



Watershed Wash-Up

Journey from the watershed to the tap

Background

Our drinking water comes from nearby lakes (or wells) that are protected to keep our tap water clean and safe. The CBRM Water Utility chooses the best nearby lakes and groundwater wells to use for our tap water. The water is then pumped to a water treatment plant (to make sure the water is clean) and then pumped to your home or school.

You might drive by your tap water every day, or it may be hidden in forests around your community. You share this water with your school and our town.

Key Questions

Source Water

- Where can you find water?
Ponds, lakes, oceans, swamps, puddles, tap, etc.
- Where does your drinking water come from?
Pottle Lake, MacAskill's Brook Dam, Sydney Well Fields, Kelly Lake, Waterford Lake

Water Treatment

- Should you drink dirty water? Why or why not?
No. It could make you sick.
- How does your water get cleaned?
First, water is pumped from the source to a treatment facility. Then, there are many different methods for cleaning water. Usually, multiple steps are required. Here is an example:
 1. *Coagulation (chemical causes small particles to clump together)*
 2. *Sedimentation (water is allowed to sit undisturbed for period of time so debris settles)*
 3. *Filtration (water pushed through tiny holes that block solids from passing through)*
 4. *Chemicals (kill any microscopic organisms such as bacteria or fungus)*

Curriculum Objectives

- **Grade 1 Science**
103-2: Students will be expected to recognize that humans and other living things depend on their environment, and identify personal actions that can contribute to a healthy environment
- **Grade 2 Science**
102-8: Students will be expected to describe and demonstrate ways we use our knowledge of solids and liquids to maintain a clean and healthy environment
- **Grade 2 Science**
102-11: Students will be expected to identify examples of water in the environment and describe ways that water is obtained, distributed, and used

- **Grade 1 Social Studies**

SCO 1.2.2: Students will be expected to describe how people depend upon and interact with different natural environments

- **Grade 1 English**

SCO 3.1: Students will be expected to demonstrate a growing awareness of social conventions such as turn-taking and politeness in conversation and co-operative play

Supplies

- Book: *All the Water in the World* by George Ella Lyon
- Chart paper (or white board)
- *Game: Tappy's Great Adventure* (**PRINT ON 11 x 17 PAPER**)- one per three students
- Dice (one per group)
- Water Filter supplies (8-10 2L bottles, cotton balls, cheesecloth, sand, rocks, coffee filters)
- Dirty water supplies (pitcher, 'dirty water' consisting of water, potting soil, small twigs, small pebbles, and a small amount of vegetable oil)

Overview

Time Line: These activities will take approximately 80 minutes to complete.

First, students will listen to a reading of the book *All the Water in the World* by George Ella Lyon to give them an idea about the topics they will be learning about. Next, students will brainstorm where water is found, where it comes from, and why drinking dirty water is unhealthy, followed by Water Filtration experiment that allows them to break into groups and create their own water filters. Students will continue to understand the treatment ('cleaning') process by playing *Tappy's Great Adventure* and then wrap up the lesson by discussing water treatment broadly as a class.

This lesson is intended to provide students with a basic understanding of how water travels from their water source to their tap and all the steps in between.

Lesson Plan (80 minutes)

15 min	Read <i>All the Water in the World</i> by George Ella Lyon to give students an overview of the sorts of things they'll be learning.
10 min	Chart paper titled: <i>Where can you find water?</i> Brainstorm places (accept all answers)
5 min	Discuss the following questions: Where does your water come from? Can we drink water from a lake outdoors? Why or why not? Should you drink dirty water? Why or Why not? What types of things would be in the dirty water? (from big branches and leaves to tiny, microscopic "germs" or bacteria)
15 min	Experiment: Water Filtration Students will be divided into groups of 3 or 4. Each group will receive a plastic bottle 'filter base' (detailed pictures can be found in the Teacher Resources) and supplies to create their own water filter (coffee filter, cotton balls, sand, rocks, cheesecloth). Inform students that they must work together as teams to design a filter that they think will remove most of the dirt from dirty water. Once students have assembled the materials for their filter, the teacher will ask each group to explain what they used and why they chose the materials. The teacher will then pour the dirty water through the filters and see which works best. Discuss: What filter materials worked best? What filters didn't work? What materials worked the best at removing specific 'dirt'? Explain to students that this experiment represents part of what water technicians at the CBRM do when they clean our water.
20 min	Game: Tappy's Great Adventure Students will divide into groups of 3. Each group will have their own copy of the board game, a die, and a place marker for each player. Students will take turns rolling the die and making their way through the treatment process. Explain to students that treatment is just a fancy word for cleaning. They can think of the water treatment process as similar to cleaning a pool: heavy debris sinks, water is

	<p>forced through a filter to remove smaller debris, and chemicals are added to kill germs.</p> <p>It is recommended that students are familiar with the treatment process terms prior to playing the game. A glossary of these terms is included beneath the playing surface.</p> <ol style="list-style-type: none"> 1. Coagulation – This happens when all the little bits of dirt in our water clump together. When the dirt clumps into big pieces, it's easier to remove from the water. 2. Sedimentation – This happens when the water is left untouched in big cleaning tanks so that all the big clumps of dirt will sink to the bottom of the tank. 3. Filtration – This happens when water gets pushed through a filter. This causes the dirt to get trapped in the filter and cleans the water that passes through the filter. 4. Chemicals – Chemicals that are safe for us to drink are added to the water to get rid of any tiny germs that may still be left in our water.
10 min	<p>Water Discussion</p> <p>With 2 pieces of chart paper, write down the question “Is water treatment good or bad?” on one sheet and “What would happen if the water utility shut down for a day?” on the other. Brainstorm with the class and write or draw their responses.</p> <p>Students should come to the conclusion that water treatment is good because it removes all the ‘yucky’ stuff (dirt, bacteria, etc.) that isn’t good for us. If the water utility shut down for a day, our water would not be treated and it would not be safe to drink or use. The water utility plays a very important role in our personal health and safety.</p>

Going Further:

Water Treatment Trivia Questions

Why are chemicals added to the water?

Name 2 things you might find in dirty water.

How does water get from the lake to the water utility?

Name 2 ways you can save water.

Tappy's Great Adventure!

Hi, I'm Tappy!

I'm here at a nearby lake.
Wait - isn't this where
YOUR water comes from?
I'm about to be cleaned.
Come along with me to
see how it works!

Water is pumped to
the water utility

START!

Tap water comes
from here

Chemicals

Jump ahead
1 space

Sedimentation

Miss a turn

Once again water is
pumped. This time,
it's going to **YOUR** house!

Jump back
1 space

Filtration

FINISH

Turn on the tap.
Clean water to drink!

Coagulation

Jump forward
2 spaces

Miss a turn

Glossary

Coagulation

Coagulation happens when all the little bits of dirt in our water clump together. When the dirt clumps into big pieces, it's easier to remove from the water.

Sedimentation

Sedimentation happens when the water is left untouched in big cleaning tanks so that all the big clumps of dirt will sink to the bottom of the tank.

Filtration

Filtration happens when water gets pushed through a filter. This causes the dirt to get trapped in the filter and cleans the water that passes through the filter.

Chemicals

Chemicals that are safe for us to drink are added to the water to get rid of any tiny germs that may still be left in our water.