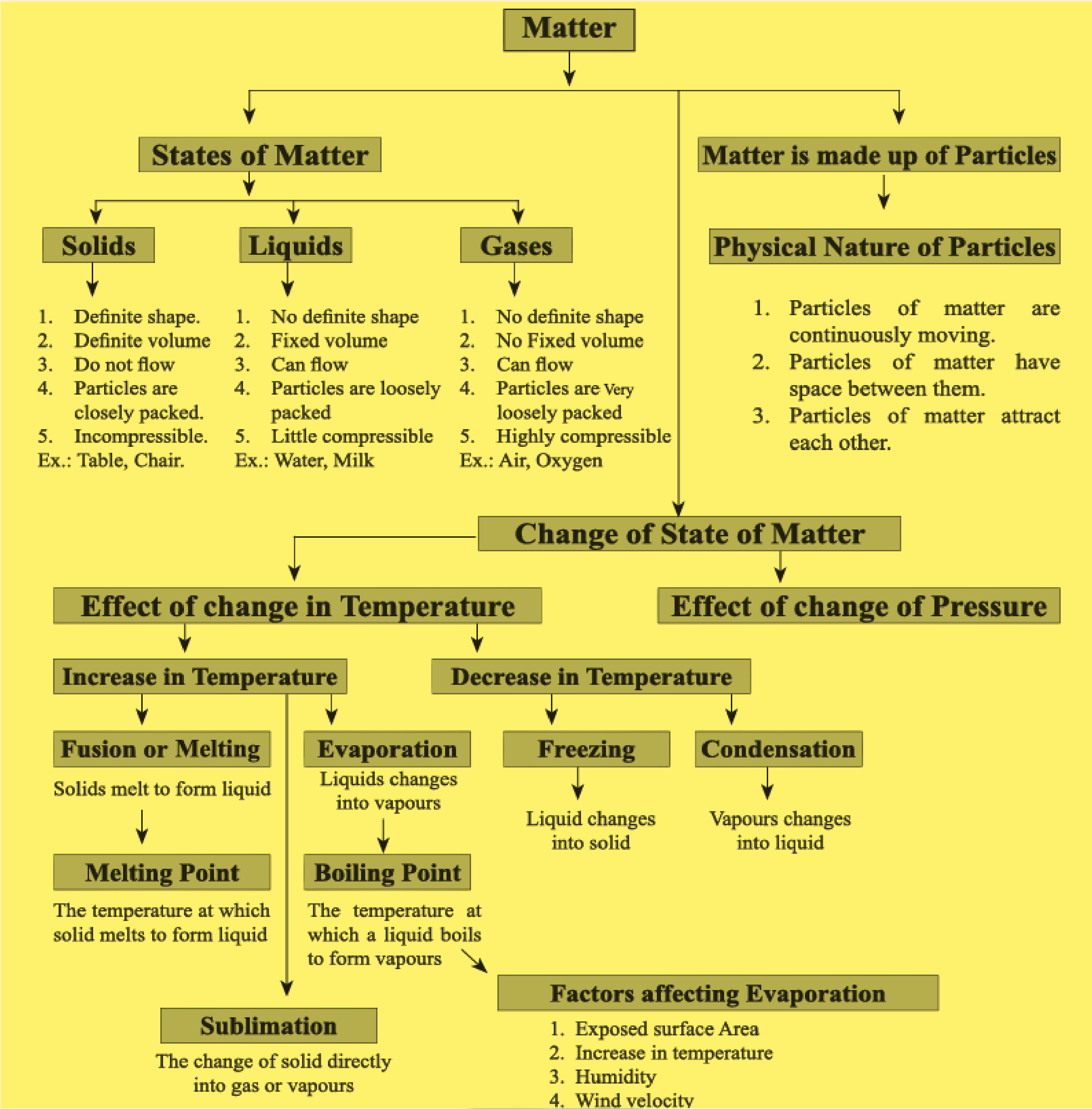
MATTER IN OUR SURROUNDINGS



1. Everything around us has different **shapes, sizes, and textures**.
2. All substances in the universe are made of **matter**.
3. Examples of matter: **Air, food, stones, clouds, stars, plants, animals, water droplets, sand particles, etc.**
4. Matter has two fundamental properties:
   a. **Mass** – The amount of substance present.
   b. **Volume** – The space occupied by a substance.

