Clean it Up

Build a filtration system and test a variety of materials to see which cleans the water the best!

Collect

- Empty plastic bottle
- Scissors
- Coffee filter
- Sand
- Gravel
- Dirty water

Build the filter

1. Use scissors to cut the bottle in half.
2. Remove the bottle cap and place the top half of the bottle upside down, like a funnel, into the bottom half of the bottle. The bottom half will act as a reservoir to collect the filtered water.
3. Create a layered filtration system by first pressing a coffee filter into the funnel.
4. Add a layer of sand, followed by a layer of gravel. Each layer should be at least one inch thick.

Test it out

5. If you don't have dirty water to test out, make your own by mixing clean water with a little bit of dirt and sand.
6. Pour some of the dirty water into the top of the funnel so that it runs through all the layers of your system.
7. Compare the filtered water to the remaining dirty water. Is the water collected in the reservoir cleaner than the water you started with? Even if it looks clear, do not to taste your filtered water!

Redesign it!

Right now, researchers and engineers are working toward creating new ways of filtering out contaminants that are too small to see, without adding materials to the water that might hurt the environment. How could you engineer a better filter? Try using other materials as filters. Which materials work best?

How does it work?

As gravity pulls the water towards the collection reservoir, the water slowly passes through the layered filtration system. The gravel at the top of the filter catches the larger bits of matter in the dirty water. The sand has smaller spaces in between each grain, which helps to filter out smaller contaminants that made it through the gravel. The coffee filter has very small holes which catch particles that the other layers missed, as well as keep the sand and gravel from falling into the collection reservoir.