STEM Careers Coalition™

ELEMENTARY CLASSROOM ACTIVITY

Water Solutions

OBJECTIVE

Students will use everyday materials to create, build, test, and optimize a water-filtration design.

OVERARCHING QUESTION

How can household materials be used to filter contaminants from water?

WHAT'S THE PROBLEM?

- People use water in many ways, including drinking, cooking, washing, and cleaning.
- Humans, animals, and plants need clean water to survive.
- Around the world, 785 million people don't have water close to their homes.[1]

When people don't have water near their homes, it is often the responsibility of people to walk long distances to find water for their families. However, the water they find and carry home often is not clean and can even make people sick. When there is not enough fresh, clean water to meet people's needs, it is called *water scarcity.*

COLLABORATE AND BRAINSTORM

A water filter is designed to trap and remove contaminants, which are substances that make water unfit to use. Some filters are designed to trap large contaminants that you can see with your eyes while other filters are designed to remove chemicals and other harmful contaminants that are too small to see.

In order for a filter to work, water must be able to pass through it! What materials could be used to filter water and trap contaminants that your eyes can see?

Before you move on to the next section, collect these materials, plus a two-liter bottle, scissors, a cup, and a pitcher.

TIP! Your filter must be permeable, which means liquid is able to travel through it.

What permeable materials may help you trap very small contaminants that are tricky to see, like sand?

What permeable materials may be better at trapping larger contaminants, like stones or leaves?

DESIGN AND CREATE

First, create your contaminated water. Fill your pitcher with water and add materials to contaminate it. Dirt, sand, pebbles, leaves, and small pieces of paper could all work well.

Next create your filter:

1. With the help of an adult, cut off the bottom of your two-liter bottle. If you unscrew the cap and turn the bottle upside down, you should now be able to pour water through it.
2. Think about how you could use the materials you collected to make a filter in this bottle and sketch your ideas on the Filter Testing sheet. As you design each one, try to:
    - include more than one permeable material
    - use new combinations of materials
    - rearrange where you place each material
    - label each part of your drawing
3. Then choose one design to kick off your testing and build it!
4. Once the filter is complete, hold it above your cup. Pour the contaminated water slowly into the filter, being sure not to overfill the cup below. When all of the water has filtered through, sketch what your filtered water looks like on your Filter Testing sheet.
5. Continue to create and test your remaining designs.
6. Rank how well each filter seemed to work by placing a 1, 2, 3, or 4 in the starburst shape next to each design.

Though your water may look clear and seem clean, even clear water can be contaminated.

MAKE IT BETTER

Hypothesize: Would adding gravel, pebbles, or sand to your filter improve or hurt your results? Think about *where* you could add one of these materials and then give it a try. Was your hypothesis correct? Why or why not?

KEEP IT GOING

As the number of people on Earth grows, it's becoming more and more important to *conserve* water and not waste it. How can you do your part to reduce the amount of water you use? Set a goal for yourself and try to achieve it!

K–2 CONSIDERATIONS

Show your students examples of materials that could be used to create a filter and encourage them to think about which ones may work best. Then work as a class to sketch a couple of filter designs. Students can use these as models when they begin to build their own.

STANDARDS

Next Generation Science Standards

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.

Source

1. "Drinking-water." World Health Organization. who.int/news-room/fact-sheets/detail/drinking-water.

FILTER TESTING