



Lesson Title: What happened to the oyster industry in Raritan Bay?

Unit: What are the Living Breakwaters for?

LESSON OVERVIEW

Grade: 6-8 Class Periods: 5-10 Setting: classroom

Subject Area(s): Science, Social Studies, ELA

Lesson Summary

Students use maps, photographs, and primary and secondary texts as inspiration for a two-page illustrated fictional memoir about life for oystering families in Raritan Bay, before and shortly after the waters were closed for shellfishing - as they remain to this day. Then students consider what practical lessons we might learn from this story about the three layers of resilience: culture, ecosystems, and risk reduction.

Objective(s)

- Synthesize information from maps, photographs, memoir, and secondary history texts
- Compose and illustrate a fictionalized historical memoir
- Analyze competing explanations of why the oyster industry collapsed in Raritan Bay
- Apply insights about history to resilience challenges we face today

MATERIALS & RESOURCES

Supplies

- Colored pencils
- 1 printed copy of the image set [Tools of the Oyster Trade](#)
 - OR if you don't want students running around your classroom, provide access to the complete image set for each student / team

Handouts

- [Tools of the Oyster Trade Matching Game](#)
- [Free-write prompt: a Day in the Oystering Life](#)
- [1917 map of leased oyster beds in Raritan Bay](#) - best if printed in color
- [Questions about Leased Oyster Beds in Raritan Bay](#)
- [Source Library: Raritan Bay Oyster Industry](#)
- [Research and inferences about your oyster bed in Raritan Bay](#)
- [1937 map of leased oyster beds in Raritan Bay](#)
- [What changed between 1917 and 1937?](#)

Lesson Materials

- [Tools of the Oyster Trade](#) image set

- [SCAPE graphic describing the three layers of resilience](#)

Teacher Resources

- [answer key for Tools of the Oyster Trade Matching Game](#)

Vocabulary

- Oyster bed - an area inhabited by a large colony of oysters

BEFORE YOU GET STARTED

Tips for Teachers

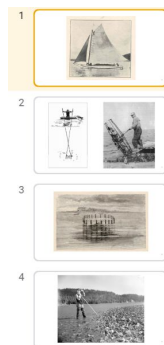
- You can teach this lesson as-is. Or students can write the first page of the fictionalized memoir, then do the lesson [Oyster Decline in New York Harbor](#), and then write the second page of the fictionalized memoir.

INSTRUCTION PLAN

Engage

Students explore the material culture of oystering, and use that information to imagine the daily experience of oystering:

1. Images are separately posted or taped to tables around the room, from the image set [Tools of](#)



[the Oyster Trade](#)

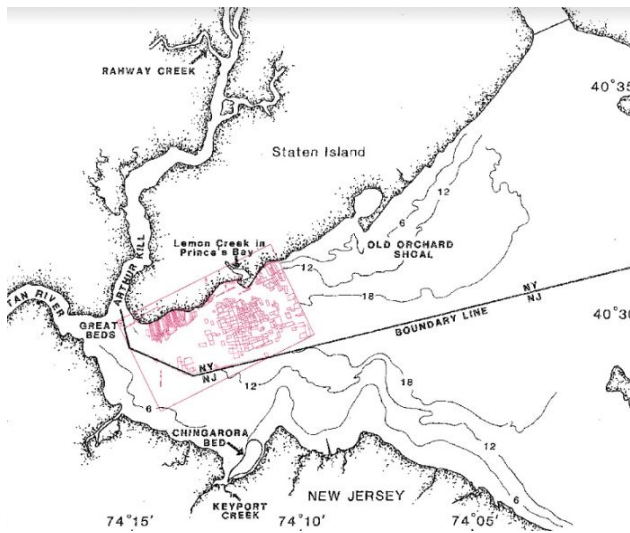
2. Students play the [Tools of the Oyster Trade Matching Game](#)
 - You can refer to the [answer key](#) if you like.
 - Students will encounter these words and phrases later, when they use the *Source Library: Raritan Bay Oyster Industry*.
 - The main point is to help students imagine what a day of oystering might feel like, not that they master the specialized vocabulary.
 - Ideally students will remember that there are specialized vessels and implements for oystering, even if they don't remember the words for them. (You'll find plenty of other, more useful vocabulary in the readings.)
3. Project each image from [Tools of the Oyster Trade](#) one at a time, so everyone can see the same image at the same time.
 - The class debriefs each image, sharing their matches and thought process.

- As they explain their reasoning, ask students repeatedly for evidence: “What did you notice in that picture that made you think that?”
4. Students free-write briefly in response to a [prompt to imagine a day in the life of a working oysterman](#).

Explore

Students select a specific plot of oyster habitat in Raritan Bay from the year 1917, which will become the location for their fictionalized historical memoirs.

