

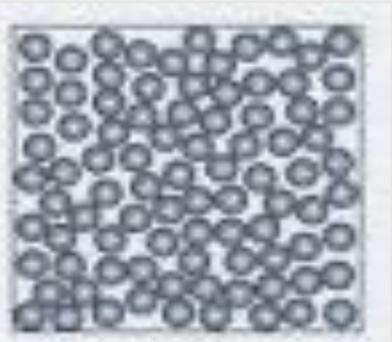
Chemistry 1 Knowledge Map - The Particle Model

The Particle Model

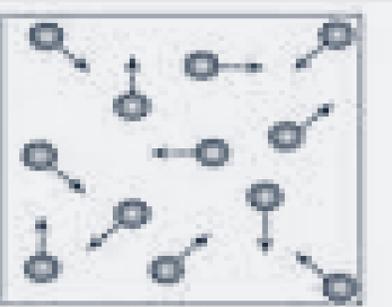
We can represent solids, liquids and gases by particle models. The particle models for solids, liquids and gases are shown below.



Solid



Liquid



Gas

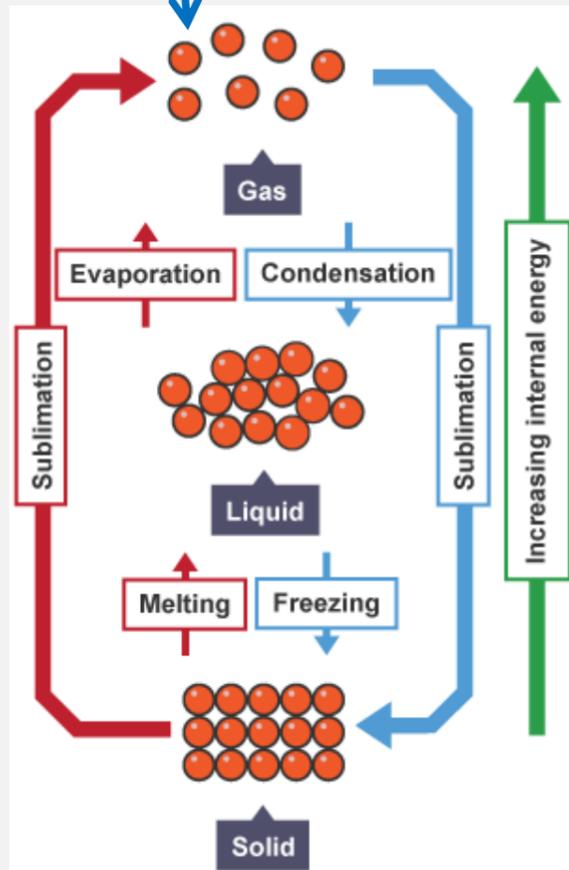
Changing State

The three states of matter are solid, liquid and gas.

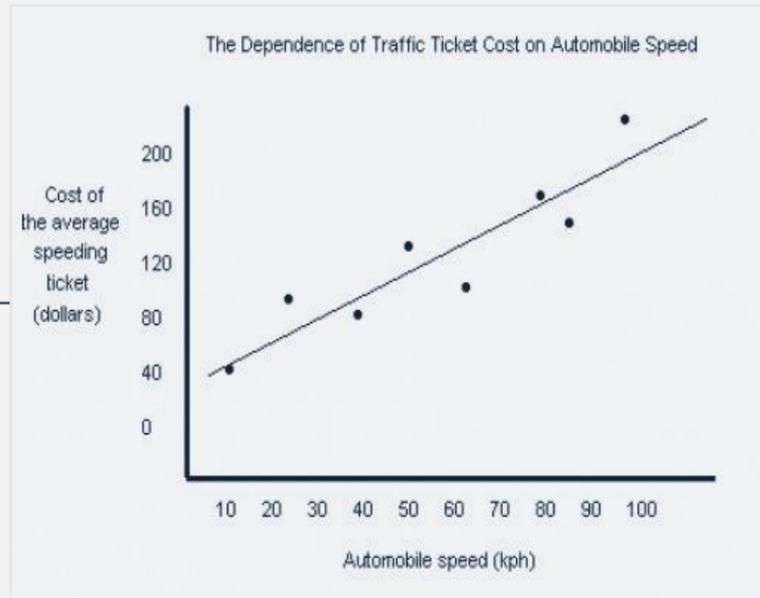
Changing state is a physical change. it is reversible.

For example, you can melt ice (solid) to form water (liquid). You can then freeze (solidify) water to make ice again.

Below shows a diagram of all the changes of state and their scientific terms.



Graph Skills



When drawing graphs, you must include the following;
 Heading for graph, underlined.
 Title and units for each axis.
 A sensible scale on each axis.
 Points plotted accurately.
 Line of best fit drawn with a ruler representing as many points as possible.

Evaporation and Thermal Expansion

Evaporation is where a liquid changes to a gas.

Heat energy gives particles kinetic energy. When those particles have enough kinetic energy, they can overcome their intermolecular forces and break free.

- The factors that affect evaporation are;
1. Wind speed: Faster speed will transfer more kinetic energy.
 2. Temperature: Higher temperature means more heat energy. More kinetic energy will be transferred to the particles.
 3. Surface Area: Evaporation occurs at the surface of a liquid. The larger the surface, the more energy can be transferred to particles.
 4. Strength of inter-molecular forces: The stronger the intermolecular forces are in a liquid, the more kinetic energy will be required to overcome the force and allow the particles to break free.

Thermal expansion is when a solid, liquid or gas expands due to heat.

Heat gives particles more kinetic energy. As the particles move around more, they take up more room. This makes the solid, liquid or gas expand.

Density and concentration

Density is how compact the particles in certain volume of a substance.

For example, solids are much more dense than gases, because their particles are very closely packed together. The density and properties of solids, liquids and gases is shown below.

The equation for density is;
 $Density = \frac{mass}{volume}$

Concentration is a term generally applied to solutions. It refers to have many particles of a solute you have in a given volume of solvent.

For example, a strong concentration of coffee would show many particles of coffee in water. A weak coffee would show less particles of coffee in the same volume of water.

Diffusion and Conservation of Mass

Diffusion is the process in which particles move from an area of high concentration to an area of low concentration. In simpler terms, the particles spread out until they are evenly spread.

When the particles are evenly spread, they will stop moving. This is called equilibrium. The concentration of the particles will now be even in all areas.

The law of conservation of mass was first proposed by Antoine Lavoisier. His law can be summarised as 'Matter cannot be destroyed, or created, just transformed.' This means the mass of the reactants of a reaction will equal the mass of the products.

States of Matter

Gas	Liquid	Solid
<ul style="list-style-type: none"> • low density • easy to expand/compress • fills container 	<ul style="list-style-type: none"> • high density • hard to expand/compress • takes shape of container 	<ul style="list-style-type: none"> • high density • hard to expand/compress • rigid shape