



POWELL CENTER FOR  
ECONOMIC LITERACY

## *Lesson Plan*

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# Bay Watch: Keeping Man at Bay

## Time Required

Seven Class Periods

## Grade Level and Subject

Middle School; Social Studies, Science,

## Keystone Principles

Principle #1 – We ALL make choices

Principle #2 - There Ain't No Such Thing as a Free Lunch

Principle #3 - All choices have consequences.

Principle #8 – Quantity and quality of available resources impact living standards

## Voluntary National Content Standards in Economics

Standard #1: [Scarcity](#)

Standard #10: [Role of Economic Institutions](#)

## Economic Concepts

**Interdependence** – *A relationship between people or firms in an economy where both benefit because of interaction – needing and benefiting from one another*

**Opportunity Cost** – *The next best alternative that must be sacrificed as a result of choosing one thing over another. ALL choices bear an opportunity cost.*

**Scarcity** - *The fundamental economic condition that exists because our wants are unlimited but our resources are limited. We can't have everything we want.*

**Tragedy of the Commons** – *The idea that resources that are used by all should be cared for by all, but often are cared for by no one.*

## Overview

Chesapeake is an Algonquin word meaning "Great Shellfish Bay." When used to identify a stretch of shore on the Virginia and Maryland coast, it refers to the largest estuary in the world. The Chesapeake Bay is over 200 miles long, and ranges from four to 30 miles wide, from 17 to 178 feet deep. It contains more than 2,000 aquatic life-forms in its ecosystem. And it is slowly being destroyed.

Reclaiming the Chesapeake will require a difficult process of balancing the needs and wants of mankind with the demands of nature. As such, a study of the Chesapeake Bay provides a wonderful introduction to economic principles. Maintaining or reclaiming this fragile ecosystem requires understanding bounty and scarcity, consumers and products, interdependence, choices, and opportunity costs. The purpose of this lesson is to introduce students to the concepts of interdependence and opportunity cost, and to apply those concepts to the task of understanding the ecological and industrial needs of the Chesapeake Bay region.

Although this lesson was written about the Chesapeake Bay, it can easily be adapted to help students learn about any body of water. Water usage has always been subject to competing interests, but as an increasing population puts more demands on this scarce resource, it is more important than ever to understand the issues in a methodical and complete way.

## Objectives

- Students understand the concepts of opportunity cost and interdependence.
- Students learn the role of the Chesapeake Bay in the region's economy.
- Students understand environmental threats to the Chesapeake Bay.
- Students demonstrate understanding and assimilation of these economic concepts in discussions about ways to address the industrial, economic, and environmental needs of the Chesapeake Bay region.

## Materials and Handouts

### Opportunity Cost

- *Alexander, Who Used to Be Rich Last Sunday*, by Judith Viorst (Anthem Press, NY)
- Art supplies
- Three types of candy such as Kisses, Skittles, or M&M's
- A selection of interesting advertising circulars

### United We Stand

- 3x5" tags for each student, with the name of an occupation
- Ball of yarn

## Research about the Chesapeake Bay

- Computers with Internet access
- [Handout 1](#) -- Fact Sheets
- 20 white "food" chips per student
- 10 colored "food" chips per student
- 1 paper bag per student
- Name tags identifying the animal each student represents

[Handout 2](#) -- Broken Links in the Food Chain

## Teaching Activity

This exercise is interdisciplinary in nature and could easily be taught in science, language arts, social studies, and technology classes, with one teacher acting as coordinator. It is presented here in a possible timeline.

### Day 1

#### Opportunity Cost Activity

(Social Studies)

*Opportunity Cost: The choice one gives up when choosing between two items.  
When there is a choice, there is always a cost.*

Introduce the lesson with the following brief activity. Tell the class that you are going to read to them; while you read, they may choose one of the following treats: a chocolate Kiss, several M&Ms, or several Skittles. (Any treat can be substituted as long as the students have to make a choice.) After you have distributed the candy, ask, "When you decided which candy to choose, what did you give up?" The students will most likely say they gave up the other two candies. Present the definition of opportunity cost, emphasizing that the opportunity cost is only the next best option, not everything that was forgone.

Read *Alexander, Who Used to Be Rich Last Sunday* to the class and discuss the concept as it is depicted in the book. Many students will already be familiar with this book, in which Alexander is given a limited amount of money and spends the weekend deciding how he is going to spend it. Every so often, stop to ask the students: What are Alexander's choices? What is scarce for Alexander? (Money.) What are the opportunity costs for Alexander's decisions?

As a classroom extension or for homework, hand out interesting advertising circulars, with an appropriate budget amount written at the top of each circular. Ask the students to:

1. decide what they are going to purchase with their allocated funds; and
2. write a brief sentence identifying their choices, the scarce resource, and

the opportunity cost of their purchase.

To illustrate that opportunity costs occur in more than monetary decisions, you could present them with possible activities for a Saturday afternoon (see a movie, skateboard, play baseball, watch TV...) and have them choose one; identify the choices, the scarce resource, and the opportunity cost.

