**Vision Empower & XRCVC**

Teacher Instruction KIT

# Water: A Precious Resource

Syllabus: NCERT
Subject: Science
Grade: 7
Textbook Name: NCERT- Science Textbook for class VII
Chapter Number & Name: 16.Water: A Precious Resource

## 1. OVERVIEW

1.1 OBJECTIVES AND PREREQUISITES

### Objective

- To comprehend the importance of water
- To understand the factors leading to the scarcity of water
- To know different ways of conserving water (water management)

### Prerequisite Concept

- Water cycle, grade 6, *Chapter 14, Water*
- Sources of water, grade 6, *Chapter 14, Water*
- Rainwater harvesting, grade 6, *Chapter 14, Water*

### Content Index

*Kindly Note: Activities marked with * are mandatory*

## 2. LEARN

### 2.1 KEY POINTS

Water is essential for life.
March 22nd is celebrated as world water day to emphasize the importance of water.
Though Earth is covered with 71% of water, only 0.006% of water is freshwater ready to use. The rest of the water is either saline or in the form of snow caps, glaciers etc. which cannot be used directly.
The water from the seas, lakes etc. evaporate and form clouds on condensation. The water is also given out by trees by a process called transpiration. On precipitation, the water comes down as rain, infiltrates through soil and accumulates as ground water. This continuous cycling of water among its three forms is called water cycle. This helps to keep the total amount of water constant.
The rain water and water from ponds and lakes seep into the soil through the process called infiltration. The upper layer of this groundwater is called a water table. The water collected in the ground is stored between the layers of rocks. This is called aquifers. Water can be drawn from aquifers using hand pumps or tube wells.
When the amount of groundwater used is more than the amount of water replenished the water table gets depleted.

Scarcity of water is caused due to the depletion of groundwater. The causes for depletion are increasing population, increasing industries and agricultural activities.
The distribution of rainfall is uneven. Some places receive heavy rainfall and are affected by floods while some suffer from droughts due to scanty rainfall.
Waste water management is essential to save this precious resource. Water is wasted through leaking taps and pipes. Lot of water is wasted due to our day to day activities like brushing, washing, bathing etc.
Rainwater harvesting, building bawris and drip irrigation are some of the ways of conserving water.
Recharging the ground with rainwater is called rain harvesting.
**Bawri** were deep step wells built into the ground. It was the traditional way of rainwater harvesting. These were built to store rain water.
Drip irrigation is a technique in which narrow tubes are used to deliver water directly to the base of the plant.
Plants too cannot survive without water. Plants provide us with oxygen, food and many other products. They also help in bringing in more rain. If there were no plants life would not exist on earth.

2.2 LEARN MORE
None

## 3. ENGAGE

3.1 INTEREST GENERATION ACTIVITY

### Interest generation activity

**Activity 1: Importance of water**
*Materials Required*: None
*Prerequisites:* None

*Activity Flow*
Discuss with the students any of the following questions to prepare them for the day's lesson.

- Ask the students the uses of water from their day to day life.
- Ask them if they can imagine a day without water?
- Ask if they heard the news about water shortage in certain areas?
- Tell the students that this chapter would cover the importance of water and its management.

OR

- Ask the students if they need water?
- Where do we get water from?
- Have they faced water shortage in school or home?
- Why is world water day celebrated?
  Tell the students that earth is covered with 71% of water but only 0.006% is available for use as fresh water. Rest of the water is saline or in the form of snow caps, glaciers etc.

OR

- Ask the student why Earth is called the blue planet?
- Why can't we use all the water present on its surface?

3.2 CONCEPT INTRODUCTION ACTIVITIES

## How much water is available

**Activity 2: How much water is available**

*Materials Required:* medium sized bucket filled with water, bath mug, tea spoon, glass tumbler

*Prerequisites: None*

*Activity Flow*

- Take a medium-sized bucket and fill it up with water. It contains about twenty litres of water. Assume that this water represents all the water present on the earth.
- Take a teaspoon of about 5 mL capacity and transfer 100 spoons of water from the bucket to a small container, like a bath mug. This represents total freshwater on the earth.
- From the bath mug transfer thirty spoons of water to a glass tumbler. This gives a measure of usable water present as groundwater.
- Finally take out a quarter (1/4th) spoonful of water from the mug. It represents all the water present in all the lakes and rivers of the world.
- The water left in the bucket represents the saline water present in the seas, oceans and partly as groundwater. This water is not fit for human use.
- The water left in the bath mug represents the water, which is present in the frozen form in glaciers, ice caps and permanent snow; again not available readily.
- Let the children discuss the actual amount of water available for human use and how they feel about this.

## Terms related to water

**Activity 3: Terms related to water**

*Materials Required:* tactile diagram of water cycle, kettle or a vessel to boil water, water, a steel plate or lid
*Prerequisites: None*

*Activity Flow*

- Give the students the tactile diagram of the water cycle and explain the concept.
- Heat the water till it starts boiling. With the help of an adult they can feel the steam. Students note that water (liquid form) changes into steam. (Gaseous form).
- Keep the steel plate /lid near the steam, water droplets get collected on the lid. Students can feel the water droplets on the lid. Water vapour has changed into water.
- When it cooled down further it changed into the solid form -ice.
- The continuous cycling of water into its three forms has to be emphasized. Solid form in the form of ice in snow caps, glaciers, liquid form in lakes, ponds, seas etc. and gaseous form as in water vapour.
- While explaining the process, explain the terms related to it. Evaporation, condensation, precipitation.
- Mention that the excess water is given out by trees by a process called transpiration.

