



# K-12 Oysters in the Chesapeake Bay

## Module I

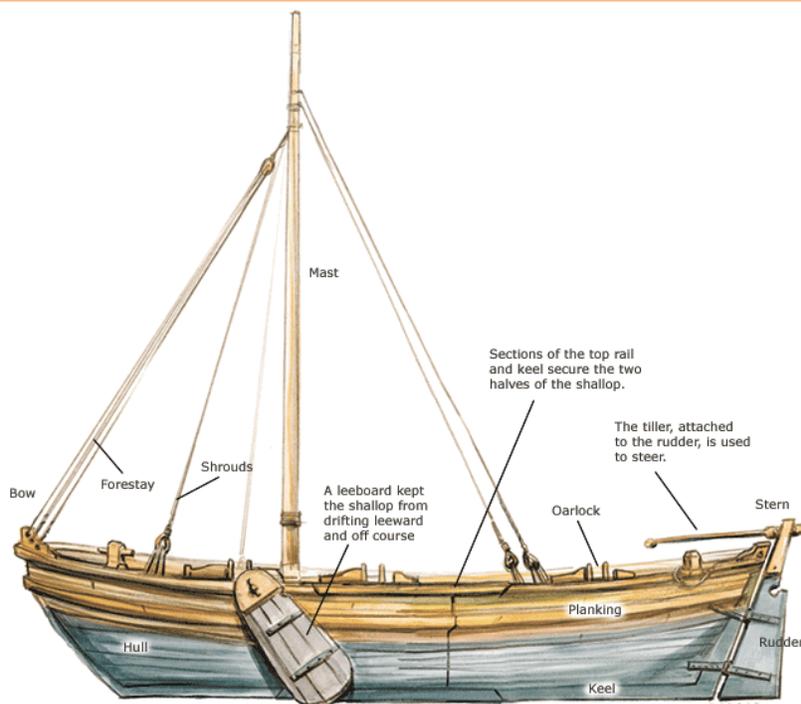
**Grade Level:** Middle School

**Teaching Time:** 1-2 class periods

**Materials:**

- Access to websites or printed resources about John Smith's journeys.
- Copies of Student Data Handouts

Activity adapted from



## I. Then and Now

### Activity Summary

This activity explores the historical changes in the ecological conditions and water quality of the Chesapeake Bay. Students will confirm or refute their predictions after reading excerpts from John Smith's journal and viewing reports from the Chesapeake Bay Foundation or other sites. This activity will set the stage for students to investigate waterways near them and to look at the role of oysters in the Chesapeake Bay ecosystem.

### Learning Objectives:

**Students will be able to:**

- Explain three differences in the physical conditions of the Chesapeake Bay from the 1600's and today.
- Characterize relative abundance and diversity of living species near the Chesapeake Bay in 1600.
- Identify 3 characteristics of a healthy Chesapeake Bay ecosystem.

## Background Information

Captain John Smith was an English explorer who played a pivotal role in the European settlement of America. His contact with Native Americans and his Chesapeake voyages was documented in maps and journals helped early English colonists to learn about the region. Smith led two voyages on the Bay. His journal entries give us a clue about the ecological conditions of the Bay at the time.

One of the most visible changes is the amount and diversity of animals that live in and around the Bay. In Smith's days, oysters "lay as thick as stones," and the Bay contained more sturgeon "than could be devoured by dog or man." During Smith's time, the land surrounding the Bay was home to bears, wolves, cougars, falcons, partridges, waterfowl, and had cypress trees that were 18 feet around the base and up to 80 feet tall. The water then was substantially clearer as well.

### Key Words

**Barge** - military term for a small, open boat

**Forested Buffer** - wooded areas help filter polluted runoff before it enters rivers or streams

**Habitat** - an area where a plant or animal lives that provides it with food, water, protection for survival and reproduction

**Keel** - the large timber at the bottom of a ship that serves as the vessel's backbone

**Primary Source** - a source of information that comes from an eyewitness; these sources might include paintings, journal entries, letters of correspondence, etc.

