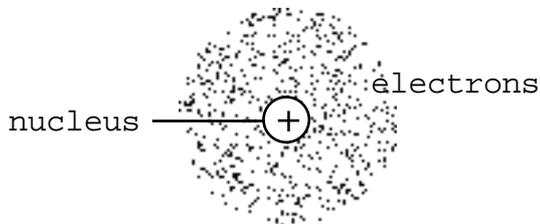


BONDING

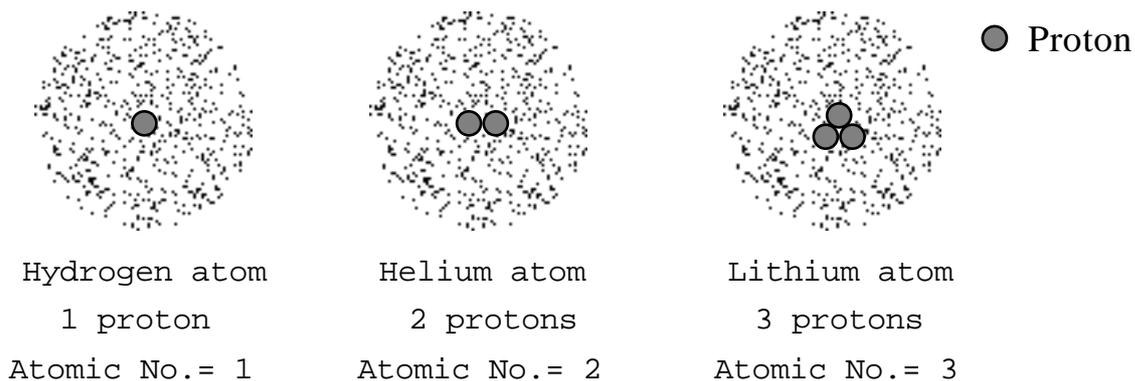
Every element is made up of very small particles called **atoms**.

Each atom consists of a positive centre called the **nucleus** with negative particles called **electrons** whirling around it:



The nucleus contains positively charged particles called PROTONS.

The number of protons in the nucleus is called the ATOMIC NUMBER and varies in atoms of different elements e.g.

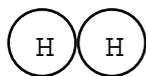


Atoms can form bonds with each other in TWO ways.

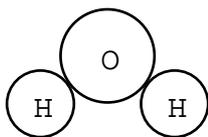
METHOD 1:

Small groups of atoms cluster together to form MOLECULES.

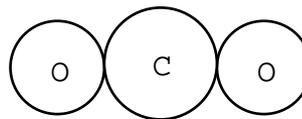
e.g.