2. Historical Perspectives on Matter

- **Early Indian philosophers** classified matter into five elements, known as **Panch Tatva**:
  - **Air, Earth, Fire, Sky, Water**
- **Ancient Greek philosophers** had a similar classification system.

3. Classification of Matter

- **Modern scientists classify matter** based on two aspects:
    1. **Physical properties** (appearance, state, texture, etc.).
    2. **Chemical nature** (composition and reactivity).
- This chapter focuses on the **physical properties** of matter.

1.1 Physical Nature of Matter

1.1.1 Matter is Made Up of Particles

- Two early views about matter:
    1. **Continuous matter theory** – Matter is a single continuous entity (like a block of wood).
    2. **Particulate matter theory** – Matter is made up of tiny particles (like grains of sand).

Activity 1.1: Demonstrating that Matter is Made of Particles

Procedure:

1. *Take a **100 mL beaker**.*
2. *Fill **half the beaker with water** and mark the level.*
3. *Add some **salt or sugar** and stir with a **glass rod**.*
4. *Observe the changes in water level.*

Observations & Questions:

- *Does the level of water change?*
- *Where does the salt or sugar disappear?*
- *The salt/sugar particles spread throughout the water*

Explanation:

1. ***Water has tiny empty spaces (intermolecular spaces) between its particles.***
    - *Water molecules are not tightly packed; there are small gaps between them.*
2. ***Salt/sugar particles break down into even smaller particles.***
    - *When we stir salt/sugar, its particles separate and spread out.*
3. ***Salt/sugar particles fit into the empty spaces between water molecules.***
    - *Instead of pushing the water level up, these particles settle in the gaps.*
4. ***This process continues until the spaces are filled.***
    - *After a certain point, if more salt/sugar is added, the spaces become full, and further addition may cause the water level to rise.*

Examples of Things That Are NOT Matter:

1. ***Light** – It has energy but no mass or volume.*
2. ***Heat** – A form of energy, not a substance.*
3. ***Sound** – A wave that travels through a medium, but itself has no mass.*
4. ***Shadows** – They are just an absence of light, not a physical entity.*
5. ***Thoughts and Emotions** – These are mental processes, not physical substances.*
6. ***Electricity** – The flow of electrons (which are matter), but electricity itself is energy.*
7. ***Magnetic Fields** – They exert forces but have no physical mass.*

1.1.2 HOW SMALL ARE THE PARTICLES OF MATTER?

Activity 1.2: Dilution of Potassium Permanganate

- ***Process:***
  - *Dissolve **2–3 crystals of potassium permanganate** in **100 mL of water**.*
  - *Take **10 mL** of this solution and add it to **90 mL of clear water**.*
  - *Repeat this dilution **5 to 8 times**.*

- ***Observation:***
  - *The water remains colored, even after multiple dilutions.*
  - *This indicates that the **particles of potassium permanganate are extremely small** and can divide further into millions of tiny particles.*

1.2 Characteristics of Particles of Matter

1.2.1 PARTICLES OF MATTER HAVE SPACE BETWEEN THEM

- **Examples from Activities 1.1 & 1.2:**
  - When **salt, sugar, or Dettol** is added to water, it dissolves completely.
  - This happens because the **particles of solute** fit into the **spaces between water molecules**.
  - Similarly, when making **tea, coffee, or lemonade**, the different substances mix uniformly.

