

Chapter 2. Measuring a Physical Contaminant

Lesson 3. Sources of sediment: Part II

Overview:

Contaminants that can affect the quality of or usefulness of water for various uses can be categorized as either chemical, physical or biological. Generally, the most troublesome physical contaminant is sediment: silt, sand, organic debris. As you will see, not only does the presence of sediment affect the drinking quality of water, it can affect other uses of water. To understand and appreciate the significance of physical contaminant such as sediment, we need to know not only how to define and measure it, but also how to prevent it and how to clean up water affected by it. The ideas taught in this lesson should give you a better understanding of sediment as a contaminant.

Purpose:

The purpose of this lesson/activity is to introduce students to the idea of physical contaminants in water, help them understand the significance of such contaminants, teach them how to measure or quantify sediment, and illustrate how to deal with sediment.

Ideas Taught:

Land surface activities such as farming, construction, recreation, forest fires and excavation can all have an adverse effect on water quality if they are a cause for erosion and a source of sediment in water systems.

Materials Needed:

- A cookie sheet or pie tins (cookie sheets work best)
- About two cups of fine textured soil or potting soil
- A clean liquid dish soap squirt bottle full of water
- A large plastic cup or bucket
- A funnel
- Two quart mason jars or clean mayonnaise jars
- Enough soft, absorbent paper towels to completely cover the top of one of the cookie sheets

Procedure:

1. ____ Lay both cookie sheets flat on a table. Spread about two cups of soil evenly over the entire top of each sheet.

2. ___ Place a single layer of paper towel over the top of one sheet. If you want, you can wet the towels first and wring them out, so they lay flat on the soil (not necessary if you have absorbent towels).
3. ___ Place each cookie sheet on a tilted angel.
4. ___ Place the cup or bucket with the funnel under the cookie sheet which is not covered with paper towel.
5. ___ Using the squirt bottle, apply a steady stream of water (about 1/2 cup or so) to the uppermost corner of the uncovered cookie sheet and observe the erosion process.
6. ___ Hold up the water which has run off. Pour it into one of the clean jars and comment about the erosion process.
7. ___ Repeat the process, this time applying the water to the upper corner of the sheet covered with paper towels. Make sure you apply the water to the towels and not directly onto the soil. What you should observe is that the water spreads out across the towels, soaks through the towels and into the soil, where it is stored, rather than quickly running off and eroding the soil.
8. ___ Explain to the class that surface cover can have a dramatic effect on the erosion process. When the soil surface is protected, erosion is minimized.
9. ___ A good variation of this exercise is to use a spray bottle which can apply water at a slow enough rate to bare soil that erosion will not occur, even when there is no surface protection.

Lesson Learned: Sediment usually comes from surface disturbance, like construction sites, agriculture, excavation sites, mining sites or bank and bottom scouring. Surface cover and the rate at which water is applied to the soil can affect the amount of sediment in the water.

The lesson above was adapted from "***What is Water Quality? A Resource Guide for 4-H Leaders and Teachers,***" 80 pages of activities and experiments related to water quality. (\$5.00) Order from the Montana 4-H Program at Montana State University-Bozeman. Phone 406-994-3501.