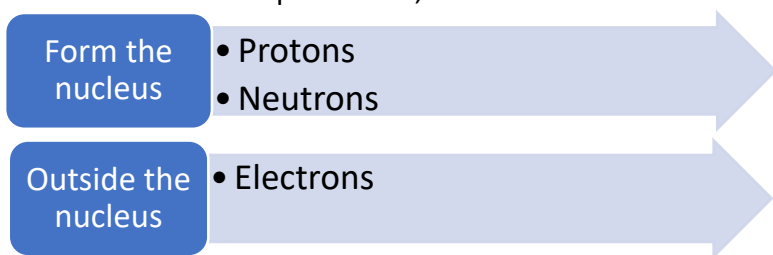


The periodic table, atoms, molecules ions, reactions of ionic compounds

The Atom

- All matter is made up of atoms, these atoms are made is of subatomic particles.



Properties of subatomic particles

- Note that p and n are similar masses, but the electron is $\sim 1/1800$ of the mass of a proton

Atomic Number

- The number of protons in the nucleus determines what ELEMENT it is
- All elements have the same number of electrons or protons
- All the elements known are collected on the periodic table and are represented by an atomic symbol and an atomic number
- The periodic table is ordered by increasing ATOMIC NUMBER
- An element with an atomic number of 4, will have 4 protons and 4 electrons

Subatomic Particle	Mass (g)	Charge (C)	Relative Charge
Proton	1.673×10^{-24}	$+ 1.632 \times 10^{-19}$	+ 1
Neutron	1.675×10^{-24}	0	0
Electron	9.109×10^{-28}	-1.632×10^{-19}	- 1

Molecules

- So far we have only discussed elements, but they only represent a small portion of chemistry
- When atoms bond with each other, they form molecules, the molecule you are most familiar with is
- Ethanol ($\text{CH}_3\text{CH}_2\text{OH}$)..... Or H_2O
- A water molecule contains 2 hydrogen atoms and 1 oxygen atom bonded to each other
- Some elements exist as molecules. i.e. Hydrogen exists as H_2 molecules (**diatomic**)

Atoms, molecules, compounds and mixtures

- Atoms** particles that make up all substances
- Molecules** are atoms that have bonded (two of the same element)
- Compounds** are pure substances consisting of atoms of more than one element. They have FIXED composition (are different atoms bonded together) (can be pure)
- Mixtures** are not pure substances and contain a combination of atoms, molecules and compounds

Compounds

- Compounds are represented by a chemical formula
- The chemical formula of a compound represents the 'relative' number of atoms of each element by subscripts
- Compounds can be classified as:
 - Ionic compound
 - Metal and a non-metal
 - Made from ions
 - But what is an ion?
- Covalent compounds
 - Only contains non-metals

Ions

- Sometimes electrons can be added or removed from an atom, this forms an ion
- If an atom (like sodium), loses 1 electron – it will become a positively charged ion
- Positively charged ions are referred to as CATIONS