

Life at Sea: An Inquiry Investigation of Maritime Artifacts

Collaboration of Mystic Seaport & LEARN

Educational Programs & Teacher Resources

Life at Sea: An Inquiry Investigation of Maritime Artifacts

This unit was developed by Laura Krenicki (lkrenicki@gmail.com) for Mystic Seaport Education and LEARN.

If you want to build a ship, don't drum up people to collect wood and don't assign them tasks and work, but rather teach them to long for the endless immensity of the sea.

~ Antoine de Saint-Exupery

Introduction: The purpose of this inquiry-based unit is to teach students how to investigate artifacts from different mariners, and to interpret understanding of a life at sea. The project allows students to make global and STEM connections to maritime history and ocean-going vessels. This series of lessons is intended for grades 5-9, but may be modified for other grades or levels. The links to the digital collections may be used in a flipped classroom or serve as resources for students. For background information about whaling, please see the Mystic Seaport Education page (<http://educators.mysticseaport.org/sets/whaling/>).

Lesson Preparation: This is an inquiry lesson that may be conducted solely in the classroom or used in a flipped environment – allowing students to preview the websites in advance, make notes on the sources, research, and come to school prepared to share in the collaborative learning. These lessons contain elements that will be done as a whole class, in small groups, and/or individual work. It is also easily formatted to serve for enrichment or after-school programs, and may be modified to make elements age- or ability-appropriate.

Technology: Every attempt has been made to digitize all parts of this unit, including the source documents (artifacts, photographs, maps, etc.) to meet Common Core standards for use of technology. The unit intends to utilize the Mystic Seaport Education Resource Sets, artifact collections and ship maps as the source material. Student conduct research using online technology and portions of this unit may be modified depending on access to computers, time or student ability.

Geographic Connections: These lessons connect to National Geographic's and the National Council for Social Studies' standards for Geographic Education. It reflects the world in spatial terms, looks at places and regions, physical and human systems, environment and society, and demonstrates the use of geography to interpret the past. To view the standards:

http://education.nationalgeographic.com/education/standards/national-geography-standards/?ar_a=1

Desired Results	
<p>Common Core Standards: The following Common Core Standards are from the English/Language Arts Informational Text strands for grades 5-9.</p> <p>Key Ideas and Details (grades 5-9) CCSS.ELA-Literacy.RI.5.3, CCSS.ELA-LITERACY.RI.6-10.1</p> <p>Integration of Knowledge and Ideas (grades 5-9) CCSS.ELA-Literacy.RI.5.9, CCSS.ELA-LITERACY.RI.5-10.7</p> <p>Informational Writing CCSS.ELA-Literacy.WHST.6-8.2</p> <p>STEM by Grade Level: 5.1.1.2 Inquiry, 6.1.1.2 Inquiry, 7.1.1.2 Inquiry, 8.1.1.2 Inquiry</p>	
<p>Understanding/Goal:</p> <p>Students will understand that life at sea required many specialized skills, understanding of technology, and human ingenuity.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> ● What was life like as a 19th century mariner? ● How did technology develop for life on the sea?
<p>Student Objectives: Students will be able to:</p> <ul style="list-style-type: none"> ● Interpret maritime artifacts (maps, images, tools, personal effects) to explain life at sea in the 19th century. ● Replicate tools of maritime navigation and use these tools to solve inquiry problems. 	
Assessment Evidence	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> ● Problem-solve inquiry challenges by investigating and evaluating sources from Mystic Seaport collections 	<p>Other Evidence:</p> <ul style="list-style-type: none"> ● Close-readings of digital sources using graphic organizer ● Planetary navigation ● Compass navigation ● Individual and group-based research ● Speaking, discussion and listening skills ● Optional exit slips ● (Optional) Plotting additional sea voyages

Resources

Mystic Seaport Cabin Boy Ditty Bag:

http://educators.mysticseaport.org/artifacts/taylor_bag_tools/

NOAA Compass Creator:

http://oceanservice.noaa.gov/education/for_fun/MakeyourownCompass.pdf

National Geographic Mapmaker Kits:

http://education.nationalgeographic.com/education/programs/nat-geo-mapmaker-kits/?ar_a=1 Teachers may download printable world maps in single-sheet, tabletop sets, or large-scale wall-sized maps.

Library of Congress: A Maritime Perspective on American Expansion:

<http://www.loc.gov/teachers/classroommaterials/connections/westward/history4.html>

Archive of Ship Manifests through the Customs Office in New London, Connecticut:

<http://research.archives.gov/description/646279> (for more information see <http://research.archives.gov/organization/1182927>)

The list of resources continues in the individual lessons and student handouts below.

