

Hydrology Activity Bag

Water Filtration: Student Activity Guide

Think of all the ways you used water today. Did you take a shower, wash your hands, or grab a drink? That water went through many processes before it was safe to use. One way the water was cleaned was by filtering it. In this activity, you will explore filtering water.

These directions will get you started. Your teacher will be in contact to guide you and provide information.

Materials From The Bag

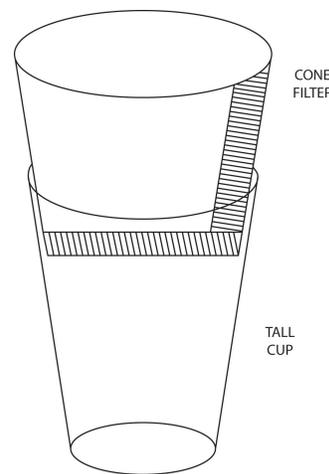
- 4 Tall Plastic Cups (If you have not completed the “Flinkers” activity, save the cups.)
- 1 Plastic Squat Cup
- Sand (If you have not completed the “Flinkers” activity, save any leftovers.)
- Small Spoon
- 2 Cone Coffee Filters
- Basket Coffee Filter
- 3 Napkins
- Red Powder Drink Mix (If you have not completed the other activities, save the remaining powder.)

You Will Supply These Materials

- Water

Part 1: Filtration

1. Use the small spoon to place one spoonful of sand into the plastic squat cup. Fill the cup $\frac{1}{3}$ full of water and stir. Describe what the water looks like.
2. You will use three different filters to remove as much sand as possible. One at a time, hold up a cone coffee filter, a basket coffee filter, and a napkin in front of a light. What do you notice? You will use these filters to remove sand from the water. Based on what you see, predict which filter will remove the most and least sand from the water.
3. Open the cone filter and place it on top of a tall plastic cup. Stir the water and sand mixture again, and gently pour it into the cone coffee filter. **Hold the filter as you pour the water.** It will take a couple of minutes for the water to completely filter through. After the water has finished filtering, throw away the filter. **Keep the cup of filtered water** and label it to show which filter you used to clean the water.
4. Repeat steps 2 and 3 with the basket coffee filter and napkin. Do not unfold the napkin. Again, label each cup to show which filter you used to clean the water.
5. Record your observations. Compare your results to your prediction. **You will use these three labeled cups of filtered water in part 2.**

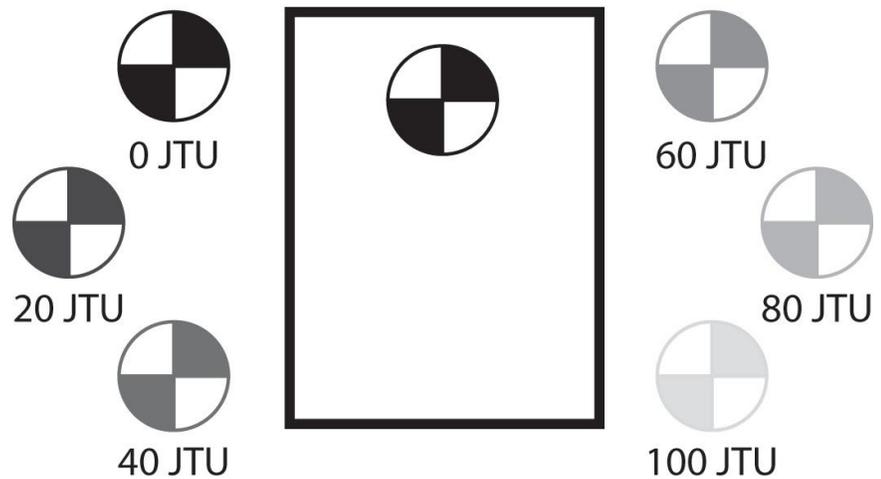


Part 2: Turbidity

Turbidity is a term that describes how cloudy water is. In this part, we will measure turbidity. The more particles in the water, the cloudier it seems, and the more turbidity you will measure.

1. Place the cup of filtered water from the cone coffee filter on the middle disk of the turbidity chart. Look at the circle from above and compare it to the other circles to determine the turbidity of the water. Record your results.
2. Repeat step 1 with the filtered water from the basket coffee filter and the napkin.

TURBIDITY



JTU is a measurement of turbidity. Drinking water has a JTU of 5 or less. *Which filter produced the least turbidity, or removed the most sand?*

Part 3: Layers of Filtration

1. Take two napkins and unfold **one of them**. Hold both the napkins up to the light. What do you notice?
2. Use the small spoon to place one spoonful of sand into the plastic squat cup. Fill the cup $\frac{1}{3}$ full of water and stir.
3. Place the folded napkin on top of a tall plastic cup. Stir the water and sand mixture again and gently pour it through the napkin. **Hold the napkin as you pour.** It will take a couple of minutes for the water to completely filter through. After the water has finished filtering, throw away the napkin.
4. Repeat step three with the unfolded napkin.
5. Record your observations and turbidity levels for each cup. *How did the turbidity change from a folded to an unfolded napkin?*

Part 4: Is It Safe to Drink?

Often water can look crystal clear and safe to drink, but what about the things you cannot see or things that cannot be filtered? In this activity, we will use a powder drink mix to represent the things we can't see. Some examples include microplastics, salt, bacteria, and other parasites.

1. Use the small spoon to place one spoonful of sand and $\frac{1}{2}$ spoonful of powder drink mix into the plastic squat cup. Fill the cup $\frac{1}{3}$ full of water and stir.
2. Look at your results for the cone coffee filter for part 1. Predict if the cone coffee filter will filter out the powdered drink mix.
3. Place one cone coffee filter on top of a tall plastic cup. Stir the water, sand, and powder drink mixture again and gently pour it into the cone coffee filter. **Hold onto the filter as you pour the water into it.** It will take a couple of minutes for the water to completely filter through.
4. Record your observations for the **filter and the cup**.

Filtration is one way to remove things from water. *Using evidence from your investigation, explain why filtration alone does not make water safe to drink (potable). Research and explore other ways to make water potable.*

Rinse, dry, and save the tall plastic cups for the “Flinkers” activity.