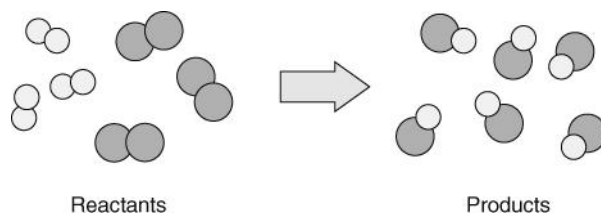


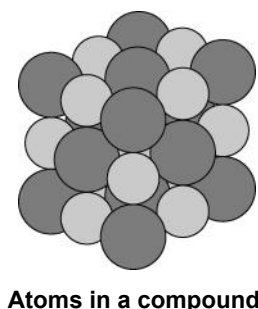
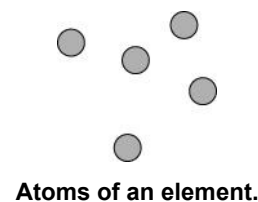
## Dalton's atomic theory

Dalton's theory stated that:

- All matter is made up of tiny particles called atoms.
- Atoms are indestructible, and cannot be created, or destroyed.
- The atoms in an element are all identical.
- In compounds, each atom of an element is always joined to a fixed number of atoms of the other elements.
- During chemical reactions, atoms rearrange, to make new substances.  
For example:

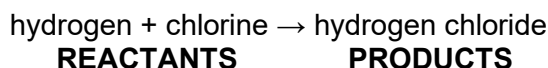


No atoms are lost or gained so the mass of the reactants is equal to the mass of the products.



## Word equations

The word equation for the above change is:



Some signs of a chemical reaction include:

- colour change
- gas produced
- solid formed from solution
- energy change.

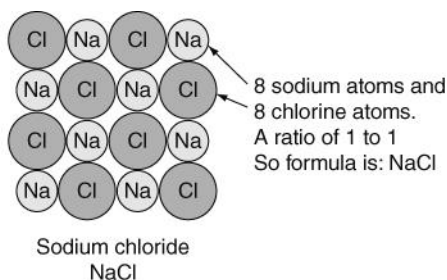
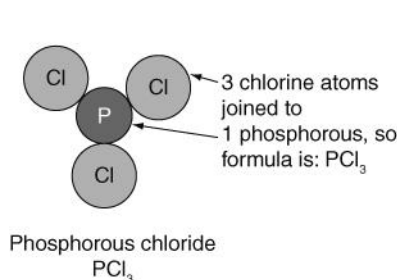
## Elements and their symbols

The **symbols** for the elements used today have been agreed by scientists in all countries. They are either a single or double letter. The first letter is always a capital letter.

**Examples:**

nitrogen = **N**    lithium = **Li**  
sulfur = **S**        copper = **Cu**  
chlorine = **Cl**    iron = **Fe**

## Formulae



The **chemical formula** of a substance tells you the number of atoms of each element that are joined in its molecules, or the ratio of atoms of each element in the compound.

## Metals and non-metals

The common **properties** of most **metals** are:

- high melting points
- solids at room temperature
- strong and **flexible**
- malleable
- shiny (when polished)
- good **conductors of heat and electricity**.

The common properties of most **non-metals** are:

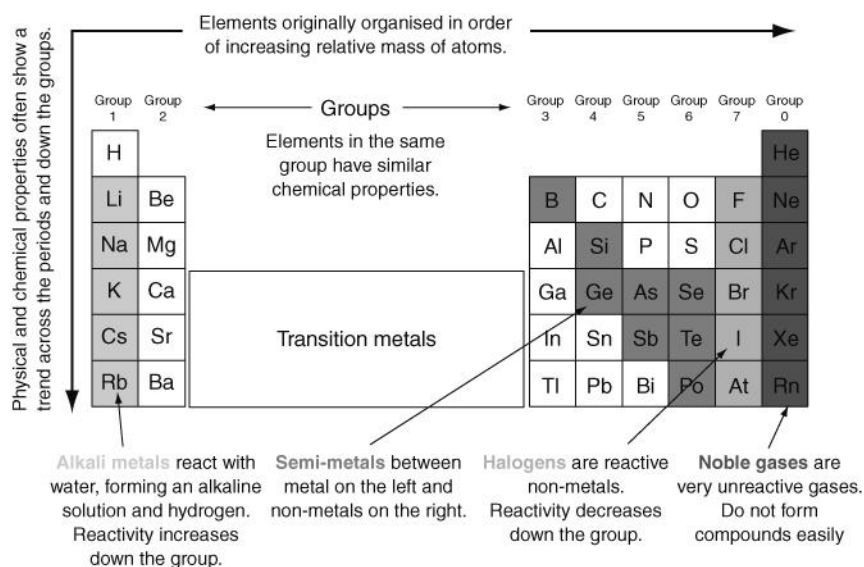
- low melting point
- **brittle**(when solid)
- not shiny
- poor conductors of heat and electricity.

The properties of a substance are what it looks like or what it does. There are two types of properties:

- **chemical properties** (e.g. flammability, pH, reaction with acid)
- **physical properties** (e.g. melting point, boiling point, density).

## The periodic table

The **periodic table** arranges the elements so that elements with similar properties are in the same vertical **group**. The periodic table also allows us to spot trends and patterns.



## Metal and non-metal oxides

Many elements burn in air/oxygen to form oxides; e.g.:

- calcium + oxygen → calcium oxide
- carbon + oxygen → carbon dioxide
- metal oxides tend to form alkaline solutions.
- non-metal oxides tend to form acidic solutions.

## Changes of state

