

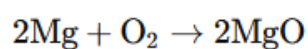


Class 10 Science: Chapter 1 – Chemical Reactions and Equations (Revision Notes)

1. Chemical Reactions

- **Definition:** A chemical reaction involves the transformation of one or more substances into new substances.
- **Characteristics:**
 - Change in color
 - Change in temperature
 - Formation of a precipitate
 - Gas evolution
 - Change in state

Example: When magnesium is burned in air, it reacts with oxygen to form magnesium oxide:



Practice Question:

- Write the observation when iron reacts with sulfuric acid. Identify the type of reaction.
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2. Chemical Equations

- **Definition:** A representation of a chemical reaction using symbols and formulas.
- **Types of Chemical Reactions:**
 - **Combination Reaction:** Two or more reactants combine to form a single product.
 - Example: $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
 - **Decomposition Reaction:** A single compound breaks down into two or more products.
 - Example: $2\text{HgO} \rightarrow 2\text{Hg} + \text{O}_2$
 - **Displacement Reaction:** One element displaces another in a compound.
 - Example: $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
 - **Double Displacement Reaction:** Exchange of ions between two compounds.
 - Example: $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$

Practice Question:

- Classify the following reactions:
 $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$
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3. Balancing Chemical Equations

- **Law of Conservation of Mass:** Mass can neither be created nor destroyed in a chemical reaction. Therefore, the number of atoms of each element must be the same on both sides of the equation.

Steps to Balance:

1. Write the unbalanced equation.
2. Balance atoms of each element.
3. Balance oxygen and hydrogen last.
4. Ensure equal number of atoms on both sides.

Example: Unbalanced: $\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$

Balanced: $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$

Practice Question:

- Balance the equation:
 $\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3$
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4. Types of Chemical Reactions

- **Oxidation:** Addition of oxygen or removal of hydrogen.
 - **Example:** $\text{Cu} + \text{O}_2 \rightarrow \text{CuO}$
- **Reduction:** Removal of oxygen or addition of hydrogen.
 - **Example:** $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$

Oxidation-Reduction (Redox) Reactions:

- **Example:**
 $\text{ZnO} + \text{C} \rightarrow \text{Zn} + \text{CO}$
Here, ZnO is reduced, and carbon is oxidized.

Practice Question:

- Identify the oxidizing and reducing agents in the reaction:
 $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$
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5. Effects of Oxidation

- **Corrosion:** The slow destruction of metals due to oxidation, e.g., rusting of iron.
- **Rancidity:** Oxidation of fats and oils, making food smell and taste bad.

Practice Question:

- Explain how corrosion can be prevented.
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