

SCIENCE

CHAPTER-16: WATER A PRECIOUS RESOURCE



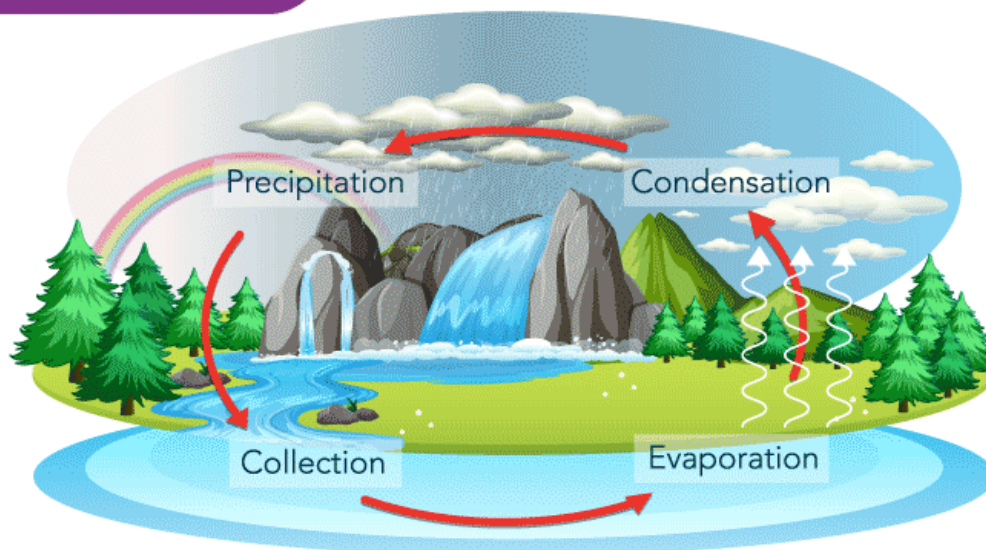
Water: A Precious Resource

- Water is an important natural resource.
- 71% of Earth is covered with **water**.
- Readily available water **for use** is only **0.006%** of the total water present on the Earth.
- Water exists in three forms: solid, liquid and gaseous.
- Snow and ice are present as ice caps at the poles of the Earth, snow-covered mountains and glaciers are **solid form** of water.
- Oceans, lakes, rivers and underground water represent **liquid form** of water.
- Water vapour in air is the **gaseous form** of water.

Water Cycle

- Freshwater supply on land has been maintained by the water cycle.
- Physical processes such as evaporation, condensation, precipitation and infiltration occur continuously one after the other and constitute the water cycle.
- The continuous cycling of water among its three forms keeps the total amount of water on the earth constant.

WATER CYCLE



Uses of water

Body functions	Plants need water to prepare their own food and for germination of seeds. Animals and human beings need water for digestion and absorption of nutrients.
Domestic use	We need water for drinking, cleaning, cooking, bathing, washing, etc.
Agricultural use	Crops like paddy, wheat, sugarcane, etc. need a large amount of water to grow.
Industrial use	Water from river is used to produce electricity.
Use in transport	Huge ships transport goods containers and people all around the world through rivers, seas and oceans.
As a habitat	Different freshwater and marine water bodies are the habitat for different kinds of plants, animals, fish and microorganisms.

Sources of water:

Rain is one of the main sources of freshwater. Some of the rainwater that falls on the land surface may flow into rivers, streams or oceans. This is called runoff water. The runoff water either flows into rivers or gets stored in lakes to form a freshwater source.