Introduction to Life at Sea in the 19th Century

Sea-fever

*I must down to the seas again, to the lonely sea and the sky,
And all I ask is a tall ship and a star to steer her by,
And the wheel's kick and the wind's song and the white sail's shaking,
And a grey mist on the sea's face, and a grey dawn breaking.*

*I must down to the seas again, for the call of the running tide
Is a wild call and a clear call that may not be denied;
And all I ask is a windy day with the white clouds flying,
And the flung spray and the blown spume, and the sea-gulls crying.*

*I must down to the seas again, to the vagrant gypsy life,
To the gull's way and the whale's way where the wind's like a whetted knife;
And all I ask is a merry yarn from a laughing fellow-rover
And quiet sleep and a sweet dream when the long trick's over”
— John Masefield, *Sea Fever: Selected Poems**

Question Related to Theme:

- o What was life like for a mariner at sea in the 19th century?

Note for Teacher: *This unit is intended for differentiation and allows students to choose their inquiry groups. However, due to your individual student needs, these decisions may need to be made by you. The intention is that each group is high-interest, so no student should feel like their group is inferior to the others. In addition, the teacher will need to create these collection kits, unless borrowed from the Mystic Seaport.*

Time: 2-5 days, depending on the amount of class time devoted to this part of the project.

Materials Needed:

- Access to the Mystic Seaport’s education page. Ideally, one computer per group of students, so a minimum of 5 computers.
- 2 large poster boards or wall space with the essential question posted above. Ask: “What was life like for a mariner at sea?” The second poster board will hold the questions from the opening initiation discussion.
- Artifact Investigation Sheets (use the appropriate ones for your grade level)
 - o Middle/High School:
http://educators.mysticseaport.org/static/connections/classroom_pdfs/object_analysis_middle_and_high.pdf

- Elementary/Middle School:
http://educators.mysticseaport.org/static/connections/classroom_pdfs/object_analysis_elementary.pdf
 - Photo analysis sheet:
http://educators.mysticseaport.org/static/connections/classroom_pdfs/photo_analysis_worksheet.pdf
 - Document analysis sheet:
http://educators.mysticseaport.org/static/connections/classroom_pdfs/document_analysis_worksheet.pdf
- Artifact investigation kits (one per group)
 - Magnifying glasses (a minimum of 5, but a class set would be best)
 - Sticky notes
 - Pocket folders or large manila envelopes to keep the investigation materials together
 - Writing utensils

Artifact Investigation Kits: If actual pieces cannot be located, you may have students use the Mystic Seaport collection to see digital images. However, even if there is one physical piece in each kit, in addition to web access, it would be recommended.

- **Whaler’s Kit** –harpoon , bomb lance (http://educators.mysticseaport.org/artifacts/bl_pierce/), ambergris (http://educators.mysticseaport.org/artifacts/ambergris_vial/), whalebone, letter (http://educators.mysticseaport.org/documents/dont_go_whaling/)
- **Captain’s Navigation Kit** – logbooks (http://educators.mysticseaport.org/maps/logbook/morgan_first/), telescope, compass (http://oceanservice.noaa.gov/education/for_fun/MakeyourownCompass.pdf), sextant (<http://educators.mysticseaport.org/sets/navigation/>)
- **Cabin Boy Kit** – awl (http://educators.mysticseaport.org/artifacts/taylor_sailmaker_prick_one/), grommets, sailcloth, rope, (http://educators.mysticseaport.org/artifacts/taylor_bag_tools/)
- **Child’s Kit** – gamming chair (http://educators.mysticseaport.org/artifacts/gamming_chair/), letter (http://educators.mysticseaport.org/documents/maxson_letter/), stereoscopes (http://educators.mysticseaport.org/artifacts/stereoscope_mears/) *Note: a “View-Master” may serve as a replica of the older stereoscope and are still being made by Fisher-Price!*

- **Mariner’s Kit** – poetry of the sea, shanties, scrimshaw (<http://educators.mysticseaport.org/sets/scrimshaw/>), deck prism (http://educators.mysticseaport.org/artifacts/cwm_deck_prism/)

Activity:

Initiation: (If possible, have the opening poem posted during the duration of the inquiry project):

