

# Chapter 1. Chemical Reactions and Equations

- A chemical equation is a statement or representation that describes a chemical reaction in terms of symbol and formulae.
- A chemical reaction is the transformation of chemical substance called reactants into another chemical substance called products. In a chemical reaction, only rearrangement of atoms takes place.
- The substances which take part in a chemical reaction are called reactants. The reactants are written on the left hand side. The new substances produced as a result of chemical reaction are called products. The products are written on the right hand side.

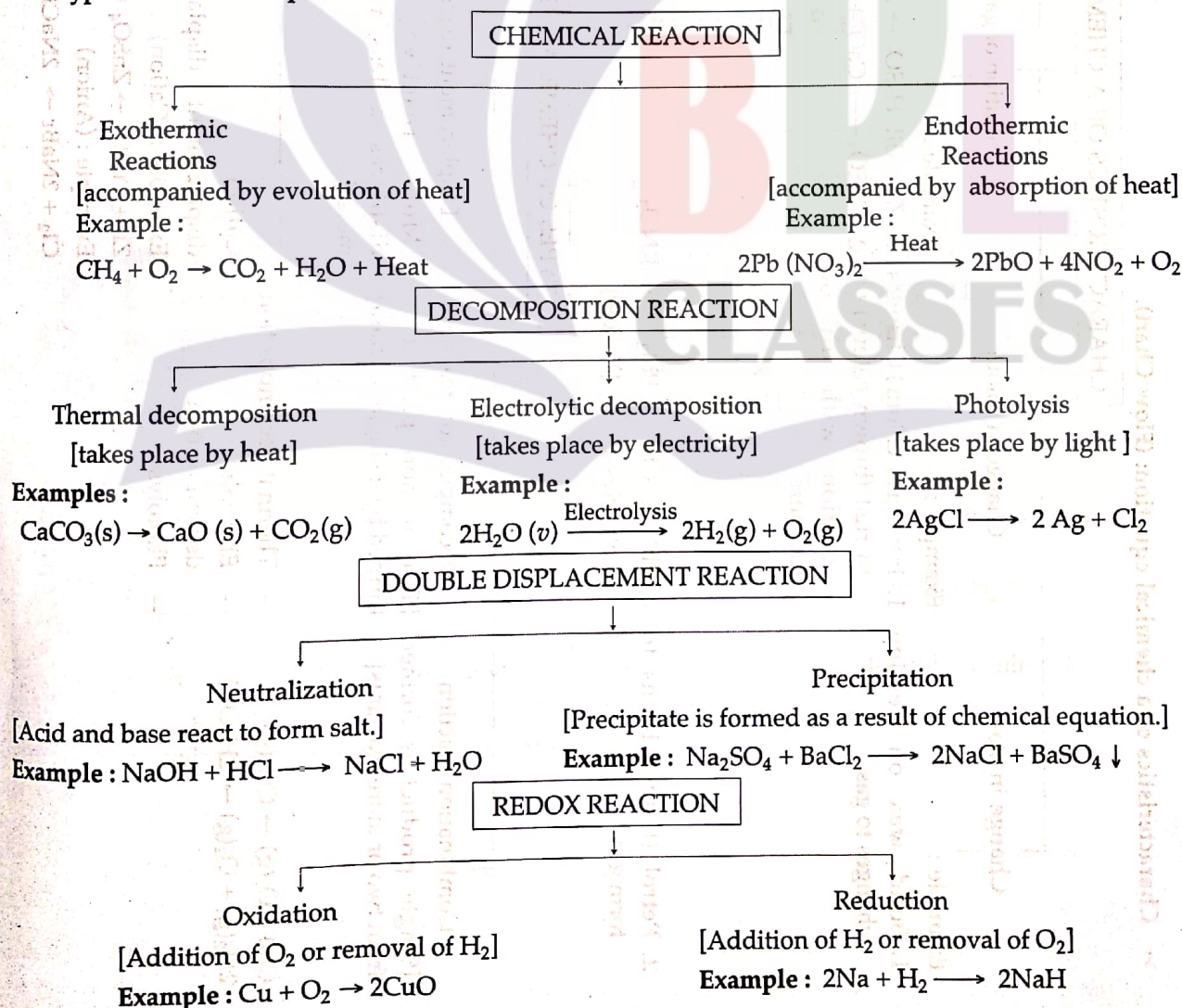
## ➤ Some of the symbols used in a chemical Equation are :