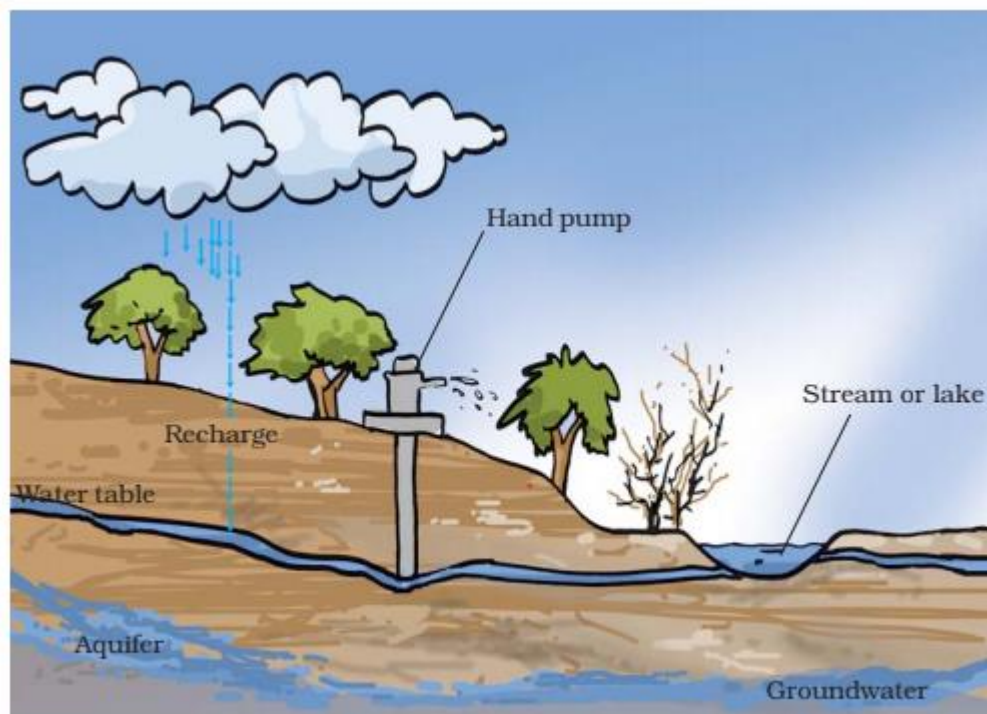
Surface water: After rainfall, water gets collected in the low-lying areas to form ponds and lakes. In hilly regions, the runoff water falls from higher areas to form rivers that flows into valleys. The rivers further flow to seas or oceans. All these water sources form the surface water of the earth.

Underground water: During the summer season or in case of failure of rainfall, people depend on the water from underground sources for domestic and agricultural purposes.

Rain water gets collected in the soil by seeping into the gravel and rocks at the bottom. The excess amount of water moves deeper into the ground and fills the spaces in the rocks. This is known as groundwater. The level of groundwater is known as the water table.

Aquifer: The rainwater that has collected in the empty space in the porous layer of rock

is known as an aquifer. The water remain there because below it is a hard layer of rock which prevents water from moving further downwards.



