

Water- Use Activity

Purpose

- To audit water usage at a facility (e.g a school, Home, Hospital, Gym, swimming pool) in order to raise awareness on water sustainable issues related to water use. Unless one knows how much water they are using, and how much is available in the rivers and lake basins, it is impossible to know whether you are using it sustainably.

Overview

- As population grows and the standards of living increases for many people, they tend to draw more from natural resources. It is important to know how much of this water is drawn from the natural environment.
- Students will measure water usage in order to understand how much water is withdrawn from the environment for use at the various facilities where they spend time. The principle is to understand how much water an individual uses and how can we reduce on water wastage and mitigate the consequences of water scarcity.
- Water scarcity or pollution can disrupt or halt production, cause problems within the supply chain, lead to conflict with other water users, such as farmers or communities in the area and damage corporate reputations.
- This exercise will tell us how much water is used each and every day in the activities at a given facility? This will partly indicate how much pressure we exert on our freshwater resources. Paying special attention to water use, water scarcity and pollution can make a school become a leader in water stewardship.

Student outcomes

- Student will be able to use the basic ways of monitoring the quantity of water used at a facility and suggest ways of mitigating water wastage. Where is the water dependency in the school operation? Can a student do something to reduce water use and help manage water for both people and nature?

Scientific inquiry abilities

- Identify answerable questions
- Design and conduct scientific investigations
- Develop explanations and predictions using evidence
- Communicate results and explanation

Time

- 30 minutes to collect water use data
- 60 minutes to analyse water use data
- 30 minutes to debate about mitigating methods to save water
- 30 minutes for group to present results to the class, ideas on going forward and problems encountered.
- 2hr visit to a local wastewater treatment plant

- Present outcomes at a school assembly- 20minutes

Level

- Intermediate and above

Materials and tools

- A watch or clock with a second hand
- Measuring cylinder.
- Two-litre plastic soda bottles
- Paper and pen
- Log-book
- Water-use activity sheet
- Bucket (10 – 20 L)
- Camera

What to do and how to do it?

At a given facility, one or more of the following places a water outlet is placed. The toilet (bathroom), Kitchen, garden, and the gymnasium. Students need to establish the amount of water used when one person has finished using a toilet and flushes. In other words, how much water is contained in a cistern? Such information can also be got from a local supplier of cisterns. Where it is not easy to establish the capacity of cisterns, then students can use the 2-litre plastic soda bottle and fill it up. Student should establish how many cisterns are in each toilet facility. They should come up with total volume of water used when all toilets are occupied and subsequently flushed. This will require a student work out how many people use the toilets at any break in time at the facility. Student can stand a distance and monitor use. This monitoring shall be limited to only 30 minutes.

Alternatively, students can create a log and pin it in every toilet. This will require the researchers to encourage toilet users to mark on the log for a particular day to indicate that after using toilet I did flush. Having worked out the volume for a cistern, this can be multiplied by the number of ticks on the log and that will indicate how much of the water was used. This log can also be put in teachers' bathrooms, the kitchen bathroom and also at the gymnasium. Students should collect the logs at end of school day and place another log for the following day.

In the school garden, water may be used to irrigate the compound. Students will establish the specifications of the irrigation system on how much water is delivered per second. Thereafter, students will find out how many hours the irrigation is opened per day, then work out the volume of water used to irrigate the school compound.

In a situation where the facility has to transport water e.g to a toilet, teachers' quarters, kitchen etc, then students have to keep track of daily delivery of water and find an average consumption per day.

For example, how many 20 litre containers are delivered to the kitchen every day? How many of these are used by each staff member at their residence? How much of this water is put in the hand wash utensil at the exit of a toilet?

The other alternative to this exercise is for students to request the administration to view the water meter at the facility. When allowed, students should record the meter reading every day at 8.00 am

and also take a reading when the school closes. A daily log should be kept every day and this exercise can be distributed among students so that everyone participates.

Analysing water use data

Daily water use records should be brought to class.

Enter the daily records into a table (one can introduce the capturing of data using MS excel spreadsheet).

Ask students to point out the days when water was less used and those days when water was most used.

Help students to construct graphs using the data that was collected.

Student should be able to see or show which unit at the facility uses more water.

Encourage students to write short sentences explaining how the exercise was carried out (contributes to their methodology), what they did when they had data (data analysis), and what did the data reveal (results).

This study is to create awareness. The volume of water used can be divided among the total number of students and staff and work out each person's consumption. (per capita use at school)

This exercise can be extended, in away of asking students to go monitor water use at home for one week. Then that data can be brought to class so that each student can analyse their home consumption and also divide it among the people in their household.

It is also expected that student will find the cost of water in cubic meters paid to the water service provider. They can then find out how much money is spent on school water and their home use water.

Visit to the wastewater treatment plant

The visit should be a follow up on the information collected at a facility. At the treatment plant students can be shown the recycle process, but most important they should learn about how much of wastewater arrives at the facility per second. Its from this point that they can work out the percentage in volume of what their school contribute to the overall total of water received at the treatment plant.