1.2.2 PARTICLES OF MATTER ARE CONTINUOUSLY MOVING

Activity 1.3: Smell of Incense Stick

- ***Process:***
  - *Place an **unlit** incense stick in a corner of the room.*
  - *Observe at what distance you can **smell it**.*
  - *Now, **light the incense stick** and check how far the smell spreads.*

- ***Observation:***
  - *The smell spreads faster when the incense stick is lit.*

Activity 1.4: Diffusion of Ink and Honey in Water

- ***Process:***
  - *Add **a drop of ink** to a beaker of water.*
  - *Add **a drop of honey** to another beaker of water.*
  - *Leave them undisturbed and observe.*

- ***Observation:***

- ***Ink spreads quickly*** *throughout the water.*
- ***Honey takes longer to mix*** *as it is thicker.*

Activity 1.5: Effect of Temperature on Diffusion

- ***Process:***
  - *Drop a* ***crystal of copper sulphate*** *or* ***potassium permanganate*** *into:*
    1. *A* ***glass of hot water***
    2. *A* ***glass of cold water***
  - *Observe how quickly the color spreads.*
- ***Observation:***
  - ***Color spreads faster in hot water*** *than in cold water.*

1.2.3 PARTICLES OF MATTER ATTRACT EACH OTHER

Activity 1.6: Human Chain Experiment

- ***Process:***
  - *Four groups of students form human chains in different ways:*
    1. ***Group 1:*** *Lock arms tightly.*
    2. ***Group 2:*** *Hold hands.*
    3. ***Group 3:*** *Touch fingertips.*
    4. ***Group 4:*** *Try to break the chains.*
- ***Observation:***
  - *The* ***third group (touching fingertips) is easiest to break****.*
  - *The* ***first group (locking arms) is hardest to break****.*

Activity 1.7: Breaking Different Materials

- ***Process:***
  - *Take an* ***iron nail, a piece of chalk, and a rubber band****.*
  - *Try* ***hammering, cutting, or stretching*** *them.*
- ***Observation:***
  - ***Iron nail is hardest to break*** *(strong attraction).*
  - ***Chalk breaks easily*** *(weaker attraction).*
  - ***Rubber band stretches*** *(medium attraction).*

Activity 1.8: Cutting the Surface of Water

- ***Process:***
  - *Try cutting the* ***surface of water*** *with your fingers.*

🔹 ***Observation:***

- *The water does **not separate completely**.*

Observing Matter Around Us

- Matter exists in **three states**: **solid, liquid, and gas**.
- These states arise due to **differences in the characteristics of particles**.

The Solid State –

Matter exists in **three states**: **solid, liquid, and gas**. These states differ due to the way **particles are arranged and behave**. Let's understand **solids** in detail.

Properties of Solids

1. **Definite Shape and Volume**
   - Solids have a **fixed shape and volume** because the particles are **tightly packed**.
   - Example: A book, a pen, or a wooden stick retains its shape no matter where you place it.
2. **Rigid and Incompressible**
   - Solids **do not change shape easily** when force is applied.
   - They are **hard to compress** because there is **very little space between particles**.
   - Example: A wooden block does not shrink when pressed.
3. **High Density and Strong Intermolecular Forces**
   - The particles in solids are **closely packed** due to **strong forces of attraction**.
   - This makes them **denser** than liquids or gases.
4. **Do Not Flow or Diffuse Easily**
   - Unlike gases and liquids, solids **do not mix or spread out on their own**.
   - Example: A lump of sugar placed in another substance remains separate.

Special Cases in Solids

🔹 **Rubber Band:**

- Can be **stretched** but returns to its original shape.
- If stretched too much, it **breaks**, meaning it still follows solid behavior.

🔹 **Salt and Sugar Crystals:**

- Take the **shape of the container** when poured.
- However, each grain of salt or sugar **remains a solid** with a fixed structure.

🔹 **Sponge:**

- Appears **compressible** because it has **tiny air holes**.
- When pressed, **air escapes**, but the material itself does not change.
- This means the sponge is still a **solid**.

1.3.2 The Liquid State –

Properties of Liquids

1. **No Fixed Shape, But Fixed Volume**
    - Liquids **do not have a definite shape** and take the shape of their container.
    - However, **their volume remains constant**, regardless of the container.
    - **Example:** Water in a glass takes the shape of the glass but remains 50 mL when poured into another container.

2.Liquids Flow Easily (Fluidity)

Unlike solids, liquids can **flow** from one place to another.

This is because the particles in liquids are **loosely packed and can slide past each other**.

