



1) Conservation of Mass

The law of conservation of mass states that no atoms are lost or made during a chemical reaction. The **mass of all the products in a reaction is the same as the mass of all the reactants.**

Reactants – what react together in a reaction

Products – what is made in a reaction

For example:



2) Relative Atomic Mass (A_r)

The mass of an atom is very small and so to make the numbers easier to use, we compare the actual mass of an atom to something else – this is known as the relative atomic mass (A_r). You can find the A_r of an atom using the periodic table. For example, the A_r of calcium is 40.

40
Ca
calcium
20

It is the **massive** number out of the two.

Relative Formula Mass (M_r)

Relative formula mass (M_r) is the **mass of a substance or a compound**. It is found by adding together the relative atomic masses (A_r) of each element in the compound.

E.g. what is the M_r of magnesium chloride, MgCl_2 ? Remember there are two atoms of Cl in MgCl_2 .

1. Find the A_r of each element present:

$$A_r \text{ of Mg} = 24 \qquad A_r \text{ of Cl} = 35.5$$

2. Add up all the A_r of the atoms in the compound:

$$\text{Mg} + (2 \times \text{Cl}) = 24 + (2 \times 35.5) = 95$$

4) Percentage Mass

You can also calculate the **percentage mass of an element in a compound** using the formula:

$$\frac{A_r \text{ of the element} \times \text{no. of atoms of that element}}{M_r \text{ of the compound}} \times 100$$

E.g. find the percentage mass of sodium (Na) in sodium bromide (NaBr).

$$A_r \text{ of Na} = 23 \qquad A_r \text{ of Br} = 80$$

$$M_r \text{ of NaBr} = 23 + 80 = 103$$

$$\% \text{ mass} = \frac{23 \times 1}{103} \times 100 = \underline{22\%}$$

5) Precipitation

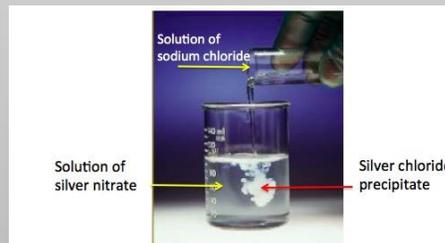
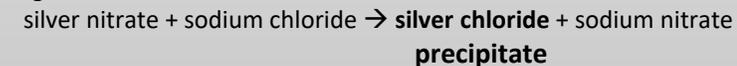
A precipitation reaction is one where a precipitate is formed. A precipitate is an **insoluble product (solid)** that forms when two solutions are mixed and react together.

Soluble – dissolves in the solvent

Insoluble – doesn't dissolve in the solvent

A **salt** is an compound formed from the reaction of an acid with a base. There are two types of salts, soluble and insoluble salts. Insoluble salts are formed by precipitation reactions.

E.g.



6) Composites

A composite material is a **mixture of two or more materials with different properties**. They are combined to produce a material with improved properties. Properties change depending on how much of each material you have in the composite.

Examples of composite materials include reinforced concrete, fiberglass, chipboard and teeth fillings.

7) Polymers

Polymers are very **long molecules made up of lots of smaller molecules** (called monomers) joined together.

Examples of polymers include plastics, rubbers and gels.

Different polymers have **different properties**, depending on the monomers they are made from. This means that different polymers have different uses.

8) Formulations

Formulations are **useful mixtures that have been designed for a particular use**. They are made by following a 'formula' (a recipe). Each part of the formulation is mixed carefully in the correct quantities to ensure it does its job correctly.

Formulations are used in everyday life, e.g. fuels, cleaning products, paints, medicines, fertilisers and even food and drink.

9) Investigation Keywords

- **Independent** variable – what you **change**
- **Dependent** variable – what you **measure**
- **Control** variables – what you **keep the same**