

FANTASTIC FILTRATION

BACKGROUND

Since only 3% of Earth's water is freshwater and only a fraction of that readily available for drinking water, it is important to understand how this finite resource is accessed and managed. While many are fortunate to be able to fill a glass with clean water simply by turning on the tap, 780 million people across the world do not have access to an "improved water source", meaning they must boil or filter their water to remove sediment, chemicals, or biological contaminants.

In this activity, you will design a water filter that uses household and natural materials to remove dirt and other pollutants from a water sample. This activity models the filtration and purification of surface water as it percolates through the layers of an aquifer and becomes groundwater. ***Note this activity is only a demonstration and not meant to provide potable water***

MATERIALS

- Plastic water or soda bottle, or a large funnel
- Vase or tall drinking glass
- Cotton balls or piece of cloth
- 1-2 cups of small gravel or pebbles
- 1-2 cups of clean sand
- ½ cup of activated charcoal (used in aquarium filters)
- Large glass measuring cup or bowl to pour from
- Water
- Materials to "dirty" the water--soil, coffee grounds, torn up paper, small pieces of plastic, cooking oil, glitter, etc.
- Scissors or knife



SNACK-SIZED
SCIENCE

FANTASTIC FILTRATION

PROCEDURE

1. Using scissors or a knife, carefully cut off the bottom of the plastic bottle.
2. Remove the cap and stuff the opening with cotton balls or a small piece of cloth. This bottom layer of your filter should be ~1 inch thick.
3. Place the bottle - neck side down - in the vase or tall drinking glass to keep your filter standing upright as you build it.
4. Build the filter by adding layers in the following order:
 - 1 inch of activated charcoal
 - 2 inches of gravel
 - 2-3 inches of sand
 - 2 inches of gravel
5. Leave at least 1 inch of space at the top of your filter to pour in the water.
6. In a large measuring cup or bowl, prepare your dirty water by adding several spoonfuls of soil to 2-3 cups of water. If desired, you can stir in other items like coffee grounds, torn paper or glitter (microplastic).
7. Pour the “dirty” water in at the top of your filter and watch as it comes out clean* below.

*This is a demonstration only as this water is not clean enough to drink.