- |                                   |  |
|-----------------------------------|--|
| (a) Solids (s)                    | (b) Liquids (l)                            |
| (c) Gases (g)                     | (d) Aqueous solutions (aq)                 |
| (e) Gas released as a product (↑) | (f) Precipitate formed in the reaction (↓) |
| (g) Direction of reaction (→)     |  |

## ➤ Steps to balance a chemical equation :

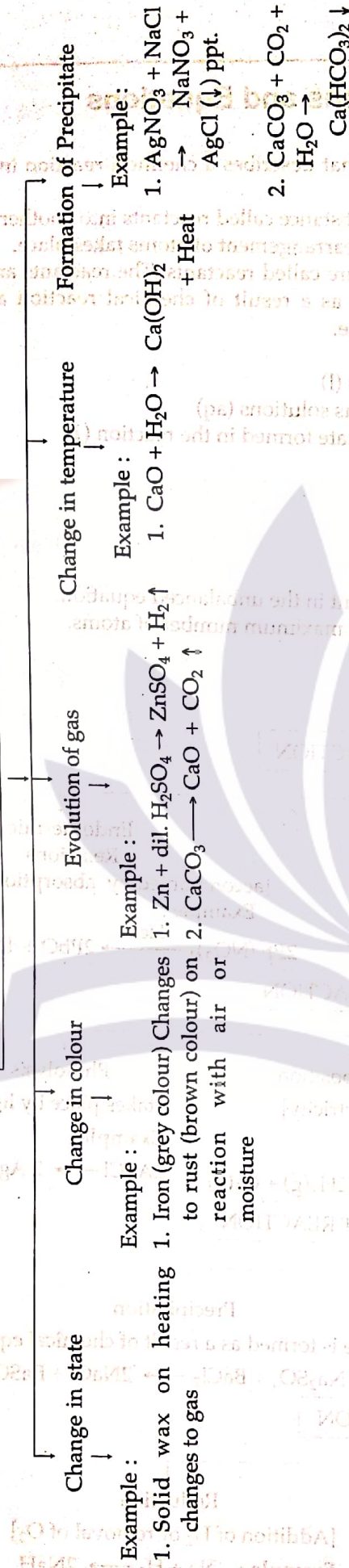
- Write word equation.
- Then write skeletal chemical equation.
- Enclose the formula in the boxes.
- List the number of atoms of different elements present in the unbalanced equation.
- Start balancing with the compound that contains the maximum number of atoms.
- Start balancing other atoms.
- Check the correctness of the balanced equation.

