

WATER CONSERVATION: FROM AWARENESS TO ACTION (LEVEL 3)

Description	Learners will make materials to spread awareness about the need and ways to conserve water in their community. They will do this based on the concepts of causes of water scarcity, water usage in our daily lives, water cycle, and rainwater harvesting to do so.
Leading question	How can we encourage our community to use water wisely?
Subjects covered	Science, Art and Design, English, Math
Total time required	40-50 minutes a day for 5 days
Resources required	Plastic tray, funnel, plastic tubing/ hose, a small jug, rocks, gravel, cloth, paper, pencil
Learning outcomes:	<p>By the end of this project, learners will be able to:</p> <p>Knowledge-Based Outcomes:</p> <ol style="list-style-type: none"> 1. Describe the importance of water, its uses and sources. 2. Describe the water cycle and the different processes involved in it (evaporation/transpiration, condensation, cloud formation, and precipitation). 3. Identify various forms of water misuse and explain their impact on the environment. 4. Describe the process of rainwater harvesting. <p>21st Century Skill Outcomes:</p> <ol style="list-style-type: none"> 1. Be creative in designing mini-rainwater harvesting systems using resources available around them. 2. Critically think of different ways to reduce water misuse and make inferences during experiments. 3. Communicate effectively and present their findings through various visual media and speeches. 4. Collaborate with an adult on topics like water scarcity, water misuse and sources of water to understand the issues better and discuss possible solutions.
Previous Learning	NA
Supervision required	Medium


Day 1 -

Today, you will learn about how much water we use in our daily lives.

Time	Activity and Description
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5 minutes	<p>Introduction</p> <ul style="list-style-type: none"> - What will happen to you if you don't drink water for a few days? - What happens to plants if they are not watered for a week? Why does this happen? - All living things need water to survive. This means that humans, animals and plants cannot live without water. Most of the human body is actually made up of water. - Do you know how much water there is in the human body? (Average 60%) - During this week-long project, you will plan, design, and implement a water conservation event. - The event will aim to raise awareness about the importance of water conservation and encourage your friends, family, and community members to use water more wisely. - You will work towards designing this event every day and present the products that you make on the final day. 																				
25 minutes	<p>Exploring Water Usage</p> <p>To understand how to use water wisely, we need to first find out how much water we use in our daily lives for different activities.</p> <p>Step 1: Identifying Water Usage</p> <p>Note: Ask learners to create a similar table to the one below listing all the activities for which they use water in a day. Allow learners to think and write the activities on their own and provide support only if they have missed anything from the table.</p> <table border="1"> <thead> <tr> <th>Activity</th><th>Amount of water used</th></tr> </thead> <tbody> <tr><td>Drinking</td><td></td></tr> <tr><td>Brushing teeth</td><td></td></tr> <tr><td>Bathing</td><td></td></tr> <tr><td>Washing utensils</td><td></td></tr> <tr><td>Washing clothes</td><td></td></tr> <tr><td>Flushing and cleaning toilets</td><td></td></tr> <tr><td>Cleaning floor</td><td></td></tr> <tr><td>Any other activity</td><td></td></tr> <tr><td>Total water used in a day</td><td></td></tr> </tbody> </table>	Activity	Amount of water used	Drinking		Brushing teeth		Bathing		Washing utensils		Washing clothes		Flushing and cleaning toilets		Cleaning floor		Any other activity		Total water used in a day	
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	<p>Step 2: Measuring Water Usage</p> <ol style="list-style-type: none"> 1. Think and write down the amount of water used for each activity by you. Use a standard-sized tumble or container to measure the amount of water used for each activity. Make sure to choose the same container for consistent measurements. Note: Learners can take the help of their family to record the amount of water used. 2. Record the amount of water used for each activity in the "Amount of Water Used" column in your table. <p>Step 3: Making Inferences and Reflecting on Water Usage</p> <ol style="list-style-type: none"> 1. Write down your observations on which activity uses the most and the least amount of water. 2. Reflect on the importance and frequency of these activities. Are they essential? Do you perform them daily or occasionally? 3. What are some ways to reduce water usage during different activities? 4. Create a water diary to keep track of your water usage over the next few days. A water diary is a table noting down your intake of water like the one create for this activity. Note any reductions or changes you make in your water consumption. <p>Water is a precious resource that should be used wisely. By understanding our daily water usage and considering ways to reduce it, we can contribute to water conservation efforts. Remember to complete your water diary and be mindful of the importance of water in our lives.</p>
10 minutes	<p>Water Scarcity:</p> <p>Water scarcity means that there isn't enough clean water for people and nature. This is a big problem because all living things need water to survive. To understand this better, let us try out an activity.</p> <ol style="list-style-type: none"> 1. Create a list of essential activities you need water for. This can include drinking, cooking, hygiene (hand washing, brushing teeth), and any other activities you consider important. 2. Now, imagine you have only a limited amount of water available for the entire day. How would you allocate this water among the activities you listed in step 2? What activities would you prioritise, and which ones might have to be limited? 3. Reflect on the challenges you might encounter when trying to manage with limited water. How does this make you feel, and what difficulties do you foresee? 4. Share your thoughts and reflections with a friend or family member, and discuss possible solutions to address the challenges of water scarcity. <p>Note: Connect the discussion to the previous activity where they listed essential activities and their water usage. Reflect on how the limited water supply affected those activities and discuss possible strategies for water conservation. Encourage learners to think about ways they can contribute to water conservation efforts in their own lives and communities.</p>

