

Virginia's Watersheds

Strand	Living Systems
Topic	Investigating watersheds
Primary SOL	6.7 The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include b) the location and structure of Virginia's regional watershed systems.
Related SOL	6.7 The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include a) the health of ecosystems and the abiotic factors of a watershed; c) divides, tributaries, river systems, and river and stream processes.

Background Information

A *watershed* is the land that water flows across, under, or through on its way to a stream, river, lake, wetland, or other body of water. Small watersheds encompass small land areas and typically drain into small bodies of water. The runoff from small watersheds characteristically joins together with that from other small watersheds to form a larger watershed. Usually, the larger the body of water, the larger its watershed. Areas of higher elevations, such as ridgelines and divides, separate watersheds.

The Virginia Department of Game and Inland Fisheries defines 12 major watersheds in Virginia. The three major regional watershed systems in Virginia lead either to the Chesapeake Bay, the North Carolina sounds, or the Gulf of Mexico. Sixty percent of Virginia is part of the Chesapeake Bay watershed, which covers 64,000 square miles in six states. This includes five watersheds in Virginia: the James River, York River, Rappahannock River, Potomac and Shenandoah Rivers, and the Eastern Shore. Two of Virginia's watersheds empty into the Albemarle Sound in North Carolina; they include the Chowan River (containing the southern portion of Virginia Beach and Chesapeake) and the Roanoke River. The Big Sandy River and the New River eventually empty into the Ohio River. The Clinch, Powell, and Holston Rivers empty into the Tennessee River, which meets the Ohio River just before it empties into the Mississippi River.

River systems are made up of tributaries of smaller streams that join along their courses. Rivers and streams generally have wide, flat, border areas, called *flood plains*, onto which water spills out at times of high flow. Virginia has 497 subwatersheds, which are made up of small creeks and streams that filter into larger ones before merging into rivers.

Rivers and streams carry and deposit sediment. As water flow decreases in speed, the size of the sediment it carries decreases.

Materials

- Virginia state map showing rivers and tributaries
- Colored pencils
- Science journals

Vocabulary

flood plain, sediment, tributaries, watershed, wetland

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Introduce the concept of watersheds by using the following questions to stimulate class discussion:
 - Have you ever wondered where rain goes when it falls? (*It soaks into the ground and becomes ground water; it becomes runoff and goes into storm drains; it evaporates.*)
 - Does the water on streets or lawns end up in our drinking water? (*Yes*)
 - What natural process keeps water clean? (*Land areas filter the water naturally as it passes through the ground and along the surface.*)
 - Into what nearby bodies of water might our rainwater flow? (*Students should be able to name nearby rivers and lakes.*)
2. Tell students that quite a bit of rainwater runs off the land, trickles down a drain or into a creek or culvert, flows into a stream, and then flows to a larger river, lake, or other body of water. The whole area of land that water drains across or through to get to a particular body of water is called a *watershed*.
3. Have students define *watershed* in their own words, and write these definitions on the board. Use these definitions to construct a class definition, and have the students record the class definition in their journals.

Procedure

1. Distribute copies of a Virginia map showing the state's major rivers and tributaries.
2. Have students use a colored pencil to trace;
 - the city/town/community in which you live;
 - the tributaries that carry water in your watershed to the nearby major river;
 - the nearby major river or other waterway that carries your water to the larger body of water; and
 - the larger body of water into which your watershed flows (see Extensions and Connections on the next page).
3. Have students locate all the land that drains into the same major river. Have them use one colored pencil to trace other tributaries in the region that flow into the same major river. Then, have them use the same colored pencil to draw a general boundary around the entire watershed area and shade it lightly with that color. Tell students that the watershed is named after the major river that drains the area. Ask, "What is the name of our watershed area?"
4. Have students locate the other major rivers in Virginia and trace each of these and its tributaries in a different color. As in step 3, have them use the matching colored pencil to outline and shade the watershed area surrounding each river system. Students should note the large bodies of water into which the rivers empty, and they should name the watershed after the major river that drains the area. Tell students that the four major

rivers in Virginia that flow into the Chesapeake Bay are part of the larger Chesapeake Bay watershed.

Assessment

- **Questions**
 - What are the names of tributaries, rivers, major lakes, and other bodies of water in your area?
 - What is the definition of the word *watershed*?
 - What is the watershed in which you live?
 - What are the Virginia watersheds that are part of the Chesapeake Bay watershed?
 - How does water get from Rhoadesville, Virginia to the Chesapeake Bay? Offer evidence using laws, theories, principles, etc.

Extensions and Connections (for all students)

- If you are in the western part of the state (New River, Big Sandy River, Holston River, and Clinch River), give students maps of the eastern U.S., and have them trace their watershed to the Mississippi River and then on to the Gulf of Mexico.
- If you are in the Chesapeake Bay watershed, give students maps showing that entire watershed area, and have them trace all the major rivers that flow into the bay.
- If you are in the Roanoke and Chowan areas, give students maps showing that entire watershed area, and have them trace all the major rivers that flow into the Albemarle Sound in North Carolina.

Strategies for Differentiation

- Demonstrate the tracing/shading of the watershed area map, using a projector or poster. Provide a clean copy for students with physical disabilities after it is completed in class.
- Create picture flash cards (picture on one side, term on the other) for vocabulary review.
- Provide a visual model or video to show the parts and process of a watershed.
- Have students utilize an interactive Web site to explore the Chesapeake Bay and other ecosystems.
- Use video clips from Internet sources such as *Discovery Education* to enhance students' understanding of watersheds.
- Have students create their own watershed, using breakfast cereals. The cereals should be layered in clear plastic cups. Each cereal represents different layers of soil common in land-based watersheds. Larger size cereals should be layered in the bottom of the cup (e.g., Cocoa Puffs®), medium size cereals should be layered in the middle (e.g., Fruity Pebbles®), and smaller size cereal should be the top layer (e.g., Rice Krispies®, Grape Nuts®). In addition, other cereals could be used to represent materials found above ground (e.g., crumbled Shredded Wheat®). Once layered, milk is sprinkled over the top to represent precipitation that makes its way into the ground water. Once it percolates through the "soil," students can see how their "water" has been affected by the different layers of "soil" in their cup.
- Invite a speaker from the Department of Game and Inland Fisheries to explain the three major regional watershed systems in Virginia.

- Invite a speaker from the local planning and development office to discuss how watersheds are considered in land development.
- Divide the students into groups and assign each group a river system to research and on which to report.
- Place students into groups to contact representatives from the Chesapeake Bay Foundation and other related organizations requesting free materials and publications.
- Lead students in completing a KWL chart at the beginning and the end of the lesson.
- Divided students into small groups, and give each group a set of cards with vocabulary words printed on them. One by one, students will pick a card and then draw a picture of the word they picked. The other students in the group will try to guess what vocabulary word the student is drawing.