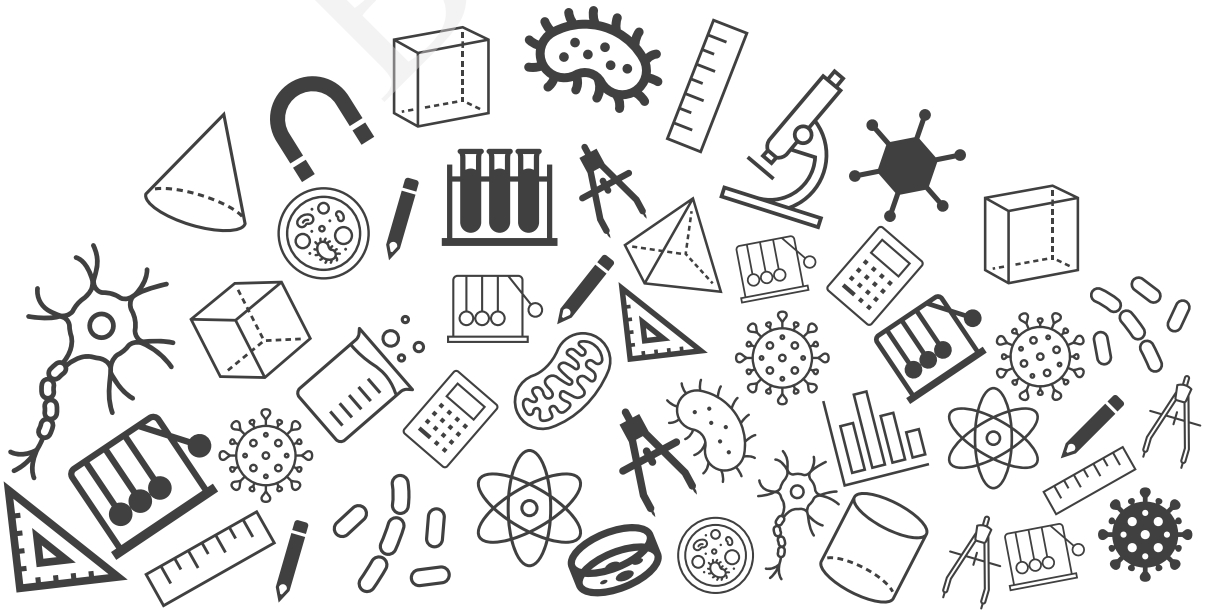
Grade 09
Science Chapter Notes



BYJU'S Classes

Chapter Notes

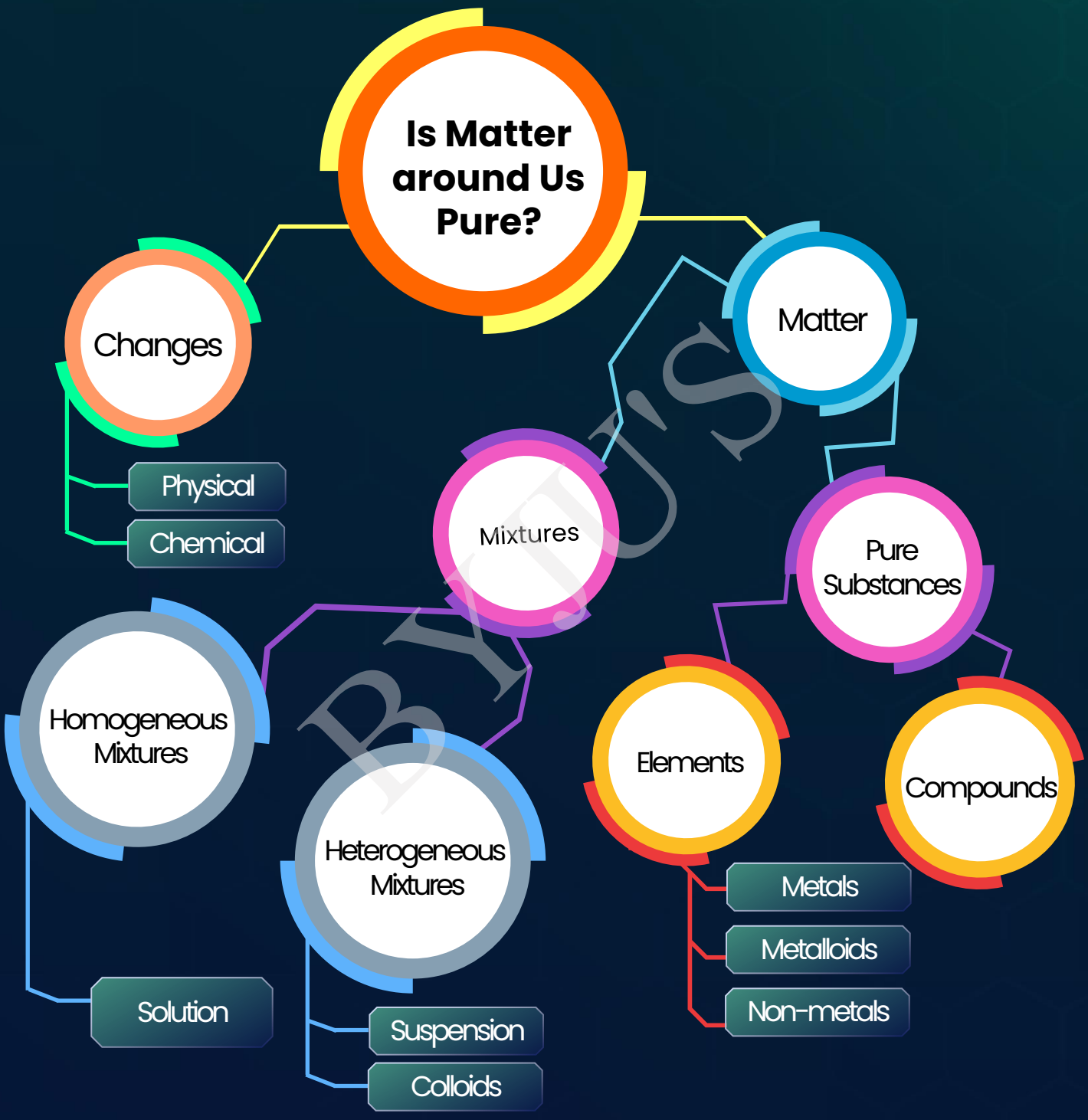
Is Matter around Us Pure?

Grade 09

Topics to Be Covered

1. Pure Substances
   - 1.1 Elements
   - 1.2 Compounds
2. Mixtures
   - 2.1 Homogeneous
     - 2.1.1 Solutions
   - 2.2 Heterogeneous
     - 2.2.1 Suspensions
     - 2.2.2 Colloids
3. 2. Changes
   - 4.1 Physical
   - 4.2 Chemical

MIND MAP



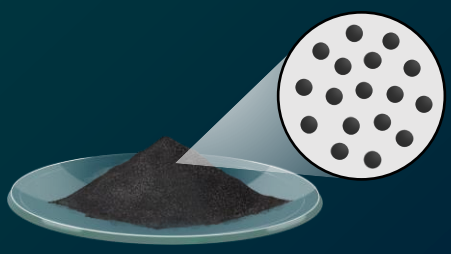
1. Pure Substances

A form of matter having an invariant chemical composition and properties that are constant throughout the sample.

Types of Pure Substances

1.1 Elements

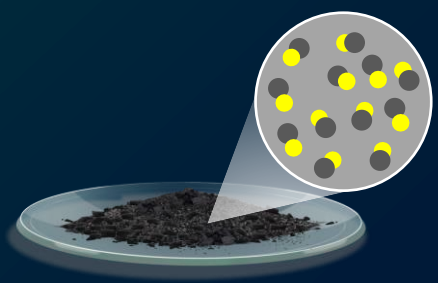
- Pure fundamental substances.
- They cannot be broken down further by chemical reactions.
- Example: Iron, sulphur, and more.