Example: Water, milk, and juice flow smoothly when poured.

3.Liquids Are Almost Incompressible

- Like solids, liquids **cannot be compressed easily** because their particles are already close together.
- **Example:** Even when you press water inside a bottle, its volume doesn't reduce significantly.

4.Liquids Can Diffuse (Mix) With Other Substances

- Liquids allow **diffusion**, meaning they can mix with other liquids, solids, or gases.
- The rate of diffusion in liquids is **faster than in solids** because particles in liquids move more freely.
- **Example:**
    - **Solids in Liquids:** Sugar dissolving in water.
    - **Liquids in Liquids:** Ink mixing in water.
    - **Gases in Liquids:** Oxygen dissolving in water, allowing aquatic animals to breathe

Real-Life Importance of Diffusion in Liquids

Dissolved Oxygen for Aquatic Life

- Fish and other aquatic animals **breathe oxygen dissolved in water**.
- Without diffusion, oxygen wouldn't mix into water, making life impossible underwater.

Mixing of Beverages and Liquids

- When we mix juice concentrate in water, **diffusion** allows it to spread evenly.

- Cooking oil, however, does **not mix well** with water, showing that some liquids do not diffuse completely.

Medicines and Solutions

- Diffusion helps in **mixing medicine into blood**, ensuring the drug spreads throughout the body.

1.3.3 The Gaseous State

Introduction

Gases are one of the three fundamental states of matter, characterized by their **ability to expand, compress, and diffuse rapidly**. Unlike solids and liquids, gases do not have a **fixed shape or volume** and can **fill any container they are placed in**.

One common example is a balloon seller filling **hundreds of balloons** from a **single gas cylinder**. This shows the **high compressibility of gases**, allowing large volumes to be stored in small containers.

Properties of Gases

1. Gases Have No Fixed Shape or Volume

- Gases take **both the shape and volume of their container**.
- If gas is placed in a small bottle, it **occupies the entire space** inside it.
- If the same gas is released into a large room, it **spreads to fill the room completely**.

Gases Are Highly Compressible

- Gases can be **compressed into small cylinders** and stored under pressure.
- **Example:**
    - **Liquefied Petroleum Gas (LPG)** is compressed gas used in cooking.
    - **Compressed Natural Gas (CNG)** is used as a fuel in vehicles.
    - **Oxygen cylinders** in hospitals store compressed oxygen for patients

- **Example:** Air inside a balloon expands to fill the balloon completely.

Gases Diffuse (Mix) Very Fast

- Gas particles are in **continuous random motion** and can mix rapidly with other gases.
- **Example:**
    - The **aroma of food** spreads from the kitchen to other rooms.
    - The **fragrance of perfume** spreads quickly in a room.
    - **Smoke from burning wood** spreads in the air.

Gases Exert Pressure on Their Containers

- Gas particles move **randomly at high speeds**, colliding with each other and with the walls of the container.
- These collisions create **pressure** inside the container.

Example:

- The air inside a **football** or **balloon** exerts pressure, keeping it inflated.
- **Tyres** of vehicles remain firm due to the pressure of air inside them.

Activity-Based Observations

◆ *Activity 1.11: Compressibility of Gases vs. Liquids vs. Solids*

Materials Needed:

- *Three **100 mL syringes***
- ***Water, small pieces of chalk, and air***
- ***Rubber corks** to seal the nozzles*
- ***Vaseline** (optional, for smooth piston movement)*

- **Gases are highly compressible**, as the piston moves **easily** in the air-filled syringe.
- **Liquids are almost incompressible**, as their molecules are closely packed.
- **Solids cannot be compressed**, as their molecules are tightly packed.

Why Do Gases Diffuse Faster Than Liquids and Solids?

1. **High Speed of Particles**
   - Gas particles move **very fast** in **random directions**.
   - This allows them to **spread quickly** throughout a room.
2. **Large Spaces Between Particles**

- Gases have **more space between particles** compared to liquids and solids.
- This allows gas particles to move **freely and mix easily**.

