

To Drink or Not to Drink?

Be a Stormwater Sleuth!

Learn how towns and cities treat water for drinking. The process to make dirty water safe for drinking and to use in the home has many steps and takes a lot of energy. And sometimes certain pollutants can't be removed.

Appreciate the clean water that comes out of your tap!

Background Information

Water! We can't live without it. We use water for many purposes such as drinking, growing crops, manufacturing, and recreation. Many of these uses require freshwater. Freshwater is water that is suitable for drinking or irrigating crops, in contrast to ocean water which is too salty to drink or to use to irrigate plants. Only 3% of water on Earth is freshwater. Two-thirds of the freshwater is frozen in glaciers and polar icecaps. That only leaves about 1% of Earth's water for our use. There is a lot of water on earth, so this 1% is enough for our needs as long as we take good care of it.

When we use water, it often becomes dirty. Think about how dirty water becomes after we wash dishes or clothing. Pollution also enters water in less obvious ways. When it rains, soil, animal waste, lawn chemicals, leaves, grass clippings, and runoff from farms can wash into streams and rivers.

We need to take care of water by conserving it (not wasting water) and by helping to keep it clean. For example, after using water in our homes, it is sent to a water treatment plant to be cleaned.

Humans have treated water to make it safer for drinking for thousands of years. In ancient times, water was cleaned by boiling it, heating it in the sun, filtering, and straining. Similar methods, along with others, are used today. Almost every city in the world treats its drinking water.

Water treatment plants use different methods to filter and clean water, depending on the quality of the water that enters the facility. For example, groundwater is filtered naturally by aquifers and usually requires less treatment than water from lakes, rivers and streams.

Consider a field trip to your local drinking water treatment plant; or ask someone from your town or city to talk to you about how your water is treated.



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Activity Instructions

In this activity, you will construct a filter to demonstrate the process of water filtration. Filtration is just one step in the process of treating water to make it safe for drinking. After you filter your dirty water sample, it will not be safe to drink.

Materials Needed:

- One 2-liter colorless plastic soda bottle with the bottom cut off
- One 2-liter colorless plastic soda bottle with the top cut off
- One unused coffee filter
- One rubber band
- 1 1/2 cups fine sand (white play sand)
- 1 1/2 cups coarse sand (multipurpose sand)
- 1 cup small pebbles (small aquarium rocks)
- One liter of clean tap water
- 2 cups of a dirty water sample



1. Using the rubber band, attach the coffee filter over the neck of the bottle whose bottom was cut off.
2. Place this bottle neck-side down into the bottom of the bottle whose top was cut off. This will serve to catch the filtered water.
3. Pour a layer of pebbles into the bottle. The filter will prevent the pebbles from falling out of the bottle neck.
4. Pour the coarse sand on top of the pebbles.
5. Then pour the fine sand on top of the coarse sand.
6. Slowly and carefully pour a liter of clean tap water through the filter (the layers of sand and pebbles) to rinse it. Try not to disturb the top layer of sand as you pour the water.
7. Discard the tap water that collects in the catcher after it has gone through the filter and then replace the catcher in its original position.
8. Carefully pour only 1/2 to 3/4 of the dirty water sample through the filter so that it collects in the catcher. Save the rest of the dirty water to compare with the filtered water.
9. After the dirty water has gone through the filter, set aside the catcher containing the filtered water to compare it with the unfiltered sample.
10. Observe the filtered and unfiltered samples and answer the following questions.
 - How does your filtered water sample look? Smell?
 - How does the dirty water sample look? Smell?
 - Has the filtration process changed your water sample?
 - Why isn't your filtered water sample safe for drinking? Bathing? Cooking?
 - What are the differences between the two samples? Similarities?

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Discussion Questions

1. What surprised you?
2. What new questions do you have?
3. What are some threats to the water supply?
4. Who do you think should be responsible for cleaning up polluted water?
5. How would you enforce the clean up?
6. What substances do you think are the most difficult to remove from polluted water? What would be the simplest to remove? Why do you think that is?

Stormwater Sleuth Examines Careers



Water Scientist/Chemist

Water Treatment Plant Technician

Bacteriologist

Watershed Ecologist

Public Health Lab Technician

The water that was just filtered in this experiment is **NOT** safe to drink. And neither is the dirty water sample!

Did you know?

Many towns and cities take their drinking water from rivers. You can help to keep our rivers clean by following Stormwater Sleuth's and Running Rain's motto of Keep it Clean! Slow it Down! and Soak it In! By doing this, towns and cities can save energy and money on water treatment needed for our drinking water.

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