1 Water The Essence of Life

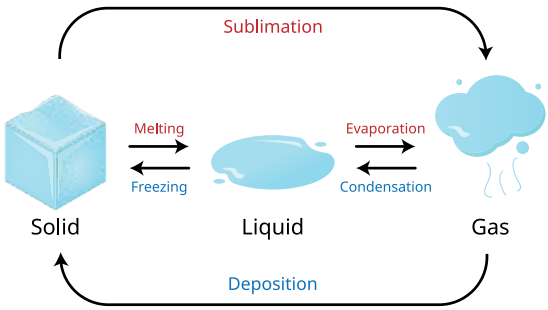
Chapter Notes:

Importance of Water

- 71 % of Earth's surface is covered with water, but most is **salty**.
- Only a **tiny portion is freshwater** — needed for drinking, cooking, farming, washing, and for all living beings.
- Without water, **life cannot exist.**

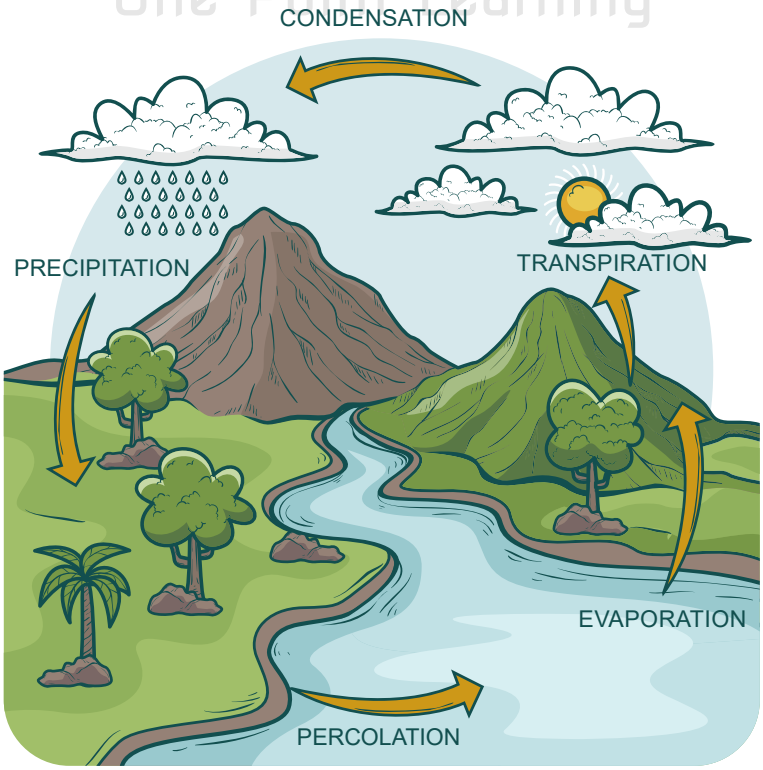
Forms of Water

- **Solid –** Ice or Snow
- **Liquid –** Water (rivers, rain, lakes)
- **Gas –** Water vapour or steam
- Water changes form due to **heating and cooling.**



Water Cycle

- **Evaporation**: Heat from the Sun changes water into vapour.
- **Condensation**: Vapour cools down to form clouds.
- **Precipitation**: Clouds release water as rain.
- **Collection**: Rainwater goes back into rivers, lakes, oceans, and underground.
- The continuous movement of water in nature is called the **Water Cycle.**



Groundwater

- Rainwater **seeps through soil** and rocks.
- Stored underground as **groundwater**.
- Wells, hand pumps, and bore wells bring it up.
- **Cemented surfaces stop recharge** → use open areas, soak pits, trees.

Surface Water

- **Surface water:** rivers, ponds, lakes.
- Rivers flow from **mountains** (**high**) to **plains** (**low**) and into **seas**.
- Flow depends on **landforms**.
- Example: The Luni River ends in the Rann of Kutch instead of the sea.