Groundwater and water table

Groundwater and Depletion of Water Table

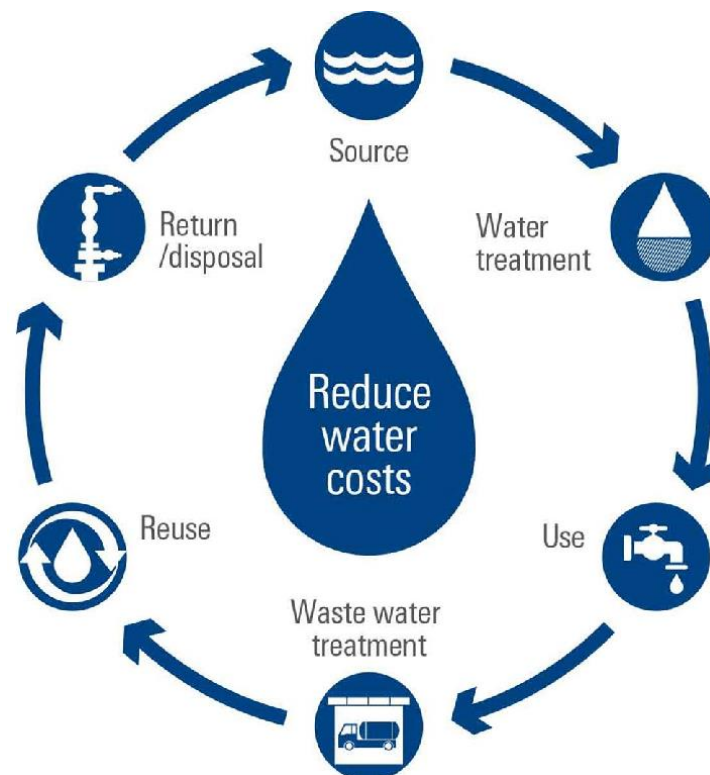
- On digging the ground near a water body, a level is reached where all the space between the particles of soil and gaps between the rocks are filled with water. The upper limit of this layer is termed water table which varies from place to place.
- The water found below the water table is called groundwater.
- The process of infiltration helps in replenishment of groundwater.
- An aquifer is a place where groundwater is stored between layers of permeable rock below the water table. By using hand pumps or tube wells, water in aquifers can be pumped out.
- Increase in the usage of water may be due to a rise in population and industrial and agricultural activities.
- Scanty rainfall, deforestation and decrease in the effective area for seepage of rainwater are other reasons for depletion of water.
- Some places receive good amount of rainfall, while regions such as deserts have scanty rainfall. For example, in India, Assam receives an average annual rainfall of

280 cm, whereas Rajasthan receives an average annual rainfall of only about 49 cm.

- Excessive rains may cause floods, whereas insufficient rains may cause droughts.

Water Management

- People often leave the taps open while shaving, bathing, brushing and washing vegetables even when not required.
- Leakage in pipes leads to wastage of water.
- Most rainwater flows into water drains and becomes useless. Such wastage of a precious natural resource must be stopped.

