A Journey through States of Water

Water – The Amazing Changing Liquid!

Solid (Ice)



- Fixed shape
- Fixed volume
- Particles are closely packed

Melting (Heat)

Freezing (Cool)

Liquid (Water)



- No fixed shape
- Fixed volume
- Particles are close together

Evaporation (Heat)

Condensation (Cool)

Gas (Water Vapour)



- No fixed shape
- No fixed volume
- Particles are far apart

Changes of State



Ice (Solid)

Melting (Heat)



Water (Liquid)

Evaporation (Heat)

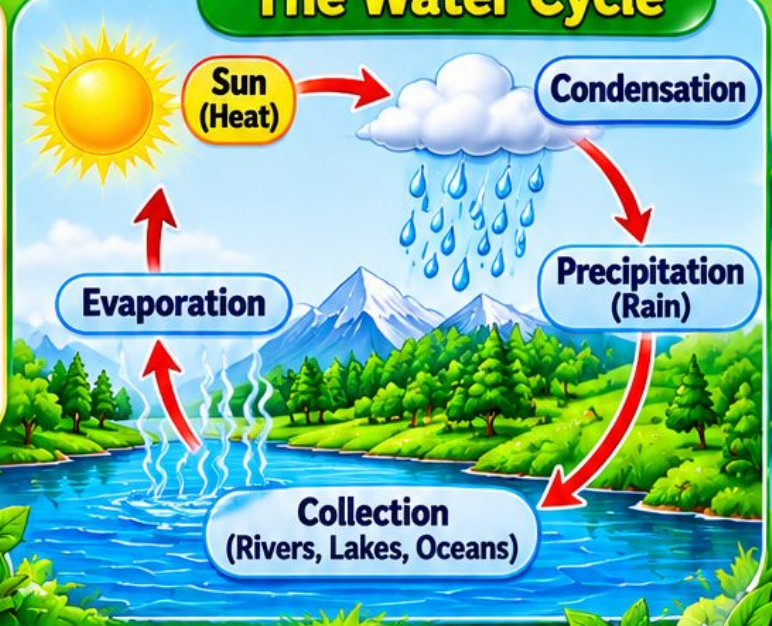


Water Vapour (Gas)

Key Points to Remember

- Water exists in three states – solid, liquid and gas.
- Heating changes ice to water and water to steam.
- Cooling changes steam to water and water to ice.
- Water can change from one state to another.
- These changes are reversible.

The Water Cycle



Water is Life!

Let's Save Water!

gptteachers.in

Water Vapour, Evaporation and Condensation

How it Happens?

Water Vapour

Water vapour is water in gaseous form.

It is invisible, but we can feel its presence as humidity in the air.

Evaporation

Evaporation is the process of change of water from liquid to vapour.

It happens at all temperatures, but faster when it is hot.

Condensation

Condensation is the process of change of water vapour back into liquid.

It happens when water vapour cools.

Simple Experiments to See How It Happens

1. Evaporation from a Hot Pan



1. Heat water in a pan.
2. You will see steam rising.

This steam is water vapour formed by evaporation.

2. Condensation on a Cold Surface



1. Keep a glass of cold water in a warm room.
2. Water droplets will appear on the outer surface.

This shows condensation.

3. Evaporation and Condensation in the Water Cycle



1. Take a bowl of hot water and cover it with a plate.
2. After a while, water droplets will form on the plate.

Water vapour rises and condenses.

Why Does It Happen?

- Heat gives water energy to change into vapour (evaporation).
- Cool surfaces take away heat, so vapour changes back to water (condensation).



Key Takeaways

- Water vapour is invisible water.
- Evaporation happens when water gets heat.
- Condensation happens when water vapour cools.
- Together, they keep the water cycle going!

gptteachers.in

Different Stattes of Matter

Matter can exist in three main states – Solid, Liquid and Gas

SOLID

Has a fixed shape and fixed volume



Key Features

- Fixed shape
- Fixed volume
- Particles are closely packed

Examples



Ice, Book, Stone

LIQUID

Has no fixed shape but has a fixed volume



Key Features

- No fixed shape
- Fixed volume
- Particles are close together

Examples



Milk, Water, Oil

GAS

Has neither a fixed shape nor a fixed volume



Key Features

- No fixed shape
- No fixed volume
- Particles are far apart

Examples



Air (in balloons), Water Vapour, Smoke

Quick Comparison

Feature	Solid	Liquid	Gas
Shape	Fixed	No fixed shape	No fixed shape
Volume	Fixed	Fixed	No fixed volume
Particle Arrangement	Very close	Close	Far apart
Compressibility	Very less	Very less	High
Flow	No	Yes	Yes
Examples	Ice, Stone, Book	Water, Milk, Oil	Air, Steam, Smoke

Changes of State

Matter can change from one state to another by changing temperature.