At home activities	Water Diary: Fill out the table with your daily water usage. In your water diary, note your observations and reflections on water usage and conservation for the next 3 days.
Optional Literacy/ Numeracy Activity	<p>Literacy: Write a short reflection paragraph summarising your key takeaways and any changes you plan to make in your water usage habits.</p> <p>Numeracy: Visualizing Fractions</p> <ul style="list-style-type: none"> Learners will represent 60% of the human body being made up of water on an outline of a human body. To do this they will: <ol style="list-style-type: none"> First, convert 60% into a fraction ($60/100 = 6/10 = 3/5$) Then, they will represent this fraction visually using circles or squares (draw 5 circles/ squares and shade only 3) Finally, try and shade 3/5th of the human body (they can do this in various ways such as shade only 3/5 the of the abdomen and any 3 parts out of limbs and the head) 

Day 2

Today, you will learn about water sources and the water cycle.

Time	Activity and Description
5 minutes	<p>Water Sources</p> <ul style="list-style-type: none"> In the previous class, you found out about the impacts of water scarcity on our lives through the activity in which you had a limited amount of water to take care of all your needs. Today, let us find out what makes water scarce! Where do we get the water that we use in our daily lives? Can you name different sources of water that you know of? What are natural sources of water? Are there any human-made sources of water in our community? What is groundwater, and how does it contribute to our water sources? How do we ensure that our water sources remain clean and safe for use? Although water is abundant on Earth, only a small percentage of it is fresh water suitable for human use. Only about three percent of Earth's water is freshwater. Of that, only about 1.2 percent can be used as drinking water. Most of the Earth's water is in the form of saltwater in seas and oceans. Based on this information, do you think we need to conserve water? Why?
25 minutes	<p>Water Cycle</p> <ul style="list-style-type: none"> How does water reach the different sources, such as lakes and rivers? How many times have you noticed that water spilt on a floor dries up after some time? The water seems to disappear! Similarly, water disappears from wet clothes as they dry up. Water from wet roads, rooftops and a few other places also disappear after the rains. Where does this water go? The changes observed are related to the movement of water in nature.

Note: Briefly introduce the concept of the water cycle, explaining that it is the continuous process through which water circulates on Earth. They will be doing the below activity to understand this better.

