

# Make a Water Filter

**Estimated Time: 60 minutes**

## SUMMARY

In this activity, kids learn how to make water safe and clean by making a water filter. The filter's layers mimic those found in natural water cycles. This parallel makes the filter work and helps kids understand how water is cleaned.

## WHAT YOU'LL LEARN

- How different materials remove impurities in water
- How to make a simple water filter
- How the water cycle works

Materials Used	
<ul style="list-style-type: none"> <li>• Scissors</li> <li>• A glass</li> <li>• A plastic bottle (preferably clear)</li> <li>• Cotton balls or coffee filter</li> <li>• Gravel or small rocks</li> <li>• Sand</li> </ul>	<ul style="list-style-type: none"> <li>• Activated charcoal (from other filters if possible)</li> <li>• Dirt, glitter, food coloring, dish soap, etc. for making unclean water</li> <li>• Water</li> </ul>
Resources Used	
<ul style="list-style-type: none"> <li>• Water Cycle Video - <a href="https://www.youtube.com/watch?v=al-do-HGulk">https://www.youtube.com/watch?v=al-do-HGulk</a></li> </ul>	

## WHAT TO DO

1. Begin by cleaning sand, gravel, and broken up pieces of charcoal with water. Dirty materials will make a dirty filter.
2. We will make our filter with a plastic bottle to hold the filtering materials. The size of the bottle doesn't matter. Begin by cutting the bottom of the bottle off, but leave as much of the bottle as possible.
3. Flip the bottle over so the original opening for the bottom faces down and put it into a glass or bowl that leaves it suspended above. The glass or bowl will catch the filtered water.
4. First, place cotton balls or coffee filters in the opening of the bottle. This will be your bottom-most layer of your filter and will serve to hold the other materials in the filter. The cotton balls or coffee filters also filter out the smallest particles.
5. A 1 inch thick layer of activated charcoal is the next layer, if this material is available. This layer will also filter incredibly small particles, but it is not absolutely necessary.
  - a. Charcoal that you'd use to grill is often too soft and will dissolve into the water. Grilling charcoal may also contain chemicals that may not be safe for human consumption. It is best to stay away from trying charcoal grill briquettes.

6. Add about two inches of clean gravel or small stones as the third layer.
7. The next layer is a 3 or 4 inch layer of sand which mimics layers of sand or sandstone.
8. Add another gravel layer at the top. Leave a little space at the top to prevent water from overflowing as you pour it into the filter.
9. To test your filter, add your impurities to a container of water and thoroughly stir it up. Pour the dirty water into the filter, being careful to not overflow the filter.
  - a. What particles make it through the filters?
  - b. What color is the water after it has been through the filter?
  - c. How does the water smell? Do you think it's clean?

#### **TIPS**

- To test for detergent, soap, or other pollutants that are difficult to see, try testing the pH of the water. You can use the method of making pH indicator with red cabbage found here: <https://www.thoughtco.com/making-red-cabbage-ph-indicator-603650>
- An extension of this activity involves testing each filter material on its own with the same water and comparing them. Because adding cotton balls or a coffee filter would skew the results, you'll need to use funnels that will hold the materials instead. These can be made pretty easily from a plastic cup.