

# The Chesapeake Bay: Great Basin of the East

## Teacher Guide

Written by Sarah Bodor

Edited by Jerome Bird

### Objectives:

After completing this lesson, students will be able to:

- Discover how they are connected to the Chesapeake Bay.
- Describe the concept of a watershed.
- Identify characteristics of the Chesapeake Bay watershed.

### Maryland Learning Outcomes:

#### Social Studies Skills

*Students will demonstrate an understanding of historical and current events using chronological and spatial thinking, develop historical interpretations, and frame questions that include collecting and evaluating information from primary and secondary sources*

- Find, interpret, and organize primary and secondary sources of information including pictures, graphics, maps, atlases, artifacts, timelines, political cartoons, videotapes, journals, and government documents.

#### Concepts of Science

*Students will demonstrate their acquisition and integration of major concepts and unifying themes from life, physical, and earth/space sciences.*

- Life Science: The life science program includes an emphasis on collection of evidence to explain observations of the interaction and interdependence of living things.

### Student Worksheets:

- Chesapeake Connections Worksheet
- BAY-SIC Facts Worksheet

### Other Materials Needed:

You will need maps on hand for this activity – county, state, and watershed maps will help students find Maryland rivers that flow into Chesapeake Bay, and your town within the Chesapeake Bay watershed.

### Key Web Sites Referenced in This Lesson:

- Chesapeake Bay Foundation: <http://www.cbf.org/resources/facts/general.htm>
- How a Stream Becomes a River: <http://mbgnet.mobot.org/fresh/rivers/how.htm>

## **Teacher Background:**

The land that drains water into a body of water is known as a watershed. The Chesapeake Bay watershed is comprised of 64,000 square miles of land, which is large compared to the relative shallowness of this body of water. All of the water that flows through this land empties into Chesapeake Bay, connecting each of us to this important estuary. It is important for students to understand that everything that washes into their local stream or river eventually winds up in the Bay.

What's more, because we rely on the Bay for so much of our economy – through recreation and our world famous seafood industry – all Marylanders have a responsibility to value and care for the Bay. Even students who live outside the Bay watershed can feel some connection to this marvelous resource if they've ever enjoyed a crab cake or gone on a weekend sailing trip.

This lesson can be used as a Social Studies lesson designed to examine different ways of defining regions, or as a Science lesson which introduces the concept of a watershed and stresses the relationship between waterways. For those students who live outside the watershed, other connections are included that will help them see the importance of protecting the wonderful and fragile ecosystem of Chesapeake Bay.

## **Introduction:**

If you like to begin your lessons with a hands-on activity, consider building a watershed model with your students, described in the first Extension. This activity will help students understand the abstract word “watershed” and will motivate them to learn more about Chesapeake Bay and its tributaries.

When you introduce this lesson, you may find it useful to ask your students if they feel connected to the Chesapeake Bay, and if so, how. Some of them may vacation on the Bay every summer, fish or boat with a parent, or simply swim in the Bay or its tributaries. Others might recognize that some of the seafood that they eat comes from the Bay. Still others may say that they don't feel connected to the Bay at all.

## **Lesson Development:**

This lesson is designed for students to complete while at the computer. This lesson can be done individually, or in partners.

In order for students to examine different ways of defining a region, they will need to use maps of Maryland, your county, and the entire Bay watershed (Maryland, Delaware, eastern Pennsylvania, northeastern New York, and parts of Virginia and West Virginia). In this lesson, we ask them to locate their "watershed address." That is, we ask them to find their home or school on the maps and then trace the path that water takes from there to the Bay.

For example, if you live in Baltimore, the nearest waterway might be Herring Run. If your students follow Herring Run downstream, it will flow into Back River. Back River flows into the Bay. This exercise will help them to visualize the way in which waterways are connected and form a network that unites the entire Bay watershed.

Underlined words in the student section of this lesson are hyper linked to a vocabulary page. The vocabulary words, with their definitions, are included at the end of this Guide. Consider reviewing the vocabulary as preparation and/or review for this lesson.