3. **Real-Life Examples of Diffusion in Gases**

- The **smell of perfume** spreads quickly in a room.
- The **smoke from a fire** spreads in the air.
- The **smell of food** reaches us from the kitchen

Comparison of Solids, Liquids, and Gases

Property	Solids	Liquids	Gases
Shape	Fixed	No fixed shape	No fixed shape
Volume	Fixed	Fixed	No fixed volume
Compressibility	Negligible	Very little	Highly compressible
Diffusion	Very slow	Faster than solids	Fastest
Fluidity	Does not flow	Flows	Flows easily
Particle Arrangement	Tightly packed	Loosely packed	Very loosely packed
Motion of Particles	Vibrate in place	Move slowly	Move randomly and very fast
Pressure Exerted	Does not exert pressure	Exerts small pressure	Exerts high pressure

Real-Life Importance of Gases

Oxygen for Breathing

- All **living organisms** need oxygen for survival.
- Fish breathe using **dissolved oxygen in water**.

Compressed Gases for Everyday Use

- **LPG** (Liquefied Petroleum Gas) for cooking.
- **CNG** (Compressed Natural Gas) for vehicles.
- **Oxygen cylinders** in hospitals.

Gas Diffusion in Industries

- **Carbon dioxide** is used in soft drinks.
- **Helium gas** is used to fill balloons.
- **Nitrogen gas** is used in food packaging to keep food fresh.

Effect of Change of Temperature

Activity 1.12: Observing Change of State

Materials Required:

- *150 g of ice*
- *A beaker*
- *Laboratory thermometer*
- *Glass rod*
- *Heat source (burner)*

Procedure:

1. *Take about **150 g of ice** in a **beaker**.*
2. *Suspend a **laboratory thermometer** in the beaker so that its **bulb is in contact with the ice** (see Fig. 1.6a).*
3. ***Start heating** the beaker on a low flame and observe:*
   - ***Note the temperature** when the **ice starts melting**.*
   - ***Record the temperature** when all the ice has converted into **water**.*
4. *Stir the water with a **glass rod** and continue **heating** until the **water starts boiling**.*
5. *Carefully observe the **thermometer reading** until **most of the water has vaporized***

6.Record observations for:

Solid to liquid conversion (melting)

Liquid to gas conversion (boiling/vaporization)

Understanding the Changes in State of Matter

Melting (Fusion) – Solid to Liquid

- When heat is supplied to a **solid**, the **kinetic energy** of the particles **increases**.
- The particles start **vibrating faster**, and the heat energy **overcomes the forces of attraction** holding them together.
- At a certain temperature, the solid **melts into a liquid**.
- This temperature is called the **melting point**.
- The **melting point of ice** is **273.15 K (0°C)**.
- The process of **melting** is also known as **fusion**.

Latent Heat of Fusion

- During melting, **even though heat is continuously supplied, the temperature does not rise** until all the ice has melted.
- This is because the heat energy is used to **break the intermolecular forces** between particles rather than increasing temperature.
- This **hidden heat energy** is called **latent heat**.
- The **latent heat of fusion** is the amount of heat required to convert **1 kg of a solid into a liquid at its melting point without any temperature change**.
- Water at **0°C (273 K) has more energy** than ice at **0°C**, because it has absorbed **latent heat of fusion**

Boiling (Vaporization) – Liquid to Gas

- When heat is supplied to a **liquid**, its **particles move faster** and **gain enough energy** to **overcome the forces of attraction** between them.
- At a certain temperature, the liquid **starts converting into gas (vapour state)**.
- This temperature is called the **boiling point**.
- The **boiling point of water** is **373 K (100°C)**.
- **Boiling is a bulk phenomenon**, meaning all particles throughout the liquid gain energy and change to vapour.

Latent Heat of Vaporization

- Just like melting, the **temperature remains constant at the boiling point** until all the liquid has converted into vapour.
- The extra heat energy supplied is used to **break the intermolecular forces** between liquid particles.
- This hidden energy is called **latent heat of vaporization**.
- The **latent heat of vaporization** is the amount of heat required to **convert 1 kg of a liquid into gas at its boiling point without any temperature rise**.
- Steam (water vapour) at **100°C (373 K)** has **more energy** than liquid water at **100°C**, because it has absorbed **latent heat of vaporization**.