Materials needed:

- Heat source (lamp or heating pad or the sun), water, clear bowl or cup, plastic wrap or glass lid

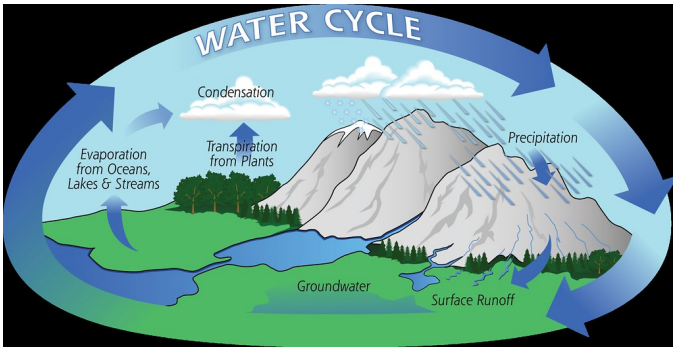
Instructions:

1. Fill the container with water and place it in the centre of the clear bowl or cup. This container represents a body of water such as a lake or ocean.
2. Cover the bowl or cup with plastic wrap or the glass lid, creating a seal. This represents the **atmosphere**.
3. Position the heat source near the container, but not directly touching it. The heat source represents **the sun's energy**.

Note: Get the help of an adult while doing this.

4. Observe what is happening. The heat from the sun causes water to evaporate from the surface of the body of water. This is the process of **evaporation**.
5. As the water evaporates, it turns into water vapour and rises, represented by the invisible water vapour filling the "atmosphere" inside the bowl or cup.
6. Over time, the water vapour cools down as it reaches the sides of the bowl or cup, represented by **condensation**. Small droplets of water start to form on the inner surface of the bowl or cup. When droplets from water bodies come together, they create **clouds**. So, when you see clouds in the sky, you're actually witnessing the result of this fascinating process of condensation.
7. As the water evaporates, it turns into water vapour and rises, represented by the invisible water vapour filling the "atmosphere" inside the bowl or cup.
8. Eventually, the droplets become large enough that they fall back into the container, simulating **precipitation**. Explain to the learners that this is how **rain** or other forms of precipitation occur. **Clouds** play an important role in the water cycle as they eventually release their moisture through precipitation, completing the cycle.
9. The water that falls back into the container collects, completing the cycle and representing the process of **collection**.
10. Throughout the demonstration, guide the learners by explaining each step and the corresponding stage of the water cycle: **evaporation, condensation, precipitation, and collection**.


Note: Encourage the learners to observe the changes happening in the demonstration and ask them questions to deepen their understanding.


	
5 minutes	<p>Reflect on the concepts learners today about the water cycle and its importance. You can provide prompts such as:</p> <ul style="list-style-type: none"> - What was the most interesting or surprising thing you learned about the water cycle? - How does understanding the water cycle help us in our daily lives? - Can you think of any examples where the water cycle has an impact on the environment or human activities?
5 minutes	<p>Introducing the final project:</p> <ul style="list-style-type: none"> - Let's take our knowledge of water sources and scarcity and apply it to a real-world context. We have an exciting opportunity ahead – a water conservation event. In this event, we will try to raise awareness about the importance of water conservation and explore practical ways to conserve this precious resource. What could we do during this event? - First, you are going to conduct surveys or interviews in your local community to gather information about people's perceptions and practices related to water usage and availability. - Collect the data on water consumption patterns, challenges faced in accessing clean water, or any initiatives taken to conserve water <p>Note: Find a worksheet in the appendix that you could distribute to learners to help them gather the required information. You could model it as well with one of the learners and discuss what questions to include.</p> <ul style="list-style-type: none"> - Be ready to discuss your findings on Day 3 and present them on Day 5 during the water conservation event. - Document your findings, including photographs, quotes, newspaper articles, or statistics that highlight the importance of water and the need for sustainable practices.
At home activities	<ul style="list-style-type: none"> - Interviews: Learners conduct 2-3 interviews with their community or family members. - Water Cycle Visual Representation: Learners work on their posters or diagrams of the water cycle.
Optional Literacy Activities	<p>Research Local Examples: Learners research and share local examples of how the water cycle affects their city or village. This could include studying local bodies of water, rainfall patterns, and any unique features related to the water cycle in their area. Learners can just interview elders or their parents.</p>

	<p>Water Source Stories (Optional activity to complement learning and the collection of stories that could be part of the Water Conservation Event):</p> <ol style="list-style-type: none"> 1. Each learner interviews an older family member or community member about their experiences with local water sources. 2. Have learners ask questions about the sources of water used in the past, how they were accessed, and any changes they have observed over time. 3. Allow each learner to share a summary of their interview and the insights gained with the rest of the class the next day. 4. Facilitate a discussion where learners reflect on the changes in water sources and their impact on the community.
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Day 3 –

Today, you will learn about water misuse and rainwater harvesting.