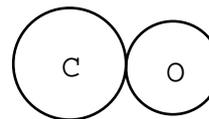
Hydrogen H_2



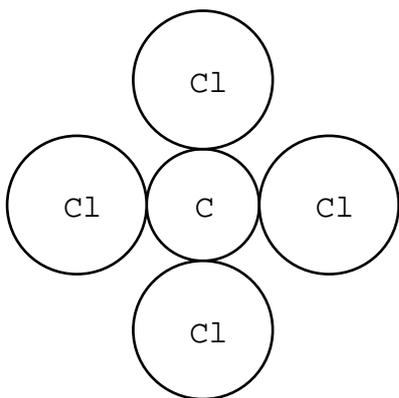
Water H_2O



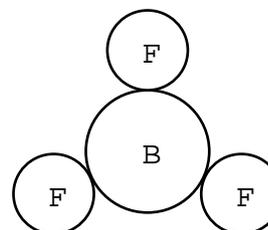
Carbon dioxide CO_2



Carbon monoxide CO



Carbon tetrachloride CCl_4



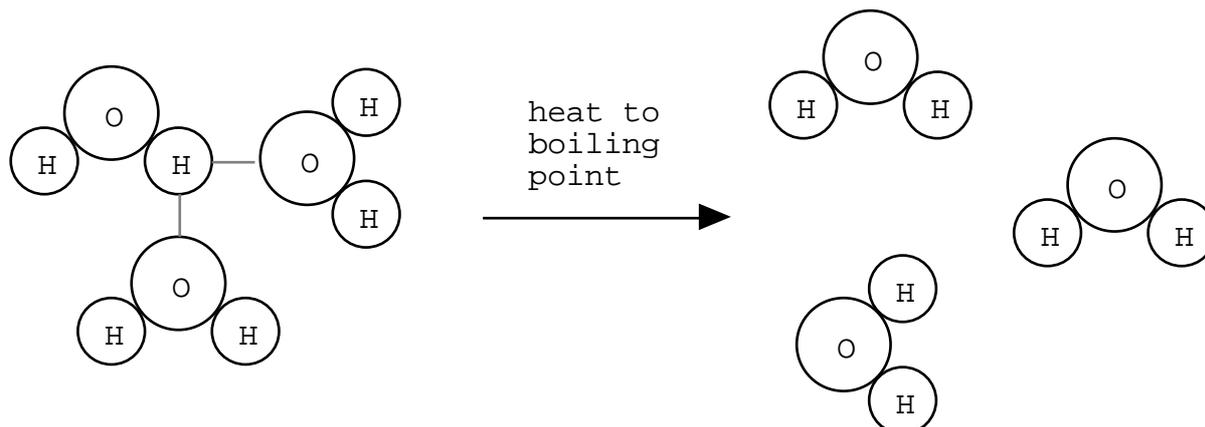
Boron trifluoride BF_3

Note the use of the FORMULA as a quick way of describing the substance e.g. the formula for Water is H_2O .

Note also the use of the prefixes mono, di, tri and tetra to indicate one, two, three or four atoms respectively.

Though the bonds between the ATOMS are very strong, the bonds between the MOLECULES themselves are fairly weak.

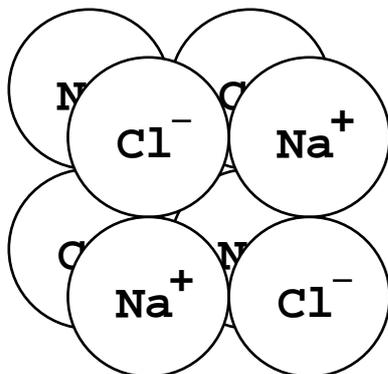
e.g. when we heat water until it boils we break the bonds between the molecules, not the bonds between the atoms:



METHOD 2

Sometimes the atoms become positively or negatively charged before forming compounds. These 'charged atoms' are called **IONS**. Since the ions have opposite charges they attract each other strongly. The ions stick together forming crystals which may contain billions and billions of ions.

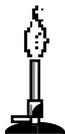
e.g. Sodium chloride is an ionic compound consisting of Sodium and Chlorine ions bonded together in cubic crystals:



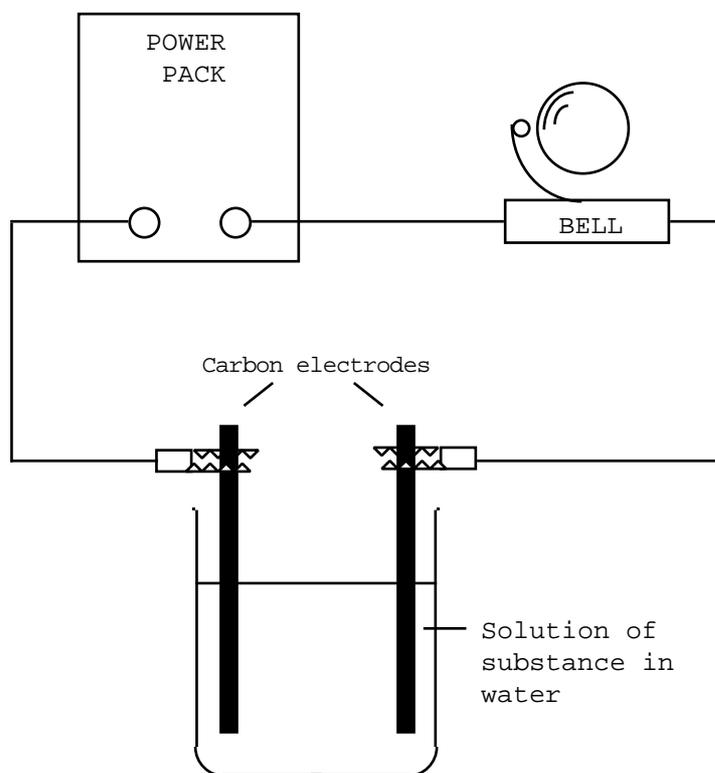
The formula of Sodium chloride is therefore Na^+Cl^- .

Compounds, like Sodium chloride, in which the bonding is between ions are called **ionic**.

Electrical Conductivity



We can find out whether solutions of substances conduct electricity using the following apparatus:



Substances containing molecules e.g. Water H_2O , do not conduct electricity.

Ionic substances like Sodium chloride Na^+Cl^- **DO** conduct.

An electric current is a flow of charged particles.

Charged particles (ions) are present in ionic substances; they are not present in molecular substances.