

Lesson 6

Water Lines

How is a river formed?
How do the hills of land direct the flow of water?
Where does the Farmington River flow?
Where does the Farmington meet the Connecticut River?

GOAL To follow the path of the Farmington River from Massachusetts to Connecticut and understand that the elevation of the land determines the flow of water

OBJECTIVES Students will:

- ✓ create a model watershed
- ✓ determine flow of water in a watershed
- ✓ create pollution and identify how it flows through the watershed
- ✓ become familiar with the flow of rivers
- ✓ understand that land and water are part of the watershed

MATERIALS copies of watershed maps, topographic maps (on CD) or relief map, butcher block paper, newspaper (two pieces each student), spray mist bottle, masking tape, permanent markers, water soluble markers

CORE CURRICULUM CONTENT STANDARDS

- Science 7(5,6), 8(1-4, 6), 12(6)
- Social Studies 9(1,3,4), 10(1-3,5,6), 11(5), 12(1-3), 13(4)
- Arts 2(1)

VOCABULARY ridge lines, topography, flow, model, man-made, dam, confluence, tributary, map, border

PROCEDURES

1. Divide students into small groups and distribute a copy of the topographic map of the Farmington River Watershed (on CD). Instruct students to find contour lines. Explain that each line represents a certain elevation or height above sea level. To move from one contour line to the next, they must go uphill or downhill. By noting the shape and distance between the contour lines, hills, mountain ridges, and other landforms can be identified.
2. Explain that a watershed consists of an area of land and water where water drains into particular water basins, such as rivers, lakes, ponds, wetlands or streams, etc.
3. Have students look at topographic map and determine whether they are able to identify rivers, tributaries, reservoirs, lakes. Discuss differences and similarities of how of the bodies of water such as a pond, stream, or a reservoir appear on the map (*a stream is narrower, pond is wider*).
4. Instruct students to follow the path of the Farmington River from Massachusetts to where it flows into the Connecticut River. Distribute large pieces of butcher block paper to groups.

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7. Explain to students that they will be drawing the path of the river on the butcher block paper by referring to the copy of the map.
5. Write the following instructions on the board for the students to follow:
 - a. Mark an “x” where the west branch of the Farmington River begins at Becket, Mass. This is the source of the river. Note the elevations at this area. Draw the source.
 - b. Follow the Farmington River with your finger or pencil down to Colebrook, Connecticut. Draw the river to the wider body of water in Colebrook. This is called the Colebrook Reservoir. Label. Identify the boundary line of Massachusetts and Connecticut.
 - c. Follow the river south through Barkhamsted to the northeastern corner of New Hartford. This is where the west and east branches the Farmington River meet, the confluence. Mark an “x”. Draw this section of the river.
 - d. Follow the river in a southeasterly direction through Canton, Burlington and Farmington. A stretch of 14 miles through Barkhamsted, New Hartford and Canton is designated as a “National Wild and Scenic” section, a designation that recognizes its value to recreation, wildlife and beauty. Draw this section.
 - e. Still flowing in a southeasterly direction, the Farmington River goes through Farmington and turns to head in a northeasterly direction back towards Avon and then up to Simsbury. Draw this part of the river, reflecting the change in direction. Place an “x” on the Farmington section of the Farmington River.
 - f. Past Simsbury the Farmington River makes a turn in an easterly direction towards Windsor. Place an “x” on the Windsor section of the Farmington and draw this area of the river on your paper.
 - g. The Farmington River connects with the Connecticut River eight miles from the Rainbow Dam in Windsor. Draw a portion of Connecticut River to show the connection to the Farmington.
 - h. Referring to the FRWA map, add the reservoirs and tributaries of the watershed.
 - i. After student groups have followed the path of the river, have them conduct the following activity.
2. Explain to students that they will be making a simple model of a watershed to simulate or demonstrate river flows. The flow and direction of the water is determined by the elevation of the land. Hills, ridgelines, mountains all influence the flow of water. Students will create a paper watershed (*based on “What is a Watershed?” from Global River’s Environmental Education Network*). Students may work in small groups.
3. Each group will receive two sheets of paper. Instruct students to crumple one sheet of paper, then, open it up but do not straighten it all the way. Tape the edges of the crumpled sheet to the surface of the other sheet of paper. The model should resemble a relief map. Show a relief map if available.
4. Identify the land that the model represents. The higher elevations are hills and mountains, and the lower levels represent valleys. Instruct the students to trace the ridgelines (the border) with blue soluble markers.
5. Have the students predict where they think the major rivers might be. Have students mark those areas with permanent markers.
6. Place models on newspaper to absorb water. Provide students with spray bottles. Instruct students to spray mist onto their models. Observe and discuss where the water collected, how it flowed, etc.
7. Ask students how the hills (topography) of the land affected the way the water flowed.
8. If this model included towns, people, parks, etc. what natural and man-made elements might these be? (*trees, soil, animals, people are examples of natural elements; buildings, dams, malls, shops, etc. are examples of man-made elements*)
9. Ask students how the model relates to their maps they created.

EXTENSIONS

1. Ask students what the highest point of elevation in the Farmington River Watershed is (2,180 feet in Becket, Massachusetts). Have students look at the contour lines on map to confirm high elevation.
2. Ask students if there had ever been a flood in their town or surrounding area. Ask why it happened and what can be done to prevent another flood?
3. Ask students how individuals can reduce the amount of pollution made.

RESOURCES

Rosselet, Dale A., *New Jersey WATERS, A Watershed Approach to Teaching The Ecology of Regional Systems*, 1999, New Jersey Audubon Society, Bernardsville, New Jersey 07924.

Farmington River Watershed Association, August 2003, *State of the Farmington River Watershed Report*, Farmington River Watershed Association, Inc.

GLOSSARY

border - the line or frontier area separating political divisions or geographic regions; a boundary

confluence - a flowing together of two or more streams

dam - a barrier constructed across a waterway to control the flow or raise the level of water

flow - to move or run smoothly with unbroken continuity, as in the manner characteristic of a fluid

map - a representation, usually on a plane surface, of a region of the earth or heavens

man-made - made by humans rather than occurring in nature; synthetic

model - a small object, usually built to scale, that represents in detail another, often larger object

ridge lines - a long, narrow chain of hills or mountains

topography - graphic representations of the surface features of a place or region on a map, indicating their relative positions and elevations

tributary - a river or stream flowing into a larger river or stream