Key Observations:

State Change	Process Name	Key Temperature for Water	Explanation
Solid to Liquid	Melting (Fusion)	273.15 K (0°C)	Heat overcomes intermolecular forces, converting solid to liquid.
Liquid to Gas	Boiling (Vaporization)	373 K (100°C)	Particles gain enough energy to break free and turn into vapour.

Sublimation and Deposition – Direct State Change

We have learned that substances can change their state by **changing temperature**. Most materials transition from **solid → liquid → gas** when heated and **gas → liquid → solid** when cooled. However, some substances **skip the liquid state** and transition **directly from solid to gas** and vice versa.

Activity 1.13: Observing Sublimation

Materials Required:

- *Camphor or ammonium chloride*
- *China dish*
- *Inverted funnel*
- *Cotton plug*

Procedure:

- *Take some **camphor or ammonium chloride**, crush it, and place it in a **china dish**.*
- *Cover the china dish with an **inverted funnel** (see Fig. 1.7).*
- ***Plug the stem of the funnel** with **cotton** to prevent vapours from escaping.*
- ***Heat the dish slowly** and observe.*
- *Heat source (burner)*

Observations and Inference:

- *As heat is applied, the **solid camphor or ammonium chloride disappears**, producing **vapours**.*
- *These vapours **condense** on the inner surface of the **funnel**, forming **solid deposits** without becoming liquid.*
- *This experiment demonstrates **sublimation** – a **direct change from solid to gas**.*

Sublimation and Deposition

Sublimation:

- The process in which a substance directly changes from solid to gas without passing through the liquid state.
- Example: Camphor, ammonium chloride, naphthalene, iodine, and dry ice (solid CO_2).

Deposition:

- The reverse of sublimation, where a gas **directly converts into a solid** without becoming liquid.
- Example: **Formation of frost (water vapour directly freezing to ice)**.

Liquefying Gases Using Pressure and Temperature

Compression of Gases:

- When a gas is **compressed** in a **cylinder**, the **particles come closer**.
- If the gas is also **cooled**, its kinetic energy decreases, making it **easier to convert into a liquid**.

Example: Dry Ice (Solid CO_2):

- **Carbon dioxide (CO_2) gas** is stored under **high pressure**, which turns it into a **solid**.
- When the pressure is **reduced to 1 atmosphere**, **solid CO_2 directly converts into gas** (without forming liquid).
- This is why **solid CO_2 is called dry ice**.

Evaporation: Change of State Without Heating or Pressure Change

We do not always need to **heat** or **change pressure** to change the state of matter. There are many **everyday examples** where a liquid changes into vapour **without reaching its boiling point**:

- **Water left uncovered** in a bowl **gradually evaporates**.
- **Wet clothes dry up** even if the sun is not shining directly on them.

Definition of Evaporation

Evaporation is the **conversion of a liquid into vapour** at a temperature **below its boiling point**. It occurs because **some particles at the surface** have **higher kinetic energy** and can overcome the **attractive forces** of the liquid.

1.5.1 Factors Affecting Evaporation

- ***Experiment 1:*** *Water in a **test tube near a window or fan** evaporates **slowly** because of **less surface area**.*
- ***Experiment 2:*** *Water in an **open china dish near a window or fan** evaporates **faster** due to **more surface area** and **airflow**.*
- ***Experiment 3:*** *Water in an **open china dish inside a cupboard** evaporates **slowly** due to **less airflow** and **lower temperature**.*
- ***Experiment on a rainy day:*** *Evaporation is **slower** due to **higher humidity** in the air.*

Observations from the Activity:

Effect of Temperature

- **Higher temperature → Faster evaporation**
- Particles gain **more kinetic energy** and escape easily.

Effect of Surface Area

- **Larger surface area → Faster evaporation**
- More **water molecules** are exposed to air, increasing evaporation.

