

# 7 Chemistry Pack 1

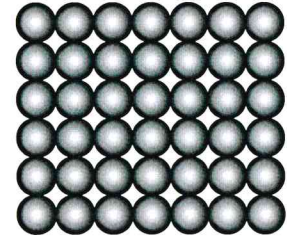
**W.S.38. Solids, liquids and gases.**

Name .....

Everything is made up of particles that are too small to see. The three states of matter are SOLID, LIQUID and GAS. They all have different properties due to the arrangement and movement of their particles.

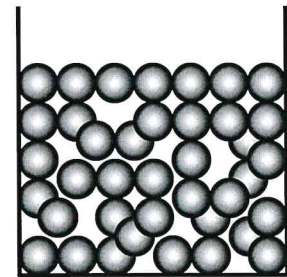
**Solids.**

The particles are held tightly together by strong forces. They make small vibrations but they stay in place. This gives solids a definite shape and volume. Solids are DENSE (heavy) and they can not be compressed (squashed) easily because the particles are already packed closely together.



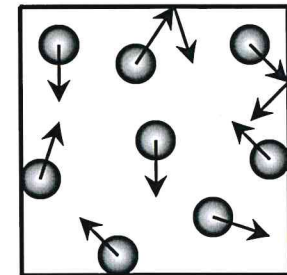
**Liquids.**

A liquid can flow because the particles can move past each other. The particles are still held closely together by strong forces. Liquids are DENSE and they can not be compressed easily. A liquid can change its shape but not its volume.



**Gases.**

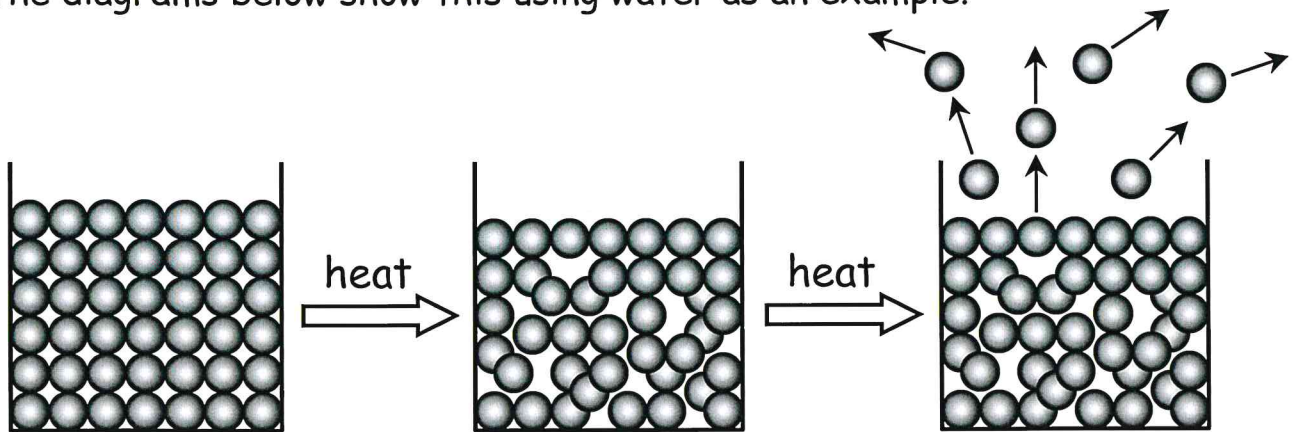
There are only very weak forces between the particles which are far apart. The particles move around very quickly and bounce off each other. Gases have a low density (they are very light) and they do not have a definite shape or volume.



**Exercise** - Complete the spaces in the table below.

Property	Solids	Liquids	Gases
Density (heavy or light)	High density (heavy)		Low density (light)
How easy are they to compress (squash)?	Hard		Easy
Do they flow?		Yes	Yes
Do they keep the same shape?		No	
Do they keep the same volume?	Yes		

When a solid is heated it changes into a liquid state and then a gas state. When a gas is cooled it changes back into a liquid and then into a solid. The diagrams below show this using water as an example.



Solid - ice.

The particles are held firmly in place but they vibrate.

Liquid - water.

The particles gain more energy. The vibrations become stronger until they break apart.

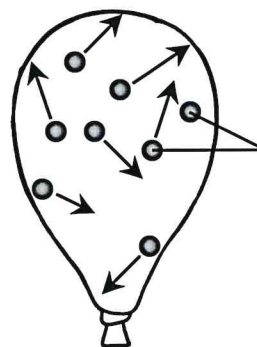
Gas - steam.

The particles have gained enough energy to break free. They are moving very quickly.

Gas pressure and diffusion.

If a gas is squeezed into a small space e.g. when air is pumped into a balloon, the particles bump against the walls. This causes a PRESSURE.

A gas will DIFFUSE (spread out) until it fills up any area that it is contained in. The gas particles diffuse until they are EVENLY SPREAD OUT.



Air particles move around quickly and bump against the inside of the balloon.

Exercise - Join up the words in the left-hand column with their meanings in the right-hand column.

DIFFUSION

A solid changing to a liquid.

ICE

The spreading out of particles.

MELTING

The solid state of water.

STATE OF MATTER

A solid, liquid or gas.

EVAPORATION

A gas changing to a liquid.

