

Watershed Science for Educators

NRS 591

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Topographic Map Interpretation, Construction & Watershed Delineation

Grade(s) : 11, 12

Subjects: Reading topographic maps, construction of contour map, creating a 3-D model of a mapped area, watershed delineation, and use of a map to analyze water quality issues.

Skills: Map interpretation, modeling, measuring, analytical skills (cause & effect).

GSE's met:

3b. Describing ways in which humans can modify ecosystems and describe and predict the potential impact.

Duration: This Mini-unit is divided into three "Exercises". Ideally each exercise can be completed in a 60-90 minute block. (270 min total)

Group size: 2

Setting: Classroom

Objectives: At the conclusion of this unit, the student will:

- become familiar with topographic maps
- construct a topographic map given elevation data
- construct a topographic profile
- learn how to visualize contour maps in three dimensions
- learn how to delineate watersheds using a topographic map

Method: This activity builds from learning how to interpret topographic maps to eventually utilizing one to solve water quality issues. Students will understand the rules of contouring through a short lecture, which leads applying those principals in constructing a topographic map. Students then will become familiar with actual topographic maps and create a 3-D model of mapped areas using clay. Students will continue developing map interpretation skills by delineating a watershed and apply cause and effect analysis using water quality data.

Background: Teaching this unit requires base knowledge and understanding of topographic map symbology and rules of contouring. Also a grasp of watershed hydrology will be essential for the culminating activity (watershed delineation and water quality analysis).

Materials: Pencil, markers, colored pencils, metric rulers, clay or play-doh™.

Procedure: Step by step procedure is included in attached lesson plan.

Variations: GIS applications, soil sciences, land use practices, point / non-point pollution sources

Resources:

Active Watershed Education (AWESOME) Curriculum Guide; Developed by the Southern Rhode Island Conservation District and the URI Dept. of Natural Resource Sciences.

- Activity V: Where is the Watershed?
- Watershed delineation
- Creating a topographic profile

Lab 2 – Topographic Maps, Watershed Delineation, and DEMs. Lafayette College. May & June 2009
<http://ww2.lafayette.edu/~brandesd/class/ce321/handouts08/Lab2_WatershedDelineation_08.pdf>.

- Mud River System Topographic Map

Evaluation: Student achievement will be assessed in evaluating the topographic maps and topographic profiles created in Exercise 1. In Exercise 2, student understanding will be evaluated as each 3-D model is constructed and monitoring understanding through questioning throughout the activity. In Exercise 3, the watershed delineation of the Mud River and its sub-watersheds will be scored according to the attached rubric. Student progress will also be gauged through the analysis questions issued at the conclusion of the unit.