Time	Activity and Description
10 minutes	<p>Note: Recap the water cycle and check if learners have completed their homework - interview and drawing of the water cycle. This is your opportunity to present you with water cycle posters/ diagrams.</p> <ul style="list-style-type: none"> - All the information gathered during the interview will be presented during the event which will contribute to the overall understanding of water usage, challenges, and the need for sustainable practices in your local context. - Today, we will shift our focus to the misuse of water to understand how our actions can contribute to water scarcity. - Think of examples of water misuse in India. (<i>wastage in households, excessive irrigation, or pollution of water bodies</i>) - Observe the picture given and answer the following questions: <ul style="list-style-type: none"> - What do you notice in this picture? - How do you think water is being misused in these situations? - How does water misuse impact individuals, communities, and the environment? 
25 minutes	<p>Rainwater Harvesting</p> <p>It is important that we understand the problems we are facing and think of solutions to solve them. One such solution to increasing the availability of water is to collect rainwater and store it for later use. Collecting rainwater in this way is called rainwater harvesting.</p> <ul style="list-style-type: none"> - Rainwater harvesting is a sustainable practice of collecting and storing rainwater that falls on rooftops and other surfaces, typically for later use in various household, agricultural, or environmental applications, helping to conserve and manage water resources. - What are the benefits of rainwater harvesting? (<i>Groundwater recharge, reduced water bills, and sustainable use of water resources</i>)

	<ul style="list-style-type: none"> - Draw the design of your rainwater harvesting system on a piece of paper. This will help you use the materials and create your model. - Let us use the design and build a mini rainwater harvesting system. <p>Materials: Plastic tray or basin, funnel, plastic tubing or hose, small container or jug, water source (e.g., a pitcher of water). If materials are unavailable, you may use cardboard/ paper to create the model.</p> <p>Note: Learners will design and build a mini rainwater harvesting system using the materials provided. Consider local materials, such as buckets, containers, or even natural elements, like vegetation or sloping terrain, that can aid in rainwater collection.</p> <ul style="list-style-type: none"> - Simulate rainfall by pouring water into their system and observe how it collects and stores water. - Discuss the effectiveness of the system and how it can be improved.
	
5 minutes	<p>Show your model to an adult to receive feedback. Feedback can be given on the following questions:</p> <ul style="list-style-type: none"> - Does the model display rainwater harvesting? - What did you like about the model? - What can be done better? <p>Note down the feedback given and incorporate the changes to your model as homework.</p>
At home activities	<ul style="list-style-type: none"> - Make any changes if required to the model. - Based on your experience of designing and creating the model today, reflect on the following questions and make a note of the same in your notebook: <ul style="list-style-type: none"> o What was the most exciting part of designing and creating the model? o What was the most difficult part? Why did you find it difficult?

Day 4 –

Today, you will learn about filtration and prepare for the Water Conservation Event!

Time	Activity and Description
20 minutes	<p>Did you know that over two-thirds (71%) of all freshwater sources on the Earth are used for agricultural purposes?</p> <ul style="list-style-type: none"> - We can significantly reduce the reliance on freshwater sources for irrigation purposes, by treating and reusing water that has already been utilised. One way to treat water is filtration. - The water we drink goes through two types of treatment:

	<ul style="list-style-type: none"> - physical filtration, during which water flows into tanks with sand or gravel; and - chemical disinfection using chemicals such as ozone, chlorine, or fluoride to kill bacteria. <p>Let us try out an activity to understand this better.</p> <p>Note: <i>While this activity does not filter the water to reach drinking standards, it helps you explore the first stage of water treatment— filtration.</i></p> <p>Think about these questions during the activity:</p> <ul style="list-style-type: none"> - What does the water look like before and after filtration? - Which filtration system made the clearest end water? Why? - What would happen if we filtered the water a second time? - Does soil help filter our water? <p>Materials: Dirty water, table or any flat area for stations, clear plastic bottle, gravel rocks and any number of filtering items: sand, rocks, porous clay, potting soil, dirt, clothing, sawdust, wood chips, cotton balls, silt, alum, powdered charcoal.</p> <p>What To Do:</p> <p>Preparation</p> <ol style="list-style-type: none"> 1. Cut the bottle off 4 inches below the mouth. 2. Place the top of the bottle upside down in the bottom section of the bottle (like a funnel.) 3. Place a few gravel rocks at the bottom of the funnel to close the gap from the cap. <p>Set-up</p> <p>Place a glass of dirty water, one cut and prepared bottle with gravel, and equal amounts of all available filtering items on the table/flat surface.</p> <p>Challenge</p> <ol style="list-style-type: none"> 1. Come up with a filtering system to turn one glass of dirty water into the clearest sample. 2. Use the bottle funnel as your basic structure and use any of the items on the table as filtering devices. <p>Note: <i>Learners can use multiple filtering materials and try to achieve as much clarity of water as possible and then reflect on what materials and combinations worked best.</i></p> <p>Tip: <i>As another form of a challenge, limit the number of materials you provide for the water filtration challenge and see how creative your learners can be with their designs.</i></p>
20 minutes	Preparing for the Water Conservation Event:



	<ul style="list-style-type: none"> - The Water Conservation Event is a celebration of everything we have learned and our way to promote water conservation and responsible practices in our community. - Present your learnings the way you prefer as long as it aligns with the goal of the conservation event, e.g., you can share: <ul style="list-style-type: none"> - Presentations and Speeches: Prepare presentations or speeches that highlight your learnings and insights on water conservation. You choose your preferred format, such as informative speeches, or even creative performances like skits or poetry! - Posters on Water Conservation: Create visually appealing and informative posters that educate viewers on how to conserve water. You can include practical tips, facts about water usage, and compelling visuals to grab attention and convey your message effectively. Use colours, fonts, and illustrations strategically to make the posters eye-catching and memorable. - Findings from Interviews: Share the findings of the interviews you conducted with neighbours or community members regarding water usage and the need for change. You can prepare reports, infographics, or visual displays that summarise the key points and recommendations gathered from the interviews. This will provide valuable insights into the local community's perceptions and challenges related to water conservation. - Presentation on Water Misuse in India: You can explore the challenges faced by different regions in India, the impact on communities and the environment, and possible solutions to address these issues. Include relevant statistics, case studies, and personal stories to make the presentation informative & thought-provoking. - Different Ways to Conserve Water: Share innovative and practical ways to conserve water. For example, you can demonstrate the use of low-flow faucets, rainwater harvesting systems, or greywater recycling methods. Explain the benefits and feasibility of each method to inspire the audience to adopt these practices. - Mini Water Harvesting Model: Show the mini water harvesting models you created to demonstrate the process and benefits of water harvesting. You can invite visitors to interact with the model to understand how water harvesting works and its positive impact on water conservation. - Water Filtration Systems <p>Tip: Encourage Creativity: <i>Emphasise the importance of creativity in learners' presentations. Encourage learners to think outside the box and explore unique ways to engage the audience. They can incorporate storytelling, visual metaphors, or interactive elements to make their presentations more memorable and impactful.</i></p> <p>Tip:</p> <ul style="list-style-type: none"> - Speech Writing: <i>Provide learners with tips on how to write effective speeches. Emphasise the importance of clarity, logical flow, and engaging storytelling.</i>
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	Encourage them to use persuasive language and provide relevant examples or anecdotes to make their speeches more impactful.
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Day 5 -

Today, you will launch the Water Conservation Event!

