Water Filter

Amount of time Demo takes: **5-10 minutes**

Try this at home!

Lesson's Big Idea

- Filtration can be done in several steps. Using different grains of filtration materials, we can make dirty water relatively clean. Coarse filters, like gravel or sand, will block out large debris (such as dirt). Smaller, more fibrous materials, will trap smaller particles and oils. After passing through the various levels of filter, the water comes out much clearer.

Materials

- 2 liter soda bottle (for large-scale demonstration)
- 16 oz. bottles cut in half (2)
- Filtering materials
    - Package of napkins
    - Gravel
    - Sand
    - Cotton balls
    - Scrap paper
- Materials for making "dirty" water
    - Paper cups (1 package)
    - Dirt
    - Bucket of clean water
- Large waste bucket
- Large metal sieve for rinsing out gravel
- Trash bags
- Extra large kit bin

SAFETY!

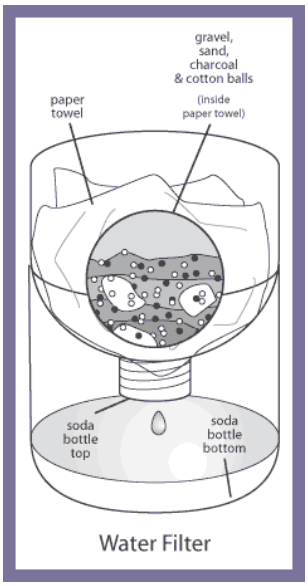
- Clean up water spills as necessary, especially when working on a slippery surface.

Set-up Instructions

1. If needed, cut two pop bottles in approximately half as shown.
2. Set out pop bottles, filtering materials, and cups.

Instructional Procedure

1. Place the top half of the soda bottle upside-down (like a funnel) inside the bottom half.
2. Have students predict what each material might remove from the dirty water. Then have them layer the filter materials (napkins, sand, gravel, and cotton balls) inside the top bottle half as they deem fit. To the right is simply an example of a filter arrangement - there are many "right" answers.
3. Mix dirt into a small cup of water for the students to use, then have them pour the dirty water through the filter.
4. Take apart the filter and look at the different layers. Can you tell what each material filtered from the water?
5. Throw out the paper/cotton filter materials then wipe out the bottle and try it again (clean out the gravel after several demos by putting it in the strainer and running water over it). See if you can make the water even cleaner. Try putting materials in different layers, or try using different amounts of each material.



Tips & Tricks

Assessment Questions

1. Why do we need to use different kinds of material?
2. How could we further improve our filter? What are some other materials we could add?
3. What happens if we run the filtered water again?
4. In the real world of water filtration, what other things do we need to worry about? (bacteria, etc)

Careers & Real-World Applications

Clean Up

- Clean up between demos. When completely finished gather all materials listed for this demo and make sure everything is accounted for. If something was used up, broken, or damaged, let someone know so it can get replaced or fixed.

- Clean out the bottles and gravel as best you can; dry things enough to be stored. Make sure sand, dirt, and gravel are inside containers/bags that won't spill inside the kit. Place everything neatly back in the bin and wipe up any mess made during the demos.

References

- Filter diagram: http://www.pbs.org/weta/roughscience/discover/waterquality.html

Related Next Generation Science Standards

- K-5
    - 2-ESS2-1
- 9-12
    - HS-ESS2-5