

WHAT IS A WATERSHED?

Lesson Focus: watersheds



Learning objectives:

- Students will learn what a watershed is and how rivers are connected to the ocean.
- Students will be able to create a model of a watershed and simulate how it works.
- Students will be able to identify how humans impact aquatic ecosystems.

Enduring Understandings for the lesson:

- We all live within a watershed and are connected to the ocean.
- Water composes a large percentage of the Earth's surface and is a vital resource. Humans play an important role in its conservation.

Georgia Performance Standards Addressed:

- **S3L2. Students will recognize the effects of pollution and humans on the environment.**
 - a. Explain the effects of pollution (such as littering) on the habitats of plants and animals.
- **S5E1. Students will identify surface features of the Earth caused by constructive and destructive processes.**
 - a. Identify surface features caused by constructive processes.
 - b. Identify and find examples of surface features caused by destructive processes.
 - c. Relate the role of technology and human intervention in the control of constructive and destructive processes.
- **S3-5CS4. Students will use ideas of system, model, change, and scale in exploring scientific and technological matters.**
 - a. Observe and describe how parts influence one another in things with many parts.
- **S6E3. Students will recognize the significant role of water in earth processes.**
 - a. Explain that large portions of the Earth's surface is water, consisting of oceans, rivers, lakes, underground water, and ice.
- **S6S5. Students will use the ideas of systems, model, change, and scale in exploring scientific and technological matters.**

Grade level: 3rd – 6th

Materials:

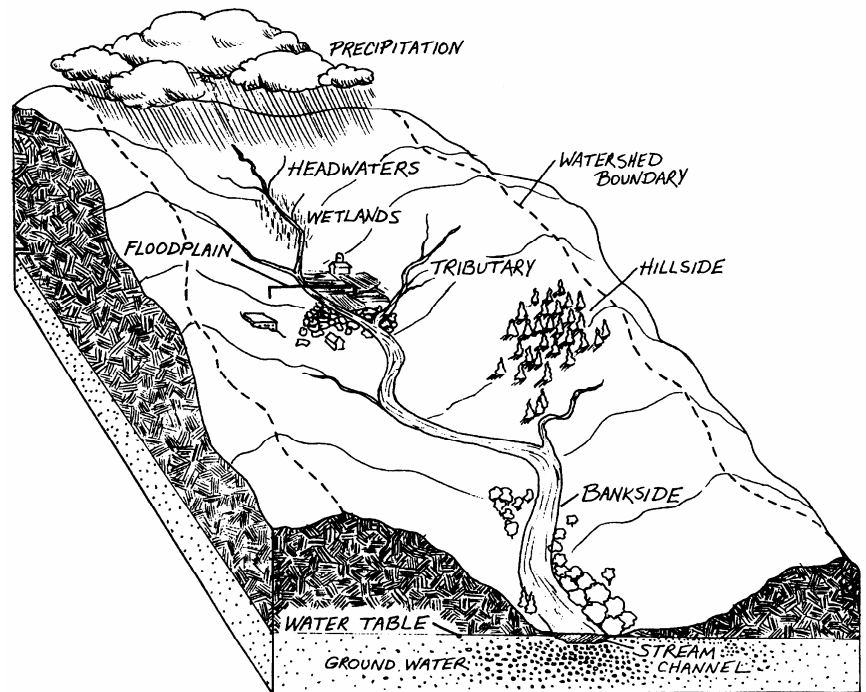
- Large sheets of paper
- Markers
- Spray bottle with colored water
- Map of Georgia

- Map of the local region
- Copies of the 14 major river systems (attached to the lesson)

Time needed: 45 minutes

Background information: Rivers are the results of many streams coming together to form a large flowing body of water. The water that flows into a river is a result of rain and/or snowmelt from the surrounding watershed. The size of a watershed depends on the elevation of the land. Where rain falls on a hill determines the direction water will flow into a stream. The areas of highest elevation surrounding a stream will mark the outer edges of the watershed with water flowing from upstream to downstream.

