



Building a Water Filter

Organizational Info:

Title: Building a Water Filter

Summary: Students build a water filter out of materials found in a wetland

Inquiry Question: Inquiry Question 5: What are our collective responsibilities to the water and how can we fulfill them?

Duration: 1-2 class periods

Learning Environment: Classroom, outdoor

Season: Summer, Spring, Fall

Materials:

- Water Filter Activity.pdf
- Chalkboard or whiteboard
- One 2-liter soda bottle for each student or small group of students (cut in half)
- Natural filtration materials such as materials found in a wetland, sand, gravel, clay
- Materials to be used as *pollution* such as, dirt, litter (bits of plastic, small objects like paperclips, etc.), food scraps (i.e. orange peels, eggshells, lettuce, etc.), bits of leaves or grass, food coloring, cooking oil, glitter, salt or other spices
- Cups or containers for mixing the polluted water
- Towels or napkins for clean-up
- Water Bundle Lesson 14: *Testing for the Presence of Road Salt in Local Lakes*

Meta Data:

Content Type: Activity

Bundle: Water

Theme: Contaminants in the Environment

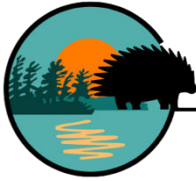
Subject Area: Biology, Environmental Education, Geography, Outdoor Education, Science, Social Studies

Curriculum Focus: 8

Curriculum Links:

Science and Technology: A1.1, A1.3, C2.3, C2.8, E1.2, E2.6

Students engage in a discussion regarding how Indigenous groups traditionally knew if water was clean to drink. For instance, community would look for sources of moving water. If possible, students can take a water sample from a still pond and from a running water source to examine the difference.



Western STEM Connection:

Teacher will discuss with students the way wetlands commonly act as nature's water filtration plants. Students will investigate how wetlands filter water by discussing the following study with their teacher.

McSorley, K., Rutter, A., Cumming, R., and Zeeb, B.A. 2016. Phytoextraction of chloride from a cement kiln dust (CKD) contaminated landfill with *Phragmites australis*. *J. Waste Management* 51: 111-118.

Summary:

Cement kiln dust (CKD) is a byproduct of cement manufacturing that contains chloride. When disposed of in landfills, the chloride ions seep into water sources where they are toxic to plants and aquatic life. This study explored the common reed (*Phragmites australis*) as a low-cost strategy to remove chloride from a CKD landfill in Bath, ON. Reeds are very tolerant to high levels of salt in soil, and they take up chloride and store it in their shoots. At the end of the growing season, the chloride-containing reeds are cut. They may be transported to landfills that prevent leaching into waterways or may be composted before removing the chloride.

Based on the study, it would take 3-9 years to remove chloride from the soil at the landfill using common reeds with low levels of disruption to the existing ecosystem.

1. Students collect natural materials typically found in a wetland area to construct their own water filter. Students examine each groups filters and make a hypothesis regarding which filter design will work best.
2. Students practice filtering water to see which design works best.
3. See instructions in **Water Filter Activity.pdf** adapted from the following lesson plan: <https://www.earthday.org/wp-content/uploads/5-8-Lesson-Plan1.pdf>

Optional Extension:

Students see if they can filter out salt from the water by following the experiment found in Lesson 14 of the Water Bundle: *Testing for the Presence of Road Salt in Local Lakes*. Teacher closes activity by leading a discussion regarding why wetlands are important and in need of preservation.