Chemistry

Ch 21. States of Matter

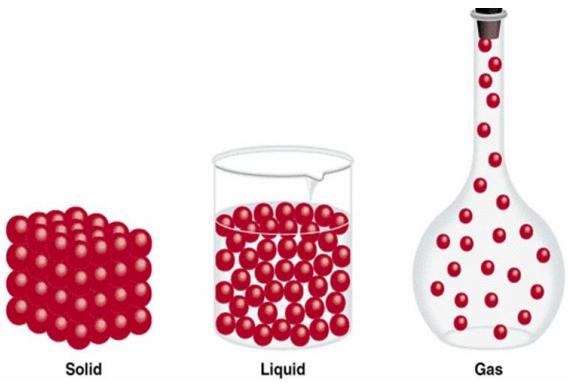
Matter is anything which takes up space and has mass.

Properties of solids, liquids and gases

Solid	Liquid	Gas
Definite mass	Definite mass	Definite mass
Definite shape	Definite shape	Indefinite shape
Definite volume	Indefinite volume	Indefinite volume
Incompressible	Incompressibe	Compressibe
Does not flow	Flows	Diffuses into space

Molecules

Solid	Liquid	Gas
Have a fixed position	Do not have a fixed position	Do not have a fixed position
Can vibrate	Can slide and roll over each other	Can seperate and move



Compounds

Form when 2 or more elements combine chemically in fixed proportions.
Eg. Hydrogen and oxygen combine to form water (H_2O)

A **Molecule** is the smallest part of an element or compound which can exist on its own. Elements that make up molecules are always present in fixed amounts.
Eg. 1 molecule of water = 2 hydrogen atoms:1 oxygen atom

Properties of Compounds A comound is a completely new substance with its own properties.
Eg. Hydrogen (explosive gas) combines with oxygen (gas which supports combustion) to form the compound water (liquid which can extinguis fires)

Mixtures

Consist of 2 or more different substances mingled together but not chemically combined.

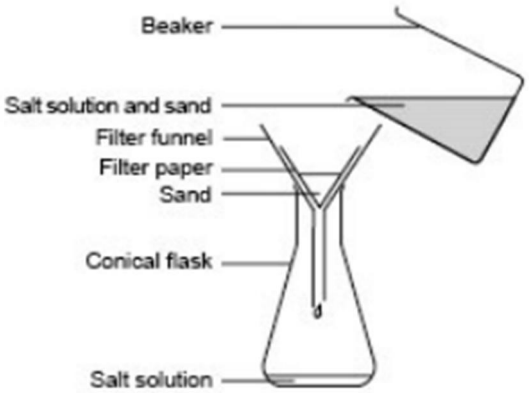
Mixture	Components		
Air	Nitrogen	Oxygen	Carbon dioxide
Seawater	Salt	Water	
Coke	Sugar	Water	Carbon dioxide

Differences	
Mixtures	**Compounds**
Two or more different substances	One substance
Proportion of components does not matter	Elements in fixed proportion
Have the same properties as the origional substances	Properties different to the properties of the elements used
Easy to seperate	Difficult to seperate
Physically changed	Chemically changed

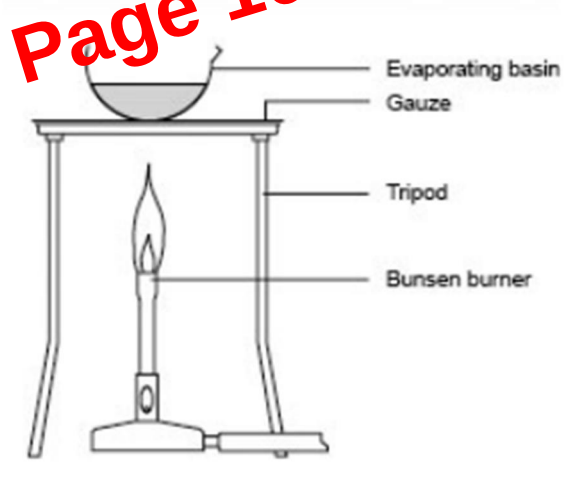
Ch 24. Seperating Mixtures

Separating Solids from Liquids

1. **Filtraton**
   Seperates insoluble solids (sand) from a liquid



2. **Evaporation**
   Seperates soluble solids (salt) from a solution
   Crystallisation occurs when crystals appear from a solution which has been evaporated.



Ch 31. Air

Air is a Mixture

Component	%
Nitrogen	78
Oxygen	21
Argon	1
Carbon Dioxide	0.03
Water Vapour	0 → 4

Proof that Air is a Mixture

- Its composition varies from place to place.
- Components can be seperated by cooling.
- Gases are just mixed, and not heated to form air.

Oxygen

Preparing Oxygen in the Lab

Oxygen is collected using downward displacement of water.

Hydrogen peroxide $\xrightarrow{\text{manganese dioxide}}$ oxygen + water

$2H_2O_2 \xrightarrow{MnO_2} O_2 + 2H_2O$

Manganese Dioxide is a **Catalyst** – substance which changes the speed of a chemical reaction without being harmed itself.