Melting (Solid → Liquid), Evaporation (Liquid → Gas), Condensation (Gas → Liquid), Freezing (Liquid → Solid)

gptteachers.in

Conversion of Different States of Matter

Matter can change from one state to another!

Solid



Has a fixed shape and fixed volume

Liquid



Has no fixed shape but has a fixed volume

Gas



Has neither a fixed shape nor a fixed volume



Heat (gives energy)

Melting (Solid → Liquid)

Vaporisation (Liquid → Gas)



Cool (removes heat)



Solid



Liquid



Gas

Freezing (Liquid → Solid)

Condensation (Gas → Liquid)

Melting

Melting is the process of changing a **solid** into a **liquid** by heating.



Examples:

- Ice melts into water.
- Butter melts on heat.

Freezing

Freezing is the process of changing a **liquid** into a **solid** by cooling.



Examples:

- Water freezes into ice.
- Juice becomes ice.



Remember!

- Heating can change solid → liquid → gas.
- Cooling can change gas → liquid → solid.
- Melting and vaporisation need heat.
- Freezing and condensation happen on cooling.



gpteachers.in

Conditions that Affect the Rate of Evaporation

Evaporation happens faster under certain conditions!



Rate of Evaporation

1. Temperature

Higher temperature makes evaporation faster.

Example:
Water evaporates faster on a hot day.

2. Surface Area

Larger surface area increases the rate of evaporation.

Example:
Water in a wide plate evaporates faster than in a glass.

3. Wind

Wind removes water vapour from the surface and helps evaporation.

Example:
Water dries faster on a windy day.

4. Humidity

Lower humidity helps evaporation. High humidity slows it down.

Example:
Clothes dry slowly on a humid day.

5. Nature of Liquid

More **volatile** liquids evaporate faster.

Example:
Ethanol evaporates faster than water.



6. Colour

Colourless liquids evaporate faster than dark-coloured liquids.

Example:
Clear water dries faster than coloured water.



Humidity

Definition

Humidity is the amount of water vapour present in the air.

Types

High Humidity
Air has a lot of water vapour.

Example:
On a rainy day.

Low Humidity
Air has very little water vapour.

Example:
On a hot, dry day.

Effect on Evaporation

- High humidity → Slower evaporation
- Low humidity → Faster evaporation

gptteachers.in

Cooling Effect

Some substances make their surroundings cooler. This is called the cooling effect.

Cool Surroundings Feel Good!

How It Happens?

- When a liquid changes into a gas, it absorbs heat from its surroundings.
- This removes heat from the surroundings and makes them cooler.
- The liquid that evaporates is called the cooling agent.

Evaporation needs heat, so it cools the surroundings!



Sweating earthen pot feels cool.

In Short

- Evaporation absorbs heat.
- It lowers the temperature.
- It creates a cooling effect.
- It happens naturally and can be used in our daily life.



Examples of Cooling Effect



Wet cloth on the forehead brings coolness as water evaporates.



Cold water in a bottle looks cool because water evaporates from the surface.



A fan increases evaporation of sweat, making us feel cooler.



Ice and ice creams cool us because they absorb heat while melting.

Cooling Effect – Water Stored in an Earthen Pot



Why Does It Happen?

1. The outer surface of the earthen pot is porous (has tiny holes).
2. A little water seeps out and evaporates from the surface.
3. This evaporation absorbs heat from the pot and the water inside.
4. So, the water stays cool even in hot weather.

Benefits

- Keeps water cool naturally.
- No electricity needed.
- Good for health.
- Eco-friendly and traditional method.

The same principle of cooling effect is used in an earthen pot.

