

EVERYDAY MATERIALS

1.1 The right one for the job

Things like how strong a material is, or if heat passes through it, are called its **properties**. We choose a material for a particular job because it has the right properties for that job.

■ Why use stainless steel for a pan?

Stainless steel is good for making pans.

- 1 Write down three properties of stainless steel that make it good for this job. Give a reason for each property you choose.

Properties of stainless steel

shiny polished surface

does not rust

hard wearing

not too heavy

does not melt easily

does not catch fire

nice to look at

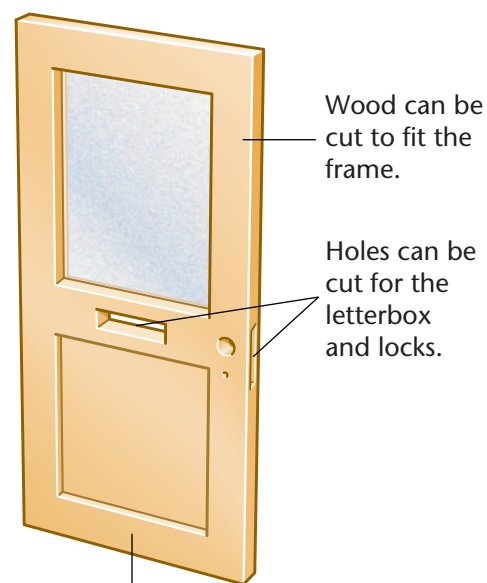
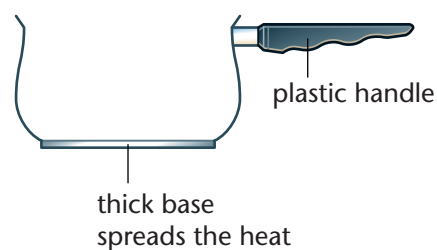
heat passes through it

■ Properties of wood

Wood is used for doors. You can cut and shape wood easily. It is strong.

- 2 Write down three properties of wood that make it good for doors.
- 3 Write down two properties of wood that explain why it is not used to make cooking pans. (Hint. Look back at the table of properties of stainless steel.)

We usually talk about 'heat', but the correct technical term is 'thermal energy'.



Wood is a poor conductor of heat. (It stops heat going in and out.)

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Materials we can see through

We need to see through a window. So we make a window out of a **transparent** material.

- 4 Write down three other important properties for a window. Give a reason for each.
- 5 Why is glass better than clear plastic for the windows in a house?
- 6 Why is plastic better than glass for the windows in a child's play house?

Glass is transparent
(it lets light through).

Glass keeps wind
and rain out.

Glass does not
dissolve in rain.



Glass does
not scratch or mark
as easily as plastic.

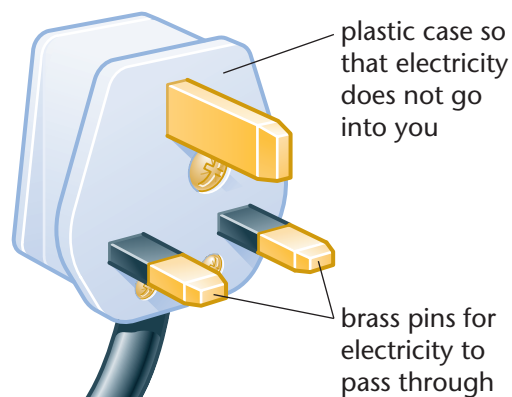
If glass breaks,
the pieces are
very sharp.

Conductors and insulators of electricity

Materials that let electricity flow through them easily are called **conductors**. All metals conduct electricity.

Materials called **insulators** do not let electricity flow through.

- 7 Copy and complete the sentences.
 The case of a plug is made of _____ because it is an _____.
 The pins of a plug are made of _____ because it is a _____.



WHAT YOU NEED TO REMEMBER (Copy and complete using the key words)

The right one for the job

The things that make a material good for a particular job, like how hard it is, are called its _____.

Materials you can see through are _____.

All metals let electricity pass through them. They are called _____.

Materials that do not let electricity through are called _____.

Note: You must be able to say what properties other materials must have to make them good for various jobs.

More about materials: C1.1

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1.2 Solid, liquid and gas

Some things are solid, some things are liquid and some things are gas. Solids, liquids and gases have different properties.

For example, gases and liquids will **flow**. Solids do not flow.

- 1 Water and gas come into people's houses through pipes. Why can they be delivered this way?
- 2 Look at the pictures. Explain why Sadia cannot pour the milk.
- 3 Copy and complete the table using the following substances. (They are all shown in the picture.)

snow, glass, pottery, orange juice, plastic, water, steam, steel, wood

Solid	Liquid	Gas

■ **Liquids change shape, gases fill space, solids stay the same**

Liquids **change** shape to fit what they are in. Lumps of solid keep the same **shape**. A gas will spread out to fill any **space**.