## **Day 2**

### **Interdependence Activity**

(Social Studies)

*Interdependence: The well-being of a community is dependent upon actions and decisions of many groups and individuals.*

Have the students brainstorm a list of jobs that are associated with an inter-tidal waterway. These might include jobs at recreational businesses (hotels, sporting goods stores, special clothing stores, water-vehicle stores), agricultural and industrial businesses (fishing, farming, canning, warehousing), and service industries (trucking firms, gas stations, restaurants).

From the list on the board, have each student pick a different industry and write the name of that industry on a 3x5" card, which will be worn by the student. The students should then stand in a circle.

Give one student the ball of yarn. This student should begin by holding onto the end of the yarn and identifying his or her business; then he should toss the ball of yarn to another student after explaining why he needs that industry for his business to work. (For example, a shrimper could toss the yarn to a shipyard owner after stating, "I bought my shrimp boat from your yard.") As they pass the yarn around the room, each person holds on to a portion of it. An intricate web is formed.

While the students are still holding the web together, point out how specialization of services has resulted in a need for interdependence. Ask about the advantages and disadvantages of specialization. To end the lesson, announce that because of pollution all fishing industries have been closed. The students representing those industries should drop their part of the web and return to their seats. The web may immediately crumble, but the students still standing should identify the effect that each loss of industry will have on their businesses.

## **Days 3-5**

### **Research About the Chesapeake Bay**

(Language Arts/Technology)

Economic reasoning can provide a framework for discussing the complex issues

of the Chesapeake Bay. Students research the two sides vying for the scarce resources of the bay: industry and environmentalists.

Break the class into teams of two or three, assigning each team either one industry or one environmental issue to research. A variety of resources may be used. (Representatives of the local Chesapeake Bay industries are happy to share information with students or connect students to their associations. In addition, vast amounts of information on the Chesapeake Bay can be found on the Internet—see links below.) Students should use the Fact Sheets ([Handout 1](#)) as they collect information to argue for or against a plan of action in the summative debate. They should be encouraged to find as much accurate research as possible and avoid using anecdotal information.

## **Day 6**

### **Broken Links in the Food Chain**

(Science)

*Environmental Interdependence: Cumulative effects of pesticides and pollution's effect on the food chain.*

Divide the class into three groups: mayflies, striped bass, and ospreys. There should be three times as many bass as ospreys, and three times as many mayflies as bass. (A class of 26 would have two ospreys, six bass, and 18 mayflies.) If the numbers are not even, have more mayflies or bass, but not more ospreys.

Mix white and colored "food" chips together and spread them around the space you are using. Give each mayfly a paper bag, which will serve as its stomach. When time begins, the mayflies should gather as many food chips as they can, regardless of color. Only the mayflies participate in this round, which should last no more than 30 seconds. After the mayflies have eaten, they continue to roam their area. The bass join in and catch as many mayflies as possible. When a mayfly is tagged, it must give its bag of food to the bass who tagged it and go sit on the sidelines. (Keep everyone in a contained area, so the game of tag does not become more important than the simulation.) Allow about 15 seconds for this phase. During the final round, the bass can continue to try to catch surviving mayflies, but the ospreys can only catch the bass. Again, this round should last about 15 seconds.

After this third round, gather all the students around in a circle and distribute Handout 2, Broken Links in the Food Chain. Use this as a basis for discussion.

## **Day 7**

### **Final Discussion**

(Social Studies)

One of the most difficult aspects of teaching middle schoolers is encouraging them to see the complexity of an issue and listen to another viewpoint.

Begin the discussion by reviewing the concepts of opportunity cost and interdependence. Divide the students into the same groups they used to research either their environmental or industrial issue. Give them three minutes to discuss what other industrial or environmental issues are related to their issues. Then give each group three to five minutes to talk to other affiliated groups, to find out their positions.

Finally, open the debate with the following proposition: The government has decreed that an environmental protection plan will be implemented to protect the fragile Chesapeake Bay. This gathering is not to discuss whether such a plan is appropriate, but to determine what type of plan will best serve the needs of the residents of this state.

On the board create four columns: choices, decisions, benefits, and opportunity costs. It is best to raise one environmental issue at a time so that the discussion can remain focused. Obviously, the discussion will need to incorporate other issues (after all we are dealing with interdependence), but one issue should remain the primary focus. After about 10 minutes move on to the next issue.

At the end of the class, ask the students if they have come to an agreement. If they have, ask them how they plan to assess that agreement. If they have not reached an agreement, ask them how they can refocus their attention when they return to the table. In each case, one suggestion would be to focus on the benefits and costs, emotional as well as monetary. This is appropriate since these considerations influence many political decisions that are made about environmental issues.

The goal for this week of instruction is not for the students to design an environmental action plan, but for them to become aware of the complexities of environmental responsibility. More importantly, the goal is to give them the language and ability to participate in conversations about our environment.