Iron

1.2 Compounds

- Substances composed of two or more elements.
- They can be broken down further by chemical reactions.
- Example: Iron sulphide, water, and more

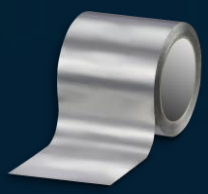


Iron sulphide

1. Pure Substances

Classification of Elements

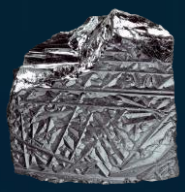
Metals



Eg: Aluminium

- Lustrous
- Malleable
- Ductile
- Sonorous
- Hard
- Good conductor

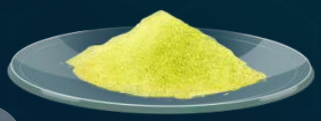
Metalloids



Eg: Silicon

Have intermediate properties between those of metals and non-metals.

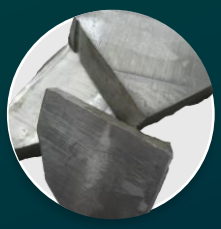
Non-metals



Eg: Sulphur

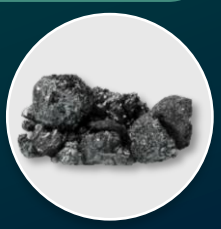
- Non-lustrous
- Non-malleable
- Non-ductile
- Non-sonorous
- Soft
- Poor conductor

Exceptions



Sodium
Soft

Mercury
Liquid at room temperature



Iodine
Lustrous

Graphite
Conductivity

2. Mixtures

Mixtures are formed by physical combination of two or more pure substances.
A mixture has a variable composition.
The constituents can be separated easily by physical methods.

Examples:

Salt water

Vegetable salad

Types of Mixtures

Homogeneous	Heterogeneous
• Such mixtures will have uniform composition.	• Such mixtures will have non-uniform composition.

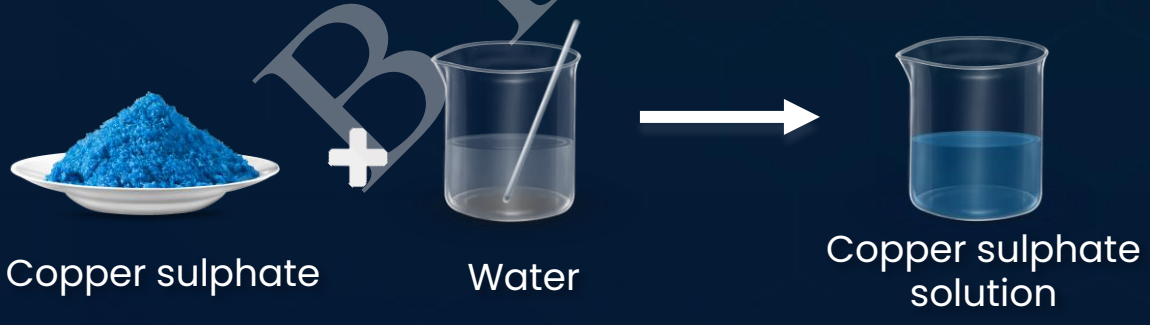
2. Mixtures

2.1 Homogeneous Mixtures

Homogeneous mixtures will have a uniform distribution of components.
Components of homogeneous mixture cannot be distinguished.

2.1.1 Solution

A solution is a homogeneous mixture of two or more components in which the constituents are not visible to the naked eye (due to very small particle size, which is less than 1 nm).



- The components of a solution include the solute (minor quantity) and the solvent (major quantity).
- The solute particles cannot be separated from the mixture by the process of filtration, and they won't settle down also.