You may want to visit the following web site with your class as part of this lesson: *How a Stream Becomes a River*: <http://mbgnet.mobot.org/fresh/rivers/how.htm>

Your students will find and record some facts about Chesapeake Bay from the Chesapeake Bay Foundation web site. One thing that they will discover is that the average depth of Chesapeake Bay is about 21 feet. That depth will probably seem pretty deep to your students, but it is important that they realize that many parts of the Bay are as shallow as 1, 2, or 3 feet. This quality makes the Bay special, as it allows a maximum amount of sunlight to penetrate the surface of the water, and thus, for many plants and animals to thrive where they otherwise would not. Ironically, however, it is this same shallowness that makes the Bay so vulnerable. The Bay contains relatively little water for the size of its watershed. Runoff and erosion can easily harm these shallow areas and do great damage to precious grass beds and fish nurseries.

**Thoughtful Application:**

As you wrap up this lesson, ask your students to brainstorm different ways that their personal behavior can influence the “health” of the Chesapeake Bay watershed. Ask students to list three changes that they, their families, and friends can make to help keep the Bay healthy.

As a final activity, students are instructed to write a letter to the Captain of *Pride of Baltimore II*. They are to draw a map or picture that shows how debris might get from their house to Chesapeake Bay. This is a good assessment of their understanding of the interconnections within the Bay watershed. They are then instructed to tell the Captain and crew what they and their family and classmates are doing to keep Chesapeake Bay litter free.

The letter is a good opportunity for students to commit themselves in writing to behaviors that protect the environment. These can be simple behaviors like always putting litter in proper receptacles. Send your class' letters to the *Maryland with PRIDE* project.

**Scoring Tool:**

Students will receive	
2 Points	<ul style="list-style-type: none"> <li>• If their drawing or map correctly shows the path from the student’s house to Chesapeake Bay. The names of rivers and streams are included and correctly spelled.</li> <li>• If their letter describes several ways in which the student and his or her family and friends will keep the Bay litter free.</li> </ul>
1 Point	<ul style="list-style-type: none"> <li>• If their drawing or map correctly shows the path from the student’s house to Chesapeake Bay.</li> <li>• If their letter describes at least one way in which the student and his or her family and friends will keep the Bay litter free.</li> </ul>
0 Points	<ul style="list-style-type: none"> <li>• If their drawing or map is incorrect.</li> <li>• If their letter do not describe at least one way in which the student and his or her family and friends will keep the Bay litter free.</li> </ul>

## Student Vocabulary:

**Brackish water:** a mixture of fresh and salty water, often formed by the mixing of a freshwater stream or river with the saltwater of an ocean.

**Ecosystem:** a system formed by interactions between a community of plants and animals and their environment. Examples include: stream, forest, and wetland ecosystems.

**Estuary:** a body of water formed by the mixture of saltwater from an ocean and freshwater from one or more rivers and streams.

**Tributaries:** streams or rivers that flow into another body of water.

**Watershed:** all the land that drains rainfall into a waterway.

## Extensions:

- You and your students can easily build a watershed model using crumpled newspaper and a large plastic bag. Make a big pile of crumpled newspaper on the floor or a large flat surface. Completely cover the newspaper with a large plastic garbage bag or waterproof tarp. Explain to your students that this hill is an exaggerated model of the land within a watershed. With a spray bottle, mist water over the top of the model for several minutes. As droplets accumulate on the garbage bag, they will begin to trickle down one side or the other, and will form small pools along the bottom. Any one of these pools represents the Chesapeake Bay. Now let a couple of drops of food coloring drip onto the top of the "watershed" and continue misting. Your students will see that the "contaminants" also run off and into the pools of water at the bottom. This will help them to see that everything that runs off the land in our watershed, eventually flows into the Bay. The beauty of this demonstration is that you simply can't do it incorrectly! It works every time! Your students will also enjoy making their own watershed model in small groups.
- Every body of water has a watershed. Consider extending this activity by researching other watersheds that you live in. Is your school in the Nanticoke River watershed? The Patuxent River Watershed? The Jones Falls watershed? Even the tiniest stream or drainage ditch has a watershed! You might want to take a walk around your school and find the storm drains or sewers nearby. What area of land drains into THAT waterway? If you contact your area's Public Works Department, they can provide you with maps of your city or town's sewers. Use these to help your students follow the path that water takes under streets, buildings, and lawns to the nearest waterway.

## Further Resources:

For further reading, consider providing the following excellent resources to your students.

- *On an Island in the Bay*, Patricia Mills, North-South Books.
- *Awesome Chesapeake, A Kid's Guide to the Bay*, David Owen Bell, Tidewater Publishers.