Chemical Reactions and Equations - Introduction

Contents

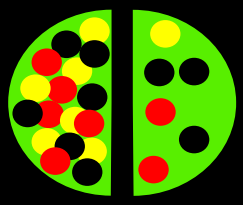
1. Changes in Life

When a change occurs, the initial identity and nature of a substance is not the same anymore.

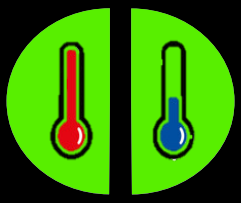
1.1 Types of Changes

Physical Changes	Chemical Changes
1. No effects on chemical bonds	1. Direct effect on chemical bonds
2. No new substances are formed	2. One or more new substances are formed

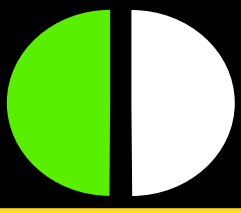
1.2 Characteristics of Chemical Reactions



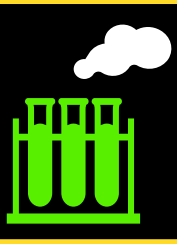
Change in State



Change in Temperature



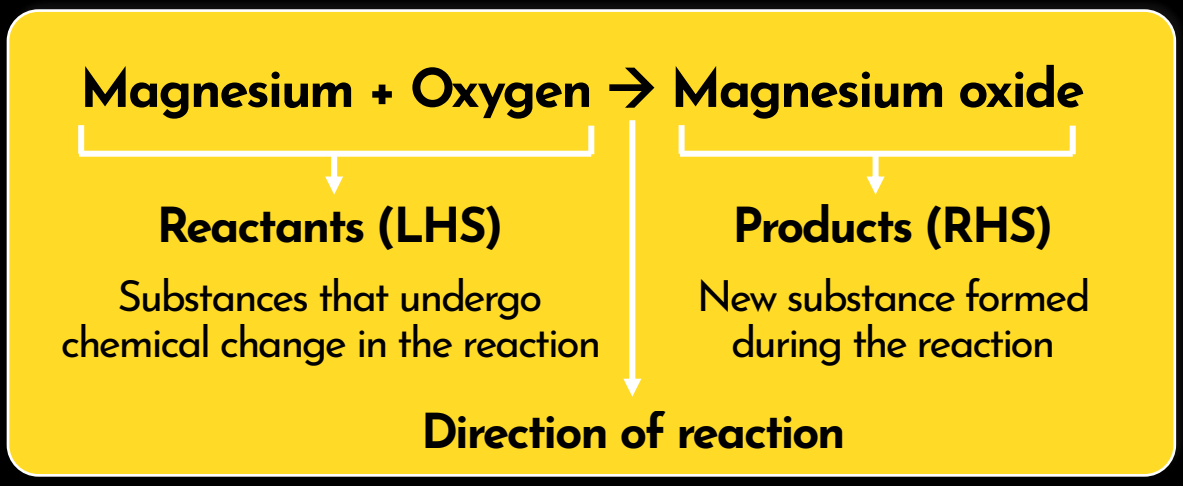
Change in Colour



Evolution of Gas

2. Chemical Equations

Chemical equations are a shorter and simpler way of depicting a chemical reaction.



2.1 Types of Chemical Equations

2.1.1 Word Equations

Magnesium + Oxygen → Magnesium oxide

2.1.2 Equation using Chemical Formulae

$Mg + O_2 \rightarrow MgO$

2.1.3 Unbalanced/ Skeletal Equations

Variation in atoms of each element on both sides of the equation

$Mg + O_2 \rightarrow MgO$

2.1.4 Balanced Equations

Same number of atoms of each element on both sides of the equation

$2Mg + O_2 \rightarrow 2MgO$

2.2 Conditions

Additional conditions mentioned above or below arrow mark include:

- Conditions (like temperature, atmospheric pressure, etc) required for a reaction to take place
- Substances other than reactants which facilitate the reaction but do not undergo any permanent changes themselves (like catalysts)

Conditions for reaction

$$6CO_2 + 12H_2O \xrightarrow[Sunlight]{Chlorophyll} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Photosynthesis