- 4 Answer the questions. For each question write down why you think the substance is a solid, liquid or gas.
 - (a) What does the brown substance do when the plate is removed?
 - (b) What happens to the shape of the meths when the bottle is tilted?
 - (c) What happens to the shape of the ice cube when the board is tilted?

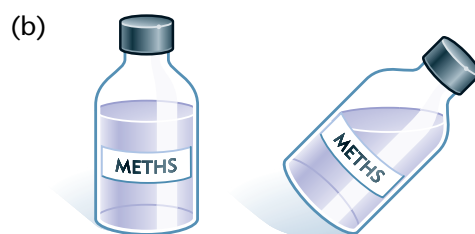
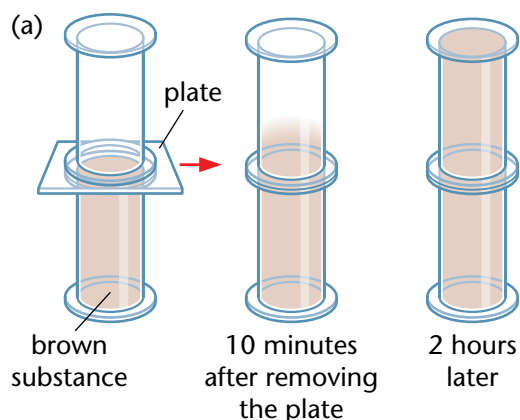
On a snowy day Sadia gets her milk from the doorstep.



It is cold and the top of the milk is frozen solid.



Sadia cannot pour the milk because the top is frozen.



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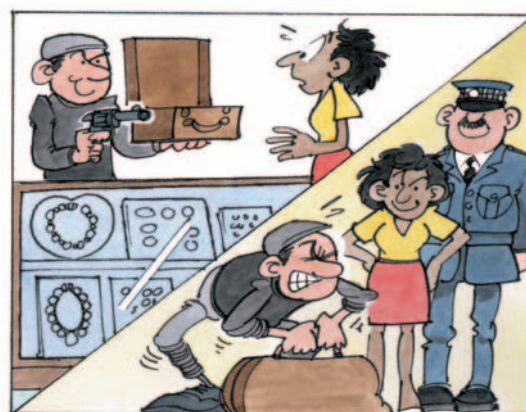
Some substances are heavier than others

The table shows how heavy different substances are. To make the table fair, the figures are for one cubic centimetre of each substance. One cubic centimetre is about the size of a small dice.

Solids and liquids are heavier than gases. We say that solids and liquids are **denser** than gases.

Mass of one cubic centimetre.		
Solid	Liquid	Gas
iron 7 g	water 1 g	air 0.0013 g
gold 18 g	olive oil 0.9 g	steam 0.0006 g
pine 0.5 g	petrol 0.9 g	
cork 0.2 g	Ribena 1.3 g	

- 5 Which solids are denser than water?
- 6 Which solids are less dense than water?
- 7 How many times more dense is:
 - (a) iron than water?
 - (b) water than cork?

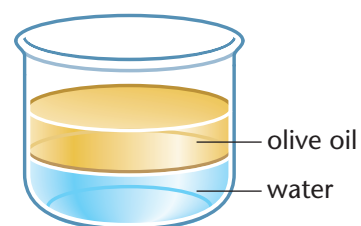


A suitcase full of air is a lot lighter than one full of gold!

Floating and sinking

Cork floats on water because it is a **less dense** substance than water. A lump of iron **sinks** in water because it is a denser substance than water.

- 8 Look at the table again. Which solids will float on water?
- 9 Copy the diagram of oil and water. Underneath the diagram, copy and complete this sentence.
 The oil floats on the water because it is less _____ than the water.



WHAT YOU NEED TO REMEMBER (Copy and complete using the key words)

Solid, liquid and gas

Solids have their own _____. Liquids and gases can _____ shape. A gas spreads out to fill any _____.

Gases and liquids will _____ through pipes.

Solids and liquids are heavier substances than gases; we say they are _____.

Something floats on a liquid if it is _____ than the liquid. A lump of iron _____ in water because it is a denser substance than water.

More about solids, liquids and gases: C1.3

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1.3 Explaining the way things are

A lot of cars have airbags in them. An airbag can save a driver in a crash.

When the bag fills with air, it makes a cushion. This stops the driver hitting the wheel. Air works because it is a gas. You can squash a gas and it will spring back.