## Ground water

**Activity 4: Ground water**
*Materials Required:* One pot, soil, water
*Prerequisites: None*

*Activity Flow*

- Tell the students to add soil to the pot and feel it.
- Ask them to pour water into the pot and again feel the soil.
- Ask them what change do they observe?
- They will answer that the soil has become wet.
- Ask them to add more water.
- Where did that water go?
- Explain that water seeps through the soil in the pot. This process is called **infiltration**. Similarly, rainwater seeps into the ground and is stored in spaces between the rocks in **aquifers**. The upper level of this stored water is called a water **table**. We can use this groundwater with the help of tube wells and hand pumps. The water gets replenished due to rain water seeping into the ground.

## Depletion of water table

**Activity 5: Depletion**
*Materials Required: small objects like marbles, box/pot*
*Prerequisites:* None

*Activity Flow*

- Place a box in the centre and ask two students at a time to do the activity.
- One student will keep dropping small objects (eg: marbles) into a box or pot at a steady pace. Another student will be taking them out.
- If the second student is taking out faster than the rate at which first student is filling it soon, there will be nothing left in the pot - depletion.
- Through this activity make them understand what depletion is.
- Another analogy is depositing and withdrawing money from a bank account.

**Activity 6: Depletion of water table**

*Materials Required:* None
*Prerequisites:* None

*Activity Flow*

- Ask the student what would happen if water is drawn out in excess and there is not enough rain to replenish it
- Ask them whether they leave the tap open while brushing their teeth?
- Why should leaking taps be repaired immediately?
- Tell the students that they are going to discuss the factors responsible for depletion of the water table.
- Ask them why we need more houses and industries now?
    - They may answer that it is due to an increasing population.
- Lead the discussion to bring out the factors like more construction, more agricultural needs due to increased population. All these lead to water shortage.
    1. More construction means more usage of water and lesser open space for infiltration of water.
    2. Increasing population leads to increasing agriculture. More water is drawn for these practices when the rain is scanty.
    3. More industries are built to supply the increasing demand of the people. Most of the industries use water for various purposes.
    4. Deforestation and decrease in area for seepage also leads to depletion of the water table.

## Distribution of rainfall

**Activity 7: Distribution of rainfall**

*Materials Required:* Tactile diagram of rain map of India
*Prerequisites: None*

*Activity Flow*

- Ask the students to recall the regions with heavy rainfall and scanty rainfall.

- Discuss about the non uniform distribution of rainfall - deserts and flooded areas.
- Discuss the reasons for floods and drought situations.
- Ask them the problems faced by the people there.
- Loss of life and property takes place during floods and there is a danger of flood related diseases.
- In drought-stricken areas, people starve and sometimes die due to shortage of food and water.
- Give them the tactile rain map of India and explain the average annual rainfall in different regions.

## Water Management

**Activity 8: Water Management**

*Materials Required: Models* of bawri and narrow tubes with tiny holes
*Prerequisites:* None

*Activity Flow*

- Ask the students what is rainwater harvesting? Why is it important to harvest the rainwater?
- Ask them to feel the model of Bawri the step well. Explain that it was a traditional method to store rain water.
- Ask the students to take a narrow tube and make tiny holes in it with the help of an adult. Seal the tube with cello tape and fill it with water. Now remove the tape and ask the students to check how water drips through the tiny holes.
- Explain that irrigation using such tubes helps to give water directly to the roots of the plants and reduces the wastage of water. This is called drip **irrigation**.

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE*

1. What role can you play as a student to save water?
   Lead the discussion to elicit the answers as given below-
   Water wise habits like -
   - Turn off the tap when not in use.
   - Report about the leaking taps immediately.
   - Simple mechanisms to collect rainwater from the roof and use it.

   Add more such points and explain that every individual should use water economically.

2. Name some industries familiar to you. Make a list of the products obtained from these and used in our daily life. Discuss how the growing industrial activity is responsible for the depletion of the water table. (From textbook)

3. Ask the students what will happen to a potted plant if you don't water it.
   - The students may give answers that it will wilt and die after some days.
   - Lead the discussion to get the fact that water is essential for plants.
   - A world without plants will not have life in it. Living things depend on plants for oxygen, food, rain and many other products.

## 4. EXERCISES & REINFORCEMENT

4.1 EXERCISE AND REINFORCEMENT

### Reinforcement

**Activity 9: A successful initiative**

*Materials Required:* None

*Prerequisites: None*

*Activity Flow*

Ask the students to read aloud the initiative:

Rajasthan is a hot and dry place. The challenge of natural scarcity of water was met by a successful experiment. A band of social workers has transformed a dry area in the Alwar district into a green place. They have revived five dried-up rivers — Arveri, Ruparel, Sarsa, Bhagani and Jahazwali by constructing water harvesting structures

4.2 IMPORTANT GUIDELINES*

**Exercise Reading**

It is very important that the children practice their learnings as well as their reading. Hence have the children read out the newly learned concepts from their textbooks or other available resources.

**Perform Textbook Activity**

It is good practice to have the children perform the textbook activities. Your textbook activities might not be accessible hence go through this resource to learn how to make textbook content accessible

**Provide Homework**

To evaluate their understanding and to help the student revise and implement the new learnt concept ensure to provide them with homework. Students should perform one or two of the questions mentioned above or from the textbook exercises with the teacher in Class and the remaining may be given for homework. Also, ensure that the student knows their special skills linked to independently using their accessible books as it will be critical to doing homework independently

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