

CBSE Class 10 Science Chapter 1: Chemical Reactions and Equations – Detailed Notes

🔍 Chapter Overview

This chapter introduces the concept of **chemical reactions**, how to write **chemical equations**, and how to balance them. It also covers different types of reactions such as combination, decomposition, displacement, double displacement, and redox reactions with real-life examples.

★ Important Topics Covered:

1. Chemical Reactions
 2. Chemical Equations
 3. Balancing Chemical Equations
 4. Types of Chemical Reactions
 5. Effects of Oxidation in Everyday Life
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1 📖 What is a Chemical Reaction?

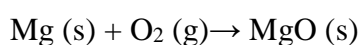
A **chemical reaction** is a process in which one or more substances (reactants) convert into one or more new substances (products) with different chemical properties.

✓ Characteristics of Chemical Reactions:

- Change in state (solid, liquid, gas)
- Change in color
- Evolution of gas
- Change in temperature (heat is absorbed or released)
- Formation of precipitate

★ Example:

When magnesium ribbon is burnt in air:



Observation: Bright white flame and white ash (magnesium oxide) formed.

2 What is a Chemical Equation?

A **chemical equation** is a symbolic representation of a chemical reaction using chemical formulas.

◆ Word Equation:

Magnesium + Oxygen \rightarrow Magnesium oxide

◆ Skeletal Equation:

$\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$

3 Balancing Chemical Equations

To follow the **Law of Conservation of Mass**, the number of atoms of each element must be equal on both sides.

✂ Steps to Balance:

1. Write the skeletal equation.
2. Balance the atoms one by one.
3. Check for atom count and verify.

✓ Example:

Unbalanced:

$\text{Fe} + \text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + \text{H}_2$

Balanced:

$3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$

4 Types of Chemical Reactions

A. Combination Reaction

Two or more substances combine to form a single product.

Example:

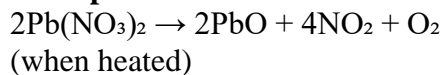
$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$ (slaked lime)

☞ Exothermic reaction (releases heat)

B. Decomposition Reaction

A single compound breaks into two or more simpler substances.

Example:

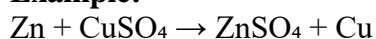


☞ This is also a **thermal decomposition** reaction.

C. Displacement Reaction

A more reactive element displaces a less reactive element from a compound.

Example:

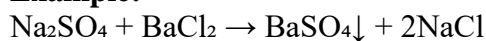


Zinc displaces copper from copper sulfate solution.

D. Double Displacement Reaction

Exchange of ions between two compounds to form two new compounds.

Example:



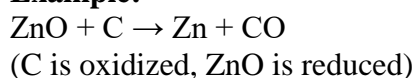
☞ A white precipitate of barium sulfate is formed.

E. Redox Reactions

Reactions where **oxidation** and **reduction** take place simultaneously.

- **Oxidation:** Gain of oxygen or loss of electrons/hydrogen
- **Reduction:** Loss of oxygen or gain of electrons/hydrogen

Example:



5 Effects of Oxidation in Daily Life

1. Corrosion

- Iron reacts with moisture and air to form rust ($\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$).
- Damages buildings, bridges, vehicles.

2. Rancidity

- Oxidation of fats and oils in food results in bad smell and taste.
- Prevented by storing food in airtight containers or adding antioxidants.

Key Definitions

Term	Definition
Reactants	Substances that undergo chemical change
Products	New substances formed
Oxidation	Addition of oxygen or removal of hydrogen
Reduction	Removal of oxygen or addition of hydrogen
Precipitate	An insoluble solid formed during a reaction

✦✦ Important Equations to Remember

Reaction Type	Example
Combination	$\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
Decomposition	$2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
Displacement	$\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
Double Displacement	$\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl}\downarrow + \text{NaNO}_3$
Redox	$\text{Zn} + \text{CuO} \rightarrow \text{ZnO} + \text{Cu}$