

Soil Conservation in River Basins

STANDARD COURSE OF STUDY CORRELATIONS:

Science, Grade 3, Goal 2: The learner will conduct investigations to build an understanding of soil properties.

2.01 Observe and describe the properties of soil:

- Color.
- Texture.
- Capacity to hold water.

2.02 Investigate and observe that different soils absorb water at different rates.

Science, Grade 5, Goal 1: The learner will conduct investigations to build an understanding of the interdependence of plants and animals.

1.04 Discuss and determine the role of light, temperature, and soil composition in an ecosystem's capacity to support life.

1.05 Determine the interaction of organisms within an ecosystem.

1.06 Explain and evaluate some ways that humans affect ecosystems.

- Habitat reduction due to development.
- Pollutants.
- Increased nutrients.

INTRODUCTION TO LESSON: Students will learn what a river basin is and the importance of protecting it. They will experiment with soil particle distribution in water to understand how human activities affect ecosystems. Later, they will locate their own river basin on a map, then create posters that illustrate/explain what people can do to protect their river basins.

BACKGROUND FOR TEACHER: North Carolina has 17 major river basins with physical boundaries that determine how and where water flows over land. Some North Carolina rivers flow into the Atlantic, while others travel toward the Mississippi and the Gulf of Mexico. A river basin is a self-contained ecosystem that is often home to species of fish, mussels, crayfish and other creatures that are endemic to that basin.

engage ➤ Using the “turn and talk” sharing method, have students discuss with partners what a river basin is and why it is important. **Show Chapter 1 of the video.** Lead a class discussion about how activities in your river basin affect water quality and the lives of other people. Review the significance of soil textures (sand, silt, clay) and hydrological conductivity (capacity of soil to hold water).

explore ➤

1. Divide class into groups and distribute three containers of water labeled A, B and C and three containers of soil material labeled A, B and C to each group. Instruct students to pour soil sample A slowly into water container A. Have them repeat the process with samples B and C. Ask them to observe what happens to the water and soil. Have them compare and contrast which soil particles sink first and at what speed.
2. Have students put lids on the containers and shake. Ask students which soil settled to the bottom, which did not and at what rate.



MATERIALS

- * Images that depict effects of human activities on land (erosion, impervious surfaces, etc.)
- * Soil samples (native samples of sand, silt and clay are ideal, but bagged topsoil/potting soil and sand will work.)
- * Three containers (with lids) of each type of soil per group
- * Three containers of water per group
- * North Carolina river basin maps, one per group
- * Poster paper
- * Colored pencils or markers

PREPARATION

- * Obtain free maps of North Carolina river basins from the N.C. Office of Environmental Education (<http://www.ee.enr.state.nc.us/>).
- * Prepare enough containers of soil and water (described above) to supply the number of student groups you will have. Use a marker to label each set of three water cups and soil cups with the letters A, B and C. In the soil cups, A should contain sand, B should contain silt and C should contain clay. (If you aren't able to obtain native soil samples, you may use commercial topsoil/potting soil in A, sand in B and a mixture of the two in C.)
- * If you have classroom Internet access, prepare to show Web sites with images that depict the effects of human activities on land (silt fences, sediment pond, impervious surfaces, houses on stilts, etc.) from the Water Science Picture Gallery <http://ga.water.usgs.gov/edu/mpg.html>. If classroom Internet access isn't available, print images from Web site beforehand.



Fishing on the Nantahala River photograph courtesy of North Carolina Wildlife Resources Commission.

3. Have students discuss how this activity relates to the physical/geological characteristics of their river basin. Discuss what types of soil would be best suited for particular purposes, e.g., a building, garden or road. Have students decide which of their water samples would be best suited for certain purposes, such as a recreation (e.g., swimming, boating) or habitat for aquatic plants and animals. Have them explain their answers.
4. Instruct students to set aside their soil and water samples so that they can check the following day for any changes.

explain > Distribute river basin maps to each group. Have students locate their river basin. **Show Chapters 4 and 5 of the video.** Afterward, discuss how river basins may be altered. Discuss the many species in river basins and how they are interdependent.

elaborate > Have groups create posters that illustrate/explain what people can do to protect their river basins.

evaluate > To measure student understanding, assess participation in class discussion and evaluate posters.

Teacher's Notes:



BEYOND THE CLASSROOM:

Visit a river or tributary in your river basin to look for examples of human impacts, positive and negative, on ecosystems.

Additional Resources:

<http://soil.gsfc.nasa.gov> • NASA's Soil Science Education Web site contains many soil-related activities and a link to GLOBE (Global Learning and Observations to Benefit the Environment) activities and "World Water Monitoring Day."