Look at the pictures.

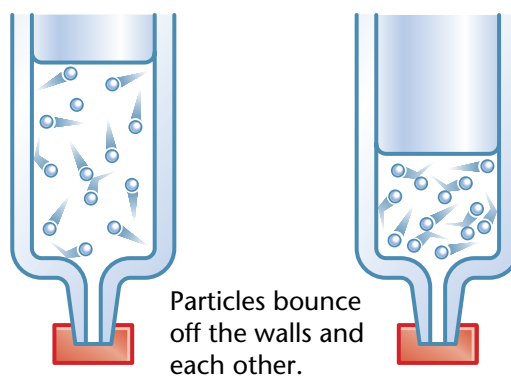
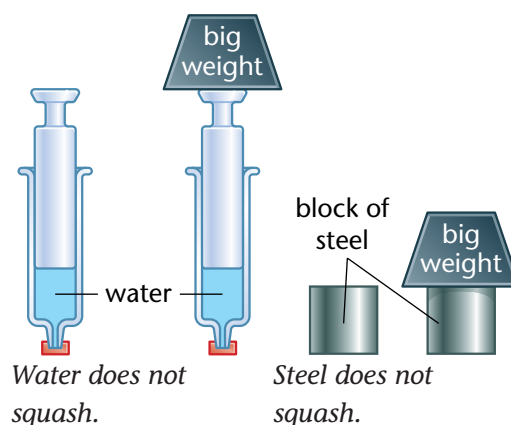
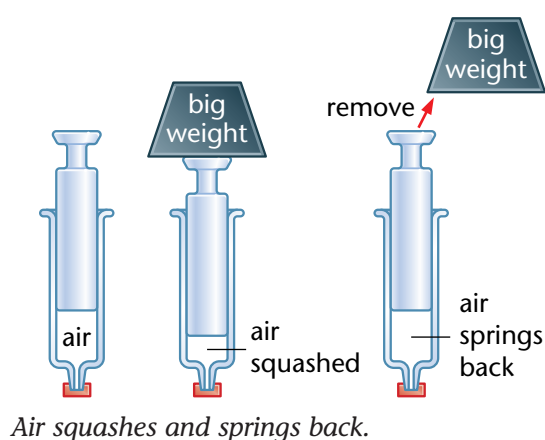
- What happens to the air in the tube when the weight is put on the top?
 - What happens to the air in the tube when the weight is taken away?
- What happens when you do the same test with a tube of liquid?
- What happens when you do the same test with a block of solid?

■ Why can a gas be squashed?

Gases are made up of tiny **particles** that **move** about at high speed.

The particles are **far apart**. They do not hold each other together.

- What is a gas made up of?
- What do gas particles do when they hit each other?
- Why can you squash (compress) a gas?



A gas is mostly empty space, so you can squeeze the particles into a smaller space.

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How are the particles arranged in a liquid?

The particles are very close together in a liquid. There is not very much space between the particles.

Though the particles in a liquid stay close together they are always moving about. They **change places** with each other all the time.

- 7 Why is it hard to squash (compress) a liquid?
- 8 You can pour a liquid into a container with a different shape. Explain why you can do this.

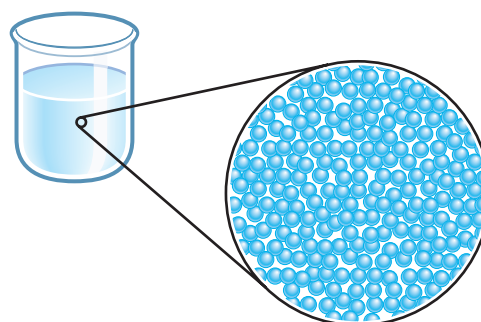
What about solids?

The particles in a solid hold each other together **strongly**. They are packed **close together**.

The particles can jiggle about or **vibrate**, but they do not change places.

Particles in a solid are usually fixed in a pattern.

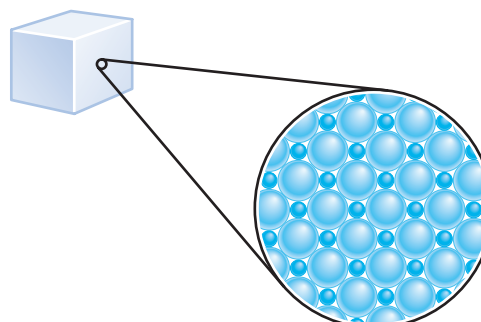
- 9 How are the particles arranged in a solid?
- 10 Why is it hard to squash a solid?



The particles in a liquid move around each other. There is no pattern.



You can **pour** a liquid.



Particles in a solid are fixed in a pattern.