2. Mixtures

Tyndall effect: It is the phenomenon by which the path of the light becomes visible in a mixture due to scattering of light by the particles.
Due to small particle size, solutions do not show Tyndall effect

Types of Solution

1 Saturated

At any particular temperature, a solution that has dissolved as much solute as it is capable of dissolving, is said to be a saturated solution.

2 Unsaturated

If the amount of solute contained in a solution is less than the saturation level, it is called an unsaturated solution.

3 Supersaturated

A supersaturated solution is one in which more solute is dissolved than is necessary to make a saturated solution.

Concentration of a Solution

Concentration of a solution is the amount of solute present in a given amount of solution.

Dilute

Concentrated

Depending upon the amount of solute present in a solution, we can refer it as a dilute or concentrated solution.

Dilution: The process of decreasing the concentration of a solute in a solution that is usually done by adding more solvent in it.

Ways of Expressing the Concentration of a Solution

1. Mass by mass percentage of a solution

$$= \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

2. Mass by volume percentage of a solution

$$= \frac{\text{Mass of solute}}{\text{Volume of solution}} \times 100$$

3. Volume by volume percentage of a solution

$$= \frac{\text{Volume of solute}}{\text{Volume of solution}} \times 100$$

2.2 Heterogeneous Mixtures

2.2.1 Suspension

A suspension is defined as a **heterogeneous** mixture in which the solid particles are solids are dispersed in liquids.

The particles of suspension:

- Are easily visible and distinguishable.
- Can be separated by filtration.
- Settle down when left undisturbed.

Suspensions in our daily life

Sand in water

Tea leaves in water

Chalk powder in water

2.2.2 Colloids

Colloids: A heterogeneous mixture in which the particles are uniformly spread throughout the solution. Hence it appears to be homogeneous.

The particles of colloids:

- Is too small to be individually seen by naked eyes.
- Are big enough to scatter a beam of light passing through it and make its path visible.
- Will not settle down when left undisturbed.