1. Each student or team has [1917 map of leased oyster beds in Raritan Bay](#)



- Students annotate the map and the caption.
 - Students add their own questions and initial answers to [Questions about Leased Oyster Beds in Raritan Bay](#).
2. Debrief to assess student understanding that leased oyster beds are plots of underwater territory, rented by individual oystermen or oystering companies, so they could own and eventually sell the oysters living there.
 3. Students view the digital image [1917 map of leased oyster beds in Raritan Bay](#) alongside their printout, so they can zoom in on the digital image while referring to the context of the printed image.
 4. Ask students: “Compare and contrast the oyster beds in terms of:
 - Size: which beds have the greatest area, and which beds have the least area?
 - If you were working a larger / smaller oyster bed, what difference might that make in your work and your life?
 - Distance from shore and depth of water: which oyster beds are right on the shore, which are in very shallow water, and which are out in deeper water?

- How might your work be different depending on the depth of the water and the distance to the shore?
 - Distance from the neighboring oyster beds:
 - Do you think you would prefer to work right next to your neighbors, or in an oyster bed that is further away from others? Why?"
5. Ask students to consider: "Based on this discussion, which oyster bed do you think you would like to have as **your** oyster bed, if you were oystering in Raritan Bay in 1917?"
- Each student / team chooses one rectangle (one leased bed), colors it in on their 1917 map, and labels it with the name of their imaginary oystering business.
 - For the remainder of the activity, this will be *their* bed.

Explain

Students use primary and secondary sources to provide details for their fictionalized historical memoirs.

Source Library: Raritan Bay Oyster Industry

Sources:

- Flynn 2012 Food Safety News
- MacKenzie 1983 "A History of Oystering in Raritan Bay"
- New York City Department of Environmental Protection (DEP) no date (Bloomberg era) "NYC's Wastewater Treatment System"
- New York State Lands Under Water: Application Surveys from Raritan Bay, 1881-1884
- SCAPE Landscape Architecture 2017 "Map of the Locations of Historic Oyster Beds"
- Shepard 2010 Totenville: the Town the Oyster Built

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1. Students access [Source Library: Raritan Bay Oyster Industry](#) and everyone reads Joline 1950 "An Oysterman's Work".
 - Students use the information they have so far -- from Joline and from the Tools of the Oystering Trade images -- to take a first pass at [Research and inferences about your oyster bed in Raritan Bay](#)
2. Assess student understanding.
 - Ask: "Tell us about your oyster bed and some of your inferences" and
 - "Tell us: do you think you need a large powerful boat, a smaller boat, or no boat at all? Why?" and/or
 - "Tell us: do you think you need oyster rakes, oyster tongs, and/or oyster dredges? Why?"
 - Review passages from Joline that are relevant to students' responses.
3. Students do **research** in the source library -- not reading it from beginning to end, but finding the parts that help them get the information they want -- to take a second pass at [Research and inferences about your oyster bed in Raritan Bay](#) and to look for more answers to their questions in [Questions about Leased Oyster Beds in Raritan Bay](#).
 - If your students seemed confused in the previous assessment, it is recommended to start with Questions about Leased Oyster Beds in Raritan Bay.

4. Assess student understanding.
 - Ask: “What’s your favorite source so far? What do you like about it? What information have you used from it? What do others think of that source?”
 - To promote rigorous discussion, insist that *all* students turn to the passage in question, that one student read the passage out loud, and ask: “What do you make of that? Does someone understand the passage differently?”
 - If no one admits to having a different understanding, you can play devil’s advocate by asking: “what if it means XYZ?” or “why couldn’t it mean ABC?”

Elaborate

Using their research and images for reference, each student / team composes a one-page illustrated fictionalized memoir of life as the oysterman who worked their leased oyster bed.

- Students can use Joline 1950 as a model, or
- Describe one day of work, or
- Describe one year of their life, or
- Use their own format.

After the students have written this first page, it is a good time to teach the lesson [Oyster Decline in](#)

Oyster Decline in NY Harbor
 Students will analyze historical photos, maps and other resources that point at some of the causes of oyster decline in New York.



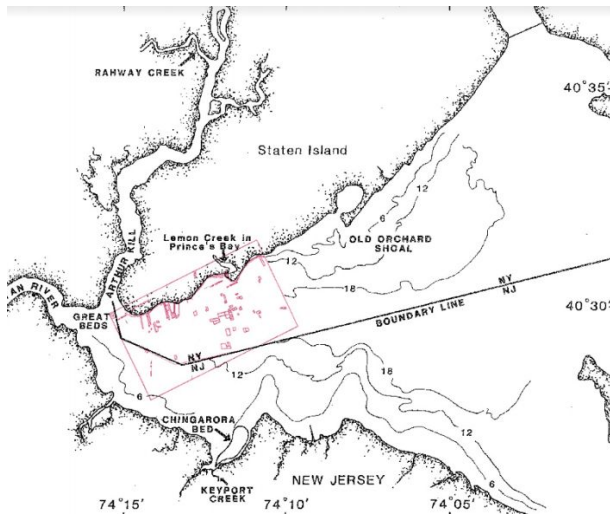
Science 6-8th
 Social Studies

[New York Harbor](#), if desired.

- That lesson provides a city-wide context, includes more components of the oyster industry such as restaurant sales, and *illustrates* three of the causes of oyster decline in NYC: overharvesting, industrial pollution, and residential and commercial pollution.

