



GeoLab Activity

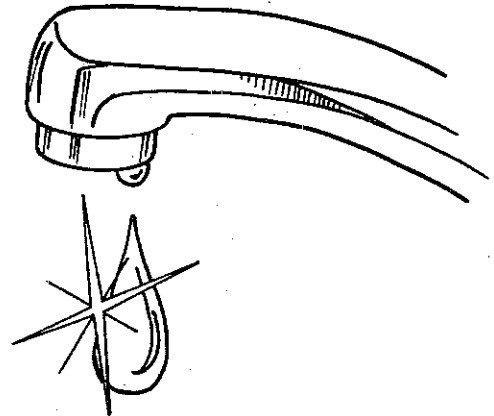
In this GeoLab Activity, you will perform an experiment to see how various polluting materials are removed from water.

Practicing Sewer Science

OVERVIEW

Clean water is one of the Earth's most important resources. People cannot live without clean water. Many everyday human activities create wastewater, or water that is unfit for human consumption and use. Wastewater must pass through a sewage treatment system before reentering the community water supply.

Most water treatment facilities use a two-stage process. First, wastewater passes through filters that remove large objects and solid waste. Oil and grease are skimmed from the remaining liquid, called effluent sewage, and chlorine is added to kill disease-causing microorganisms. In the second stage, the effluent is aerated, or exposed to oxygen in a tank, where beneficial microorganisms consume the remaining organic material. Additional chlorine is added to the water before returning it to the community water supply.



OBJECTIVES

1. To discover the different properties of pollutants
2. To understand how sediment (sludge) forms and how it can be separated from wastewater.

1 Materials

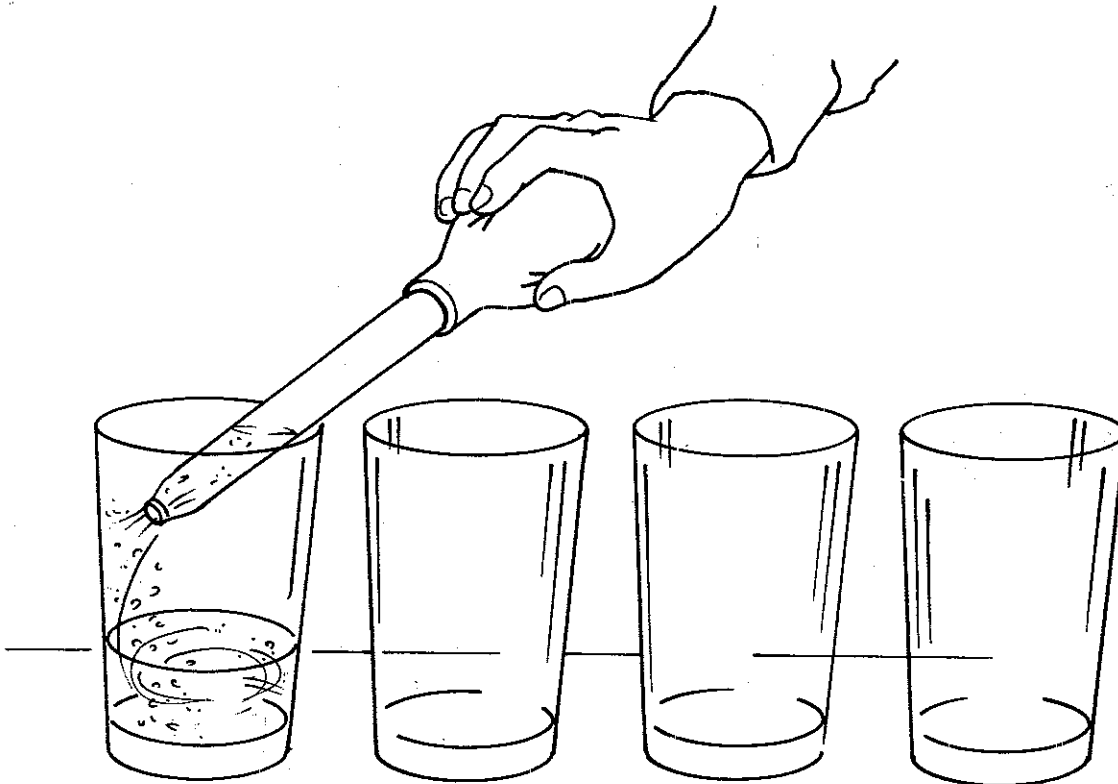
For each team:

- 3 cups dirt
- 1 cup clean sand
- 1 cup clean pebbles or aquarium gravel
- 2 to 5 rocks, each about 1 inch (2.6 cm) in diameter
- 1 gallon tap water
- 1 cup salad oil
- turkey baster
- eyedropper
- 4 clear plastic cups, numbered from 1 to 4
- small aquarium or goldfish bowl
- bucket
- writing materials

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**GeoLab Activity****2** Procedures

- Mix the dirt and water in a bucket. Using the turkey baster, fill cup 1 with the dirt-water mixture. Observe what happens to the mixture. Record your observations on a chart like the one shown on page 7.
- Add the sand, pebbles, and rocks, and mix them with the dirty water in the bucket. Scoop a cupful of this mixture into cup 2. Observe what happens, and record your observations.
- Pour the salad oil into the bucket. Insert the turkey baster several inches below the surface of the bucket's contents, and fill the baster. Transfer this material to cup 3. Record your observations.
- Fill the turkey baster from the surface of the bucket's contents. Place this material in cup 4. Record your observations.
- Without mixing the bucket's contents, pour the remainder into the aquarium. Notice what happens to each material, and record the properties of each.
- Record your observations after one hour, five hours, one day, and one week, noting any changes in any of the materials.



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GeoLab Activity
LAB ACTIVITY REPORT

1. Create a table like the one below to record your observations. Using your notes, explain how the four samples differ from one another at each stage of settling.

2. How could you remove the oil from the samples in cups 3 and 4?

3. Is it possible to remove the sludge from the bottom of the aquarium without disturbing the liquid on top?

Properties	Cup 1	Cup 2	Cup 3	Cup 4	Aquarium
Immediately					
After 1 hour					
After 5 hours					
After 1 day					
After 1 week					

Critical Thinking

Drawing Conclusions According to your observations, what happens to the water in streams and rivers over time? Why would this process be inadequate for meeting the water treatment needs of a large community?
