

Create a Water Filter

Lesson Objective

In this lesson, students will learn to identify pollutants in water and learn about the types of pollutants that can be removed by designing, building and testing a water filtration system.

Activating Prior Knowledge & Concept Building

Begin the activity by asking students to identify pollutants that they find in everyday scenarios (when they are in the city, at the beach, in their neighborhood, etc.). After they have shared their responses, ask if they have ever seen pollutants in bodies of water (i.e. the beach, puddles of rain, going through drains, etc.).

Background knowledge: Many societies used to dispose of waste and garbage directly into lakes, streams, and oceans. Now, most countries require polluted water to be treated. Environmental, chemical, and civil engineers work to improve existing water treatment systems and design new ones to ensure a steady supply of safe, clean water now and in the future. Water is often considered the “universal solvent” because it can mix with organic (natural) or synthetic (man made) substances. Some of these products break down easily in water, others break down very slowly or never. Water naturally cleans itself through filtration through the ground and evaporation in the water cycle.

The Science Behind It

Polluted water can be **filtered** to remove the particulate matter. **Filtration** is commonly the mechanical or physical operation which is used for the separation of solids from fluids (liquids or gases) by interjecting a medium through which only the fluid can pass. Civil, chemical, and environmental engineers work together to develop new water treatment systems or to improve existing ones.

Materials:

- 2-liter soda bottle cut in half (by an adult)
- napkins or paper towels
- gravel, sand and cotton balls for your filter
- dirty water- you can make it by adding cooking oil, food coloring, pieces of paper, and tiny pieces of Styrofoam
- Water Cycle Chart

Instructions for Instructor:

1. Prepare the “polluted” water sample and let it ripen in a sunny spot for a day or two. (Note: This can also be done as a class demonstration so that the students know exactly what is in the water. If you decide to do this, ask the students to write down the “ingredients” and make observations about the “polluted” water as it changes. They should use sight and smell, but do not let them taste the mixture.)
2. Be sure to mix the solution thoroughly before preparing the student samples.
3. Prepare the 2-liter bottles: cut them in half horizontally.
4. Review the water cycle with the students. Pay special attention to where the water can be purified.
5. Distribute all other materials.

Closing

Review the activities of the day with the students and assess what concepts they took away or what they missed. List the key learning points on the board. Have students reflect on the activity by sharing out and writing about it in their science journals (or activity document).

Debrief Questions: What are other sources of pollution in fresh water? (Chemicals from factories, oil leaks from cars, untreated sewage, fertilizer from farms, golf courses, and lawns, household cleaner, medicines). What can be a better alternative to pesticide use so that it does not contaminate our drinking water? What are some solutions to decrease pollution? What can be done to clean our water?

Source: <http://teachers.egfi-k12.org/dirty-water-project/>
<http://pbskids.org/zoom/activities/sci/waterfilter.html>