# CURIOSITY AT HOME

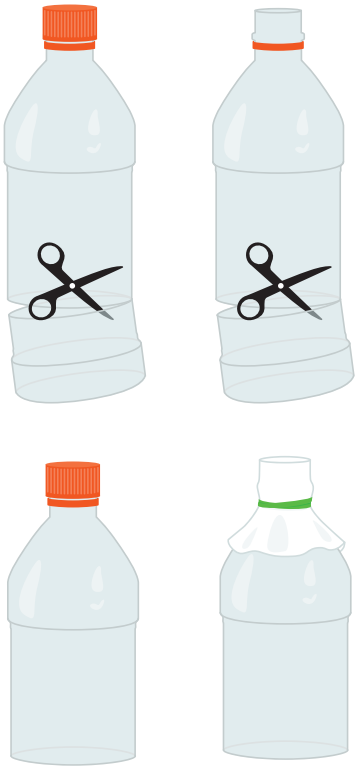
## FILTRATION STATION

Humans need clean drinking water to be healthy. Water can contain debris (loose material), chemicals, and many other materials that could hurt your health. Luckily there are many natural and man-made systems that help improve water quality, which in turn helps improve human health.

*Take some time to design and test your own water filtration system.*

## MATERIALS

- 2 (or more) disposable plastic water bottles
- Scissors
- Rubber bands
- Cheesecloth (used to cover the mouth of your water bottle. You can substitute linen, coffee filter, medical gauze, or paper towel)
- Science notebook or paper
- Something to write with
- Wastewater (these are some options to create wastewater with)
  - o Yellow food color
  - o Sand
  - o Dust from sweeping the floor
  - o Hair from pet or hair brush
- Filtering materials (any mixture of these items can create a filtering system)
  - o Coffee filter
  - o Paper towel
  - o Aquarium rocks
  - o Play sand
  - o Uncooked macaroni
  - o Cotton balls



## PROCEDURE

- Ask an adult to help cut the bottom inch off of your plastic water bottles (make sure you keep the cap end intact).
- Keep the lid on one bottle. This bottle will be how you collect the filtered water.
- Take the cap off the other water bottle. This will become your filter for the wastewater.
- Use your cheesecloth (paper towel/gauze/coffee filter) to cover the smaller capless end of your filter. Use a rubber band to secure it.

*Experiment continued on next page...*

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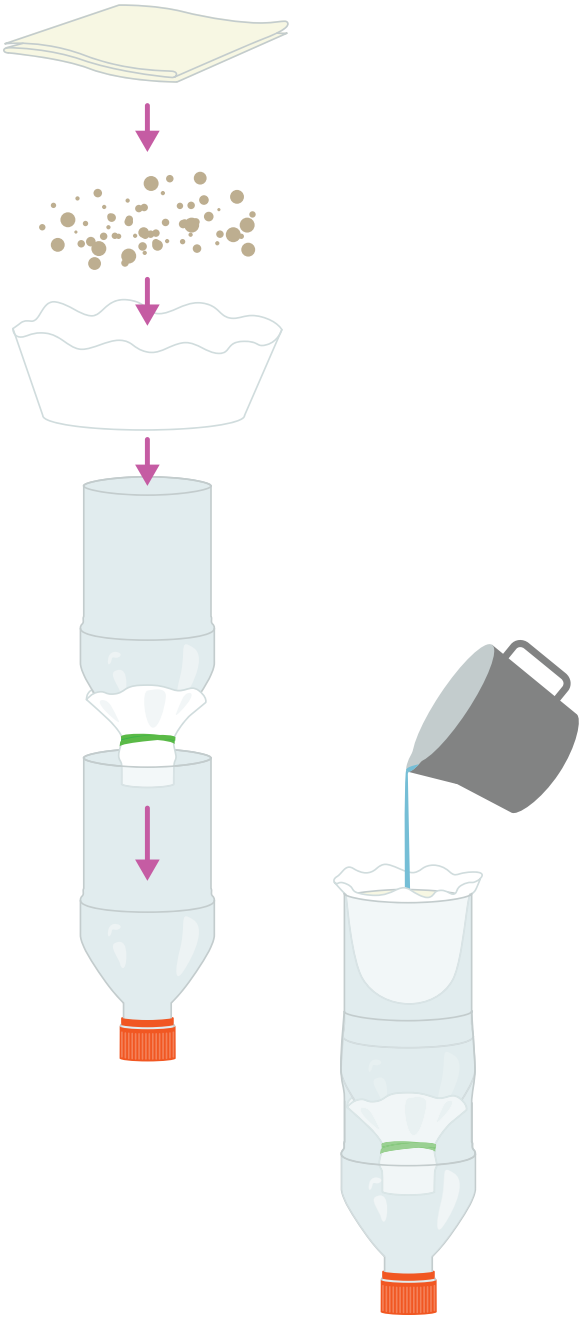
- Add a mixture of the filtering materials into your filter.
- Place your filter into the filtered water collecting bottle, small end first. The filter should reach to about half way down the other bottle.
- Mix a pitcher of waste water by adding dust (swept from your floor), a couple drops of yellow food dye, sand, and hair from a pet or your hair brush. Mix well. If you have an empty milk carton you can add water and the waste into it and shake thoroughly.
- Pour a small amount of wastewater into the filter slowly. You may need to hold your filter upright while adding wastewater to keep it steady. Keep adding water until you have about two inches of filtered water.
- Observe filtered water at the end of the process.

***Note: Even after filtration do not drink this water!***



## EXPLORE MORE

If you have more water bottles try different materials to filter your wastewater, or clean out your used filter and try a new filter design. Consider using different materials, different amounts of material, or placing the filter materials in a different order. Which filter design filtered the water the best? How could you design your filter to improve it even further? Create a video of the process and share it with us!

## DID YOU KNOW?

Water can be filtered to different degrees. Water from your sink and toilet can even be filtered and processed back to potability (a level safe enough to drink). We don't recommend you try that at home! Where does your drinking water come from? What filtering process does your drinking water go through?

*Experiment continued on next page...*

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### GRADE 6–8 EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Build a couple different water filtration systems and compare the filtered water from the designs. Did any design seem to filter the water better? Why do you think that is?
- What did you notice about the water after it had been filtered? Was there any debris or leftover waste in your water? What type of filtration could you use to remove any remaining waste?
- If you were to empty the filtered water from the bottle and run the experiment again with the same filter and new waste water, do you think the results be the same or different? Why? Test your hypothesis (educated guess). Was it accurate or not?
- How can you make your filtration system more efficient? Design a new water filtration system that you think can filter out all the debris. Test your design and determine if it worked better than previous systems. Can you design a filter that works more quickly? That could easily travel with someone going on a trip? Build and test your ideas.