Rivers in India

- Rivers flow towards either the **Bay of Bengal** (e.g., Ganga, Godavari, Krishna) or the **Arabian Sea** (e.g., Narmada, Tapi).
- Rivers help in farming, transport, and provide homes for **aquatic life**.

Life in Water

- Water bodies are home to many **plants and animals** such as fish, frogs, turtles, and lotus.
- These living beings have special features to survive in water (like fins, gills, or floating leaves).
- Water supports both **aquatic life** and **human life**.

River Food Chain

- Example:
- 🌿 Aquatic plants → 🐠 Small fish → 🐸 Frog → 🐦 Bird → 👴🌾 Human / 🐊 Crocodile
- If one link is lost, the entire chain is disturbed.

Types of Plants in Water

- **Variety of Life in Water**
  - Freshwater bodies like ponds, lakes, and rivers are home to many **plants and animals.**
  - These living beings are called **aquatic plants and animals.**
  - They have special **features** that help them **live and grow in water.**
- Special Features of Aquatic Plants
  - Some have **floating leave**s (like lotus, water lily).
  - Some have **long roots** that reach the bottom of the pond.
  - Some float freely on the surface (like water hyacinth).
  - Edge plants (like reeds) grow along the sides of water bodies.

Need for Conservation

- Freshwater is **limited**.
- We must **use water wisely, store rainwater,** and **prevent pollution** of rivers and lakes.
- Freshwater is **essential for all forms of life** — both on land and in water.
- It provides a **home** and **food** for many living beings.
- Without freshwater, **life on Earth cannot survive.**

New Terms

Term		Meaning
• Freshwater	➜	Water suitable for drinking and farming
• Water vapour	➜	Gaseous form of water
• Groundwater	➜	Water stored under the ground
• Water cycle	➜	Continuous movement of water in nature
• Evaporation	➜	Process of water changing into vapour
• Condensation	➜	Cooling of vapour to form droplets/clouds
• Precipitation	➜	Rain, snow, or hail falling from clouds

Discuss

1. Do you think we can drink the water present in the oceans?

Answer: No, we cannot drink ocean water because it is salty and not fit for drinking. The salt in ocean water can make us sick if we drink it.

2. What can ocean water be used for?

Answer: Ocean water can be used for:

- **Producing salt by drying seawater in salt pans.**
- **Fishing and collecting other sea products.**
- **Transportation and trade through ships and boats.**
- **Tourism and recreation, such as swimming and water sports.**

However, ocean water cannot be used for drinking or farming because it is salty.

Activity 1

Where can we find freshwater? Identify the different freshwater sources from the images given below and write their names.

Pond

Sea / Ocean

Glacier

Sources of Water

Lake

Groundwater

River

Well

Rain

Q. "Is there water in the air too? And is snow a form of water?"

Answer: Yes, there is water in the air in the form of water vapour. We cannot see it, but it is present around us.

And yes, snow is also a form of water — it is the solid form of water, just like ice.

Activity 2

1. **Take a steel glass. Put some ice cubes in it. Observe the small water droplets forming on the glass.**

   (a) Where do these water droplets come from?

   Answer: The water droplets come from the water vapour present in the air. When the vapour touches the cold surface of the glass, it condenses into tiny droplets of water.

   (b) What happens to the ice cubes after they are left in the glass for some time?

   Answer: The ice cubes melt and change into liquid water because of the surrounding warmth.

   (c) If we heat water, what will happen to it?

   Answer: When we heat water, it changes into steam or water vapour, which rises into the air.

2. **In the above activity, what forms of water do you see?**

Answer: We see three forms of water:

1. Solid: Ice cubes 2. Liquid: Water 3. Gas: Water vapour or steam

Observing Changes – Answers

Activity	I Observe
• **Ice melting**	- Ice changes into water.
• **Water boiling**	- Water changes into steam or water vapour.
• **Water in sunlight for three days**	- Some water disappears as it evaporates into vapour.

