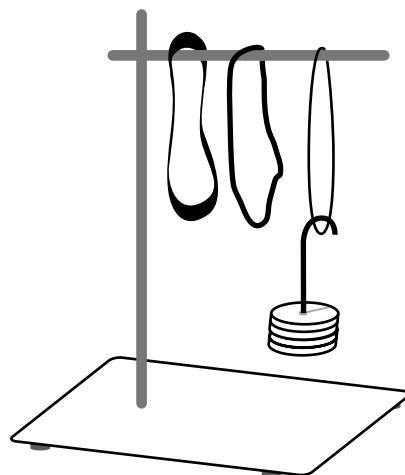
Materials from which the balls were made

Safety!

- Goggles should be worn when testing elastic bands.
- Care should be taken when using weights.

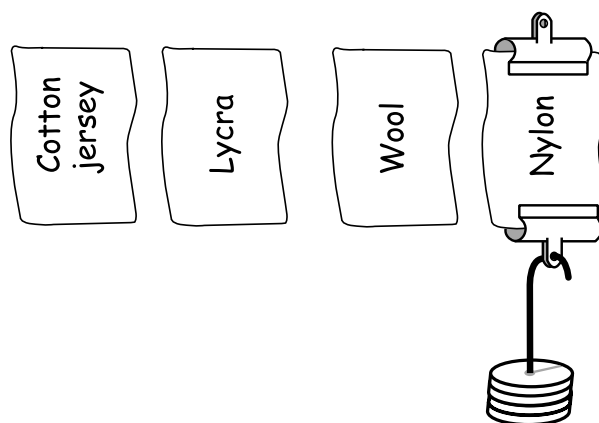
- (b) **Elastic bands** Investigate elastic bands with older children. Stretching them to their breaking point is too dangerous! Try comparing different thicknesses of the same band circumference with a fixed weight eg 500 gram. Carry out this experiment on the floor. Hold the band and weight against a ruler to see which stretches the most.

Testing different thicknesses of rubber bands with weights



- (c) **Stretchy materials** Sometimes we want a material (fabric) to have some elasticity because of the garment it will be used to make, for example, a pair of tights. Different fabrics can be tested for this, but pupils must remember that we want the fabric to return to its original shape and size. Strips of fabric can have weights hung onto them. What length is the fabric at the start? To what length does it stretch? What length does it return to? Use bulldog clips to support the weights or cut a hole in the fabric to hang the weights through.

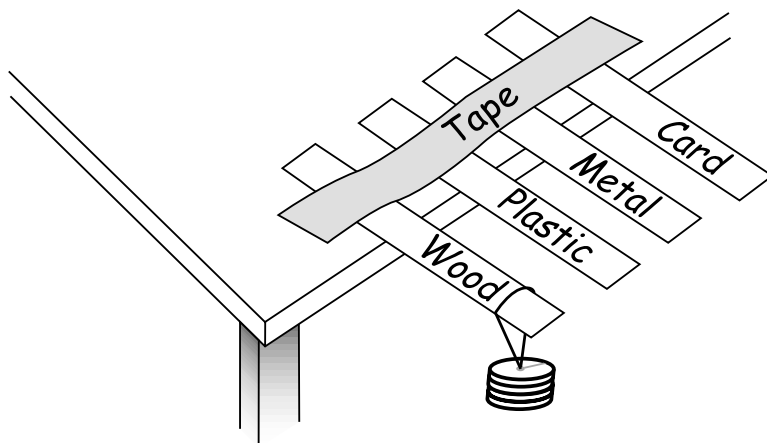
Testing fabrics





Spreadsheets

- (d) **Flexibility** Some usually rigid materials need to be able to 'give' a little and not break, to accommodate different situations for example a bridge carrying heavy traffic. Different materials can be tested eg identical lengths of wood, plastic, metal (use rulers) and card to **investigate** how much they will bend by hanging weights from string onto the end or sticking weights on the top with Blu-Tack[®]. Since the intention is not to break all your material samples, use a light weight and **investigate** 'which material bends the most using a 100 gram weight?' Measure the distance that each ruler bends. Another consideration is the way the material is formed. A card tube, for example, is less flexible than the same card unrolled. Children can **investigate** one material in different forms. Cut the card from both sides of a cereal packet to test the card flat, rolled the long way, the short way and folded zig-zag, then put the weights on the top.



I predict that the card will break and the plastic will be most flexible.