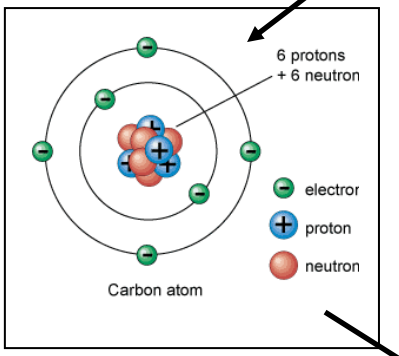
Atomic Structure

Atoms are made up of the following particles

Particle in atom	*Charge*	*Mass*
Electron	-1	Zero (0.0005)
Proton	+1	1
Neutron	0	1

Atomic number = Number of protons and number of electrons (*E.g. 6 for C*)

Mass number = Number of protons + number of neutrons (*E.g. 12 for C*)



Putting electrons in shells –

1st shell = 2

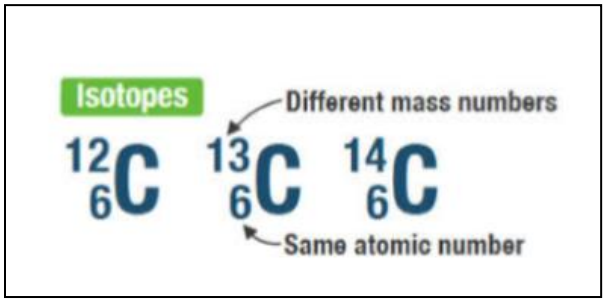
2nd shell = 8

3rd shell = 8

KEY LINK TO PERIODIC TABLE

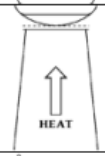
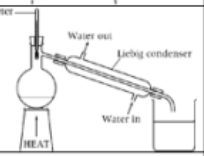
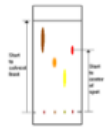
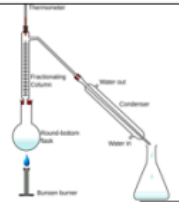
Electrons on outside shell = GROUP

Number of shells = PERIOD



CU1 – Atomic Structure and the Periodic table

Separating techniques

Filtration	Separates an insoluble solid from a liquid		Sand from water
Crystallisation	Separates a soluble solid (solute) from a solution		Salt from seawater
Simple Distillation	Seperates a liquid (the solvent) from a soluble solid		Pure Water from seawater
Chromatography	Used to separate mixtures of substances (solutes) dissolved in a solution		The colours found in ink
Fractional Distillation	Used to separate miscible liquids (liquids that can dissolve in each other		Different liquids found in crude oil

Important Scientists!!!

Developing our understanding of atomic structure

a) *Dalton (1800)* - Suggested everything was made of particles that couldn't be broken down. He called them atoms.

b) *Thompson (1897)* - Showed that atoms had electrons in them

c) Rutherford (1911) - Carried out experiments that proved atoms must have a nucleus.

d) Bohr - Showed electrons must be in shells around the nucleus

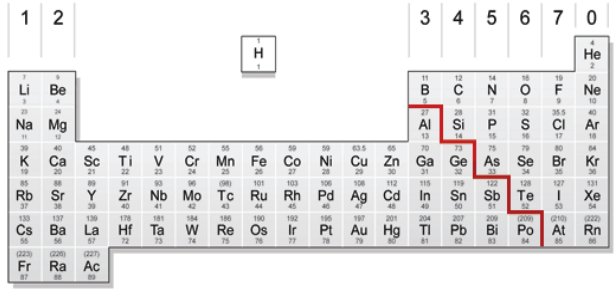
e) Rutherford – Late showed the presence of protons in the nucleus

f) Chadwick –Showed the presence of neutrons

Periodic table

Developed by Dmitri Mendeleev. He ordered the elements by atomic mass and then organised them so that elements with properties were in the same columns (Groups). He left gaps in his table for elements that hadn't been discovered yet.

METALS NON-METALS



Group 1 – The Alkali metals

- All have one electron in the outside shell
- Get more reactive down group
- React + water forming hydroxide and hydrogen
  E.g. Lithium + water → lithium hydroxide + hydrogen
- React with oxygen and chlorine
  E.g. sodium + chlorine → sodium chloride

Group 7 – The Halogens

- All have seven electrons in the outside shell
- Get less reactive down group
- More reactive Group 7 elements displace less reactive ones from their compounds
  E.g. Lithium bromide + chlorine → lithium chloride + bromine

Group 8 – The Noble Gases

- All have outside shells full of electrons so they do not react