

Reading the River, Summer 2001

**Erosion Control Demonstration Area
A Lesson for 8th Grade Science**

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Erosion Control Demonstration Area

Grade Level: 8

Objectives

In this lesson, students will:

Observe and measure how surface runoff contributes to soil erosion.

Program of Studies

Scientific Inquiry

- Identify and refine questions that can be answered through scientific investigations combined with scientific information.
- Use appropriate equipment (e.g. balances), tools (e.g. meter sticks), techniques (measurement), technology (e.g. computers, digital camera), and mathematics in scientific investigations.
- Communicate designs, procedures, and results of scientific investigations.

Conceptual Understandings

- Investigate the structure of the Earth system.
- Analyze Earth's history (e.g. Earth processes).

Applications/Connections

- Recognize how science is used to understand . . . issues related to resources, and changes in environments.
- Demonstrate the role science plays in everyday life . . .
- Recognize that science is a process that generates conceptual understandings and solves problems.

Core Content:

- SC-H-3.5.5 Human beings live within the world's ecosystems. Human activities can deliberately or inadvertently alter the dynamics in ecosystems. These activities can threaten current and future global stability, and if not addressed, ecosystems can be irreversibly affected.
- SS-H-4.4.2 Human modification of the physical environment has possible global effects.

Materials

- Flat-edged shovel for sod removal
- Rip rap (large stones)
- 3 Sections of roof gutter (length equal to the width of each site section)
- 6 Gutter end caps
- Meter sticks or tape measures
- Balances
- Beakers/Graduated cylinders
- Computers
- Calculators
- Digital Camera

Activity Procedures

- Obtain permission (e.g. School Principal or Director of Grounds & Facilities).
- Select a site on school grounds with moderate slope, 1 meter wide and approximately 2 meters long (measurements can be adjusted to fit your situation). If you do not have a suitable site, you may create one by mounding and compacting dirt to construct a hill about 1 to 1.5 meters high.
- Strip all grass and vegetation from two sections; leave only bare soil exposed.
- Leave site 1 undisturbed with its original vegetation.
- Cover site 2 with riprap (like you often see on slopes alongside highways).
- Leave site 3 bare (no covering).
- Dig a trench at the bottom of each section for the rain gutter. The trench should be deep enough so that the gutter is even with the ground surface.
- Place ends on the gutter pieces, secure, and place one in each trench. Runoff should be able to drain from the slope section into the gutter.
- Measure the volume and mass of soil collected in each gutter section after a good rain.
- Clean out gutters before repeating the activity.
- Have students measure, calculate and record their results.
- Encourage students to take pictures of the trials at various stages with a digital camera.
- Have students communicate their results and conclusions as graphs or other visual representations in PowerPoint presentations.

Questions to be Answered

1. Which section lost the greatest amount of soil?
2. Which section lost the least amount of soil?
3. What accounts for the differences in the amounts of soil lost in the three sections?

Assessment Rubric

1. Presentation contains everything in #2 plus sounds, animations, and/or other ways of emphasizing important points and/or generalizing the implications to the community e.g. noting the erosion and runoff from local community development construction projects and proposing possible remedies.
2. Presentation contains a minimum of six slides with complete data on all trials, in graph form with supporting text and pictures. Implications for existing and proposed features on campus are discussed fully. Competence with PowerPoint software is demonstrated.
3. Presentation contains complete data on at least one trial in graph form with supporting text or pictures. Implications for existing and/or proposed features on campus are mentioned. Ability to create a PowerPoint presentation is demonstrated.
4. Presentation contains some data from one or more trials and/or supporting text and/or pictures. PowerPoint presentation is attempted with limited success.
5. Little or no effort is shown.

References

This lesson was adapted from a "SPLASHING IN KENTUCKY" lesson which was adapted from a 1993 Louisiana Department of Agriculture and Forestry publication.

Lesson Context

This lesson is to be a part of a unit that will include yet to be discovered lessons on riparian zones and their function and value.

Additional Information

Additional Information on surface runoff, sedimentation etc., can be found on the EPA website (www.epa.gov) and typing the word "erosion" into the search box on the EPA home page. This will give you a variety of information resources.