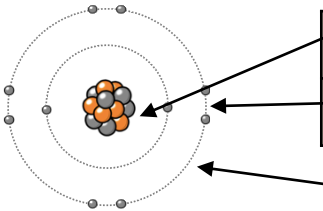




Atoms, elements and compounds

Atom	<i>The smallest part of an element that can exist</i>	Have a radius of around 0.1 nanometres and have no charge (0).
Element	<i>Contains only one type of atom</i>	Around 100 different elements each one is represented by a symbol e.g. O, Na, Br.
Compound	<i>Two or more elements chemically combined</i>	Compounds can only be separated into elements by chemical reactions.



Central nucleus	Contains protons and neutrons
Electron shells	Contains electrons

Name of Particle	Relative Charge	Relative Mass
Proton	+1	1
Neutron	0	1
Electron	-1	Very small

Electronic shell	Max number of electrons
1	2
2	8
3	8
4	2

Electronic structures

Relative electrical charges of subatomic particles

7 Li 3	Mass number	<i>The sum of the protons and neutrons in the nucleus</i>	
	Atomic number	<i>The number of protons in the atom</i>	Number of electrons = number of protons

Mixtures	<i>Two or more elements or compounds not chemically combined together</i>	Can be separated by physical processes.
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Method	Description	Example
Filtration	<i>Separating an insoluble solid from a liquid</i>	To get sand from a mixture of sand, salt and water.
Crystallisation	<i>To separate a solid from a solution</i>	To obtain pure crystals of sodium chloride from salt water.
Simple distillation	<i>To separate a solvent from a solution</i>	To get pure water from salt water.
Fractional distillation	<i>Separating a mixture of liquids each with different boiling points</i>	To separate the different compounds in crude oil.
Chromatography	<i>Separating substances that move at different rates through a medium</i>	To separate out the dyes in food colouring.

AQA GCSE Atomic structure and periodic table part 1

Pre 1900		<i>Tiny solid spheres that could not be divided</i>	Before the discovery of the electron, John Dalton said the solid sphere made up the different elements.
1897 'plum pudding'		<i>A ball of positive charge with negative electrons embedded in it</i>	JJ Thompson 's experiments showed that showed that an atom must contain small negative charges (discovery of electrons).
1909 nuclear model		<i>Positively charge nucleus at the centre surrounded negative electrons</i>	Ernest Rutherford's alpha particle scattering experiment showed that the mass was concentrated at the centre of the atom.
1913 Bohr model		<i>Electrons orbit the nucleus at specific distances</i>	Niels Bohr proposed that electrons orbited in fixed shells; this was supported by experimental observations.

The development of the model of the atom

James Chadwick	<i>Provided the evidence to show the existence of neutrons within the nucleus</i>
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Rutherford's scattering experiment

A beam of alpha particles are directed at a very thin gold foil

Most of the alpha particles passed right through. A few (+) alpha particles were deflected by the positive nucleus. A tiny number of particles reflected back from the nucleus.

Chemical equations	<i>Show chemical reactions - need reactant(s) and product(s) energy always involves and energy change</i>	Law of conservation of mass states the total mass of products = the total mass of reactants.
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Word equations	<i>Uses words to show reaction</i> reactants → products <i>magnesium + oxygen → magnesium oxide</i>	Does not show what is happening to the atoms or the number of atoms.
Symbol equations	<i>Uses symbols to show reaction</i> reactants → products <i>2Mg + O₂ → 2MgO</i>	Shows the number of atoms and molecules in the reaction, these need to be balanced.

Relative atomic mass

Isotopes	<i>Atoms of the same element with the same number of protons and different numbers of neutrons</i>	³⁵Cl (75%) and ³⁷Cl (25%) Relative abundance = (% isotope 1 x mass isotope 1) + (% isotope 2 x mass isotope 2) ÷ 100 e.g. (25 x 37) + (75x 35) ÷ 100 = 35.5
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