As streams increase in flow and join other streams, a branching network is established much like the branches of a tree. This network is called a river system. A watershed is all the area that contributes runoff (such as soil, little and chemicals) and precipitation to a specific river system. What affects a watershed in one place eventually affects other sites, accumulating as the water proceeds downstream.



Changes in a watershed affect all living and nonliving things within its boundaries. For example, trees capture water as it moves across land helping it absorb into the soil. When trees and plants are removed, water moves across the land much more quickly resulting in an increased amount of surface water entering streams. As this water flows over land, it picks up soil and other items like branches and leaves, and dumps them in to the river system. These sediments in turn impact the aquatic habitats found in a river system and reduce the diversity of plants and animals like macro invertebrates and fish found there.

Perhaps the single most important thing to remember about watersheds is that they are single units connected to other watersheds as they are traced downstream. What affects a watershed in one place eventually affects other sites downstream.

Learning Procedure:

1. Write the word “watershed” on the board and ask students what they think the word means? Record all ideas.
2. Pull out a map of your local region and the state of Georgia. Have students identify where they are on both maps and locate the closest waterway to their school, mark the spot on map.
3. Have students trace the where the water goes upstream or headwaters from their “X” to see where the waterway starts and mark that spot. Next have the students trace where their waterway goes downstream to the mouth of the river and mark the end point. Continue to follow the river all the way down stream to see where it drains into the ocean. Identify the major river system in which the students live.
4. Introduce to students that Georgia has 14 major river systems. (use attached maps) Explain to the students that each river system is divided by a system of ridges and valleys (elevation).
5. Have students divide into groups of 3-4 students and hand out a large easel size piece of paper to each group and markers.
6. Have one student crumble up the paper into a ball.
7. Slowly as a group unroll the ball - do not make the paper flat, leave the crinkles.
8. Have the students mark the high points or ridges on the page in black. Have the student also mark the low areas or valleys in blue. Ask the students what do they think will happen when it rains on our mountains?
9. Go around and spray the page with colored water and have students watch where the water flows. Ask the students what happened when it “rained”? Did the water flow as they thought? Any other observations? Ask the student where did the water collect and where do they will it eventually flow to if these were real mountains?
10. Revisit the word watershed on the board. Ask the students do they want to revise their definition of watershed.
11. Now that the students know what a watershed is, ask them if we as humans can impact it? Write their ideas on the board. Discuss with students some of the ideas they generated and what can be done to reduce those impacts. (Why did they pick that idea, how does it impact the watershed, and what result might those impacts have on the watershed?)

Evaluation:

1. Evaluate the student’s pre and post lesson definitions of watershed.
2. Ask the students to draw a watershed and label the parts and direction of water flow (head waters, ridge, valley, river, stream, and mouth)
3. Ask students to list and/or draw their home or school and identify potential sources pollution that could impact their local watershed.

Extensions:

- 1) Lead students through the *Sum of the Parts* activity from Project WET's Curriculum Guide K-12 on non point source and point source pollution.
- 2) Have students develop a 3-D model of a watershed and look at the impacts of exposed soil, plants, cement, and fertilizer on a watershed. Use dirt for soil, tape for cement, and jello for nutrients.

Resources:

- Adopt-A-Stream - www.georgiaadoptastream.org/home.html - for maps, listing of workshops, Educator Guide, and other resources.
- EPA website at www.epa.gov/OWOW/watershed/ - for more information about watersheds and additional lessons and resources.
- Georgia River Network - www.garivers.org - for fact sheets about the 14 major watersheds in Georgia.

Lesson developed by: Kim Morris-Zarneke, Georgia Aquarium

This activity is a product of the Rivers to Reef Teacher Workshop sponsored by the Georgia Aquarium and NOAA Gray's Reef National Marine Sanctuary that the author co-coordinated. For more information about this workshop, Georgia Aquarium, or Gray's Reef National Marine Sanctuary, please visit our websites at www.georgiaaquarium.org or <http://graysreef.noaa.gov/>

Georgia's 14 major river basins