**Rudder** - a large flat piece of wood attached to the tiller; as the rudder moves from side to side it causes the vessel to turn

**SAV (Submerged Aquatic Vegetation)** - rooted underwater plants that provide an important source of food and habitat for many Bay-dwelling animals

**Secondary source** - a source of information that comes from an individual who was not present at the time the event took place

**Shallop** - a small, stoutly built workboat powered by oars and sails

**Shipwright** - a person who is an expert at ship construction

**Tiller** - a long wooden handle in the stern used to steer a ship

**Water Clarity** - a measure of how clear the water measured by how far light penetrates into the water

**Wetlands** - areas such as marshes and swamps typically found along the Bay's edges in shallow areas where the water meets the land. These areas are called "nurseries" because they provide food and shelter for small, juvenile animals.

## Activity Procedure

### Engagement

Ask students to draw a favorite memory about living near the Chesapeake Bay on a small square of paper (6" x 6"). As each student shares their drawing, they place their signed image together to build a paper quilt on the wall. Alternatively, provide students with a diagram of a waterfront area or section of their local waterway and assign each a parcel of land. What would they do to improve their property?

### Exploration

In small groups or individually, ask the students to make a prediction about the ecologic conditions of the Chesapeake comparing today with 1608 when John Smith first sailed the Bay. Students then examine resources that describe the animals and plants that John Smith and his crew encountered on the Chesapeake Bay in 1608. Students will record their findings on Students Data Sheet #1.

Resources:

- Captain John Smith's Journal: <http://www.johnsmith400.org/journal.htm>
- Chesapeake Habitats, <http://smithtrail.net/the-chesapeake/habitats/>
- Life In and Around the Waters of the Chesapeake Bay – 1608: [http://smithtrail.net/files/Bay\\_watershed\\_1608.pdf](http://smithtrail.net/files/Bay_watershed_1608.pdf)
- "Beyond Jamestown", article from *Smithsonian*, May 2007. P. 49-60  
<http://www.smithsonianmag.com/travel/beyond-jamestown-152598412/?no-ist>

### Explanation

Students will review the various Chesapeake Bay habitats from the Chesapeake Bay Foundation (<http://www.cbf.org/about-the-bay/more-than-just-the-bay/habitats-of-the-chesapeake>) and compare that with information taken from Captain John Smith's description of the Chesapeake Bay in the early 1600s. At the conclusion of this activity, students will issue a "report card" on the Bay's health in 1608, using evidence from primary sources to support their assessment and compare it with today's Bay health.

Resources:

- Captain John Smith: <http://www.chesapeakebay.net/discover/bayhistory/johnsmith>
- Student Data Sheet #2 and #3 and Discussion Questions
- State of the Bay Report at <http://www.cbf.org/>
- How Healthy is your Chesapeake Bay? <http://ecoreportcard.org/report-cards/chesapeake-bay/health/>
- The Chesapeake Bay in John Smith's Time, <https://www.nps.gov/teachers/classrooms/chesapeake-bay-in-1608.htm>

Procedure:

1. Ask students to review information about the state of the Chesapeake Bay habitats and species in 1608 ([http://smithtrail.net/files/Bay\\_watershed\\_1608.pdf](http://smithtrail.net/files/Bay_watershed_1608.pdf)), and complete the table on Student Data Sheet #2.

2. Have them read make a conclusion with evidence about the health of the Bay’s fisheries and habitats in the 17th century on the bottom of Student Data Sheet #2.

3. Using information about the Health of the Bay in 1600 ([http://smithtrail.net/files/Bay\\_watershed\\_1608.pdf](http://smithtrail.net/files/Bay_watershed_1608.pdf)); students should compare those findings with information about today’s Bay health at <http://ecoreportcard.org/report-cards/chesapeake-bay/health/> to determine whether or not the Bay has changed since 1608. Have them look at the Overall Health Index on that site along with some of the other parameters from the data sheet. Alternatively, use the annual State of the Bay report at <http://www.cbf.org/>, issued by the Chesapeake Bay Foundation.

4. Students should consider what they learned about the Bay that Captain John Smith and other explorers knew and what they know about healthy habitats, and then complete the Student Discussion Questions at the end of Student Data Sheet #3.

### Extension

Depending on time, students can prepare a visual representation of the 1600 Bay conditions and habitats to use in future comparisons. These may take the form of graphs, diagrams, story/cartoon, painting, or other artwork.

### Evaluation

Student Data Sheets 1-3 will provide evidence for student predictions, explanations, evidence for the Bay grades, and conclusions are evaluated for completeness of thought and explanation of their thinking.