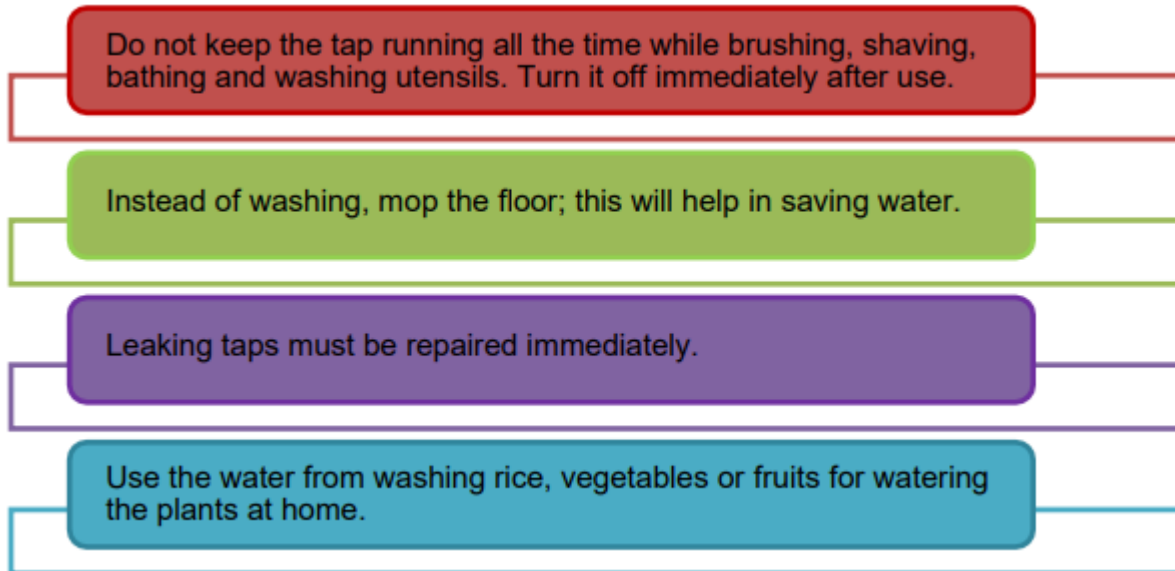


Proper Management of Water

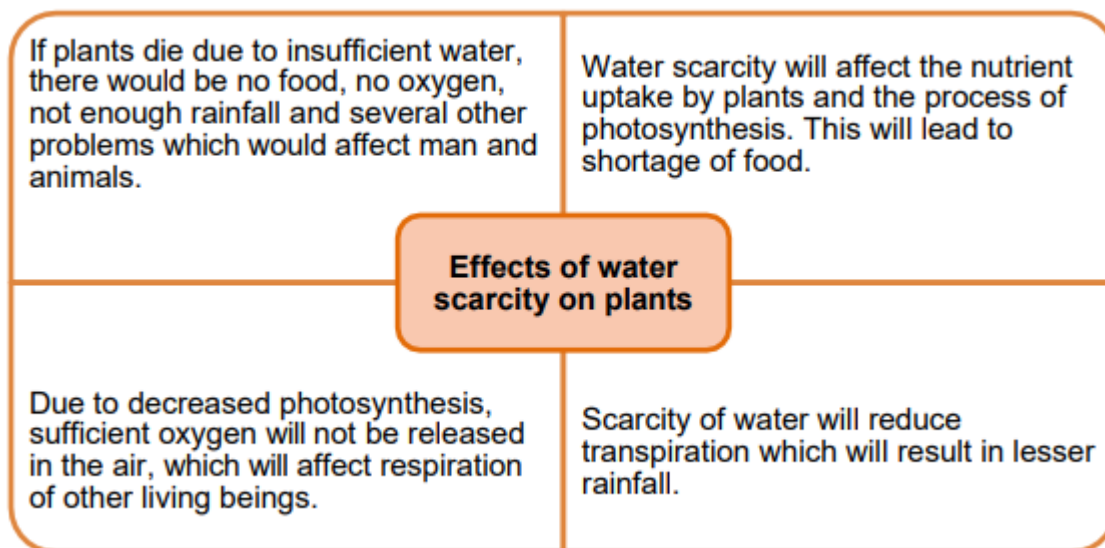
Percolation Pit	An important technique is rainwater harvesting which involves construction of percolation pits and recharge wells to recharge groundwater.
Bawri	A traditional way of collecting water is the ' <i>bawri</i> '. It was primarily constructed for collecting water to be used during times of drought.

Drip Irrigation	Drip irrigation is another technique of watering plants by making use of narrow tubes which deliver water directly at the base of the plant. It minimises the use of water in agriculture.
-----------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Water - Wise Habits



Effects of Water Scarcity on Plants



Methods of Conservation of Water

Economic use and conservation of water are the two main methods to save water.

- **Rainwater harvesting:** A lot of rain water goes into storm drains during the rainy season. This water can be conserved for use or to replenish the groundwater levels by the method of rainwater harvesting. Rainwater harvesting can be done by collecting rainwater from

