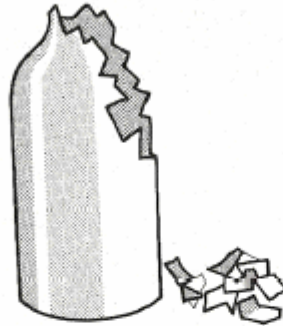
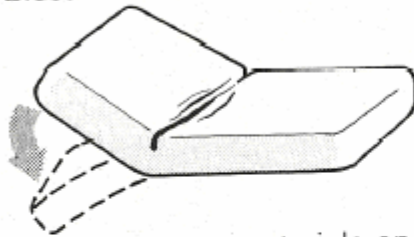


## SECTION 1 describing qualities of materials

**A** All materials (glass, wood, rubber, steel, etc) have various properties. What words are used to describe these properties?

Rubber is \_\_\_\_\_.  
Rubber is a \_\_\_\_\_ material.

Glass is \_\_\_\_\_.  
Glass is a \_\_\_\_\_ material.



Here are some materials and some properties. Make statements to describe the properties of the materials. For example, *Steel is strong* or *Steel is a strong material*.

Materials	Properties
glass	stiff elastic
rubber	flimsy rigid
steel	strong pliable
polythene	weak soft
wood	resilient hard
wool	tough fragile
paper	brittle
porcelain	flexible

Notice that many materials can be described by more than one property. For example, Steel is strong and rigid. We therefore say: *Steel is a strong rigid material*.

Make similar sentences about other materials, describing them with more than one property if possible.

**B** We often want to **modify** statements about the properties of materials. For example,

Glass is **extremely** brittle.  
Polythene is **very** resilient.  
Wood is **fairly** strong.  
Rubber is **quite** tough.  
Paper is **not very** strong.

We can therefore also say:

Glass is **an extremely** brittle material.  
Polythene is **a very** resilient material.  
Wood is **a fairly** strong material.

But notice that we must say:

Rubber is **quite a tough** material.  
Paper is **not a very strong** material.

Make statements about various materials again, but this time modify the statements with the following words: *extremely, very, fairly, quite, not very*.

**C** Ask and answer questions about the properties of various materials, using the **modifiers** above. For example,

Is glass very resilient?

No, it isn't, it's very brittle.

Is wool an extremely rigid material?

No, it isn't, it's a very soft pliable material.

Isn't paper very strong?

No, it isn't, it's quite weak.

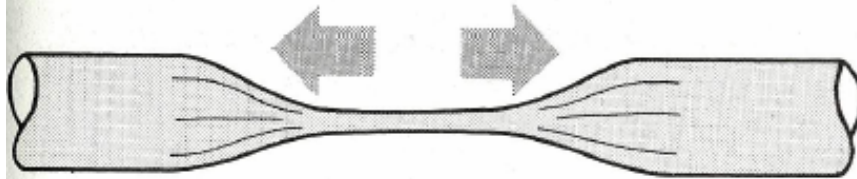
Use the following notes to help you ask the questions:

- |                      |                 |
|----------------------|-----------------|
| 1 glass/resilient?   | 4 wool/hard?    |
| 2 polythene/brittle? | 5 paper/strong? |
| 3 rubber/rigid?      | 6 wood/soft?    |

- 7 paper/tough?
- 8 steel/weak?
- 9 wool/rigid?
- 10 rubber/brittle?

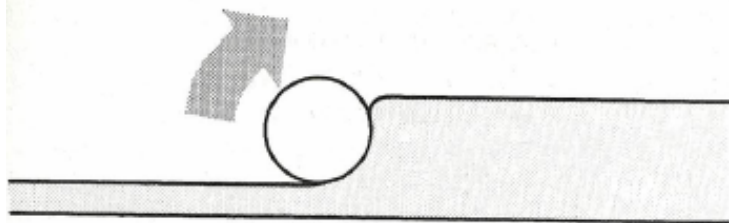
**D** What words are used to describe the following properties?