Three Dimensional Learning		How the Dimensions are Addressed
<b>Core Disciplinary Idea(s)</b>	<b>MS-LS2.A Interdependent Relationships in Ecosystems</b> Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	Students compare the differences between environmental conditions and organisms in the Chesapeake Bay 400 years apart. They use both historical and current reports related to the Bay’s health to collect evidence about how water quality impacts the availability of biological components of an ecosystem.
<b>Science/Engineering Practice(s)</b>	<b>Obtaining, evaluating, and communicating information</b> in 6-8 builds on K–5 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations	Students gather evidence about the physical and biological components of the Chesapeake Bay over the past 400 years through various readings, graphs, data, or internet resources. They integrate this information to form conclusions comparing two time periods. Students develop a report

	<p>about the natural and designed world. <b>Gather, read, and evaluate scientific</b> and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source.</p> <p><b>Construct an argument supported by empirical evidence</b> that changes to physical or biological components of an ecosystem affect populations.</p>	<p>card that is backed by evidence from trusted resources to begin to consider how changes in physical or biological components can affect populations in an ecosystem. This sets up the next activity on water quality, and eventually to the connection between water quality and biological populations.</p>
<b>Cross-cutting Concepts</b>	<b>Patterns identify cause and affect relationships.</b>	<p>As students gather evidence about characteristics of the Bay between 1600 and today, they may start to see a connection between water quality and the health of biological systems. This will be investigated in the next activities.</p>
<b>Ties to Common Core</b>	<b>WHST.6-8.9:</b> Draw evidence from literary or informational texts to support analysis, reflection, and research. (MS-LS2-2)	<p>Students use a number of historical records to collect evidence about conditions in the Bay, and compare that to current conditions.</p>
<b>Ties to MD Environmental Literacy Standards</b>	<b>Standard 4. Populations, Communities, and Ecosystems</b> The student will use physical, chemical, biological, and ecological concepts to analyze and explain the interdependence of humans and organisms in populations, communities, and ecosystems.	<p>The student uses historical and current information about populations and habitats of the Chesapeake Bay to provide evidence for the effects of conditions on ecosystem health and organism populations.</p>

## Module References

Chesapeake Bay Foundation. <http://www.cbf.org/>

Maryland Environmental Literacy Standards

<http://marylandpublicschools.org/programs/Documents/Environmental/MDEnvironmentalLitStandards.pdf>

National Park Service, Captain John Smith, <http://www.nps.gov/jame/learn/historyculture/life-of-john-smith.htm>

On the Trail of Captain John Smith,

<http://kids.nationalgeographic.com/kids/games/interactiveadventures/john-smith/>

Oyster Company of Virginia, <http://www.oysterva.com/oyster-history.html>

The Voyages of Captain John Smith, <http://smithtrail.net/captain-john-smith/>

The Ward Museum, <https://www.wardmuseum.org/>

## Additional Resources

Maryland Field Trip Suggestions:

- Annapolis Maritime Museum, <https://www.amaritime.org/>
- Calvert Maritime Museum, <http://www.calvertmarinemuseum.com/>
- Chesapeake Bay Foundation, <http://www.cbf.org/>
- Chesapeake Bay Maritime Museum, <http://cbmm.org/>
- Choptank River Heritage Center, <http://choptankriverheritage.org/wp3/>
- Havre de Grace Maritime Museum, <http://www.hdgmaritimemuseum.org/>
- Living Classrooms Foundation, <https://www.livingclassrooms.org/>
- Phillip’s Wharf Environmental Center, <http://phillipswharf.org/>
- Richardson Maritime Museum, <http://www.richardsonmuseum.org/>
- Sultana Education Foundation, <http://sultanaeducation.org/>
- Waterman’s Museum, <http://www.rockhallmd.com/watermans-museum>
- The Ward Museum, <https://www.wardmuseum.org/>

Virginia Field Trip Suggestions:

- Living Classrooms Foundation, <https://www.livingclassrooms.org/>
- The Mariner’s Museum and Park, <http://www.marinersmuseum.org/park-and-trail/>
- Museum of Chincoteague Island, <http://chincoteaguemuseum.com/>
- Reedville Fishermen’s Museum, <http://www.rfmuseum.org/>
- Watermen’s Museum, <https://watermens.org/>