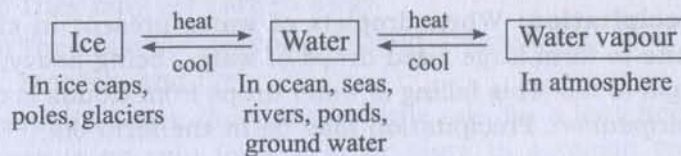


Lesson at a Glance

- **Water** is the most common and important substance for survival of life after air.
- **Uses of Water:** Water is used in our daily activities such as bathing, washing, drinking and for irrigation.
- Water is a universal solvent because nearly all substances partially or completely dissolve in water.
- The versatile nature of water as solvent is due to its neutral nature and ability to dissolve large variety of substances.
- **Sources of Water:** The main sources of water are oceans, rivers, tubewells, seas, springs, etc.
- **Physical States of Water:**
 - (i) In nature water occurs both in the free as well as in the combined form.
 - (ii) Water is found in nature in all the three physical states of matter: solid (ice), liquid (water) and gas (water vapour).
 - (iii) **Liquid state:** The water that we use everyday is a liquid. It is called liquid state of water.
Gaseous state: Water evaporates on heating. Water vapour is the gaseous state of water.
Solid state: On cooling the water turns into ice. Ice is solid form of water.
- The different physical forms of water are inter-convertible. The easy inter-convertibility of water from one form to other form, makes its availability in all parts of the earth and throughout the year.



• Water Cycle:

- (i) The continuous circulation of water in the nature is called *water cycle*.
- (ii) Water cycle helps in regulating weather on the earth.
- (iii) Water cycle is like a ring. In nature the water cycle takes place from sea to land and back to sea again.

• Evaporation:

- (i) The process of conversion of water into water vapour at a temperature below the boiling point is called *evaporation*.
- (ii) Evaporation takes place from open surfaces of water all the time day and night and at all temperatures.
- (iii) Evaporation of water takes place continuously from oceans, rivers, lakes, wells and seas which are called *water bodies*.
- (iv) Evaporation causes cooling because liquid molecules absorb heat from water or surrounding to be converted into vapour.
- (v) Evaporation depends upon the following factors: (a) Temperature (b) Surface area of water (c) Speed of air over the exposed surface of water.

• **Transpiration:** The loss of water molecules in the form of water vapour through the holes present in the leaves (stomata) is called *transpiration*.

• Condensation:

- (i) The process of conversion of water vapour into liquid form of water is called *condensation*.
- (ii) Condensation is reverse process of evaporation.
- (iii) **Cloud formation:** The earth surface is hotter but as we go up in atmosphere the temperature gradually decreases. At the upper layer of atmosphere, where the temperature is very low, the vapour gets condensed into tiny water droplets and forms cloud.

• **Precipitation:** When droplets of water present in clouds unite to form large sized drops of water, being heavy, they begin to fall. This falling of water drops from clouds is called *precipitation*. Precipitation may be in the form of:

- (i) **Rain:** If water droplets fall in form of liquid on the surface of the earth it is called as *rain*.
- (ii) **Hail/Snow:** Precipitation may be in the form of frozen or solid form. If the size of frozen water drops is large, the precipitation is called as *hail*. If precipitation is in the form of light flakes, it is called *snow*.
- (iii) **Dew:** Water droplets, especially during winter nights, formed by water vapour present in the air, are called as *dew*.

• Water Back to Ocean:

- (i) Evaporation of water from the water bodies like ocean, river, takes forms clouds.
- (ii) The water that falls on the land as rain and snow sooner or later goes back to oceans. This may happen in many ways.
- (iii) Snow in the mountains melts into water that flows down in the form of streams and rivers.
- (iv) Some of the water of rainfall also flows in the form of streams and rivers.
- (v) Most of the rivers, after covering long distances on land, pour their fresh water into a sea or an ocean.
- (vi) Thus, a large amount of water evaporated from a sea or an ocean, ultimately comes back to a sea or an ocean.

• **Ground water:** The water that seeps into the ground accumulates under the ground is known as *ground water*. Ground water is the source of wells and lakes. Ground water is withdrawn through handpumps and tubewells.

• **Flood:** Heavy rains may lead to rise in the level of water in rivers, lakes and ponds. The water may spread over large areas causing flood.

Flood causes extensive damage to crops, domestic animals, property and human life. Flood disturbs life of aquatic animals. For example,

- (i) They may get carried away.
- (ii) They may get trapped on land areas, when flood water recedes, and die.

• **Drought:** When there is very little rain for a long period or there is no rain for a year or more in a region causing

dryness and non-availability of water to plants and animals. This condition is called *drought*.

