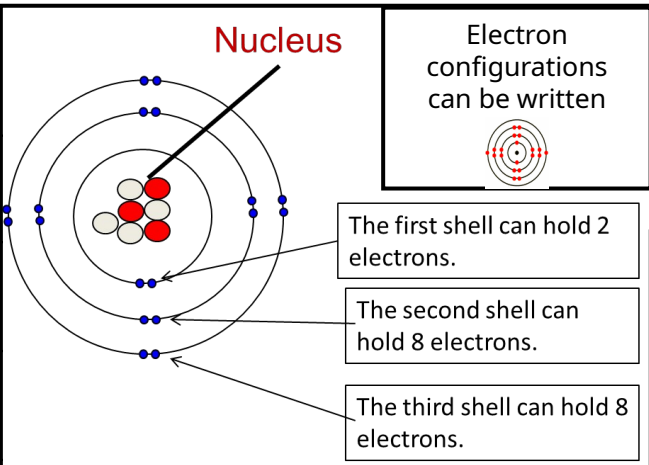


Topic: C1A Atomic Structure

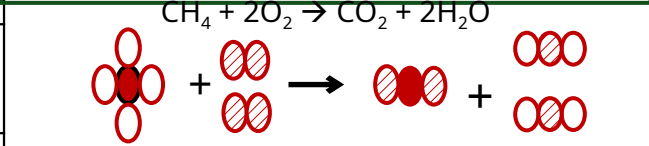
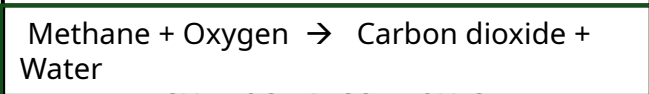
Key word	Definition
Atom	The smallest part of an element that can exist
Element	A substance made up of only one type of atom
Compound	A substance made of two or more elements chemically bonded together
Mixture	Two or more substances not chemically combined, so they can be separated by physical methods
Ion	A charged particles formed when an atom gains or loses electrons
Isotope	Atoms of the same element with the same number of protons but different number of neutrons
Mass number	The total number of protons and neutrons in the nucleus of an atom.
Atomic number	The number of protons in the nucleus of an atom
Electron shells	The energy levels around the nucleus where electrons are found.

Atoms of each element are represented by a **chemical symbol** e.g. O for oxygen, Na for sodium.



	Proton	Neutron	Electron
Mass	1	1	Negligible (very small)
Charge	+1	Neutral	-1
Location	Nucleus	Nucleus	Shells

An atom contains **equal** numbers of **protons** and **electrons**. All **atoms** of an **element** have the same **number** of **protons**. Atoms of **different** elements have **different numbers** of **protons**.



Chemical equations: They show the **reactants** (what we start with) and the **products** (what we end with). No **atoms** are **lost** or **made**. The **mass** of the **products** equals the **mass** of the **reactants**.

Relative atomic mass – average value that takes account of the abundance of the isotopes of that element.

$$\text{Relative atomic mass} = \frac{\text{sum of (isotope abundance} \times \text{isotope mass number)}}{\text{sum of abundances of all the isotopes}}$$

Mass number = Number of **protons** and **neutrons**

Atomic number = Number of **protons**

Number of neutrons = Mass Number – Atomic Number

Radius of an atom = 0.1 nm (1×10^{-10} m)
Radius of a nucleus = 1/10000 of that of the atom (about 1×10^{-14} m)

Dalton
Described atoms as solid spheres and said that different spheres made up different elements.

Thomson
'Plum pudding model' – ball of positive charge with electrons spread throughout it.

Rutherford
Alpha scattering experiment – Nuclear model – positive nucleus with electrons around the outside.