Modeling Erosion

Estimated Time: 60-120 minutes

SUMMARY

Erosion is a problem in many areas, from yards washing away to roads being undermined by eroding slopes. Controlling erosion is an important step for engineers and homeowners alike, and in this activity, we'll see how some steps help reduce erosion.

WHAT YOU'LL LEARN

- What erosion is and why it is a problem.
- The effect of erosion control methods and which works best.

Materials Used	Resources Used
• Gallon soda bottles (2-3) • Scissors (or utility knife) • Potting soil, dirt, leaves, wood chips, and other materials • Gravel • Books (to prop up) • Plastic cups (two for each bottle) • Pitcher for pouring water	• Introduction to Erosion https://www.youtube.com/watch?v=aBixnx1kd7k&ab • Erosion and Soil https://www.youtube.com/watch?v=im4HVXMGI68&ab • Weathering and Erosion https://www.youtube.com/watch?v=R-Iak3Wvh9c&ab

WHAT TO DO

1. Cut the top part half of each of the plastic bottles. Leave the neck of the bottle whole.The rest of the bottle becomes a basin for the experiment. See picture below.

Picture from the Soil Science Society of America

2. Fill all the bottles with potting soil up to the mouth of the bottle so that water can flow across the soil and out of the bottle. Leave one bottle with just potting soil but cover the soil in the other bottle(s) with an erosion control substance like wood chips, dead leaves, or gravel.
3. Prop the bottle up on cups. One cup goes upside-down cup at the back to hold that end up and the other is under the neck of the bottle to catch water running out of the neck. The picture above shows this set up.
4. Predict what the water will look like in each of the cups after poured over the soil samples.
5. Starting with the bottle of bare soil, pour water over the soil and see how much soil is washed into the cup. Compare that to water poured into the “erosion control” bottles.
6. Leave the water to settle after you finish pouring, allowing the soil washed away to settle at the bottom. Compare the depth of soil to get a quantitative comparison of erosion control methods.

TIPS

- The videos at the start of the lesson show the effect of different control methods on soil, but nearly anything can be tested. Once a control method has been tested, remove it and add another to save your bottle.
- Besides potting soil, soil from your garden or other areas can be tested. Compare in a grid pattern to see which control method is best for which soil type.
- Since a steeper slope makes water flow faster, adjusting the angle of the bottles can also be a new test for which control methods work well at shallow angles and which work better at steep angles.