
Lesson at a Glance

There can be no life without water on the earth or elsewhere in the universe.

- March 22 is celebrated as the **World Water Day**.
- The amount of water recommended by the United Nations for drinking, washing and maintaining proper hygiene is a minimum of 50 litres per person per day.
- *Year 2003* was observed as the *International year of Freshwater* to make people aware of this dwindling natural resource.
- Roughly only 0.006% of all the water found on the earth is available for our use.
- **Forms of water:**
 - (i) **Solid:** Ice and snow. Ice is present as ice caps at the poles, snow covers mountains and glaciers.
 - (ii) **Liquid:** Water. Water is present in oceans, lakes, rivers etc.
 - (iii) **Gaseous:** Water vapour. Water vapour is present in the air around us.
- **Unique Nature of Water:** Ice (solid water) is less dense as compared to liquid water. We can say that as water freezes, it expands. This is the unique nature of water. This unique nature of water is useful in many ways.
 - (i) In winters, the water in the lakes starts freezing to ice. The frozen ice floats at the top of the lake and covers it well. This ice then acts as a coat or insulator cover for the warmer water below. This helps the fishes and other aquatic animals to survive in severe winters.
 - (ii) The heat capacity of water is the highest among liquids. This property of water is used to cool engines of cars, trucks etc. Room coolers or desert coolers work on this property. The patients in the hospitals usually keep

their body warm by keeping hot water bottles. If they are filled with any other liquid, they would cool down faster.

(iii) Water is a very good solvent that can dissolve most of the things. That is why water is known as *universal solvent*.

(iv) Water is the only substance which is found in all its three forms, i.e., solid, liquid and gaseous, in nature.

- **Water cycle:** Ocean is the biggest store house of water which on evaporation forms clouds and which after condensation falls down as rain. After rain it passes through rivers and gets collected again in the ocean. The circulation of water in this manner is known as *water cycle*. The cycle is also performed through living beings like absorption and transpiration of water by plants and drinking by animals. Animals lose water during respiration and perspiration. They also lose water through excretion.

- **Groundwater:** The water of rain or from other sources like ponds, which seeps or percolate under the ground and collects over the impermeable rocks is called *ground water*.

- **Water Table:** The upper limit of underground water where all the space between particles of soil and gaps between rocks are filled with water is called *water table*. The water table varies from place to place. It may even change at given place.

- **Infiltration:** The process of seeping of water from water sources like rainwater, rivers, lakes and ponds into the ground is known as *infiltration*. This causes recharge of groundwater.

- **Aquifer:** The groundwater stored between layers of hard rocks below the water table is known as an *aquifer*. Water in the aquifers can be usually pumped out with the help of tube-wells or hand pumps.

- **Depletion of Water Table:**

(i) Depletion of water table takes when we withdraw underground water by tube-wells, hand pumps, jet pumps, more than seepage of rainwater or water from rivers, lakes and ponds.

(ii) Agricultural activities, scanty rainfall also affect water table.

(iii) Due to increase in population increases the demand of houses, shops, industries, roads, pavements etc. increases. All these things decrease open areas like parks and playgrounds and thus seepage of rainwater into the ground because pukka floors do not allow water to seep into ground easily.

(iv) As the number of industries increases, the demand of water also increases. This increased demand of water is fulfilled by drawing underground water which adversely affects water table.

- **Distribution of water:** The distribution of water over the globe is quite uneven. In India, some regions receive excessive rains causing floods whereas some regions have very little rains resulting in droughts.

- **Water Management**

(i) Due to leakage of water supply pipes, a lot of water gushes out of the pipes causing wastage of precious drinking water.

Civics authorities must take steps to prevent such wastage of water.

(ii) Knowingly or unknowingly we waste fresh drinkable water while brushing teeth, shaving, washing and other activities such as leaking taps.

We should take care of such ways of wastage of water.

(iii) The water that we get as rainfall just flows away. This is wastage of precious natural resource. We can prevent wastage of rainfall water by **Water harvesting or rainwater harvesting**. There are two techniques of rain-water harvesting.

(i) **Rooftop rainwater harvesting:** In this technique rooftop rainwater may be collected into a storage tank through pipes. That can be purified further and supplied as drinking water.

(ii) Another way to harvest rainwater is to percolate rainwater through the roadside drains. Making

special pits in the ground to percolate rainwater and overflow water to the underground water.

- **Bawris:** Bawri was the traditional way of collecting water. Bawris were recharged time to time. With time they fall into disuse and garbage starting piling in these reservoir. Nowadays, the bawris are being revived.
- **Drip irrigation:** It is a technique of watering plants by making use of narrow tubings which deliver water directly at the base of the plant.
- Need of the hour is that every individual uses water judiciously. Overdrawing of underground water should be avoided and efforts should be made to recharge underground water. To avoid wastage of water in the fields, drip irrigation may be adopted for watering the plants.

TEXTBOOK QUESTIONS SOLVED

Q.1. Mark 'T' if the statement is true and 'F' if it is false:

(a) The freshwater stored in the ground is much more than that present in the rivers and lakes of the world.

(T/F)

(b) Water shortage is a problem faced only by people living in rural areas.

(T/F)

(c) Water from rivers is the only source for irrigation in the fields.

(T/F)

(d) Rain is the ultimate source of water.

(T/F)

Ans. (a) T (b) F (c) F (d) T

Q.2. Explain how groundwater is recharged.

