

Water Conservation Lesson Plan



Aim

To show how vital water is in our lives and why it's so important to look after it.

Time requirements

Approximately 120 minutes spread out over a few classes (additional time for preparation and research)

Resources

- Interactive water resource
- Whiteboard or projector
- Post its and A3 sheet of paper
- Pens
- Internet access

Cultural Eutrophication Experiment

- 3 beakers per group
- fertiliser
- graduated cylinders
- pipettes
- slides
- microscopes (or filter paper)
- pond water/ distilled water with added algae
- recording tables

Learning objectives

To learn, through discussion, observation and experimentation, about the importance of water, the many ways we use it, the pressures on water and the various ways we can save and protect this essential resource.

Curriculum Strands

Geography

Senior Cycle – Elective Unit 4: Patterns and Processes in Economic Activities (4.5 Environmental Impact)

Junior Cycle – Section C: Patterns in Economic Activity (Unit C1. Primary Economic Activities: the earth as a resource)

Maths

Junior and Senior Cycle – Strand 1: Statistics and Probability

Biology

Senior Cycle – Unit 1: Biology – The Study of Life (1.4.9 Human Impact on an Ecosystem)

Junior Cycle – Section 1C: Animals, Plants and Micro-organisms (1C2 the Microscope, 1C7 Ecology)

Skills

Questioning, observing, recording, discussing, cooperating, investigating, counting, analysing, interpreting and presenting data

Links to Green-Schools

Step 3 Action Plan – Discussions and experiment on water, its importance, pressures it faces and solutions

Step 6 Informing and Involving – Posters, displays and presentations on water conservation involving students and informing the whole school community

Vocabulary

Eutrophication, cultural eutrophication, algae, cell, pulse disturbance, press disturbance

Running the activity:

- 1) Water conservation discussion:** put the class in pairs or small groups, handout 4 post it's per group, pose the below questions asking the students to place their answers on the post it's.
 - How much water is there on the planet? And how much of this is available for direct human use? (guess in percentage)

- What are the ways people use water?
- What pressures are on our water resource?
- Name some ways you can save water?

Collect and display the answers on a sheet.

Go through Section 2 of the resource, checking and discussing the answers as you go. Have the students design and put together an informational poster including the answers to the questions above and place around the school. You could show the clip One Water (www.onewater.org/movie) which highlights the changing relationship towards water around the world and its importance in our lives or one of the many clips on Water for the Ages website (<http://waterfortheages.org/>). One of these clips could be played on the monitors around the school on a water awareness day or even shown at a school assembly.

2) After going through Section 2 ask the students what the main types of pollution are, see how many they can recall. Carry out the following **cultural eutrophication experiment** which shows nutrient pollution:

- Explain eutrophication (nutrient pollution) and cultural eutrophication (nutrient pollution accelerated by human activity).
- Explain the following experiment and ask the students to come up with a hypothesis of what they think will happen during the experiment. For example, will there be more or less algae in the beakers, will the colour change, will any samples recover from the added pollutant etc.
- Divide the class into groups and give out 3 beakers per group.
- A sample of pond water should be given to each group. The pond water should be stirred and equal amounts poured into the 3 beakers.
- Students will make observations about the amount of algae in each beaker. Then count and record the number of algae cells on a slide and/or quantifying the colour of the water using filter paper. If looking at the colour, filter approximately 150-200ml of pond water using the filter paper, take a picture of the filter and keep the paper for future reference and comparison.
- Each group will then add an agreed amount of fertiliser (e.g. 10ml of fertilizer to 90ml of water) to beaker 2 which will be the pulse sample and beaker 3 which will be the press sample. None will be added to beaker 1 as this will be the control. Different groups could add varying amounts of fertiliser to see what will happen to the samples.
- Student should place their beakers in a place with adequate sunlight and observe them for a designated period of time. Each time the students observe their beakers they should record the data and add more fertiliser to the press beaker (the same concentration as previously added).
- Discuss the results; what they were and what they mean. Each group could create a presentation based on their findings and research the potential impacts of eutrophication on the environment. They should include background information, materials and methods, results and conclusions. Graphs and tables could be created from results.

Explanation:

After some time students should notice that beaker 2 will recover from the large amount of fertiliser while beaker 3 will not. This highlights the fact that a onetime pollutant incident (pulse disturbance), while influential, is recoverable because of the temporary nature of the problem verses continued long-term disturbances (press disturbance) that have longer lasting impacts on an ecosystem.

See Section 2 of the Water Resource

Questions

See running the activity

Go further

- Carry out a Walk for Water event to raise awareness about the fact that women and children in countries around the world have to walk on average 6km to get drinking water and often it is not clean. For further details see: <http://www.greenschoolsireland.org/water/walking-for-water-2015.3781.html>
- Research the amount of freshwater available in each continent, the amount of people relying on this resource and whether it is treated or untreated. Do up a poster of your findings.
- Adopt and study a local water source. Go to a local water source and check the quality (e.g. kick test) and research the potential risks to the water source and what they can do to prevent pollution.
- Research the surrounding water sources, check their quality on the EPA website and put together a map with all the relevant information and post on your Green-Schools notice board.