Summary Sheet Year 7 Elements:

Atoms, molecules, elements and compounds

All substances are made up of tiny particles called **atoms**. Substances can be made of single atoms but they can also be made of atoms **bonded** together in small groups, called **molecules**. Substances can also be made of many trillions of atoms all bonded together.

Natural materials can be **pure** (containing one substance) or **mixtures** (containing two or more substances which are not joined together). A **mixture** is formed if elements are mixed without joining.

Elements are simple substances made up of only one kind of atom. We can easily see this in their formulae.

There are about 90 different types of atom found on Earth. Therefore there are about 90 different elements.

The **periodic table** lists all 118 known elements.

Element are described by **symbols** of one or two letters.

The first letter is always a capital letter and the second is always lower case.

The same symbols are used in all countries

Examples: hydrogen (**H_2**), oxygen (**O_2**), nitrogen (**N_2**), carbon (**C**), iron (**Fe**), zinc (**Zn**) , copper (**Cu**), sulphur (**S**), aluminium (**Al**), iodine (**I_2**), bromine (**Br_2**), chlorine (**Cl_2**), sodium (**Na**), potassium (**K**) and magnesium (**Mg**).

Although there are only about 90 natural elements, there are millions of compounds.

Most substances are **compounds,** which contain more than one kind of atom (more than one element) bonded (joined) together. We can see this in their formulae (more than one symbol for atoms).

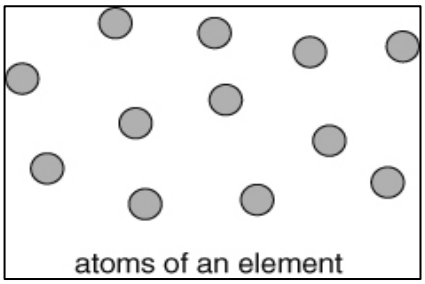
Examples: Hydrogen Chloride (HCl), Carbon Dioxide (CO_2), Copper Bromide ($CuBr_2$) Zinc Iodide (ZnI_2), Sodium Hydroxide (NaOH), Potassium Nitrate (KNO_3), Magnesium Sulfate ($MgSO_4$), Sodium Carbonate (Na_2CO_3)

What does the formula of a substance tell us?

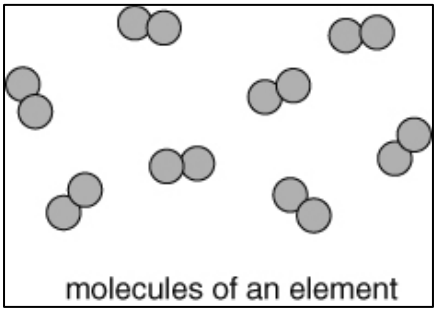
The symbols tell you which types of atoms there are;

The small numbers to the right of the symbols tell us the **relative proportions** of each type of atom.

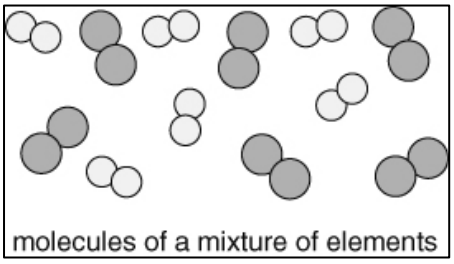
This could be helium (He)…

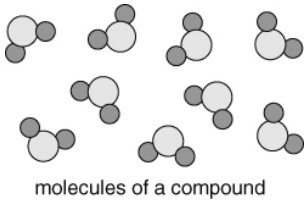


This could be nitrogen molecules (N_2)…



These could be a mix of nitrogen and oxygen (O_2 /N_2)…





These could be sulphur dioxide (SO_2) molecules

NaOH tells us there is one lot of oxygen per sodium and also one lot hydrogen

KNO_3 tells us there is one lot of nitrogen per potassium BUT three lots of oxygen

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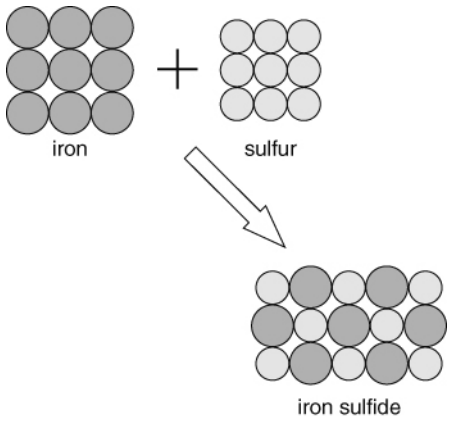
Naming compounds:

Compounds are formed when elements are mixed and react so that the atoms join together.



Naming compounds

If there is a metal in the compound, the name of the metal goes first.

