**Extension Activity**

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| **Extension Activity Title:** Is That Water Clean?  | **Duration:** 2 Periods  |
| **Introduction:**  |
| In this activity, students will understand the complexities of water filtration and the need to protect water from contamination. Working in groups, students will create a water filtration system and learn about water treatment.* Suitable for all grades 7 and 8
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| **Materials:** |
| * Absorbent cotton
* Gravel
* Sand
* Metal screening (Scotch Brite Scour Pads)
* Coffee filters
* Aquarium filter materials
* Eyedropper
* Microscope
* Multiple 2L pop bottles
* Scissors
* Masking tape
* Cups of dirty water (from a lake, creek or stream)
* Water Filtration Observation worksheet (1 copy per group)
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| **Activity Set-up** |
| * Before beginning this activity with the class, you will need to get a pail of water from the lake, local creek, or stream. Make sure to include twigs, leaves, mud etc., for the sample.
* It is suitable to divide the class into groups of four to complete this activity
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| **Activity:** |
| * Take the students outdoors and show them the pail of the water that was collected from the lake, creek or stream

**Ask:** students if they think the water is suitable to drink, use at home to wash the dishes, flush the toilets – why or why not? What would make the water suitable to drink and use around the home? **Answer:** students may answer that the water should be clear, needs to be treated before using it* Let students know that the water they get out of their taps, has actually come from water that once looked like the water in the pail. Some water treatment plants take water from rivers and lakes and filter it for drinking water.

**Ask:** How difficult do they think it would be to convert the water in the pail into drinking water? Students will now get the opportunity to try it for themselves.* Stress with all students during this activity, that they are NOT to taste the water at any time
* Prepare the 2L plastic bottles (2 per group) by cutting off the top and using masking tape to cover the edges. Allow the groups one piece of each of the following filter materials:
* Absorbent cotton
* Gravel
* Sand
* Metal screening (Scotch Brite Scour Pads)
* Coffee filters
* Aquarium filter materials
* Provide each group with 2 cups of dirty water from the pail. Students are now asked to perform a number of experiments on their sample of water and record their observations. Have them observe one of their cups of dirty water and record its appearance such as colour, clarity and volume. This is their control sample and it should be put aside for comparison later in the experiment. Have them select one of the filtering materials and place it in the upper portion of the cut off top. This creates a filter. Place the top upside down (like a funnel) into the 2L bottle and pour the second cup of dirty water into the filter. What does the water in the bottom of the filter container look like? Ask the students to compare its clarity, colour and volume to the control sample and record their findings
* Encourage the students to continue their filtering process, keeping track of their results every time they re-filter the dirty water.

**Ask:** which materials worked the best for filtering the water? Which materials didn’t work at all? Ask students to design a filtration process for water using the materials that they found worked the best. How many steps would it take to and to produce their best water sample as proof of their methods. Each group will present their process and product to the class.* Take a few samples from the class that appear to be the cleanest and ask the class if they think the water is now clean. Take an eyedropper sample of water and place it on a slide. Have the students look through the microscope to see what is living in the water. These living organisms known as pathogens are found in water and can cause you to become sick if you ingest them. So, the water that appeared clean enough to drink is actually not.
* What processes are used to ensure that the treated water is potable and safe to drink?
* Visit the Region of Peel’s website to learn more about the water treatment process
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| **Activity Wrap-up:**  |
| Watch this video that highlights the stages of water treatment* Barry’s Water Treatment Tour

<https://www.youtube.com/watch?v=xc4zoS9EgY4>* Length of video: 6:07 minutes

**Class discussion:*** Is it enough for water to appear clean enough to drink?
* What extra steps have to be taken to purify water?
* Was it harder to clean water than they originally thought?
* Cleaning relatively good water is a hard-enough job but imagine a chemical spill in the water. Would that be even harder?
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**Water Filtration Observations**

In your group, you will create a water filtration process that will clean the water. You have the following materials to use in your filtration process:

* Absorbent cotton
* Gravel
* Sand
* Metal screening (Scotch Brite Scour Pads)
* Coffee filters
* Aquarium filter materials

**Process #1**

Choose your materials and the order you will use them in. Record your choice of materials in the first column of the chart. After each step, record your observations. Observations should include changes to the water appearance, what was removed, and how quickly the water was filtered.

**Process #2**

Based on your observations of the first trials, choose a new order for filtering the water. Record your choices and observations in the chart below. Did your choices make the water clearer?

**Observations:** Describe the appearance of the water before filtration

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| **Process #1** |
| **Filter Material** | **Appearance** | **Material Removed** | **Speed of filtration** |
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| **Process #2 Create your own water filter**  |
| **Filter Material** | **Appearance** | **Material Removed** | **Speed of filtration** |
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**Observations:** Describe the appearance of the water after filtration

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