2.3 Notations

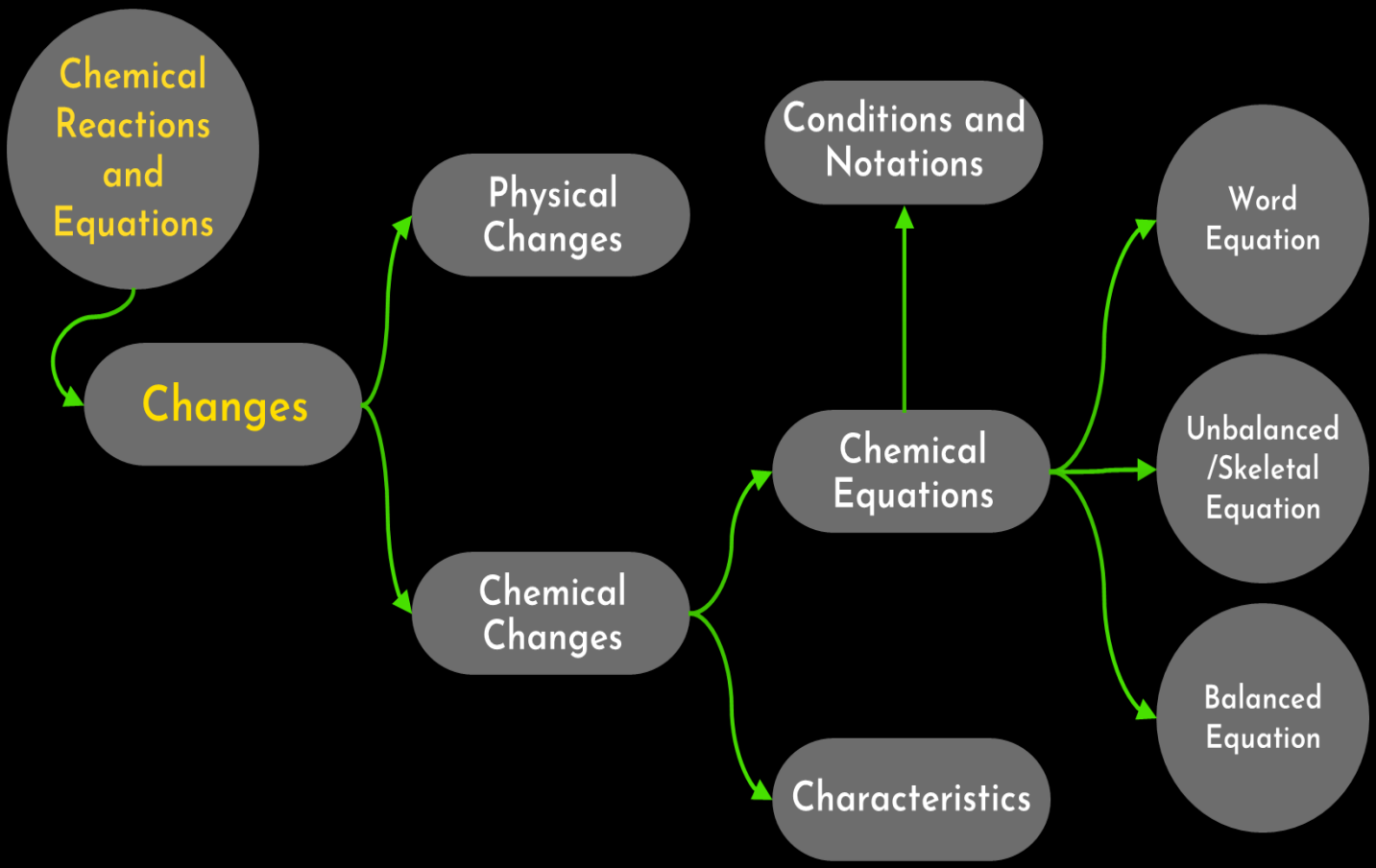
The states of the reactants and products involved in a reaction are mentioned within brackets after the chemical formulae of each element/compound.

Photosynthesis

$$6CO_2(g) + 12H_2O\ (l) \xrightarrow[Sunlight]{Chlorophyll} C_6H_{12}O_6\ (aq) + 6O_2\ (aq) + 6H_2O\ (l)$$

Symbols of physical states (Notations)

$$2Mg\ (s) + O_2\ (g) \rightarrow 2MgO\ (s)$$


Chemical Reactions and Equations
Changes
Physical Changes
Chemical Changes
Conditions and Notations
Chemical Equations
Characteristics
Word Equation
Unbalanced /Skeletal Equation
Balanced Equation