Time	Activity and Description
30 minutes	<p>Present your final products to your friends, family and community members. Note: Encourage learners to demonstrate their understanding of the topics, showcase their creativity, and convey the importance of water conservation through their projects.</p> <p>After the presentation, ask the audience to provide feedback and offer suggestions for improvements. Feedback can be given on aspects like content, presentation, creativity, and effectiveness in raising awareness.</p>
10 minutes	<p>Reflection and Conclusion: Note: Encourage learners to think about what they have learned, their growth, and the impact of their work.</p> <ul style="list-style-type: none"> - What did you learn from this project? - What did you enjoy doing the most during this project? - Do you think you will be mindful of your water usage going forward? - Do you think you will ensure there is no water wastage in your house or surrounding areas? How do you hope to do this? <p>Note: Acknowledge and celebrate the efforts and achievements of the learners. Recognize outstanding projects, creativity, teamwork, and engagement throughout the week.</p>

Additional enrichment activities:	<p>How Clouds are Formed Activity</p> <ul style="list-style-type: none"> - Take a glass half filled with water. Wipe the glass from the outside with a clean piece of cloth. Add some ice to the water. Wait for one or two minutes. Observe the changes that take place on the outer surface of the glass. - From where do water drops appear on the outer side of the glass? The cold surface of the glass containing iced water cools the air around it, and the water vapour of the air condenses on the surface of the glass.
Modifications for simplification	<ul style="list-style-type: none"> - If your learners are unable to write, encourage them to draw pictures to show their ideas, and communicate verbally. - Allow learners to choose the format in which they present their data, such as a traditional oral presentation, a visual poster, a slideshow, or a written report. This accommodates different learning preferences and skills. - Provide graphic organisers or templates to help learners structure their findings and insights. This can assist learners who may struggle with organising their thoughts or presenting information in a coherent manner. - Adapt your explanations based on learners' prior knowledge and comprehension levels. Simplify the language or provide additional examples for struggling

learners, while challenging more advanced learners with higher-level explanations or connections to other scientific concepts.

ASSESSMENT CRITERIA

A majority of my learners were able to:

- ☐ Describe the importance of water for human survival.
- ☐ Illustrate and describe the processes involved in the water cycle.
- ☐ Describe the different ways in which water is misused.
- ☐ Create a model of rainwater harvesting.
- ☐ Present their findings on water sources, scarcity, misuse and conservation methods to an audience.

APPENDIX

Day 1 Worksheet: Water Usage and Availability Surveys

Name: _____

Instructions: For your homework assignment, you will be conducting surveys or interviews in your local community to gather information about people's perceptions and practices related to water usage and availability. This data will be used to support your final project presentation on Day 5. Follow the steps below:

- 1. Choose a Location:** Select a specific area or community in your locality where you will conduct your surveys or interviews. It could be your neighbourhood or even people in your house!
- 2. Prepare Your Questions:** Use the questions you developed in the class (pick 4-6 questions) that will help you gather insights about water usage, challenges, and conservation practices. Consider asking about the following:
 - How do people use water in their daily lives?
 - What challenges do they face in accessing clean water?
 - Are there any initiatives or practices in place to conserve water?
 - What are people's perceptions about water scarcity and the importance of conservation?
- 3. Conduct Surveys or Interviews:**
 - Visit your chosen location and approach individuals or households to conduct your surveys or interviews. Be polite and respectful, and explain the purpose of your assignment. Do 3-4 interviews.

- Ask your questions and listen attentively to the responses. Take notes or record their answers, with their permission.
- Feel free to include photographs, quotes, or any other relevant data that can support your findings.

4. Document Your Findings:

- Compile your survey responses, interviews, and any additional data you collected.
- Organise your findings in a clear and structured manner. You can create a table or chart, or write a summary highlighting the key points.

5. Reflection and Analysis:

- Reflect on the data you have collected and analyse the patterns or trends you observe.
- Consider the implications of your findings and how they relate to the topics covered during the week.
- Think about how you can present this information effectively to engage and inform your audience during the final event.

6. Bring Your Findings to class:

- Come prepared to share your findings with your classmates and teacher.
- Be ready to present your data, showcase any photographs or quotes, and discuss the insights you gained from your community interactions.
- Your findings will contribute to the overall understanding of water usage, challenges, and the need for sustainable practices in your local context.
- You will present your findings on Day 5.

Note: Remember to respect the privacy and consent of the individuals you interview or survey. Ensure that you approach people in a considerate manner and only collect data from those who are willing to participate.