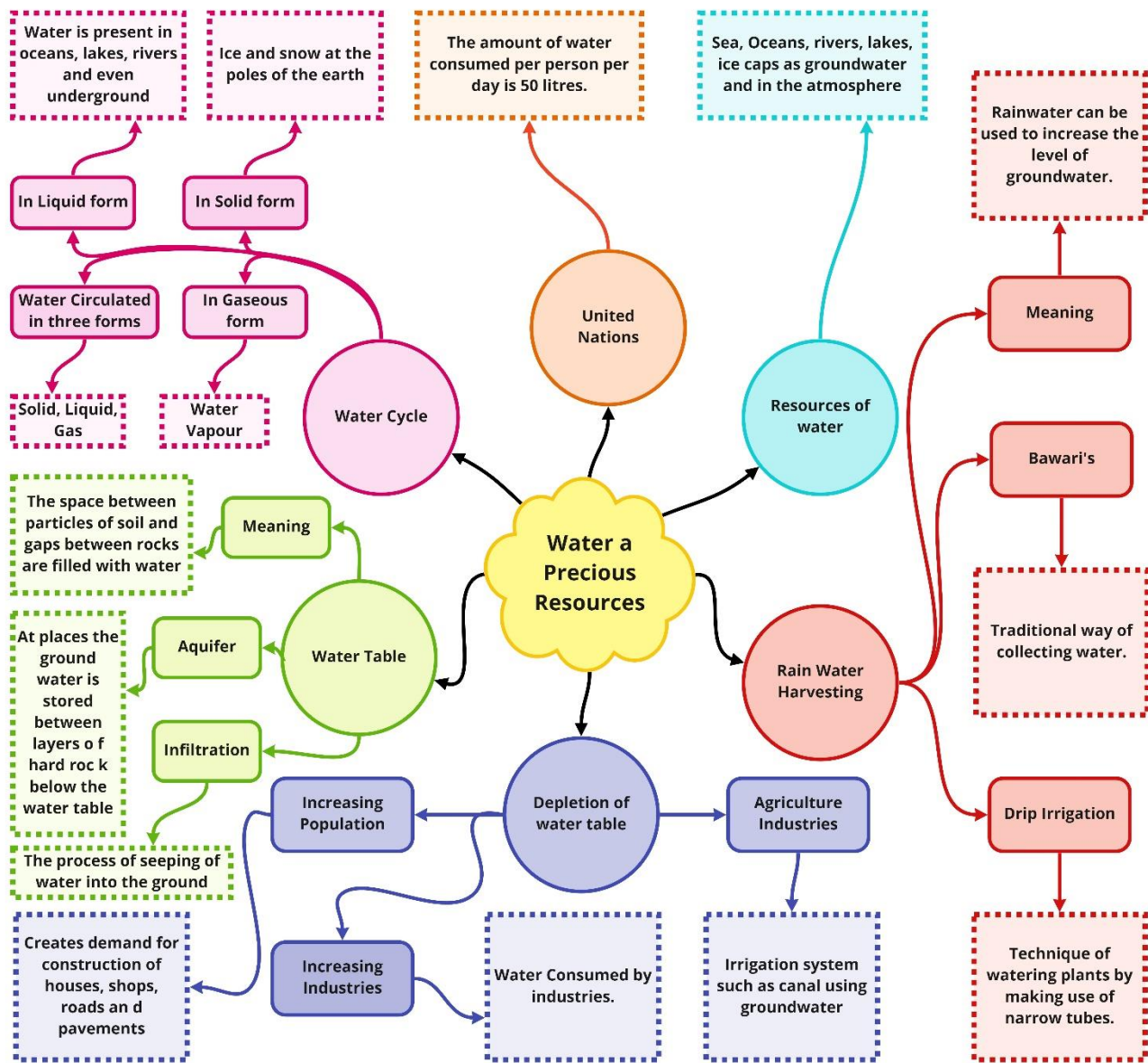
rooftops and storing it in tanks. The water can be used for various household purposes. Rainwater harvesting can raise the underground water table of the region.

- **Check dams:** Rainwater percolates into the soil only if it does not flow away quickly. Water can be prevented from flowing away by constructing check dams in the path of its flow.
- **Drip irrigation:** The drip irrigation system supplies the required amount of water only around the roots. Since water is supplied drop by drop, water loss through evaporation and runoff is prevented thus saving water.
- A huge amount of potable water is lost during the distribution of water because of leakage in the main water pipelines. Fixing these leakage can save a lot of water from going into the drains.
- Care should be taken by not to pollute the lakes and ponds by using them for washing clothes, bathing animals and other human activities.
- Another simple and effective method to reduce the usage of water is by recycling the water from industries and using it for horticulture purposes.