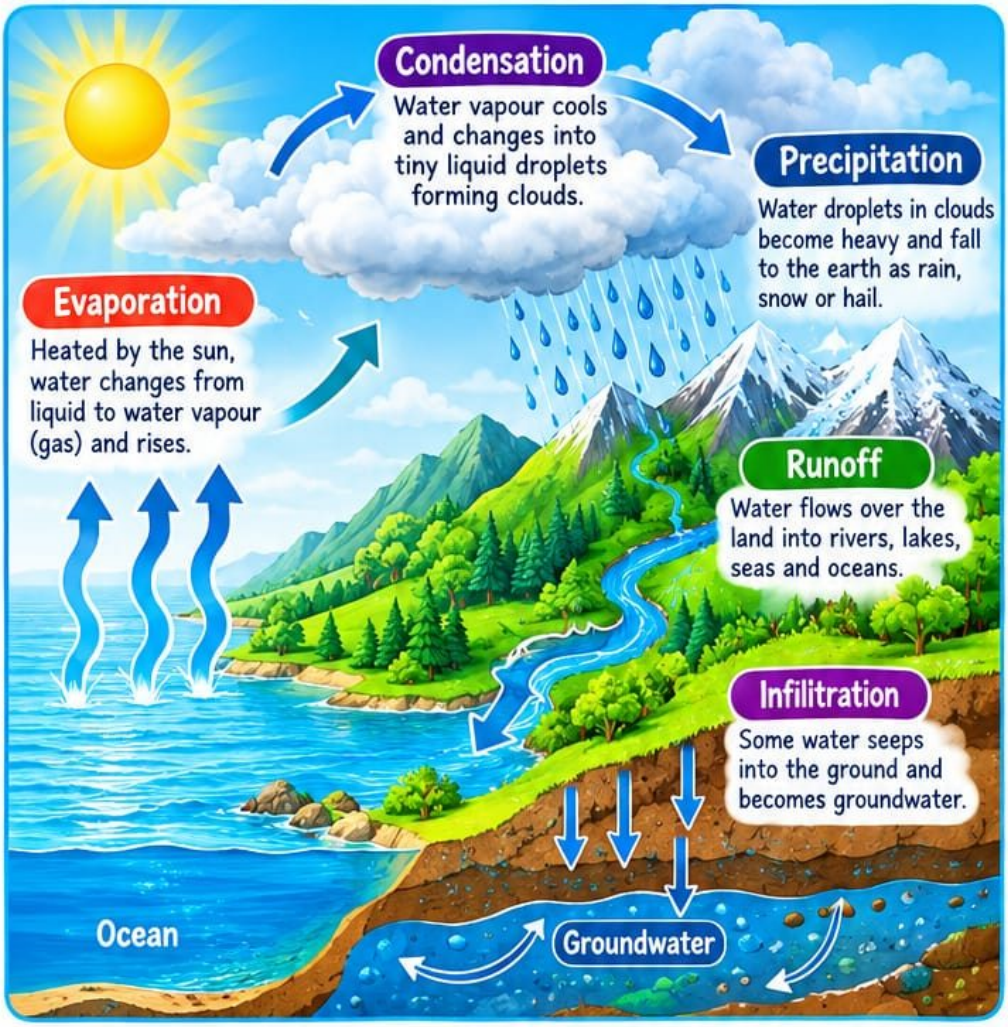
Heat from surroundings → Evaporation from porous surface → Water stays cool

Nature provides smart solutions!

THE WATER CYCLE

Same Water • New Journey • Again and Again

Water changes form, but it never stops moving!



STEPS OF THE WATER CYCLE

1. **Evaporation**
   The Sun's heat changes water from oceans, lakes, rivers and other water bodies into water vapour.
2. **Condensation**
   Water vapour cools and changes into tiny liquid droplets, forming clouds.
3. **Precipitation**
   The droplets join together and fall to the earth as rain, snow or hail.
4. **Runoff**
   Water flows over the land into rivers, lakes, seas and oceans.
5. **Infiltration**
   Some water seeps into the ground and becomes groundwater.
6. **Collection**
   All water finally collects in oceans, lakes, rivers and underground (groundwater) and the cycle continues.

THE WATER CYCLE IN NATURE

The water cycle is a continuous process. Water evaporates from oceans, rivers, lakes and plants. It condenses to form clouds, falls as precipitation, flows as runoff and seeps into the ground. Then it returns to water bodies and the cycle continues.



The same water circulates again and again!

IMPORTANCE OF THE WATER CYCLE

- Provides fresh water for all living things.
- Helps plants grow and maintain life on land.
- Regulates climate and temperature of the Earth.
- Recharges rivers, lakes and groundwater.
- Maintains ecosystems and biodiversity.

DID YOU KNOW?

- About 97% of all water on Earth is in oceans (salt water).
- Only 3% is fresh water, and most of it is locked in ice caps and glaciers.
- Water can exist in three forms: solid (ice), liquid (water) and gas (water vapour).
- The water you drink today may have been a dinosaur's rain millions of years ago!

Save Water • Save Life

gpteachers.in