A material which can be easily pulled out, or stretched into a long wire or strand, is said to be \_\_\_\_\_.

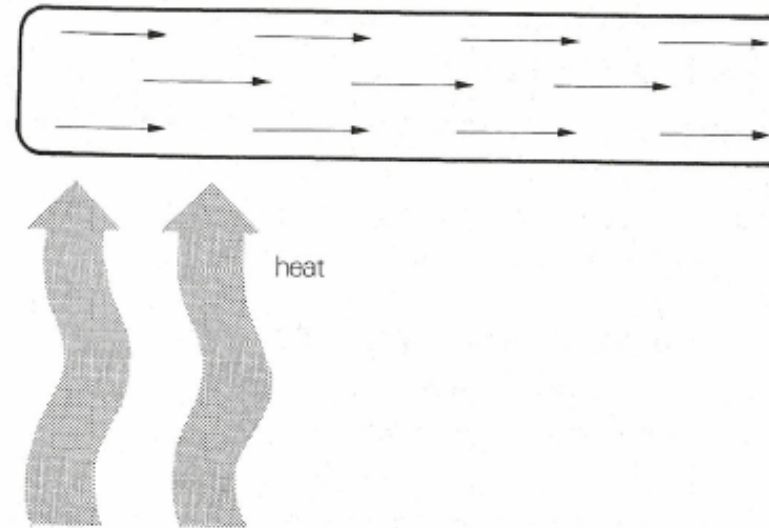


Materials which are used for wires, such as copper and aluminium, must therefore have this property.

A material which can be easily deformed by hammering or rolling is said to be \_\_\_\_\_.



When a substance allows heat or electricity to pass along it, it is said to \_\_\_\_\_ heat or electricity.



Copper (Cu) and aluminium (Al) are \_\_\_\_\_, but glass and porcelain are \_\_\_\_\_.

Make sentences from this table.

Copper (Cu)	is	a	extremely	good	insulator.				
Aluminium (Al)									
Lead (Pb)						an	very	poor	conductor.
Glass						fairly			
Porcelain									

**E** You know that we can say: *Wood is fairly strong and Steel is very strong.* If we wish to **compare** steel and wood, we can say:

Steel is \_\_\_\_\_ wood.

Now look at these comparisons:

Cardboard is quite strong. Paper is not very strong. Cardboard is **slightly stronger** than paper.

Steel is very strong. Wood is not very strong. Steel is **much stronger** than wood.

or:

Steel is **a lot stronger** than wood.

Wool is very soft. Wood is not very soft. Wool is **considerably softer** than wood.

Rubber is very tough. Paper is not very tough. Rubber is **far tougher** than paper.

But notice what we say with these properties:

Steel is slightly **less ductile/slightly more resilient** than copper.

Rubber is **much more flexible/much less rigid** than steel.

or:

Rubber is **a lot more flexible/a lot less rigid** than steel.

Glass is **considerably more brittle/considerably less resilient** than wood.

Polythene is **far more resilient/far less fragile** than glass.

Make statements comparing these materials:

- 1 glass/fragile/steel
- 2 paper/flimsy/wood

- 3 copper/ductile/iron
- 4 rubber/rigid/steel
- 5 cardboard/stiff/paper
- 6 polythene/brittle/material/glass
- 7 iron/malleable/wood
- 8 paper/strong/cardboard
- 9 porcelain/resilient/material/plastic
- 10 wood/hard/cardboard
- 11 copper/good/conductor/lead
- 12 iron/poor/conductor/aluminium

**F** All the substances described so far are solids. But, of course, we must be able to describe the properties of other substances. Here are some properties of **liquids and fluids**:

oily    thick    viscous    thin    creamy  
runny    sticky    free-flowing

Name some substances which have some of the properties in the list above. For example,

Milk is a free-flowing white liquid.