## ➤ Types of chemical equations :

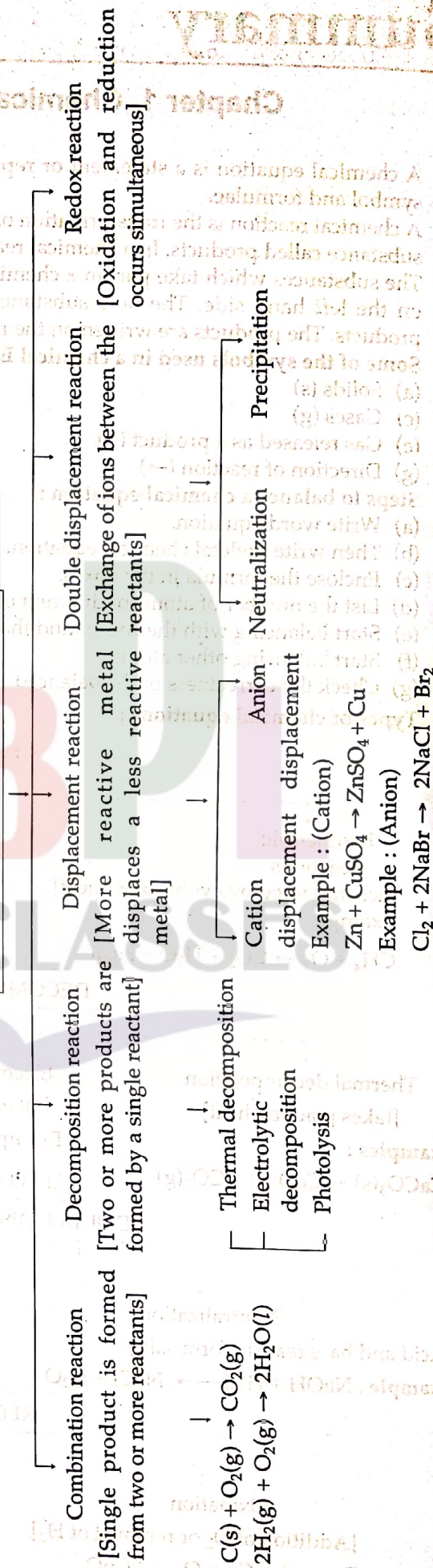


## > Characteristics of a chemical equation: (Flow Chart).

### CHARACTERISTICS OF A CHEMICAL EQUATION

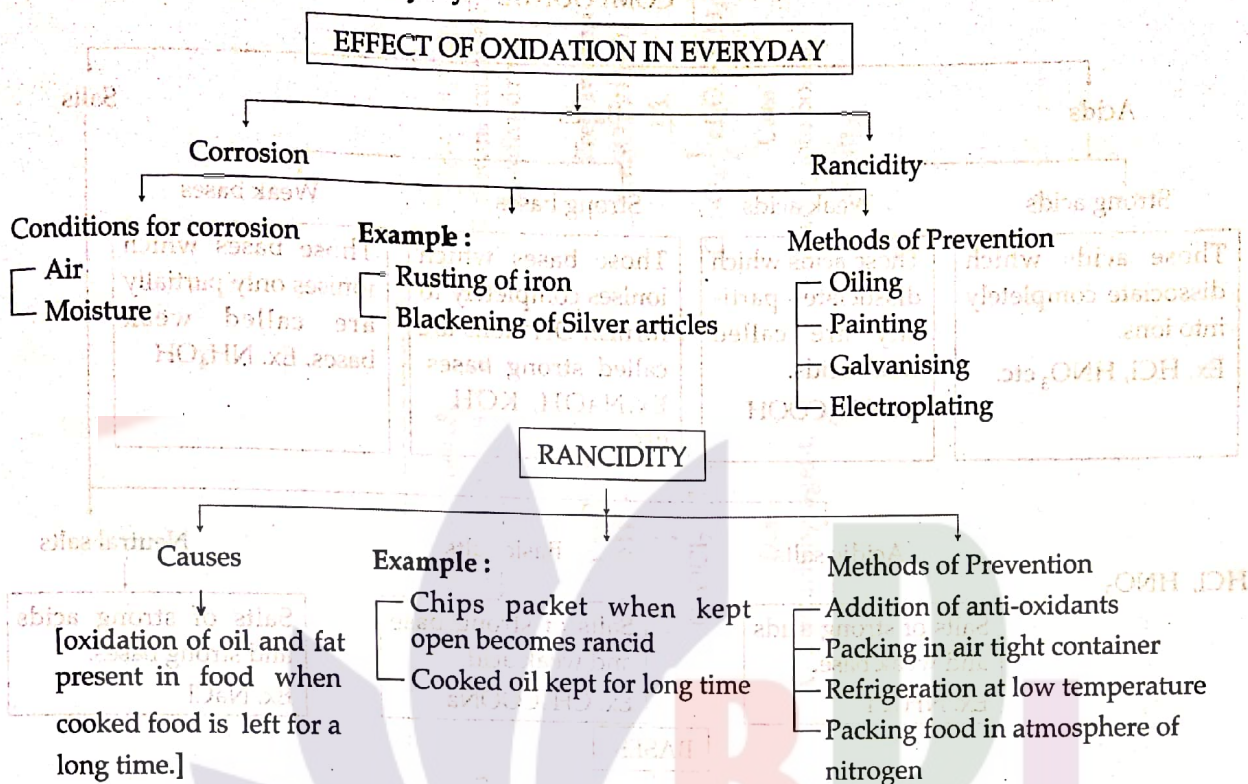


### TYPES OF CHEMICAL REACTIONS

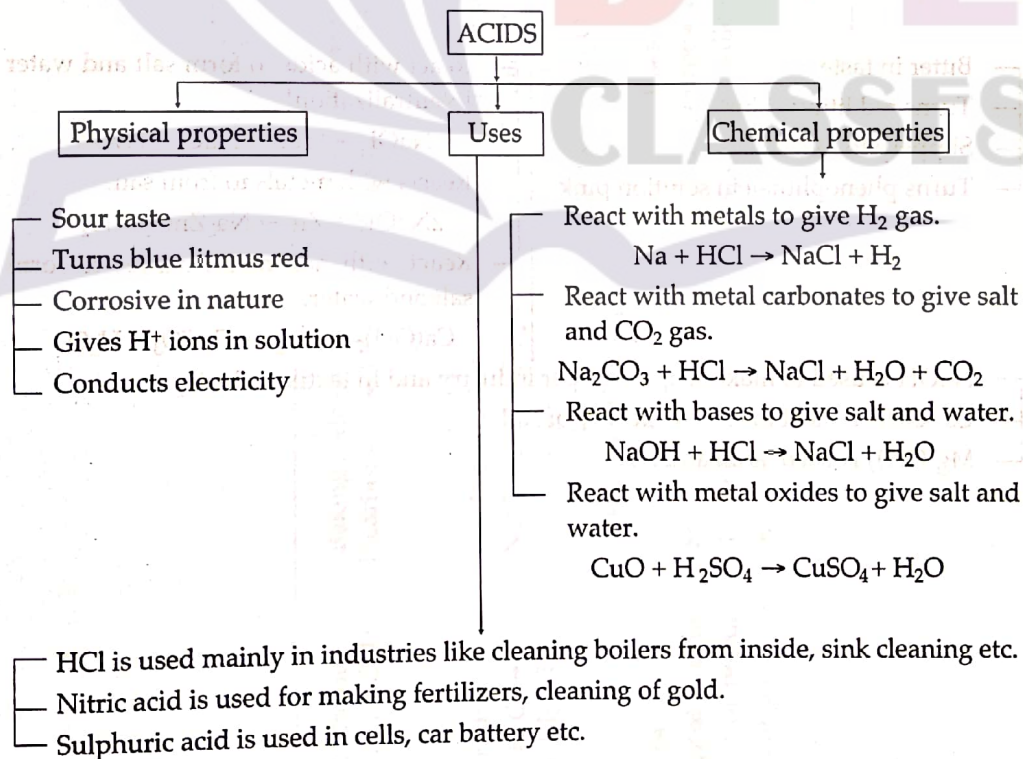




## 8. Effects of oxidation in everyday life.



## Chapter 2. Acids, Bases and Salts



# COMPOUNDS

## Acids

### Strong acids

Those acids which dissociate completely into ions.

Ex.  $\text{HCl}$ ,  $\text{HNO}_3$  etc.

### Weak acids

Those acids which dissociates partially are called weak acids.

Ex.  $\text{CH}_3\text{COOH}$

## Bases

### Strong bases

Those bases which ionises completely to furnish  $\text{OH}^-$  ions are called strong bases.

Ex.  $\text{NaOH}$ ,  $\text{KOH}$  etc.

### Weak bases

Those bases which ionises only partially are called weak bases.

Ex.  $\text{NH}_4\text{OH}$

## Salts

### Acidic salts

Salts of strong acids and weak base.

Ex.  $\text{NH}_4\text{Cl}$

### Basic salts

Salts of strong base and weak acid.

Ex.  $\text{CH}_3\text{COONa}$

### Neutral salts

Salts of strong acids and strong bases.

Ex.  $\text{NaCl}$

$\text{HCl}$ ,  $\text{HNO}_3$

## BASES

### Physical properties

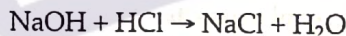
- Bitter in taste
- Turns red litmus blue
- Slippery to touch
- Turns phenolphthalein solution pink

### Uses

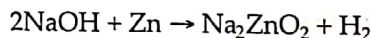
- $\text{NaOH}$  is used to make soaps in paper industry and in textile industry.
- $\text{Ca}(\text{OH})_2$  is used to remove acidity of soil.
- $\text{Mg}(\text{OH})_2$  is used as an antacid.