Activity 3

- **Take a transparent bag.**
- **Use a marker to draw the sun, clouds, trees and arrows on it as shown in the picture.**
- **Fill one-third of it with coloured water. Tip: You can use blue paint or food dye for this.**
- **Seal the bag tightly to prevent any leaks.**
- **Place it in the sunlight.**
- **After a few hours, observe the changes inside the bag.**

I Observe	I Wonder	It is because of...
- **Water heats up**	- How does water heat up?	- **Because of sunlight** — the Sun's heat warms the water.
- **Water droplets formed inside the cover**	- Where did these water droplets come from?	- **Because of condensation** — the water vapour cooled down and changed back into tiny droplets of water.

Activity 4

- **Take a transparent glass.**
- **Fill half of it with soil.**
- **Slowly pour water into the soil using a spoon.**
- **Observe what happens.**

Answer:

- **Observation**:
  - When we slowly pour water into the glass filled with soil, the water starts soaking into the soil.
  - After some time, the soil becomes wet, and we can see tiny bubbles or air escaping from it.
- **Explanation**:
  - The soil absorbs the water, and it seeps down through the layers of soil and rocks.
  - This shows how rainwater seeps into the ground and gets stored deep below the surface as groundwater.
  - Later, this water can be used through wells, borewells, and handpumps.

Activity 5

Tick the image that will help in groundwater recharge.



Concrete road ☐ Green lawn ☑ Paved area ☐

Activity 6

Material Required: An old newspaper and a cup of mustard seeds or any other small seeds.

Procedure

- **Take a sheet from a newspaper and crumple it to create folds.**
- **Take another sheet and place it over the crumpled paper.**
- **Press it down so that the slopes are gentle.**
- **Now, slowly pour the mustard seeds from the cup on to the highest point of the slope.**
- **Observe the movement of the seeds.**

1. **What did you observe about the mustard seeds?**

   Answer: The mustard seeds roll down from the higher areas to the lower areas of the paper.

2. **Are they moving in a straight line, or do they spread out in different directions?**

   Answer: The seeds spread out in different directions, following the slopes and folds of the paper.

3. **Are they collecting in some areas? Do they gather like water gathers in lakes, rivers and so on?**

   Answer: Yes, the seeds collect in the lower parts of the paper, just like water gathers in ponds, lakes, and rivers.

Discuss

Q. On the basis of Activity 6 with mustard seeds, discuss how some rivers flow towards the Arabian Sea while some flow towards the Bay of Bengal.

Answer: Just like the mustard seeds rolled down from higher to lower places following the slopes of the paper, rivers also flow according to the slope and shape of the land.

In India:

- Rivers on the western side of the mountains flow towards the Arabian Sea (for example, Narmada and Tapi).
- Rivers on the eastern side flow towards the Bay of Bengal (for example, Ganga, Godavari, Krishna).

Thus, the direction of a river's flow depends on the slope of the land.

Activity 7

In the map, you can see the rivers flowing in different directions. Some flow into the Bay of Bengal and some into the Arabian Sea.

Observe and fill in the table.

Name of the River	Moves towards the Bay of Bengal	Moves towards the Arabian Sea
• Godavari	✓	
• Narmada		✓
• Ganga	✓	
• Krishna	✓	
• Mahanadi	✓	
• Tapi		✓

Life in Water

Animals on Land	Animals in Water
- Cannot breathe in water. - Have legs and feet to walk or run. - Have lungs for breathing. - Their bodies are covered with hair or fur. - Examples: Dog, Cat, Elephant.	- Can breathe in water using gills or by coming to the surface for air. - Have fins or flippers to swim. - Have gills or special organs for breathing underwater. - Their bodies are smooth and covered with scales or slippery skin. - Examples: Fish, Frog, Turtle.

Activity 8

Visit a local water body like a pond, lake or an aquarium with your teacher or parents, and observe life in and around the water body.