Effect of Wind Speed (Airflow)

- **More wind → Faster evaporation**
- Moving air **removes vapour particles**, allowing more water to evaporate.

Effect of Humidity

- **Higher humidity → Slower evaporation**
- When the air already has a lot of **water vapour**, less evaporation occurs.

Factors Affecting the Rate of Evaporation

Increase in Surface Area

- **Evaporation is a surface phenomenon**, meaning it occurs at the surface of the liquid.
- **Larger surface area → Faster evaporation**
- **Example:** Clothes dry faster when spread out rather than when folded.

Increase in Temperature

- **Higher temperature → More kinetic energy → Faster evaporation**
- **More particles** gain energy to **escape** into vapour.
- **Example:** Water evaporates faster on a **hot sunny day** than on a cold day.

Decrease in Humidity

- **Humidity** is the amount of **water vapour present in the air**.
- If the air is already **full of moisture**, it **cannot absorb more vapour**, slowing down evaporation.
- **Lower humidity → Faster evaporation**
- **Example:** Clothes dry slower during the **rainy season** because of high humidity.

Increase in Wind Speed

- **Higher wind speed → Faster evaporation**
- **Wind removes the vapour particles, making space for more water to evaporate.**
- **Example: Clothes dry faster on a windy day than on a still day.**

Evaporation and Cooling

Evaporation causes **cooling** because:

- **Evaporating particles absorb heat** from their surroundings to gain energy and escape as vapour.
- This **heat loss cools** the surroundings.

Real-Life Examples of Cooling Due to Evaporation

Acetone (Nail Polish Remover) on Palm

- When you pour **acetone** on your palm, it **evaporates quickly** by absorbing heat from your skin.
- This **heat loss makes your palm feel cool**.

Sprinkling Water on Roofs and Open Grounds

- On **hot sunny days**, people **sprinkle water** to cool the surface.
- The **high latent heat of vaporization of water** absorbs heat, lowering the temperature.

Using Earthen Pots for Storing Water

- Water stored in **matkas (clay pots)** remains **cool** because the **porous** walls allow water to evaporate, absorbing heat from the pot.

Sweating Keeps Us Cool

- During summer, **sweat evaporates** from our skin, taking away heat, making us feel cool.

Why Should We Wear Cotton Clothes in Summer?

- **Cotton absorbs sweat** from the skin.
- It **exposes sweat to the air**, making it **evaporate quickly**.
- As sweat **evaporates**, it absorbs heat from the **body**, keeping us cool.

Why Do We See Water Droplets on a Cold Glass?

- The air contains **water vapour**.
- When it comes in contact with a **cold glass**, it **loses heat** and **condenses** into liquid.
- This appears as **water droplets** on the **outer surface of the glass**.

How Does Evaporation Cause Cooling?

Evaporation is the process where **liquid particles at the surface gain energy and turn into vapour**. But where does this energy come from? It is **absorbed from the surroundings**, which causes a cooling effect.

Detailed Explanation with Examples

Cooling Effect of Acetone (Nail Polish Remover) on Palm

- When you pour **acetone** on your hand, it **evaporates quickly**.
- The **liquid particles take heat** from your palm to turn into vapour.
- This **heat loss makes your hand feel cool**.

Sprinkling Water on Roofs and Open Grounds

- After a **hot sunny day**, people **sprinkle water** on the ground.
- As the **water evaporates**, it takes heat from the ground, making it cooler.

- This is the same reason why roads feel **cooler after rain**.

Why Do We Sweat More in Summer?

- Our body produces **sweat** to regulate temperature.
- The sweat **absorbs heat** from the body and **evaporates**, cooling us down.
- Cotton clothes **help absorb sweat** and allow it to evaporate easily, keeping us cooler

Why Do We See Water Droplets on a Cold Glass?

- Air contains **water vapour (moisture)**.
- When humid air touches a **cold glass**, it **loses heat** and condenses into **liquid droplets**.
- This is why you see **water droplets forming on the outside** of a glass filled with ice water.