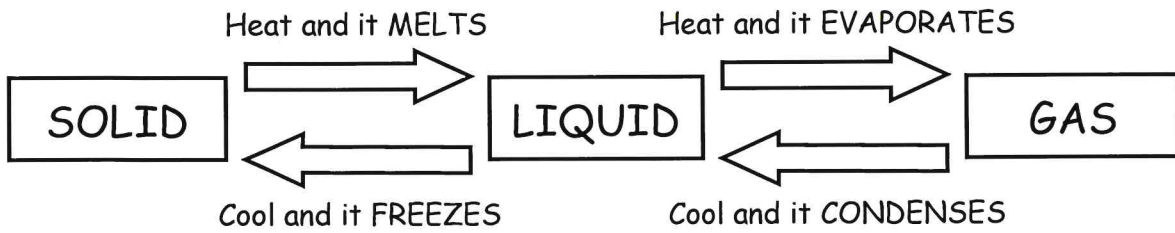
CONDENSING

A liquid changing to a gas.

# W.s.45. Changes of state.

Name .....

The three states of matter are SOLID, LIQUID and GAS. One state can change into another. The diagram below shows this.



When a solid changes to a liquid, or a liquid changes to a gas, heat is absorbed. This is because the particles that make up the substance need more energy to move faster and overcome the forces that hold them together. When a gas changes to a liquid, or a liquid changes to a solid, heat is given out. This is because the particles lose energy as they slow down. The substance still keeps the **SAME MASS** because it still contains the **SAME NUMBER OF PARTICLES**.

Exercise - Use the information in the table below to help you complete the sentences at the bottom of this page.

Substance	Melting point (°C)	Boiling point (°C)
Oxygen	-219	-183
Ethanol	-15	78
Water	0	100
Sulphur	119	445
Iron	1,540	2,900

- 1) Oxygen is a \_\_\_ at room temperature.
- 2) Water and \_\_\_\_\_ are liquids at room temperature.
- 3) \_\_\_\_\_ and iron are solids at room temperature.
- 4) Sulphur melts at a temperature of \_\_\_\_\_ °C
- 5) Iron melts at a temperature of \_\_\_\_\_ °C
- 6) The substance with the lowest melting point in the table is \_\_\_\_\_
- 7) Ethanol has a \_\_\_\_\_ boiling point than water.

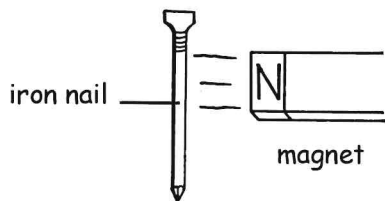
**w.s.44. Metals and non-metals.**

Name .....

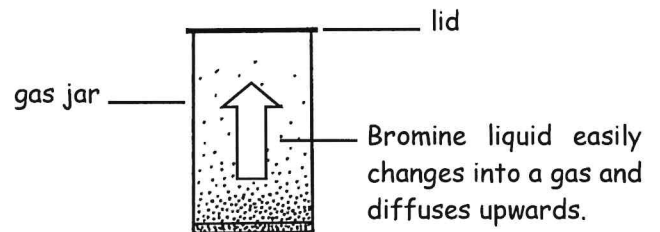
The elements can be divided into two main groups which are METALS and NON-METALS. The table below shows the properties of each group.

Metals	Non-metals
Most are shiny solids at room temperature although mercury is a liquid. They usually have high melting points.	They vary in their properties. They usually have low melting points and many are gases at room temperature.
Good conductors of heat.	Most are poor conductors of heat.
Good conductors of electricity.	Poor conductors of electricity except for graphite which is a form of carbon.
A few are magnetic (iron, cobalt and nickel).	None are magnetic.
They are often flexible (bendy) and can be hammered into shape.	They are often brittle (hard but break easily).

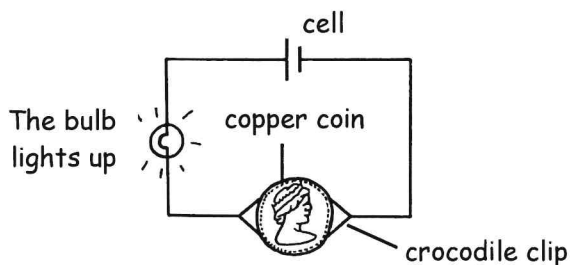
**Exercise 1** - For each diagram below write down if the element is a metal or a non-metal.



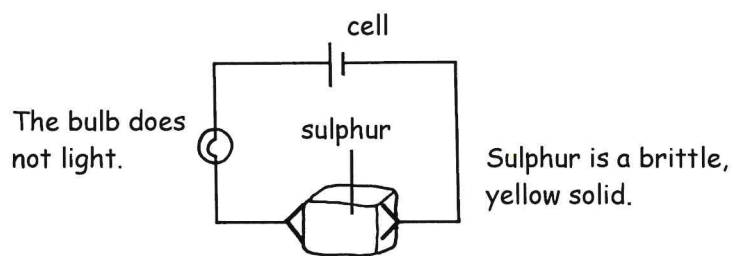
Iron is a \_\_\_\_\_



Bromine is a \_\_\_\_\_



Copper is a \_\_\_\_\_



Sulphur is a \_\_\_\_\_

**Exercise 2** - Complete the sentences below.

- 1) M \_\_\_\_\_ is the only metal that is a liquid at room temperature.
- 2) G \_\_\_\_\_ is the only non-metal that is a good conductor of electricity.
- 3) The M \_\_\_\_\_ metals are iron, cobalt and nickel.
- 4) M \_\_\_\_\_ can be hammered into shape.