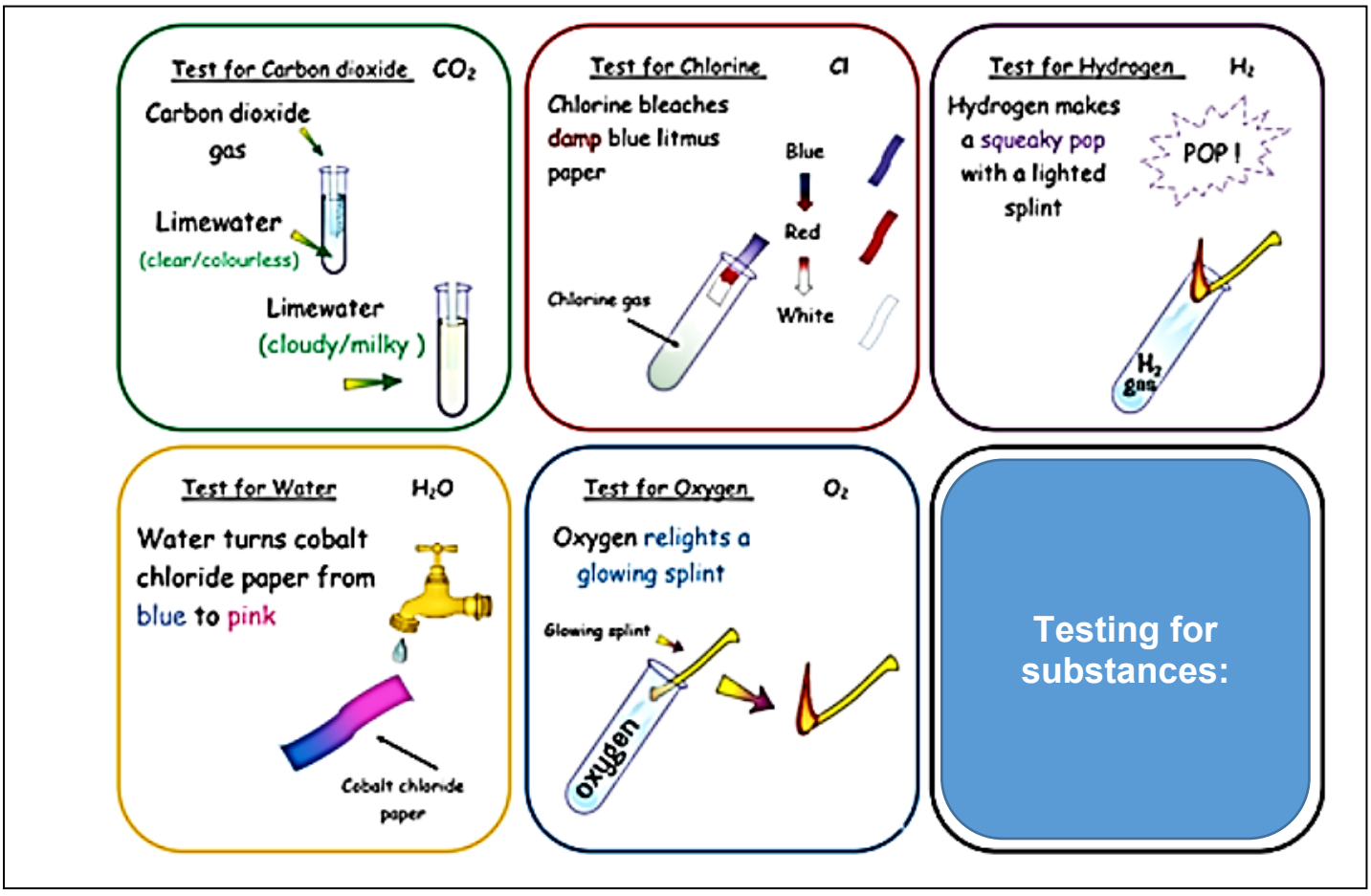
If the compound contains only two elements then one of the element's name has its ending changed to '**ide**'.

e.g. zinc + oxygen = zinc oxide

iron + bromine = iron bromide

If a compound contains two elements plus oxygen, then the name ending of one of the elements is changed to '**ate**'.

e.g. sodium + carbon + oxygen = sodium carbonate



Summary Sheet Year 7 Elements:

Flame Tests

Flame tests can be used to identify metal ions (cations).

The metal compounds below have distinctive coloured flames. **You should try to remember these colours**

Metal compound	Flame Colour
Lithium	**Crimson (deep red)**
Sodium	**Yellow**
Potassium	**Lilac (pink)**
Calcium	**Orange – red**
Copper	**Green**

Problems

- If metal ions are mixed, the colour of the flame will be masked
- Some flame colours are quite similar anyway, making identification difficult