Home Experiment to Observe Evaporation and Cooling

Steps:

1. Take a **cotton ball** and dip it in **acetone** (nail polish remover).
2. Rub the cotton ball on your **hand**.
3. **Observe:** You will feel a **cooling effect** as the acetone evaporates.

Some questions

VERY SHORT QUESTIONS

1. Write different states of matter.
2. Which has more density – liquid or solid ?
3. What is the melting point of ice ?
4. Boiling point of alcohol is 78°C. Change it into Kelvin scale ?
5. Why do gas exert pressure ?
6. How do we liquefy the gases ?
7. What happens to particles when salt dissolves in water ?
8. What is the physical state of water at:
   (a) 0° C (b) 25°C
9. What is the chemical name of dry ice ?
10. Why is heat energy needed to melt a solid ?

SHORT QUESTIONS

1. Classify the matter on the basis of physical characteristics ?
2. Why solid carbon dioxide is called 'dry ice' ?
3. Why do we keep ether and acetone at cool places ?
4. Write two factors which will increase rate of evaporation ?
5. Which gas is supplied in the liquefied form at home and in hospitals ?
6. Compare the force of attraction between iron, rubber band and chalk ?
7. Arrange sugar, water and oxygen in the increasing order of force of attraction between their particles ?
8. Define boiling point, melting point and evaporation ?
9. What is sublimation? Name two substances which undergo sublimation.
10. Why does steam causes more severe burns than boiling water?
11. Change the temperature in celsius scale temperature :
    (a) 293 K (b) 470 K

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OBJECTIVE TYPE QUESTION:

1. A few substances are arranged in the increasing order of 'forces of attraction' between their particles. Which one of the following represents a correct arrangement ?

(a) Water, air, wind
(b) Air, sugar, oil
(c) Oxygen, water, sugar
(d) Salt, juice, air

2. Which one of the following sets of phenomena would increase on raising the temperature ?

(a) Diffusion, evaporation, compression of gases.
(b) Evaporation, compression of gases, solubility
(c) Evaporation, diffusion, expansion of gases.
(d) Evaporation, solubility, diffusion, compression of gases.

3. The property to flow is unique to fluids. Which one of the following statements is correct?

(a) Only gases behave like fluids
(b) Gases and solids behave like fluids
(c) Gases and liquids behave like fluids
(d) Only liquids are fluids

4. Choose the correct statement of the following:

(a) conversion of solid into vapours without passing through the liquid state is called sublimation.
(b) conversion of vapours into solid without passing through liquid state is called vaporisation.
(c) conversion of vapours into solid without passing through the liquid state is called freezing.
(d) conversion of solid into liquid is called sublimation.

5. During summer, water kept in an earthen pot becomes cool because of the phenomenon of

(a) diffusion.
(b) transpiration
(c) osmosis.
(d) evaporation

6. On converting 25ºC, 38ºC and 66ºC to kelvin scale, the correct sequence of temperature will be

(a) 298K 311K and 339K

(b) 298K, 300K and 338K

(c) 273K, 278K and 543K

(d) 298K, 310K, and 338K

[K=273+tºC]

7. Fill in the blanks:

(a) The boiling points of, acetone is 329 K, its temperature in Celsius will be ....ºC.

(b) The arrangement of particles is ordered in the .... state. However there is no order in the .... state.

(c) Evaporation of a liquid at room temperature leads to a .... effect.

(d) Osmosis is a special kind of ....

8. Match the physical quantities given in column A to their S. I. units given in column B :

Column A	Column B
Temperature	Pascal
Density	Cubic Metre
Volume	Kelvin
Pressure	Kilogram per cubic meter

9. Choose the correct option given in bracket.

The amount of heat required to change 1 kg solid to its liquid state at atmospheric pressure is known as its ....

(Latent heat of fusion / Latent heat of vaporisatoin)

Assertion and reason type questions:-

Two statements are given one labelled assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation fo A.

(c) A is true but R is false.

(d) A is false but R is true.

1. Assertions (A) : Steam causes severe burn than boiling water

Reason (R) : Steam has latent heat.

2. Assertion (A) : A glass filled with ice has water droplets on its outer surface

Reason (R) : Ice is liquid state of water.