Some substances are between solid and liquid form. Such substances may be in the following forms:

gel (jelly)            (adjective: gelatinous)  
cream                (adjective: creamy)  
paste

Some solids may be found in the following forms:

powder                (adjective: powdery)  
crystals              (adjective: crystalline)  
granules              (adjective: granular)  
filings  
chips  
flakes                 (adjective: flaky)  
shavings



We sometimes describe these further by using *fine* or *coarse*. For example,

Refined sugar consists of fine white granules.  
Fine iron filings are used to show the presence of a magnetic field.  
A substance such as sand may be either fine or coarse.

Now use the words above to describe the following substances as fully as possible.

- |              |                       |
|--------------|-----------------------|
| 1 jam        | 6 oil for a motor car |
| 2 toothpaste | 7 sand                |
| 3 butter     | 8 instant coffee      |
| 4 salt       | 9 honey               |
| 5 glue       | 10 chalk              |

## SECTION 2 **describing colours and appearance**

**A** What are the three colours of light which together form white light? They are printed on the back cover. What colours are made by mixing these three colours? What are the colours of the spectrum called in English? These are also shown on the back cover.

**B** We can modify our descriptions of colours by saying:

light blue *or* pale blue  
dark blue *or* deep blue  
bright yellow  
dull brown

Describe the colours of some objects in the

classroom. Ask and answer questions using this table. For example,

What colour is the chair?  
It's dark brown.  
Is the floor light green?  
No, it isn't. It's dark blue.

light	red
dark	blue
pale	green
deep	yellow
bright	orange
dull	purple
	brown
	grey
	pink

**C** When an object is not exactly one colour, we can add *-ish* to the colour. For example,

red            reddish  
blue          bluish  
yellow        yellowish  
(but: silver    silvery)

When an object is between two colours, we often say: *reddish-brown*, *bluish-yellow*, *greyish-green*, etc. (We can also say: *lightish blue*, *darkish grey*, etc.) For example,

Copper is a reddish-brown colour.  
The sea is a bluish-green (*or* greenish-blue) colour.

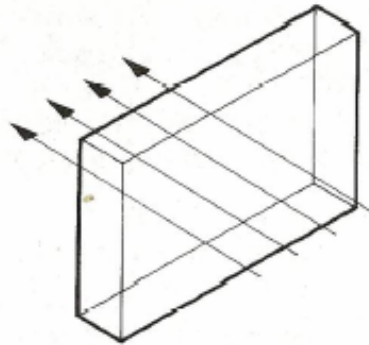
Describe more of the objects in the room, and objects your teacher presents, using these approximate expressions of colour. Ask and answer questions about the colours of things.

What colours are these?

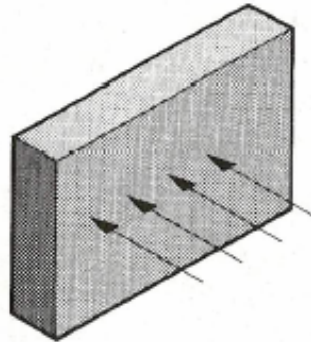
amber        mauve  
bronze        turquoise  
crimson      khaki

**D** Complete these statements.

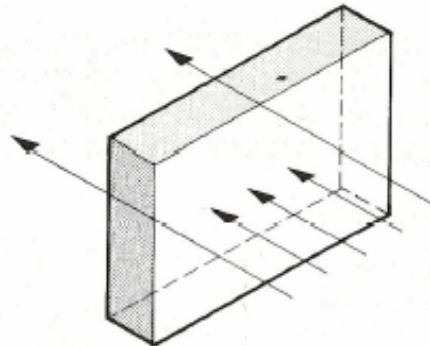
A material which allows light to pass through it is \_\_\_\_\_. Glass is \_\_\_\_\_. (Glass is a \_\_\_\_\_ substance.)



A material which does not allow light to pass through it is \_\_\_\_\_. Steel is \_\_\_\_\_.



