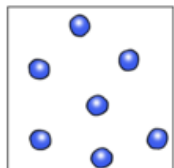


Atoms, elements and compounds

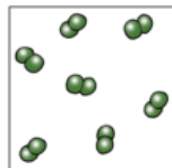
All substances are made of **atoms** that cannot be chemically broken down. It is the smallest part of an **element**.

Elements are made of only one type of atom. Each element has its own **symbol**.
e.g. Na is sodium.

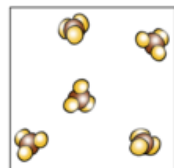
Compounds contain more than one type of atom.
Naming compounds -
Two elements = **ide**
e.g. Na₂S Sodium sulphide
Two or more including oxygen = **ate**
e.g. Na₂SO₄ = sodium sulphate



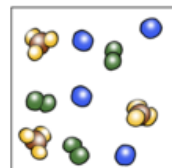
a) Atoms of an element



b) Molecules of an element



c) Molecules of a compound



d) Mixture of elements and a compound

There are two elements here - Magnesium and chlorine



There are 3 atoms. 1 x Mg and 2 x Cl

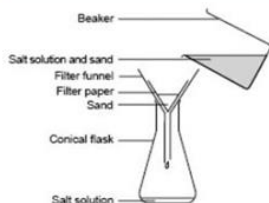
Small numbers (subscripts) after symbols tell you how many of the element BEFORE the number.

Separating mixtures

A mixture consists of **two or more** elements or compounds **not** chemically combined together.

Filtration

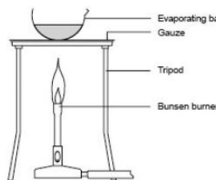
This technique separates substances that are insoluble in a solvent from those that are soluble



Example - filtering a mixture of sand, salt and water to collect the sand

Crystallisation

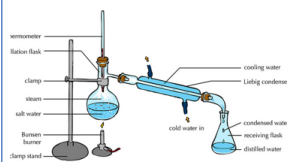
This technique separates a soluble substance from a solvent by heating



Example - crystallisation of sodium chloride from salt solution

Simple distillation

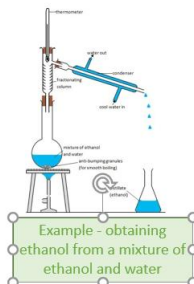
This technique separates a liquid from a mixture by evaporation followed by condensation



Example - obtaining water from sea water

Fractional distillation

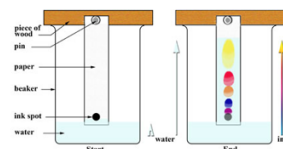
This technique differs from distillation only in that it separates a mixture into a number of different parts, called fractions.



Example - obtaining ethanol from a mixture of ethanol and water

Chromatography

This technique separates small amounts of dissolved substances by running a solvent along absorbent paper



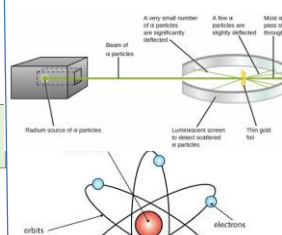
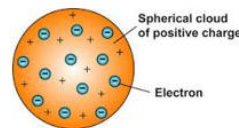
Example - separating the different colours in ink

C1 Atomic Structure

Development of Atomic Model

Dalton - atoms can't be divided

JJ Thompson discovered electrons - Plum pudding model

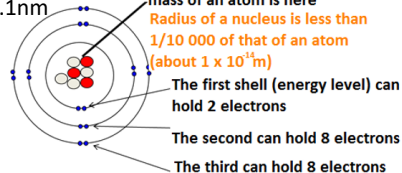


Geiger-Marsden The Nuclear Model of the Atom

Bohr - electrons in shells

Chadwick - the neutron

Atomic radius = 0.1nm



Nucleus - almost all of the mass of an atom is here
Radius of a nucleus is less than 1/10 000 of that of an atom (about 1×10^{-14} m)

The first shell (energy level) can hold 2 electrons

The second can hold 8 electrons

The third can hold 8 electrons

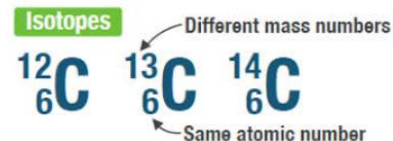
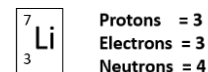
Subatomic Particles

	Mass	Charge	Location
Proton	1	+	nucleus
Neutron	1	0	nucleus
Electron	Very small	-	shells

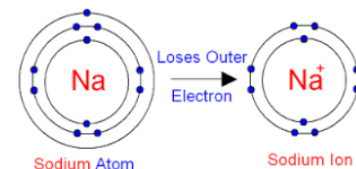
Mass number = Number of protons and neutrons \rightarrow 7
Atomic number = Number of protons \rightarrow 3

Number of protons(+) = Number of electrons (-)

Number of neutrons = mass number - atomic number



Atoms lose or gain electrons to form ions



$1\text{nm} = 1 \times 10^{-9}\text{m}$