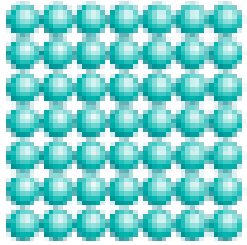
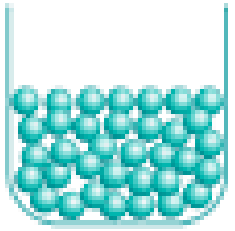
8i Fluids

1	All substances can exist in three states of matter, a solid, liquid or gas. There is even another state of matter called plasma. This properties of the states of matter can be explained using the particle model.
2	Solids keep their shape and volume (they have a fixed shape). They cannot flow but their particles can vibrate in their fixed positions. The particles are held in their fixed arrangement by strong forces. They are incredibly difficult to compress (squash into a smaller volume).
3	Liquids keep their volume but will change shape to that of any container they are held in. Their particles can flow and are held in their arrangement by fairly strong forces. Liquids are difficult to compress.
4	Gases can change both their shape and volume. Because there are weak forces between the particles, they are able to spread far apart and move fast in all directions. Gases are easy to compress.
5	The particle model explains many observations including diffusion, Brownian motions and density.
6	The particle model also explains why materials expand and contract. Materials expand when heated because the particles in hotter materials move faster and so take up more space.
7	Materials contract when cooled because the particles in cooler materials move slower and so take up less space.
8	Substances can change state when energy is transferred. We can do this by heating or cooling the substance.
9	Melting is the name of the process when a substance changes state from a solid to a liquid. The temperature at which the substance melts is called its melting point.
10	Particles can then evaporate from the surface of a liquid to become a gas. The boiling point is the temperature at which evaporation happens within the liquid.
11	If you cool a gas it condenses into a liquid.
12	A substance can then change into a solid by freezing. The freezing point of the substance will be the same temperature as its melting point.
13	During the process of changing state the temperature of the substance remains the same. This is because the energy is needed to overcome forces holding particles together.
14	A heating curve is a graph that shows the temperatures at which changes of state occur for a substance or mixture.

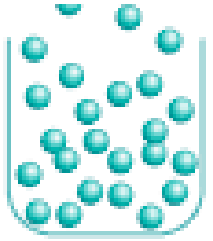
Solid

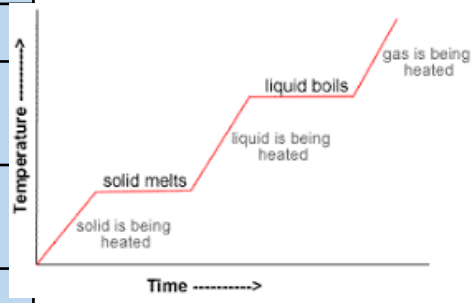


Liquid



Gas





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15	The force of particles hitting things causes pressure. Pressure in liquids and gases comes form all directions.
16	Pressure is measured in pascals (Pa). 1 Pa is is a force of 1 N acting on every square metre of an object. 1 Pa = 1 N/m^2
17	Pressure can be calculated by dividing the force by the area. Pressure = force ÷ area. P = F / a
18	The atmosphere around us exerts pressure. This is known as atmospheric pressure and at the surface of the Earth this about 100 000 pascals.
19	Atmospheric pressure decreases with an increase in height. This is because there are fewer particles in the atmosphere above us.
20	The pressure of a gas depends on the temperature. When the particles of a gas are heated they move faster and so there are more collisions which causes and increase in pressure.
21	A decrease in the temperature of a gas causes a decrease in pressure.
22	The pressure of a gas also depends on the volume of its container. If a gas is compressed into a smaller container there will be more collisions which causes an increase in pressure.
23	An increase in the volume of its container causes a decrease in pressure.
24	In large bodies of water like the ocean, pressure increases with depth. This is because there are more particles above you (both the water and the atmosphere!)