A material which allows **some** light to pass through it is \_\_\_\_\_. Ground glass or 'frosted' glass is \_\_\_\_\_.



Substances which have no colour (like water) are \_\_\_\_\_. Water is a \_\_\_\_\_ liquid.



A white liquid is sometimes said to be \_\_\_\_\_ or \_\_\_\_\_. Carbon dioxide turns lime water \_\_\_\_\_.

When an object or a substance is dirty, it is said to be \_\_\_\_\_.

**E** As well as colour, objects have different types of **surface** or **appearance**. Surfaces can be:

bright      glossy  
shiny      mat/matt  
dull

They can also be:

smooth      grainy  
rough      corrugated  
uneven      pitted  
coarse      abrasive

Complete these descriptions together with your teacher. Your teacher will help you with new words.

- 1 Glass is a \_\_\_\_\_ solid which usually has a \_\_\_\_\_ surface.
- 2 Chalk is a porous solid which has a \_\_\_\_\_ surface.
- 3 Some cardboard is \_\_\_\_\_ to give it extra strength.
- 4 The inside of a camera has a \_\_\_\_\_ surface.
- 5 Mercury is a liquid metal which has a \_\_\_\_\_ appearance.

Complete this table:

Adjective	Verb	Noun
hot warm cool cold		

Complete these statements:

- At normal temperatures, iron is a solid. However, when it is \_\_\_\_\_ above 1,537°C, it \_\_\_\_\_.
- Water is a liquid at normal temperatures. However, when it is \_\_\_\_\_ below 0°C, it \_\_\_\_\_.
- When water is \_\_\_\_\_ to 100°C, it \_\_\_\_\_.
- When a substance changes from a solid to a liquid, it is said to \_\_\_\_\_.
- When a substance changes from a liquid to a solid, it is said to \_\_\_\_\_.
- When a substance changes from a liquid to a gas, it is said to \_\_\_\_\_.

**C** We can also form nouns and verbs from the adjectives in this table. Study the table and write out a completed copy.

Adjective	Verb	Noun
weak tough soft hard rough coarse	weaken	weakness

However, not all nouns and verbs can be formed in this way. What are the missing words from this table? (In some cases we cannot form a verb directly from an adjective, for instance with *resilient*. In this case we have to say *make something resilient*.)

Adjective	Verb	Noun
strong resilient brittle flexible elastic pliable smooth rigid ductile malleable		

**D** Fill in the missing words in the following passage:

**Hardening.** Medium and high carbon steel are not very h\_\_\_\_\_, and so they must be h\_\_\_\_\_. They are h\_\_\_\_\_ slowly to a h\_\_\_\_\_ temperature (above 700°C), and then rapidly c\_\_\_\_\_ (or 'quenched'). Fully h\_\_\_\_\_ steel is, however, extremely brittle, and has poor shock resistance. The b\_\_\_\_\_ of h\_\_\_\_\_ steel can be reduced and the quality of the metal increased by tempering. This process is described below.

**Tempering.** The metal is re-h\_\_\_\_\_ to a comparatively l\_\_\_\_\_ temperature and again q\_\_\_\_\_ at a carefully controlled temperature. The colour of the film of oxide on the brightened surface of the h\_\_\_\_\_ steel gives a good approximate indication of the temperature of the



**exercise 1** Read this passage carefully, and then complete the exercise.

Steel is an alloy of iron (Fe) and carbon (C). The carbon content must not be more than 1.7%. Steel is very strong and ductile. When the carbon content is high, the steel is stronger and harder than when it is low, but steel with a high carbon content is less ductile and less resistant to shock. Steel which contains less than 0.1% carbon is known as **dead mild steel**. It is soft and ductile. Steel which contains up to 0.35% carbon is known as **mild steel**. It is harder and less ductile than dead mild steel.

Steel with a carbon content of 0.35% to 0.7% is called **medium carbon steel**. It is harder, stronger and less ductile than mild steel.

