

Chapter 5: Language of Chemistry

1. Symbols of Elements

- Every element is represented by a unique chemical symbol, usually derived from its **English** or **Latin** name.
- Example:
 - **Hydrogen (H), Oxygen (O), Carbon (C), Sodium (Na)** (from *Natrium*).

2. Formulae of Compounds

- Chemical formulas represent **the composition of a compound** using element symbols and their ratios.
- Example:
 - **Water (H₂O)** → 2 Hydrogen atoms + 1 Oxygen atom
 - **Carbon dioxide (CO₂)** → 1 Carbon atom + 2 Oxygen atoms
 - **Sodium chloride (NaCl)** → 1 Sodium atom + 1 Chlorine atom

3. Chemical Equations (From Word Equations)

- A **word equation** describes a reaction in words:
 - *Hydrogen + Oxygen → Water*
- A **chemical equation** uses symbols and formulas:
 - $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

4. Law of Conservation of Mass

- **Statement:** "Mass can neither be created nor destroyed in a chemical reaction."
- **Example:** Decomposition of calcium carbonate:



- Mass of reactants = Mass of products

5. Balancing Simple Equations

- The **law of conservation of mass** requires that **atoms on both sides of the equation be equal**.
- Example (Balancing): **$\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$ (Unbalanced)**



6. Information Gathered from a Chemical Equation

- **Reactants and products** involved.
- **Number of atoms/molecules** of each substance.
- **Proportion of reactants and products** (stoichiometry).

7. Limitations of a Chemical Equation

A chemical equation does not provide:

- **Catalysts** used in the reaction.
- **Reaction conditions** (temperature, pressure, light, etc.).
- **Physical states** (solid, liquid, gas, aqueous).
- **Nature of reaction** (exothermic/endothermic, reversible/irreversible).

Example (Complete Equation with Conditions):

