Who Polluted the Otonabee River?

Idea adapted from "Who Polluted the Red River" featured in GreenTeacher magazine

GRADE: Elementary

THEME: Water pollution

TIME: Story - 15 minutes
Building water filters – 30 mins

MATERIALS:
- film canisters or small containers filled via directions below
- clear bin of water ~half full, clear cups
- Water filters: variety of household items or natural items found outdoors
- funnel & base, elastic bands

Overview
Through an interactive scenario, children will discover various actions that contribute to water pollution and discuss ways to minimize their impact. They will also be given the opportunity to design and build their own water filter.

Hook
Start off by asking: "Do you think you pollute water?" – most kids won't admit to polluting water, or perhaps some are simply unaware. Explain that the following scenario will get them thinking about simple actions that we as humans do on a daily, weekly or monthly basis that contribute significantly to water pollution.

Part 1:
Story- "Who polluted the Otonabee River?"

1. Set filled containers (fill according to chart) on a table next to a clear bin filled half-way with water.
2. Explain that you will read through a story that will mention contributors to water pollutions - when you hear a contaminant, pour the contents from that container into the river (feel free to choose any river you'd like! We chose our local waterway: the Otonabee River).

Part 2: Creating Water Filters

1. Set aside the materials to choose from. Encourage the kids to select from a variety of household and natural materials that they find outside. They may wish to make 2 filters and compare natural vs. man-made materials.
   Some material ideas include:
   - Coffee filter, cottonballs, paper towel
   - Leaves, sand, pebbles, sticks
2. An easy funnel can be created using a 2-L pop bottle cut 1/3 of the way from the bottle. The filter is creating by placing items inside the funnel.
3. Review “filter” vs. a water “purifier” (filters only remove solid materials, they do not eliminate bacteria and very small particles).
4. For older children, add an extra challenge by assigning a price to each item. Encourage them to track their spending to build a cost-effective filter.

Canisters & Labels

Label on Canister	Pollutants in Canister
Trees	Dry leaves
Construction sites	Dry soil
Farmers	Baking soda (fertilizer)
Septic tanks	Water, yellow food colouring, toilet paper
Barnyards	Water and instant coffee
Coal mine	Vinegar
Electric Power Plant	Vinegar
Commuters	Vegetable oil and vinegar
Gardeners	Baking soda
Antifreeze	Water, Red food colouring
Washing the Car	Water, dish soap
Expired Medication	Sprinkles
Mystery Liquid	Water, Red food colouring
Motor Boats	Vegetable oil
Careless Angler	Dental floss
Careless Consumer	Candy wrapper/ garbage
Waste Water	Raisins / toilet paper

Story: Who Polluted the Otonabee River?

For thousands of years, people have lived on the banks of the Otonabee River. Aboriginal people hunted in the forests, harvested food from wetlands and caught fish in the river. One of the first European explorers to visit the river wrote in his journal about the tributaries of “sweet water” and seeing so many fish that his crew tried to scoop them out of the river with a frying pan.

Colonists began to arrive from Europe. They found fertile land, forests teeming with wildlife, and a river that provided ample food and water. It was an outstanding environment for settlement, and the colonists prospered. The river has changed since it was first explored. This is a story of those changes.

Scoop out a glass of water and show it to the group
Ask: Is the water safe to drink? Would you drink this water?
Set glass aside for comparison later

Years go by, and occasional storms drench the area. High winds whip through the **trees** and blow leaves into the river. Gradually the city of Peterborough grows on the banks of the Otonabee River. Developers clear wetlands and forests to build houses and businesses. Rain washes loose soil from **construction sites** into the river.

Ask: How about now? Would the water still be safe to drink if it contained soil and leaf litter?

Upstream, **farmers** plant crops to feed the city’s growing population. Some of the fields extend right to the banks of the river, and fertilizer washes into the water. Other farmers keep livestock in their **barnyards**. As rainwater drains from barnyards, it carries manure into a little creek that flows into the river.

Since the city is so close to Ontario’s beautiful lakes, many people build cottages nearby. The cottages are not connected to the city sewer system. Instead, wastewater flows into **septic tanks** underground. Some homeowners do not maintain their septic tanks, and poorly treated sewage seeps into the nearby lake.

To meet the energy needs of the city, a **coal mine** is dug far upstream. Rainwater drains into the mineshaft, and as it soaks through mining wastes it becomes very acidic. It then trickles into the river. The coal is burned to power the turbines of an **electric power plant** that is built along the river. Gasses from the smokestacks combine with moisture in the air from acids. These pollutants return to the ground as acid rain or smog.

Traffic congestion is starting to become a problem for **commuters** who drive their cars to and from work every day. Car exhaust causes acid rain, and cars that are not kept in good repair often leak oil and other fluids. These contaminants are washed off the pavement and into the river with the next rain.

And how do the residents of the city and suburbs spend their time? In one neighborhood, **gardeners** are out working in their yards. Many are using weed killers and insect sprays to keep the lawns beautiful. The next rain will wash these poisons into a little creek nearby, which then flows into the river. A father is teaching his daughter show to change the **antifreeze** in their truck. They pour out the used antifreeze on to the driveway. Antifreeze tastes sweet and can poison any animal that licks it. It can also get into the nearby creek and poison fish.

Nearby, a boy is **washing the family car**. The soapy water rushes down the driveway into the storm drain, which empties in to the river. The grime on the car contains asphalt from roads, asbestos from brakes, rubber particles from tires, toxic metals and rust. If the boy had gone to a local car wash, the water would have been treated before it entered the river. While the boy washes the car, his mother is cleaning out her medicine cabinet and discovers some **expired medication**. Instead of throwing it into the garbage where children or animals might get to it, she decides to flush it down the toilet. Most of these contaminants will be cleaned from the water by the water treatment system, but 2 to 3 percent will still be in the water when it released back into the river.

Next door, a family is cleaning out their garage. They find an old rusty can with a tattered “skull and cross bones” label. It looks dangerous and they want to get rid of it before someone gets hurt. Junior gets an idea: “Let’s pour it down the drain by the curb!” So the **mystery liquid** goes down the storm drain. The poison is out of sight- but is on its way to the river.

It’s a nice day and many people head down the river. Some zoom up and down in **motor boats** and don’t notice that a little engine oil leaks into the water. On shore, a **careless angler** snags a hook on a log and breaks off the fishing line. Many **careless consumers** are picnicking in the parks along the river. A wind sweeps by and some of their trash is blown into the river. At the water treatment facility in the north end of the city, a malfunction occurs and untreated **wastewater** flows directly into the Otonabee River…

Ask: How about now? Would the water be safe to drink? Would you drink this water?

Set glass aside and compare to the original water sample

Wrap Up:

1. Ask children if there were any surprises as the story was read.

2. Have them brainstorm a list of actions that they can do to help minimize water pollution in order to protect all of the species that live there.

THE OFAH | MARIO CORTELLUCCI
HUNTING & FISHING
Heritage Centre

Show us your learning in-action!

@ofahhfhc