### Chemical properties

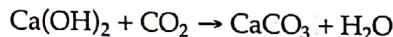
React with acids to form salt and water  
[Neutralization]



Reacts with metals to form salt.

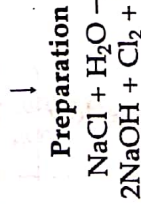


React with non-metal oxides to form salt and water.



# SALTS

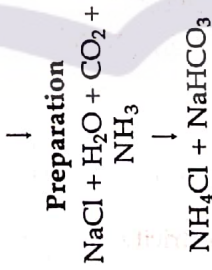
Sodium Hydroxide  
caustic soda (NaOH)



## Uses

- Metallurgy of bauxite
- Distillation of petrol
- Formation of soil

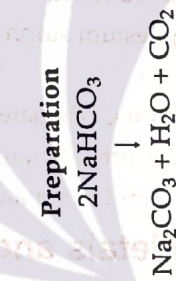
Baking soda sodium  
bicarbonate  $\text{NaHCO}_3$



## Uses

- Food industry
- Bakery
- Antacid

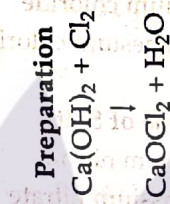
Washing soda sodium  
carbonate  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$



## Uses

- Washing purposes
- Paper and textile industry

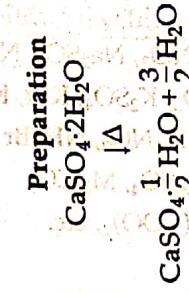
Calcium oxychloride  
Bleaching powder  $\text{CaOCl}_2$



## Uses

- As a bleaching agent

Plaster of paris  
Calcium sulphate  
hemihydrate



## Uses

- Used to join bones
- Indentistry



## Families of Salts

Sodium Salts	—	$\text{NaCl}$ , $\text{NaNO}_3$ , $\text{Na}_2\text{SO}_4$ , $\text{Na}_2\text{CO}_3$ , $\text{CH}_3\text{COONa}$ etc.
Potassium Salts	—	$\text{KCl}$ , $\text{KNO}_3$ , $\text{K}_2\text{SO}_4$ , $\text{KBr}$ , $\text{K}_2\text{CO}_3$
Ammonium Salts	—	$\text{NH}_4\text{Cl}$ , $\text{NH}_4\text{NO}_3$ , $\text{NH}_4\text{Br}$
Magnesium Salts	—	$\text{MgCl}_2$ , $\text{MgSO}_4$ , $\text{MgCO}_3$
Calcium Salts	—	$\text{CaCl}_2$ , $\text{Ca}(\text{COO})_2$ , etc.

## Chloride Salts

Formula	Name of Salt	Base involved
$\text{NaCl}$	Sodium chloride	$\text{NaOH}$
$\text{KCl}$	Potassium chloride	$\text{KOH}$
$\text{NH}_4\text{Cl}$	Ammonium chloride	$\text{NH}_4\text{OH}$
$\text{BaCl}_2$	Barium chloride	$\text{Ba}(\text{OH})_2$
$\text{MgCl}_2$	Magnesium chloride	$\text{Mg}(\text{OH})_2$

## Nitrate Salts

Formula	Name of Salt	Base involved
$\text{NaNO}_3$	Sodium nitrate	$\text{NaOH}$
$\text{KNO}_3$	Potassium nitrate	$\text{KOH}$
$\text{Ca}(\text{NO}_3)_2$	Calcium nitrate	$\text{Ca}(\text{OH})_2$

## Sulphate Salts

$\text{Na}_2\text{SO}_4$	Sodium sulphate	$\text{NaOH}$
$\text{K}_2\text{SO}_4$	Potassium sulphate	$\text{KOH}$
$\text{MgSO}_4$	Magnesium sulphate	$\text{Mg}(\text{OH})_2$

## Carbonate Salts

$\text{Na}_2\text{CO}_3$	Sodium Carbonate	$\text{NaOH}$
$\text{K}_2\text{CO}_3$	Potassium Carbonate	$\text{KOH}$
$\text{CaCO}_3$	Calcium Carbonate	$\text{Ca}(\text{OH})_2$

## Chapter 3. Metals and Non-Metals

Elements are classified into Metals, Non-metals and Metalloids

### PHYSICAL PROPERTIES

