Drinking Water Treatment Process: Simple Water Filtration Activity

Introduction:

Cities and towns need to provide safe drinking water to its citizens. Public water suppliers, like the Philadelphia Water Department, have been providing drinking water to its citizens since 1801, once pumped directly from the river. Today, over 1.5 million people in Philadelphia have access to safe and reliable Tap Water from our rivers but now making it safe requires a multi-step process at our Treatment facilities. The treatment steps are the following: Sedimentation, Coagulation, Flocculation, Filtration and Disinfection. Originally unnecessary, Philadelphia has been filtering its drinking water for over 100 years! A sand, gravel and charcoal trap and remove solid impurities.

Note: Since students may not have access to sand, gravel and charcoal at home, this simple activity uses simple household items that may be readily available to help them think about the process. SCIENCE CHALLENGE: Ask students to find and test alternative materials in and around the house as a good substitute for the charcoal, sand and gravel used for the drinking water treatment filtration process (hint backyard stones, small legumes in the pantry, safely pulverized pebbles).

Learning Objectives:

Students will be able to

- test and observe how a simple filtering process cleans dirty water
- describe and draw the all steps of the Drinking Water Treatment process of the Philadelphia Water Department

Materials:

- Household measuring cup or empty jars or cups for collecting sample; if you don’t have a measuring cup, use a marker to delineate quantity in liquid measure of in inches if a ruler is all you have available to measure
- Homemade dirty water sample: mix of water from tap and used coffee grounds or dryer lint
- Coffee filter or paper towel
- Funnel or cone not joined completely at the bottom made from flexible cardboard
- Notebook for recording observations

Activity Procedure:

1. Mix up a “dirty water” sample, measure and record the sample to be filtered
2. Place your funnel securely in place over your collection jar or cup
3. Slowly pour your dirty water sample into the funnel. Catch the filtrate (filtered water) in the collection jar or cup as it drains through.
4. Visually observe and describe what ends up in the collection jar, such as the properties of the filtered water sample; measure and record its volume.
5. Repeat if desired with filtered sample to see if a second “pass” makes it cleaner
6. Use the attached diagram of the Drinking Water Treatment process and copy this link: https://vimeo.com/276103615 to watch a video about drinking water. Identify where filtration is in the entire step process. Now draw your own illustrated (as a foldable).

Suggested Grade Level: 3rd-5th  
Suggested Subject Area(s): Science