Factors which lead to Drought:

- (i) Very little or no rainfall in a region for a year or more.
- (ii) Continuous loss of water by: (i) evaporation from the soil and (ii) transpiration from the plants. These factors cause the soil to become dry.
- (iii) Due to evaporation and transpiration by the vegetation, the level of water in lakes, ponds and wells goes down and some of them may even dry up.
- (iv) The ground water may also become scarce.

Effect of Drought:

- (i) Drought causes scarcity of water so it is difficult to get food and fodder for animals—both for domestic and wildlife of the region.
- (ii) As there is scarcity of water and many ponds and small lakes dry up, as a result the aquatic organisms of these places die.
- (iii) Survival of human beings also becomes difficult in drought conditions because:
 - (a) Water is not available to fulfill basic needs of life such as water required for drinking.
 - (b) As crops of cereals, vegetables and other necessary plants may not survive or grow in a drought condition.
 - (c) As food and fodder will not be available to the domestic animals, we would not get animal products such as milk, eggs, meat, etc.

- **Water Conservation:** Enough water is available on the earth but the water available for use is very limited and is decreasing with over usage. On the other hand, due to increase in human population, demand of water usable for drinking, preparation of food and also for industries, is increasing.

Most of water in the oceans cannot be used directly.

Conservation of water means using it carefully and economically. It also means avoiding unnecessary wastage

of water. Conservation programmes can be successful, if all people follow them faithfully.

How to conserve water: In the first place, make it a habit to close a water tap, immediately, after taking the required amount of water from it.

Minimum quantity of water should be used for bathing, washing and cleaning purposes.

Farmers can save lots of water if they mend leakages in their water courses in time.

- **Rainwater Harvesting:** The process of collecting and storing rain water for later use is called *rainwater harvesting*. The following are two techniques of rainwater harvesting:

1. **Roof top rainwater harvesting:** The rainwater which gets collected on the rooftops is allowed to pass through means of pipe into a storage tank at the ground level for later use. This water, which contains soil from the roof, needs filtering before use.
2. Another way of utilising rain water is to refill or recharge the ground water. For this, the pipes can be allowed to carry water directly into a pit in the ground. From the pit water will seep into the soil to recharge the ground water.
3. Second technique of rain water harvesting is to allow rainwater to go into the ground directly from the roadside drains.

■ **TEXTBOOK QUESTIONS SOLVED** ■

- Q.1.** Fill up the blanks in the following:

- (a) The process of changing of water into its vapour is called _____.
- (b) The process of changing water vapour into water is called _____.
- (c) No rainfall for a year or more may lead to _____ in that region.
- (d) Excessive rains may cause _____.

- Ans.**
- (a) evaporation or vaporisation
 - (b) condensation
 - (c) droughts
 - (d) flood

Q.2. State for each of the following whether it is due to evaporation or condensation:

- Water drops appear on the outer surface of a glass containing cold water.
- Steam rising from wet clothes while they are ironed.
- Fog appearing on a cold winter morning.
- Blackboard dries up after wiping it.
- Steam rising from a hot girdle when water is sprinkled on it.

Ans. (a) condensation (b) evaporation
(c) condensation (d) evaporation
(e) evaporation.

Q.3. Which of the following statements are "true"?

- Water vapour is present in air only during the monsoon.
- Water evaporates into air from oceans, rivers and lakes but not from the soil.
- The process of water changing into its vapour is called evaporation.
- The evaporation of water takes place only in sunlight.
- Water vapour condenses to form tiny droplets of water in the upper layers of air where it is cooler.

Ans. (a) False (b) False (c) True
(d) False (e) True.

Q.4. Suppose you want to dry your school uniform quickly. Would spreading it near an anghiti or heater help you? If yes, how?

Ans. Yes, to dry the school uniform quickly, the uniform is spread near an anghiti or heater because evaporation is rapid at higher temperature. Higher the temperature faster is the rate of evaporation. So the uniform is dried up quickly.

Q.5. Take out a cooled bottle of water from refrigerator and keep it on a table. After some time you notice a puddle of water around it. Why?

Ans. The cooled water bottle has very cold exposed surface. Due to cool surface there is condensation of water-

vapour from air on the surface of water bottle because water vapour is present in atmosphere. The condensed water molecules spread around the bottle. So a puddle of water is noticed after sometime.

Q.6. To clean their spectacles, people often breathe out on glasses to make them wet.

Explain why the glasses become wet?

Ans. The breathe out gases contain water-vapour. The water-vapour condenses at spectacles so glass becomes wet and with the help of small amount of water, it is easy to clean the spectacles.

Q.7. How are clouds formed?

Ans. The water present on the earth evaporates due to heating by the sun. The water vapour in the air condenses to form tiny droplets of water at high altitude, which appears as clouds. Thus clouds are formed by the condensation of water vapours present in air at high altitude.

Q.8. When does a drought occur?

Ans. If there is no rain for a long period or for many years then there is scarcity of water in that region. This leads to drought.