Steel with a carbon content of 0.7% to 1.5% is called **high carbon steel**. It is harder and less ductile than low carbon steels.

Now make these notes into sentences. For example,

mild steel/ductile/medium carbon steel  
*Mild steel is more ductile than medium carbon steel.*

- 1 steel/high carbon content/ductile/steel/low carbon content
- 2 dead mild steel/soft/mild steel
- 3 medium carbon steel/hard/mild steel
- 4 high carbon steel/ductile/dead mild steel/mild steel
- 5 medium carbon steel/ductile/mild steel
- 6 medium carbon steel/hard/high carbon steel
- 7 mild steel/hard/dead mild steel
- 8 high carbon steel/much/hard/dead mild steel
- 9 dead mild steel/far/soft/high carbon steel
- 10 mild steel/considerably/ductile/high carbon steel

**exercise 2** Construct statements which give the main properties and appearance of these substances. For example,

Mercury is a bright shiny white liquid metal.

- |               |                                |
|---------------|--------------------------------|
| 1 Silver      | 7 Sulphur (S)                  |
| 2 Water       | 8 Milk                         |
| 3 Copper (Cu) | 9 Sulphuric acid ( $H_2SO_4$ ) |
| 4 Iron (Fe)   | 10 Coal                        |
| 5 Coffee      | 11 Sand                        |
| 6 Glass       | 12 Sugar.                      |

**exercise 3** From the notes, make sentences like this example:

water/heat/100°C/boil

*When water is heated to 100°C, it boils.*

- 1 aluminium/heat/659.70°C/melt
- 2 water/cool/0°C/freeze
- 3 steel/hard/become/brittle
- 4 hardened steel/heat/270°C/turn/purple
- 5 water/heat/above/100°C/vaporize
- 6 ice/heat/0°C/melt
- 7 liquid steel/cool/solidify
- 8 rubber/vulcanize/become/tougher
- 9 copper/heat/become/more ductile
- 10 glass/tough/become/more resilient
- 11 blue copper sulphate crystals/heat/turn/white
- 12 steel/heat/300°C/film of oxide/turn/dark blue

**drill 1** Here is a table which compares the properties of aluminium and copper. Use it to help you make statements about the metals in answer to the questions you hear. For example,

What about strength?

*Aluminium is less strong than copper.*

What about resistance?

*Aluminium has a higher resistance than copper.*

Aluminium	Copper
Light	Not very light
Fairly strong	Very strong
Good conductor	Very good conductor
Fairly cheap	Not very cheap
Fairly low resistance	Very low resistance
Very high corrosion resistance	Fairly high corrosion resistance
Not very easy to solder	Very easy to solder

**drill 2** Here is a list of substances, showing which are good conductors of heat and which are poor conductors. Use the notes to help you answer the questions.

Copper	GOOD
Aluminium	
Brass	
Zinc	
Lead	
Glass	POOR

↓

Is copper a better conductor than lead?

*Yes, it's far better.*

Is brass a better conductor than copper?

*No, it's much poorer.*

- |   |          |   |          |
|---|----------|---|----------|
| 1 | far      | 5 | slightly |
| 2 | much     | 6 | far      |
| 3 | much     | 7 | much     |
| 4 | slightly | 8 | slightly |

**drill 3** Here is a table showing the colours of metallic elements. Use it to help you answer the questions.

Copper's brown, isn't it?

*No, it's not; it's a reddish colour.*

Gold's a dull white, isn't it?

*No, it's not; it's a bright yellow colour.*

Element	Colour
copper (Cu)	reddish
mercury (Hg)	silvery-white
aluminium (Al)	light white
zinc (Zn)	bluish-white
sulphur (S)	pale yellow
gold (Au)	bright yellow
lead (Pb)	bluish-white
magnesium (Mg)	silvery-white
silver (Ag)	bright white
tin (Sn)	silvery-white