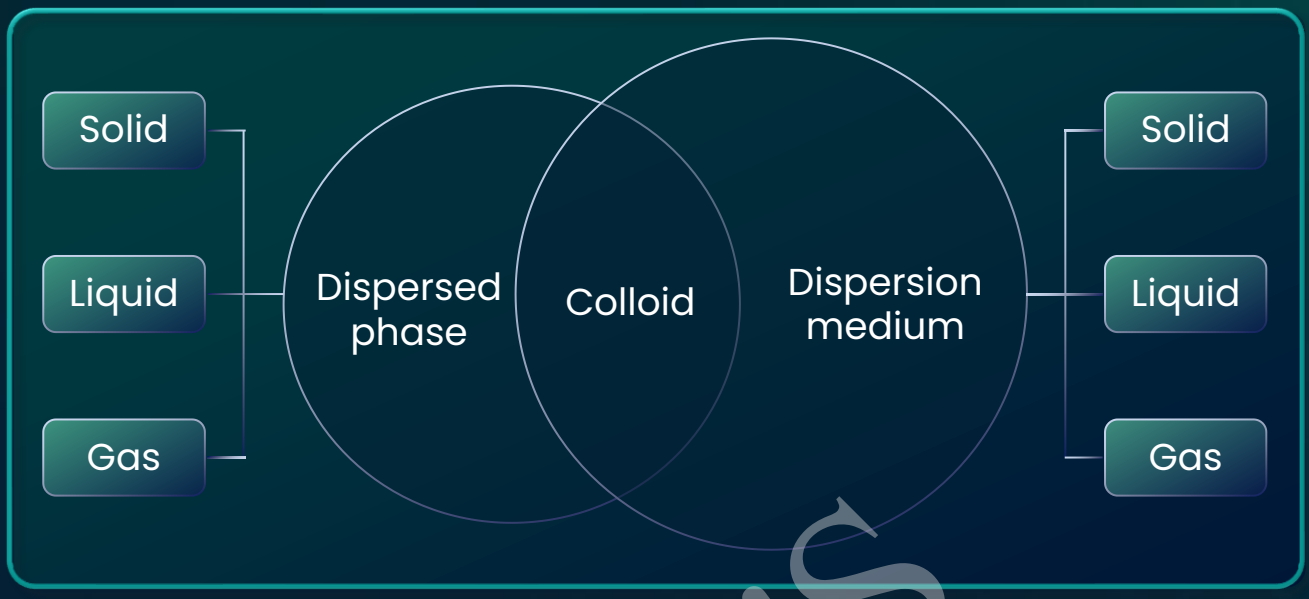
Colloids in our everyday life

Milk

Ice cream

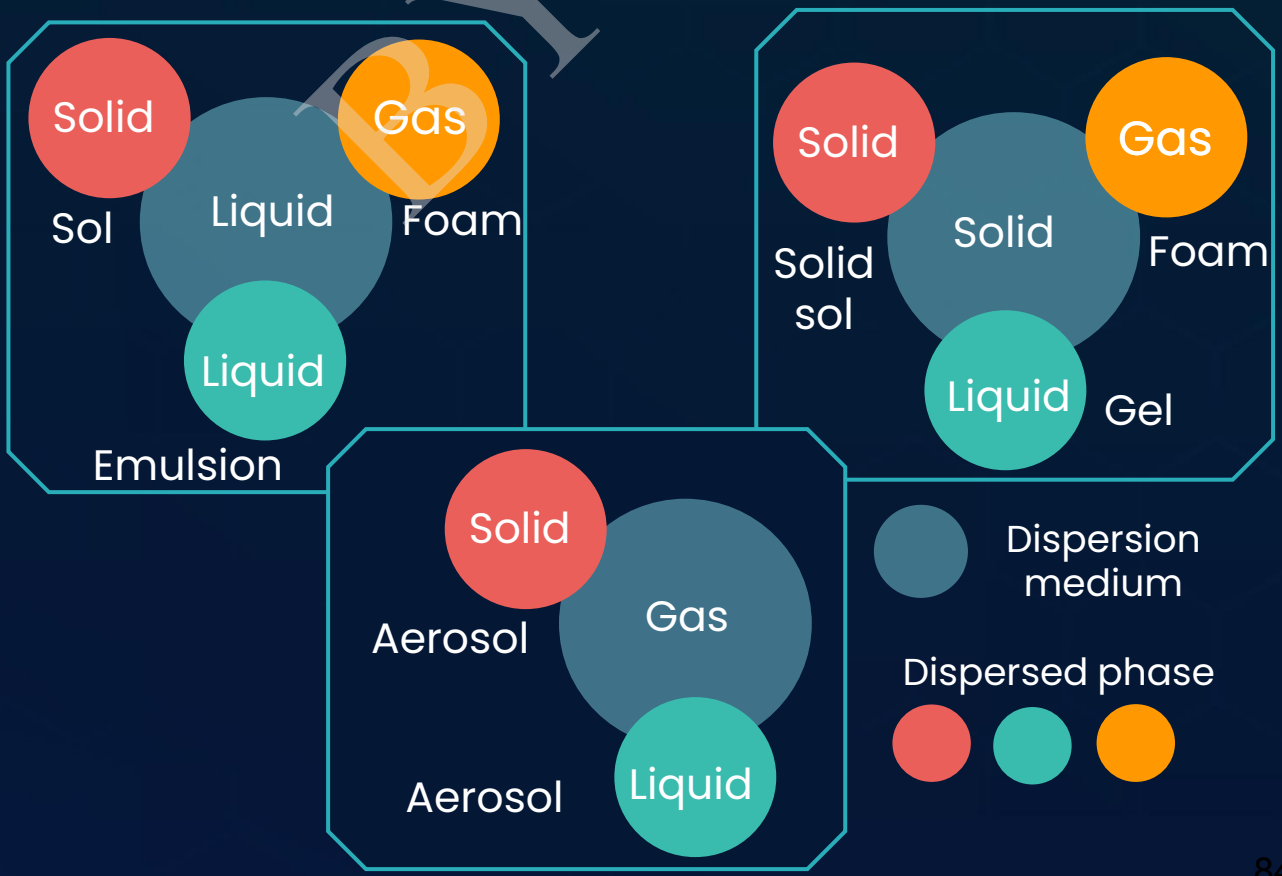
Paint

Components of a Colloid

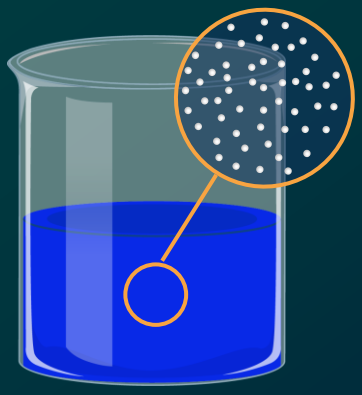
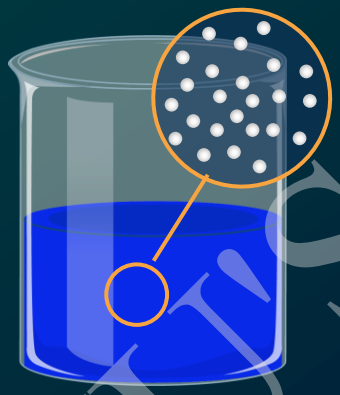
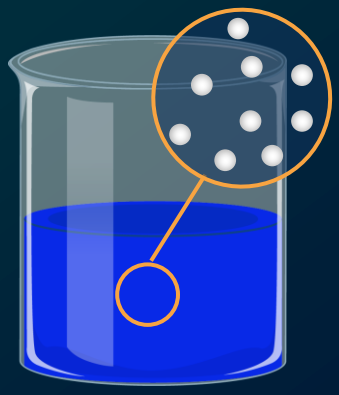


Classification of Colloids

According to the state (solid, liquid, or gas) of the dispersing medium and the dispersed phase, colloids are classified into different types.



Comparison

	Solution	Colloid	Suspension
Particle size	Less than 1 nm	Between 1-1000 nm	More than 1000 nm
			
Tyndall Effect	✗	✓	✓

3. Changes

3.1 Physical Change

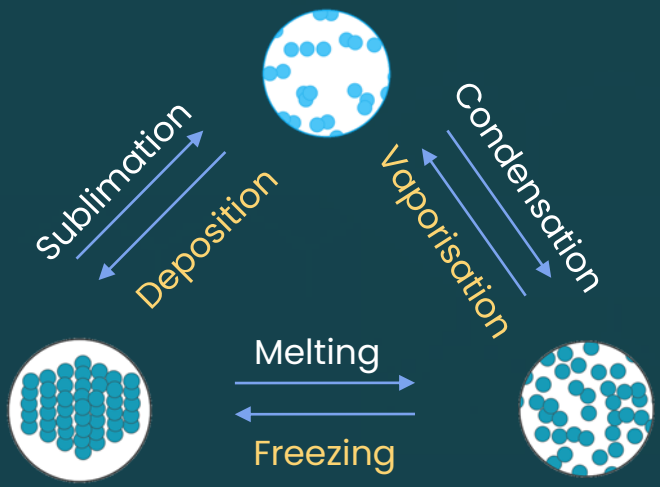
A physical change is a change in which the physical properties such as size, state, shape, appearance, and more of a substance alters without changing its chemical nature.

Mostly, physical changes tend to be reversible.

Melting ice

Tearing a paper

Interconversion of states of matter is a physical change:



3.2 Chemical Change

A chemical change is a change that brings change in the chemical properties, and we get new substances.

A chemical change is frequently harder to reverse than a physical change.

Burning of wood

Rotting of an apple

Formation of curd

During burning of a candle, both physical and chemical changes take place.

Burning wick (Chemical change)

Melting wax (Physical change)