



AREA BEST LINKED TO

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



OBJECTIVES

- To construct a take-home hanging water filter for the students to use outside and inside
- To engage students on the issue of water science and how water and pollutants interact with the earth



CURRICULUM LINKS

GRADE FOUR:

Science:

1.1 analyse the positive and negative impacts of human interactions with natural habitats and communities.

GRADE FIVE:

Science:

1.1 assess the effects of social and environmental factors on human health, and propose ways in which individuals can reduce the harmful effects of these factors and take advantage of those that are beneficial

GRADE SIX:

Science:

- 1.1 analyse a local issue related to biodiversity.



MATERIALS

- Two-litre plastic water bottle
- Cotton batting sheets
- Fine and large grain gravel
- Fine and large grain Sand
- Paper coffee filter
- Activated charcoal granules (would have to be ordered online)
- Funnel (cheaper option: construction paper wrapped in saran wrap)
- String



BACKGROUND INFORMATION

Ground water is defined as water that comes from rain, snow, sleet, and hail that goes into the ground. The water moves down into the ground because of gravity, passing between different layers of soil, sand, gravel, or rock until it reaches an impervious layer where it accumulates. The area that is filled with water is called the saturated zone and the top of this zone is called the water table where some people's drinking water comes from. The soil layers in the ground act as filters to get rid of pollutants before they get into the water table. Water has been filtering through these substances underground for millions of years. The result is spring water, some of the cleanest water on Earth.

Spring water is pure because it has filtered through porous layers of sediment. Surface water, however is much more readily available, but it often contains contaminants, including disease-causing organisms and toxic chemicals. In many places, groundwater is similarly contaminated because the soil only has a certain filtering capacity so if there are too many pollutants they can eventually get into our ground water. To make water from these sources safe to drink, most treatment facilities use processes and materials similar to those that remove contaminants in natural sediment filters. The objective of artificial filters is to speed the filtration process and decrease the amount of space required for purification.



TIME LINE AND WORK PLAN

Set up the activity at the tables.

Before you start the activity, have the students discuss questions such as:

1. What are some things that go into the ground that you would not want to drink?
2. If you were camping and had run out of water and there were no pure water sources how would you get water?
3. Discuss what ground water is and how soils can act as agents in cleaning water moving through the earth.

(20 mins)

Start explaining the steps of the activity. See figure 1 which will make steps clearer to understand:

Step 1: cut off a one inch section of the bottom of a two-litre water bottle. Then make a hole in the lid of the bottle so that a straw may fit and stay in place. Then make two holes in the top sides of the bottle and attach a string so the filter can be hung outside to collect rain water.

Step 2: Place the cotton batting at the top of the two-litre bottle; this will serve as the lining for your purifying system.

Step 3: Then place a layer of activated charcoal granules on top of the cotton. Next, place a layer of fine grain sand followed by a layer of large grain sand.

Step 4: Follow the layers of sand with a layer of fine grain gravel then larger grain gravel. Alternate these layers until you reach the top of the bottle.

Step 5: Top the filtration system with the coffee filter.

Step 6: Add the funnel to the top of the bottle.

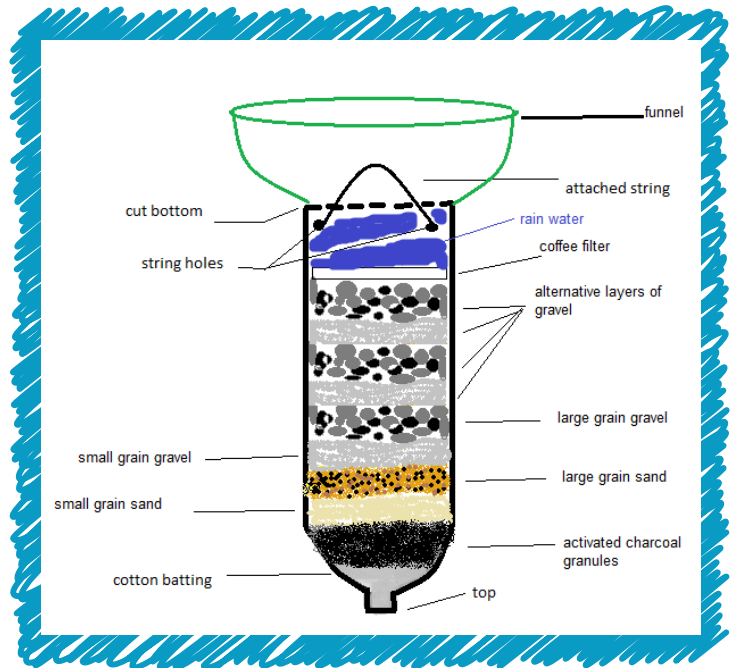
The untreated water will work through the layers of sediment to wick away the impurities in the water. The cotton batting catches particulates from the sediment and acts as a final buffer.

Aftermath: discuss that you will have to clean the top layers of debris and change the filter every once in a while.

(30 mins)

CREATE A PLAN FOR FOLLOW UP, SHARING AND/OR CELEBRATION AT THE END OF THE CHALLENGE:

To create a long term understanding of soils and to promote the awareness of pollutants it is being proposed that the students make a pledge to not use lawn fertilizers or explain to their parents why they shouldn't use them. The students with the most pledges collected to not use fertilizers could maybe win a pizza party. The teacher could then send all the pledges into the Haliburton-Muskoka-Kawartha Children's Water Festival to show how they are doing their part. Or all of the pledges can be tallied up and sent on a post card made by the students back to the Haliburton-Muskoka-Kawartha Children's Water Festival.





RESOURCES/REFERENCES

- <http://hmwaterfestival.ca/>
- http://www.freedrinkingwater.com/water_quality/quality1/1-how-water-is-filtered-in-nature.htm
- <http://www.groundwater.org/kc/whatis.html>
- <http://nyshooters.net/forum/archive/index.php/t-1193.html>
- <http://www.buzzle.com/articles/homemade-water-filter.html>
- <http://water.ygoy.com/homemade-water-filter/>



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