1. Based on your observations, complete the following table.

Name of the Bird or Animal	Mouth or Beaks	Movement through Legs, Feet, Fins	Rough Diagram
• **Fish**	- Round mouth facing upwards	- Fins	
• **Pond heron**	- Long and pointed	- Thin legs	
• **Frog**	- Wide mouth	- Hind legs for jumping and swimming	
• **Turtle**	- Small mouth with hard beak	- Legs and webbed feet	
• **Duck**	- Flat and broad beak	- Webbed feet for swimming	

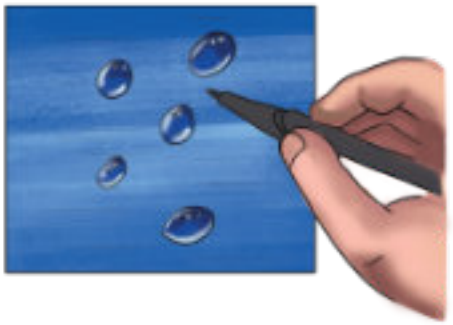
2. Draw the plants that you saw during the visit and label them with their local name.

Types	Names	Local Name
• **Plants floating (above water)**	- Water Lily / Water Hyacinth	- Kamal / Jalkumbhi
• **Plants under water**	- Hydrilla	- Pani ki ghaas
• **Plants whose roots are in the water bed, but are seen above the water**	- Lotus	- Kamal

Activity 9

1. Take a piece of paper and put a drop of water on it. Observe.

2. Colour the paper with a wax crayon. Now, put a drop of water on it. Do you observe any change?



Write your observation.

Answer:

- When a drop of water is put on plain paper, it soaks into the paper and makes it wet.
- When the paper is coloured with a wax crayon, the water does not soak in. The droplets stay on the surface.

Activity 10

Who Eats Whom?—A River Food Chain Game

- **Distribute slips of paper to students. Each student writes what they choose to be (for example, small fish, big fish, frog, bird, human, crocodile, otter, etc.)**
- **Ask the students to think about what they eat, and who eats them.**
- **Use a string to connect the students who depend on each other for food.**
- **Discuss what would happen if one animal disappears (for example, what if all the fish are gone?).**

Answer:

- **Observation / Discussion:** In a river or pond, living beings are connected through a food chain — each one depends on another for food.
- **Example of a River Food Chain:**

  Aquatic plants → Small fish → Frog → Snake → Bird / Human / Crocodile
- **What happens if one animal disappears?**
- If one animal (for example, all the fish) disappears, the entire food chain gets disturbed:
  - Frogs and snakes will have no food to eat,
  - Aquatic plants may grow too much,
  - The balance of life in the water will be affected.

Let us reflect

1. Match the following:

Answer:

Column A	Column B	Answer
(i) Ocean water	**(a) Solid form of water**	- (c) Not fit for drinking
(ii) Snow	**(b) Vapour form of water**	- (a) Solid form of water
(iii) Steam	**(c) Not fit for drinking**	- (b) Vapour form of water
(iv) Rainwater	**(d) Freshwater**	- (d) Freshwater

2. Why do you think most of the water on Earth cannot be used for drinking or farming?

Answer: Most of the water on Earth is salty ocean water or frozen as ice in glaciers. Only a very small amount is freshwater, which we can use for drinking and farming.

3. Large number of living beings live near water bodies. Why?

Answer: Living beings live near water bodies because water is essential for life. It provides food, shelter, and suitable living conditions for plants and animals.

4. What would happen if it did not rain in your region for two years?

Answer: If it did not rain for two years, there would be water scarcity.

- Rivers, ponds, and wells would dry up.
- Crops would fail, and people and animals would suffer due to lack of water.

5. What do you think happens to rainwater in a forest compared to a city?

Answer: In a forest, rainwater soaks into the soil and helps recharge groundwater.

In a city, much of the rainwater flows away on roads and drains because of cemented surfaces that do not absorb water.

6. Can you design a house or school that conserves water wisely? What would it include?

Answer: Yes. A water-conserving house or school would include:

- Rainwater harvesting system
- Leak-free taps and pipes
- Soak pits and open gardens for water to seep in
- Reusing water for cleaning or watering plants