Ans. The groundwater gets recharged through the process of infiltration. Infiltration means seeping of water from rivers and lakes into the empty spaces and cracks deep below the ground.

Q.3. There are ten tubewells in a lane of fifty houses. What could be the long-term impact on the water table?

Ans. The effect on the water table depends on the replenishment of underground water. Only five families will share a tubewell, the water used for daily domestic purposes will not effect the water table. But if there is shortage of rains, the water used by the family will not replenished and water table will fall down.

Q.4. You have been asked to maintain a garden. How will you minimise the use of water?

Ans. To minimise the wastage of water we will use the drip irrigation which throws the water at the base of plants. We will check the leakages in the water pipes and arrange small pits for rainwater harvesting. The collected rainwater will be used later.

Q.5. Explain the factors responsible for the depletion of water table.

Ans. Various factors responsible for the depletion of water table are:

(i) **Increased population:** Demand of water has been increased by the increased population. As the number of humans increase, the consumption of water also increases.

(ii) **Increasing industries:** All industries need water. As the number of human population increase, the number of industries are also increased which definitely increases the consumption of water.

(iii) **Lack of water conservation techniques:** Main source of water on earth and for the underground water is rain. The water of the rain, if conserved can increase the ground water level. But this is not done due to lack of water conservative techniques.

(iv) **Agricultural activities:** India is a country which depends on agriculture. The land used for cultivation has increased. So, the consumption of water for agriculture has increased. Irregular rainfall has increased the consumption of groundwater. This has increased the depletion of groundwater.

Q.6. Fill in the blanks with the appropriate answers:

(a) People obtain groundwater through _____ and _____.

(b) Three forms of water are solid, _____ and _____.

(c) The water bearing layer of the earth is _____.

(d) The process of water seepage into the ground is called _____.

- Ans.** (a) wells, hand pumps
 (b) liquid, gas
 (c) aquifer
 (d) infiltration

Q.7. Which one of the following is not responsible for water shortage?

- (i) Rapid growth of industries
 (ii) Increasing population
 (iii) Heavy rainfall
 (iv) Mismanagement of water resources

Ans. (iii) heavy rainfall

Q.8. Choose the correct option. The total water

- (i) in the lakes and rivers of the world remains constant.
 (ii) under the ground remains constant.
 (iii) in the seas and oceans of the world remains constant.
 (iv) of the world remains constant.

Ans. (iv) of the world remains constant.

Q.9. Make a sketch showing groundwater and water table. Label it.

Ans.

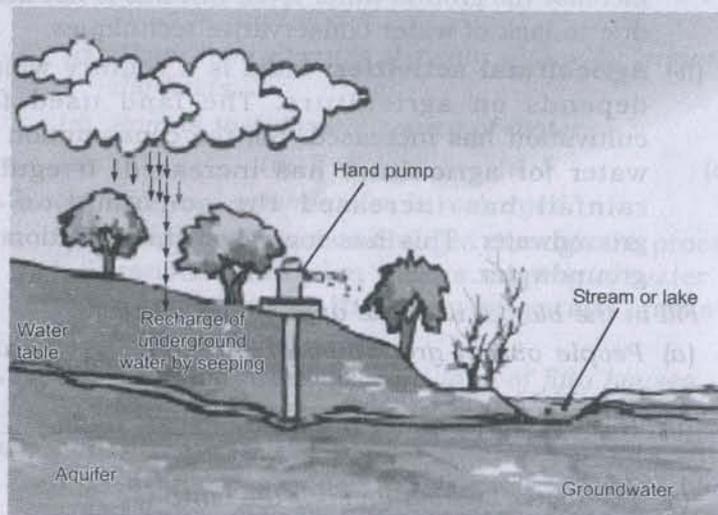


Fig. 16.1 Groundwater and water table.

EXTENDED LEARNING — ACTIVITIES AND PROJECTS

Q.1. Role play

You are a water detective in your school. You have a team of six members. Survey the campus and make a note of the following:

- (a) Total number of taps
 (b) Number of taps leaking
 (c) Amount of water wasted due to leakage
 (d) Reasons of leakage
 (e) Corrective measures taken

Ans. Students survey the campus and give answers of the questions on the basis of their observations.

Q.2. Groundwater pumped out

Try to find out if there are any hand pumps in your neighbourhood. Go to the owner or the users of a few of these and find out the depth at which they struck water? If there are any differences, think of the probable reason. Write a brief report and discuss it in your class. If possible, visit a place where boring is going on to install a hand pump. Watch the process carefully and find out the depth of the water table at that place.

Ans. The depth of the water depends on the water table at that place. Due to different depth of water table at different places the hand pumps are bored to different depth.

Q.3. Catching rainwater — Traditional methods

Form groups of 4 to 5 students in the class and prepare a report on the various traditional ways of water harvesting. If possible, use the following web link: www.rainwaterharvesting.org.

Ans. There are various ways of the water harvesting like bawris, ponds and check dams.

Q.4. Conservation of water

Carry out a campaign to conserve water at home and in the school. Design posters to remind others of the importance of water resources.

- Ans.** Educate the fellow students to:
- Close up the taps after use.
 - Take adequate amount of potable water which is required to drink. Do not take excess of drinking water which you later on throw.
 - Design posters such as people are standing in queue to collect drinking water from a tap or a water pump.

Q.5. Create a logo

Hold a competition to create a logo or a symbol depicting water scarcity.

- Ans.** Do it yourself.