Distribution of water in India

- The movement of wind influences rainfall in India. Rainfall varies from place to place and the distribution of water is uneven.
- Some regions such as those of Rajasthan, Northern Karnataka and Gujarat do not have sufficient rainfall and are prone to drought, whereas some regions such as Andhra Pradesh, Orissa, West Bengal receive excess rain causing floods.
- Dams are built to maintain and distribute water supply. Artificial walls are built across the river that control the flow of water in them. It holds a reservoir whose water content is maintained by the opening and closing of the gates.
- The Bhakra-Nangal dam is built on the river Satluj and provides water to the states of Punjab and Haryana.

Class : 7th Science
Chapter-16: Water a Precious Resources



Important Questions

➤ Multiple Choice Questions:

Question 1. Water is found in

- (a) solid form
- (b) liquid form
- (c) gaseous form
- (d) all of these

Question 2. Water day is celebrated on

- (a) 21st March
- (b) 23rd March
- (c) 22nd March
- (d) None of the above

Question 3. Our body contains _____ % portion of water.

- (a) 75
- (b) 65
- (c) 95
- (d) 85

Question 4. Which one of the following is the cause of the depletion of water table?

- (a) Increasing population
- (b) Agricultural activities
- (c) Increasing industries
- (d) All of these

Question 5. _____ represents the solid form of water.

- (a) water vapour
- (b) snow
- (c) lake water
- (d) well water

Question 6. The process of seeping of water into the ground is called

- (a) aquifer

- (b) infiltration
- (c) water cycle
- (d) all of these

Question 7. The water below the ground is known as

- (a) groundwater
- (b) pure water
- (c) polluted water
- (d) none of these

Question 8. The large well like structure which is used in olden times for rainwater harvesting is called

- (a) well
- (b) bawris
- (c) johad
- (d) check-dams

Question 9. Which of the following doesn't show water shortage?

- (a) Taps running dry
- (b) Long queues for getting water
- (c) Marches and protests for demand of water
- (d) Three buckets of water per person per day

Question 10. 'Every drop counts' is a slogan related to

- (a) counting of drops of any liquid
- (b) counting water drops
- (c) importance of water
- (d) importance of counting

➤ **Fill In the Blanks:**

1. The groundwater stored between layers of hard rocks below the water table is known as an
2. is the purest form of water.
3. The water which is fit for human use is called
4. In India was the traditional way of collecting water.
5. % of earth's surface is covered with water.

6. is the process which maintains the amount of water on the earth.

➤ **True or False:**

1. Ice is liquid form of water.
2. Water is not essential for all living beings.
3. Water exists in its gaseous form as water vapour above 100°C only.
4. Rainwater harvesting is one of the ways to conserve water.
5. The minimum amount of water recommended by UN per person per day is 20 L.
6. Groundwater will not be depleted due to afforestation.

➤ **Very Short Question:**

1. Name the available water resources on earth.
2. Water that is fit for human consumption is called.
3. What per cent of total water on the earth is actually available for our use?
4. Why ice floats on water?
5. Name the gaseous form of water around us.
6. Clouds then release the water through?
7. Is increasing population the reason for depletion of water table?
8. What is water management?
9. What do you mean by water harvesting?
10. State the advantage of water harvesting?

➤ **Short Questions:**

1. Why are we left only tiny fraction of water for use even if about 75 % of the earth surface is covered with water?
2. State various uses of water?
3. Why do we need the water cycle?
4. What do you understand by anomalous expansion of water?
5. What is the reason behind floating of ice in water?
6. Define specific heat capacity of substance?
7. Water is a universal solvent. Explain
8. How cloud is formed?

➤ **Long Questions:**

1. Why water is considered as a precious resource?
2. Explain various processes that make up the water cycle.
3. Enlist some methods to conserve water.