WHAT YOU NEED TO REMEMBER (Copy and complete using the key words)

Explaining the way things are

Solids, liquids and gases are all made of _____.

In solids, the particles hold each other together _____. They cannot change places, but they can _____.

In liquids, the particles stay close together but they can _____ with each other. This means you can _____ a liquid.

In a gas there is a lot of space between the particles. The particles _____ around at high speed.

You can squash a gas because the particles are _____.

It is hard to squash a liquid or a solid because the particles are _____.

More about models of matter: C1.4

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1.4 Mixing solids and liquids

To make drinks sweet you add sugar. When you add sugar to water and stir for a time you can't see the sugar any more. But it is still there in the water. The sugar dissolves in the water and produces a **solution**.

- 1 Write down four solids which dissolve in water and are commonly used in the kitchen.

■ Making solutions sweeter

Vicky added spoonfuls of sugar to two beakers of water. She stirred the water 10 times after adding each spoonful to see if all the sugar would dissolve.

Look at the diagram of the experiment.

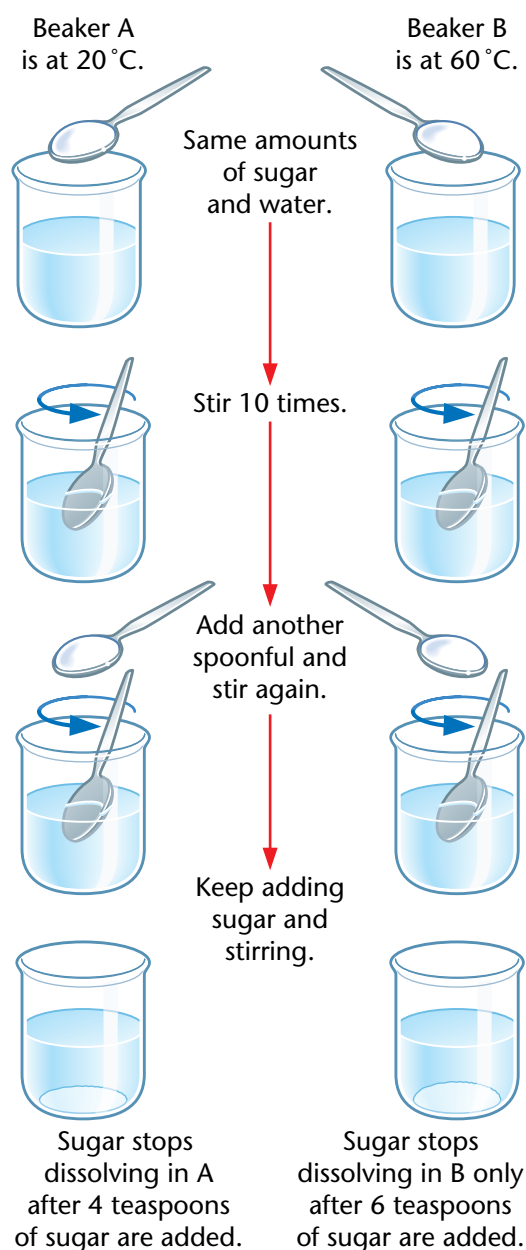
- 2 Why can beaker B dissolve more sugar than beaker A?
- 3 Write down how this investigation was made fair.

More sugar dissolves in **hot** water than cold. The sugar is more soluble in hot water.

- 4 How could you dissolve more spoonfuls of sugar in the water in beaker A?



Just mix with water ...



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■ Cleaning the mess!

Graffiti on desks or a wall is a nuisance. Water will not always clean the coloured dye from ink or marker pens. To remove graffiti we need a liquid which dissolves the dye. This liquid is called a **solvent**.

- 5 (a) Which liquid removes the dye in the picture?
 (b) Does the dye dissolve in water?
 (c) Which liquid is a good solvent for dye?

The dye which dissolves in the solvent is called the **solute**.

- 6 Copy the table of words. Then copy the correct definition next to each word.

Word	Definition
dissolve	
solvent	
solution	
solute	

Definitions

- The name for a substance which dissolves in a liquid.
- A liquid which contains a dissolved substance.
- A liquid in which another substance will dissolve.
- This is what happens when a solid, liquid or gas disappears into a liquid.



Coca Cola is a solution. Find out the solvent and main solutes in Coca Cola.



WHAT YOU NEED TO REMEMBER (Copy and complete using the key words)

Mixing solids and liquids

When a substance dissolves in a liquid we get a _____.

Substances often dissolve better when the liquid is _____.

The liquid that the substance goes into is called the _____. The dissolved substance is called the _____.

More about mixtures: C1.6