

Is the Water Clean Yet?



R X F O R

**CHILD
SURVIVAL**

A GLOBAL HEALTH CHALLENGE™

Purpose: To build a filter system that will clean dirty water

Activity at a Glance

- Activity type: Engineering challenge
- Age range: Elementary school–adult
- Number of players: Any number
- Duration: 30 minutes
- Space: Half a table
- Facilitation: Moderate—explain the concept, monitor the testing, and discuss results
- Preparation time: 30 minutes

Overview

Teams design, construct, and test a filter system to clean dirty water. At the end of the testing, teams compare how clean the water from each setup looks. They discuss questions, such as whether water that looks clean is actually clean and whether there are better materials or better methods for cleaning water.

Core Concepts

- In many places around the world, people have no access to clean water and must work to clean it before they can drink it.
- Even simple materials, such as cloth, can be used as a filter.
- Filters can remove certain kinds of materials from water.
- Removing microscopic organisms that can cause disease, such as the bacteria and protists, requires filters with fine pores.

Materials (per setup)

- 2-liter soda bottle, cut (by an adult) at the point where the bottle's sides begin to slope toward the opening. Save the top to use as a funnel.
- Filter materials (e.g., cloth of any kind, paper napkins or towels, gravel, sand, and cotton balls)
- Dirty water made by mixing one liter of water with 1 tablespoon cooking oil, small pieces of paper and Styrofoam, 2 tablespoons of dirt, and 1 tablespoon of salt

Procedure

1. Predict what each material in the filter might remove from the dirty water and the best order to layer the materials.
2. Place the top of the soda bottle upside down on the bottom part of the bottle to use as a funnel. (The top will hold the filter. The bottle will catch the filtered water.)
3. Layer the filter materials inside the top half of the bottle. You can use some or all of the materials. You can also put them in what ever order you think will work the best.
4. Pour the dirty water slowly through the filter.
5. Make observations:
 - What does the filtered water look like compared to the unfiltered water?
 - Take the filter apart and look at the different layers. Can you tell what each material removed from the water?

6. Discuss the following questions:

- Why is removing dirt particles from water a good idea? (*Many harmful bacteria cling to dirt particles. Removing the dirt removes these bacteria. In fact, by filtering water through old saris, Bangladeshi women in one community cut the incidence of cholera by 50%.*)
- What did your filter catch and what did it miss? (*The filter caught the materials unable to pass through the filter. Anything smaller than the filter's pores—the spaces in the filter—passed through.*)
- Would you drink the water you filtered? Why or why not? (*Answers will vary*)
- Suggest ways to improve your filter or a better way to clean water. (*Answers will vary*)
- What is the difference between cleaning and purifying water? (*Purifying kills organisms in the water*)
- List some ways to purify water. (*Boiling, treating with chemicals, distilling*)

7. Extensions:

- Rinse the bottle and dry it. Construct and test a different kind of filter.
- Set some of the filtered water in a pan. After it has evaporated in a day or two, inspect the pan to see if any residue remains. If so, what does this mean about using a filter to purify water? What do your results suggest about whether bacteria could pass through your filter? How would you have to design a filter to remove bacteria? (*The filter would have to have very small pores.*)