✓ Answer Key-

➤ Multiple Choice Answers:

1. (d) all of these
2. (c) 22nd March
3. (a) 75
4. (d) All of these
5. (b) snow
6. (b) infiltration
7. (a) groundwater
8. (b) bawris
9. (d) Three buckets of water per person per day
10. (c) importance of water

➤ Fill In the Blanks:

1. aquifer
2. Rainwater
3. freshwater
4. bawris
5. 71
6. Water cycle

➤ True or False:

1. False
2. False
3. False
4. True
5. False
6. True

➤ Very Short Answers:

1. Answer: Oceans, seas, lakes, rivers, ice, ground water and moisture in the air.
2. Answer: Freshwater.
3. Answer: 0.006 per cent
4. Answer: Ice is lighter than water so floats on water.
5. Answer: Water vapour present in the air around us.
6. Answer: Precipitation
7. Answer: Yes
8. Answer: Water management is the continuous matching of water resources with the water requirements of a place.
9. Answer: Instead of letting rainwater run -off into the sea, it can be used to recharge ground water. This is known as rainwater harvesting.
10. Answer: Rainwater harvesting can be used to raise the water table in arid areas.

➤ Short Answers:

1. Answer: This is because most of the water about 97% of surface water is in sea and ocean as salty water that is unfit for domestic and agricultural use.
2. Answer: Water is used for various activities such as agriculture, industries, cooking, cleaning utensils, bathing, washing clothes, and, most importantly, for drinking.
3. Answer: The Earth is covered by water, however, almost 97% is salt water found in the oceans. We cannot drink salt water or use it for crops because of the salt content. We can remove salt from ocean water, but the process is very expensive.
4. Answer: When water at room is cooled, it contract until reaches 40c and then starts expanding. This strange behaviour of water is called anomalous expansion of water.
5. Answer: Ice is lighter than water so it floats on water.
6. Answer: The amount of heat required to raise the temperature of substance is known as specific heat capacity of substance.
7. Answer: A large number of substances dissolve in water so it is called universal solvent. A liquid that dissolve another substance (solute) to form solution is called solvent.
8. Answer: The evaporated water above the earth surface is carried away by warm air. As the warm air moves higher from the surface of the Earth, it starts to cool down. It is because the water vapour present starts to condense to form tiny water droplets. These droplets float in the air and form cloud.

➤ Long Answers:

1. Answer: Water is a precious source because all our daily activities are carried out with the help of water only. Water is found everywhere but not everywhere it is drinkable/ usable. Though the seas have no lack of water but still we can't drink or use it anywhere. Water helps in nourishment of animals and plants. We can't live without water and because it is scarce, that's why water is precious
2. Answer: There are six important processes that make up the water cycle:
 - Condensation – the opposite of evaporation. Condensation occurs when a gas is changed into a liquid.
 - Infiltration – Infiltration is an important process where rain water soaks into the ground, through the soil and underlying rock layers.
 - Runoff – Much of the water that returns to Earth as precipitation runs off the surface of the land, and flows downhill into streams, rivers, ponds and lakes.
 - Evaporation – the process where a liquid, in this case water, changes from its liquid state to a gaseous state.
 - Precipitation – When the temperature and atmospheric pressure are right, the small droplets of water in clouds form larger droplets and precipitation occurs. The raindrops fall to Earth.
 - Transpiration – As plants absorb water from the soil, the water moves from the roots through the stems to the leaves. Once the water reaches the leaves, some of it evaporates from the leaves, adding to the amount of water vapour in the air. This process of evaporation through plant leaves is called transpiration.
3. Answer: Water conservation is process of preventing wastage of water, using water carefully and recharging ground water. Water conservation can be done by:
 - Repairing leaking pipes and taps.
 - Not wasting water during brushing teeth, shaving, bathing, washing clothes and during other activities.
 - Rainwater harvesting.
 - By drip irrigation of plants.