Water Conservation Experiments:
WATER CONSERVATION

AREA BEST LINKED TO

City of Kawartha Lakes, County of Haliburton and District Municipality of Muskoka

OBJECTIVES

- Help students to become aware of their water consumption and waste in their everyday lives
- Raise awareness of what students can do to conserve water at school and at home
- Increase understanding of the need for watershed protection through conserving water

CURRICULUM LINKS

GRADE FOUR:

Arts:

- D1.1: Create two- and three-dimensional works of art that express feelings and ideas inspired by their interests and experiences
- D1.3: Use elements of design in art works to communicate ideas, messages, and understandings

Science:

- 1.1: Analyse the positive and negative impacts of human interactions with natural habitats and communities (e.g., human dependence on natural materials), taking different perspectives into account (e.g., the perspectives of a housing developer, a family in need of housing, an ecologist)

GRADE SIX:

Arts:

- D1.1: Create two-dimensional, three-dimensional, and multimedia art works that explore feelings, ideas, and issues from a variety of points of view

BACKGROUND INFORMATION

Water is everywhere and almost everything is made up of water. Potatoes are made up of 80% water; a cow is made up of 74% water. There is not much more to a tomato then 95% water. Humans are about 65%-70% water meaning we are more liquid then solid. (Bryson B. 2003) That being said it is obvious that we need fresh water to survive. It is important that we teach and practice water conservation. Every water molecule that was present when the earth's oceans were formed is still present here today. It's present in one of three forms, a gas (steam, vapour, clouds) a liquid (water) or solid (ice). Water molecules move in various ways and speeds through the water cycle. Water in gas form may stay in our atmosphere for about 9 days. Water in ice form (solid) can stay frozen in polar ice caps for 10,000 years. This is why most of the world's fresh water is present in the ice caps. This leaves the remaining majority of fresh water in groundwater. This water is located in aquifers underneath the earth's surface. In North America we use some of this groundwater for our daily lives. Unfortunately this water taken is not returned immediately to the groundwater system but passed down sewers to water treatment plants and then passed into rivers and lakes. From rivers and lakes that water eventually makes its way to the ocean or atmosphere. Groundwater is renewed from water slowly percolating through soil and bedrock making its way back into these groundwater aquifers. Shallow groundwater has an average renewal rate of 300 years while deep groundwater (deeper than 1,000 meters) can take about 4,600 years to renew. (Canadian Wildlife Federation 1988) When vast amounts of water are removed from the water table it can have grave effects on ponds marshes and streams. The groundwater levels drop, drying out wetlands and potentially killing aquatic wildlife like fish, turtles and frogs and removing other aquatic functions that are preformed in these important ecosystems. Wetlands help clean polluted water before passing the water through the soil into the water table. If wetlands dry up due to low water tables, there is a greater chance that the remaining ground water will become contaminated by pollution. If we practice personal water conservation and water quality practices we could make a positive difference on these fresh water systems.

The following are a series of small experiments that will teach students and their families simple things that can save thousands of litres of water a day collectively. systems.

EXPERIMENT 1: THE LEAKY FAUCET

This experiment will look at how much water a leaky faucet wastes a day. Leaky taps can waste many litres of water a day and a relatively inexpensive repair can save the faucet owner the cost of the repair many times over on the utility bill.

MATERIALS

- Sink with working faucet
- Timer/ clock/stopwatch
- Plastic bin/tub that will fit in sink
- Graduated cylinder / measuring cup

Procedure:

- **Step 1:** turn tap on so that it is just dripping.
- **Step 2:** get ready to place plastic tub under the dripping tap once the timer is ready.
- **Step 3:** place plastic tub under dripping tap and start timer.
- **Steps 4:** wait 30 min as the tub collects water.
- **Step 5:** stop tap or remove plastic bin at the 30 min mark. (if time is a factor can reduce time to 10 or 15 min)
- **Step 6:** pour water into graduated cylinder or measuring cup and measure how many mL's dripped in the allotted time (may have to add up multiple full graduated cylinders/measuring cups to get the total)
- **Step 7:** multiply the amount of water by two if you used the 30 min time. (Multiply by 6 for ten min and by 4 for 15 min) this will give you how much a leaky faucet will leak in an hour.
- **Step 8:** multiply how much water leaked in an hour by 24 to get the amount of water that was wasted in a day.
- **Step 9:** (optional) you can take this further by multiplying the number found above by the amount of students in your class to show how much water would be wasted if all their households had leaky faucets. Or take it further to calculate how many days it would take to fill and Olympic sized swimming pool (2,500,000 litres of water) if all of the students in the school had leaky faucets. These steps can be explored to illustrate how much water can be wasted in a community.

Note: Inform the students that these values are only a guideline as no two taps leak at the same rate.

You are now done!

This simple activity shows children that a leaky faucet/tap can waste many litres of water a day and/or show how many days it would take to fill an Olympic sized swimming pool if many leaky faucets go unattended. This will hopefully encourage their family and friends to fix and replace leaky taps in their households.

FEEDBACK

We appreciate your feedback! Please let us know…

- Did this activity continue the learning your students engaged in at the Water Festival?
- What curriculum requirements did this activity satisfy?
- Was the activity easy to facilitate to your class?
- Did students have fun and learn something new about water?
- Please send photos of your class using these activities!

Please send comments and photos to: iheaven@outtolearn.ca

EXPERIMENT 2 & 3: TURN OFF THE TAP!

In this experiment we will look at how much water gets wasted when we leave the tap running while brushing our teeth or washing our hands. Most people don't realize how much water gets wasted while they leave the tap on. This is two experiments in one, but both will look at how much water is wasted while the tap runs.

MATERIALS

- Sink with working tap
- New Toothbrush
- Toothpaste
- Plastic tub
- Graduated cylinder/ measuring cup
- Hand soap

Procedure:

- **Step 1:** place bin under tap in the sick basin.
- **Step 2:** ask a volunteer to brush their teeth as they always would (if they do shut the tap off while doing this you can use this sample and compare it to leaving the tap running while they brush again)
- **Step 3:** take water from bin and measure in the graduated cylinder/ measuring cup. This shows how much water was used while the tap was left running.
- **Step 4:** repeat step three with the taps turned off so students can see the difference in how much water gets used.
- **Step 5:** repeat experiments but use hand soap this time (Ontario health unit suggest lathering for 15 seconds before rinsing).
- **Step 6:** collect and record samples from both running sample and the sample where tap was turned off.
- **Step 7:** compare the results and discuses with the class what they think about wasted water and what they can do to minimize its waste.

This activity will not only show students how much water can be wasted but have them think about what they can do in their daily lives to conserve water.

RESOURCES/REFERENCES:

- Bryson, B. 2003. A Short History of Nearly Everything. USA: Broadway Books. ISBN 0-7679-0817-1. Retrieved 20 April 2011.
- Canadian Wildlife Federation 1988. Project Wild Elementary Activity Guide. 1988 by the Western Regional Environmental Education Council. Printed in Canada. Founded by the Canadian Wildlife Federation. Retrieved 15 April 2011.

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