Evaluate

1. Each student or team has [1937 map of leased oyster beds in Raritan Bay](#)



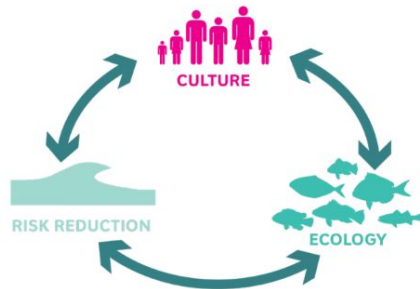
- Students annotate the map and the caption.

2. Students compare and contrast the 1917 and 1937 maps of leased oyster beds and capture their observations in the handout [What changed between 1917 and 1937?](#)
3. Students compose the second page of their illustrated fictionalized memoir of life as the former oysterman who used to work their old oyster bed -- now set in 1937 -- including how their life has changed, and why they think their industry has collapsed.

Extend

Students analyze the collapse of the Raritan Bay oyster industry from the point of view of *resilience of social-ecological systems*.

1. Project the [SCAPE graphic describing the three layers of resilience](#) envisioned for the Living



Breakwaters
1 in this unit).

(which students are familiar with from lesson

2. Facilitate a class discussion using these questions as starting points:
 - In the case of the oyster industry of Raritan Bay, what social, biological, and/or physical conditions became difficult? Why do you think this industry, economy, and way of life were not resilient enough to last beyond the 1920s? What might have been done differently to make the Raritan Bay oyster industry more resilient?
 - Why do you think those things were not done?
 - What about our culture, ecosystems, and physical coast do you think is facing difficult conditions *right now*?
 - Do you think there are any practical lessons we can apply today, from studying the collapse of Raritan Bay's oyster industry?

FEATURED IMAGE

Featured image:



Featured image credit: UBC Library [digitalcollections.library.ubc.ca/cdm/about](https://open.library.ubc.ca/cdm/about), No known copyright restrictions. Date Created: 1769-1782 <https://open.library.ubc.ca/collections/tgdp/items/1.0129017>

STANDARDS

ELA Common Core Grade 4

CCSS.ELA-LITERACY.L.4.4

Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.

CCSS.ELA-LITERACY.RF.4.4

Read with sufficient accuracy and fluency to support comprehension.

CCSS.ELA-LITERACY.SL.4.2

Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

CCSS.ELA-LITERACY.W.4.7

Conduct short research projects that build knowledge through investigation of different aspects of a topic.

CCSS.ELA-LITERACY.W.4.8

Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

CCSS.ELA-LITERACY.RI.4.1

Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-LITERACY.RI.4.2

Determine the main idea of a text and explain how it is supported by key details; summarize the text.

CCSS.ELA-LITERACY.RI.4.3

Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

CCSS.ELA-LITERACY.RI.4.5

Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

CCSS.ELA-LITERACY.RI.4.6

Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.

CCSS.ELA-LITERACY.RI.4.9

Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.

CCSS.ELA-LITERACY.W.4.4

Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.W.4.3

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

ELA Common Core Grade 5

CCSS.ELA-LITERACY.L.5.4

Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.

CCSS.ELA-LITERACY.RF.5.4

Read with sufficient accuracy and fluency to support comprehension.

CCSS.ELA-LITERACY.W.5.7

Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

CCSS.ELA-LITERACY.W.5.8

Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.

CCSS.ELA-LITERACY.RI.5.1

Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-LITERACY.RI.5.3

Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

CCSS.ELA-LITERACY.RI.5.5

Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.

CCSS.ELA-LITERACY.RI.5.6

Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.

CCSS.ELA-LITERACY.RI.5.9

Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

CCSS.ELA-LITERACY.W.5.4

Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.W.5.3

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

ELA Common Core Grade 6

CCSS.ELA-LITERACY.L.6.4

Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.

CCSS.ELA-LITERACY.SL.6.2

Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

CCSS.ELA-LITERACY.RI.6.4

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.

CCSS.ELA-LITERACY.W.6.7

Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.

CCSS.ELA-LITERACY.RI.6.7

Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

CCSS.ELA-LITERACY.RI.6.9

Compare and contrast one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).

CCSS.ELA-LITERACY.W.6.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.W.6.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

ELA Common Core Grade 7

CCSS.ELA-LITERACY.SL.7.2

Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.

CCSS.ELA-LITERACY.RI.7.3

Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

CCSS.ELA-LITERACY.RI.7.4

Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.

CCSS.ELA-LITERACY.W.7.7

Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

CCSS.ELA-LITERACY.W.7.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-LITERACY.W.7.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

ELA Common Core Grade 8

CCSS.ELA-LITERACY.W.8.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.W.8.3

Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

ELA Common Core Grades 9-10

CCSS.ELA-LITERACY.W.9-10.7

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.W.9-10.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.W.9-10.3

Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

ELA Common Core Grades 11-12

CCSS.ELA-LITERACY.W.11-12.7

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.RI.11-12.3

Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

CCSS.ELA-LITERACY.RI.11-12.7

Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

CCSS.ELA-LITERACY.W.11-12.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.W.11-12.3

Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.