- Use the opening poem to *preview* the learning about a life at sea. You may wish to decide how to have students read this poem depending on the level of the student (guided reading, think-pair-share, etc.) Consider these questions: *What questions does the poem raise? What terms/expressions are unfamiliar? Does it appear that the author likes being at sea? What does the author want you to know about being a 19th century mariner?* Have students write their questions to the poem on sticky notes and attach them to a large sheet of poster paper that will remain on the wall during the lesson. As the inquiry investigation unfolds, many of these questions will be answered. The intention of this introduction with a poem is not to have the teacher present a modeled close-reading, but to expose students to the descriptive language of a “life at sea” that will be further developed throughout their investigations in this unit.
- **Ask:** ‘What do you think life in America would have been like in the 19th century?’ Have students share verbal answers and have a student keep the list of sources on the board or easel. Depending on your student population, some background may need to be provided. To add to the discussion and narrow the focus, ask “What do you think life at sea would have been like in the 19th century?” To assist in this part of the discussion, images from the Mystic Seaport Library collection may be used (<http://library.mysticseaport.org/>) either as digital projections or smaller printed collections/handouts for groups of students.
- Explain to student that they will be “investigators” to learn about maritime life in the 19th century. Students will be able to choose their investigation groups (unless you’ve made the groups already). Their Artifact Investigation Kits will contain some of the resources for their investigations, but some of the research will need to be done elsewhere.
 - **Interpreting Primary Sources:** Explain that the class is going to their kits using the artifacts, documents, photographs, etc. and they should use the appropriate note-taking sheets to do close readings of the artifacts. Provide magnifying glasses to look for details, especially if you are using high-quality printouts for the investigation. Students on the computer should be able to enlarge the screen view. *If the teacher needs to model a close-reading of an artifact, please see http://educators.mysticseaport.org/artifacts/adventure_tooth/ and have students work with the teacher on how to do a close-reading of the artifact (there are two sides of this artifact and both images are on this page). It is also helpful to have the teacher or student make a claim about the artifact and then provide the evidence to support it. This modeling may be necessary for students who are unfamiliar or weak in the skill.*

- Students should ask questions and keep a record of the questions they need to research further.
 - What does this artifact tell you about life at sea?
 - What additional information is needed? Where may that information be found?
 - How does this artifact help to tell a story?

Guiding Questions to the Artifact Collections:

- Are there any connections you are starting to see between the objects? How were the objects used? (*relationships & interactions*)
- What information did you learn about the job of this mariner from the artifacts left behind? Have students find specific evidence. (*informational text*)
- Why do you think this person decided to go to sea? (*inference*)
- What questions do you have about the mariner you are investigating? Where do you think this information may be found? (*inquiry*)
- Have students keep their work in a shared class folder by investigation group. This way, if the class needs multiple class periods to work on the investigation, all of the materials will be stored safely in the classroom.
- *Closure: Although the entire inquiry project may not be covered in the first day, be sure to have this closure discussion after every day of the investigation. After the discussion and close reading activity, ask students to consider to the guiding question “What do we still need to know about life at sea?” If students are still in groups, have one be the secretary and write the group questions on a new sticky note that will be attached to the work folders. These questions will continue as part of the investigation on subsequent days and should help quickly refocus the students when they return to their investigation.*

Closer Investigations and Testing Theories

"We cannot direct the wind, but we can adjust the sails." -Bertha Calloway

Questions Related to Theme:

- o How did technology develop for a life on the sea?

Materials Needed:

- Investigation folders from the previous lesson
- Aluminum foil, paper, pennies and/or marbles
- Small pieces of cork (perhaps slices from a bottle of wine), sewing needles, magnet, cups, water
- Construction paper
- Tape
- Lengths of rope for knot-tying station
- Protractors, string (see Sextant Station)
- Pan, water, table fan (see Wave Station)
- Additional materials will be needed in the Weather Stations (see handouts below)
- Writing utensils

Activity:

- *Initiation:* Remind students of the earlier essential question posted as well as some of the questions they generated about the poem. Ask if any of the questions may be answered yet. The investigation will continue today, plus students will be able to check their theories by doing some experiments on some of the artifacts.
- **NOTE:** For more information about a mariner's life at sea, please review the other educational resources on the Mystic Seaport Education website. There are lessons specific to whaling and a mariner's life at sea, which may provide some foundation for your students.
- Students may move between stations to check for understanding about their inquiry investigations. In fact, students should carry Station Cards with the essential question noted on the top -- how did each station help the student reflect back to the essential question and answer it in the context of the station? Also ask students to consider how the technology at each station may have developed for use at sea in the 19th century. Students do not need to do all of the stations, and may, in fact, only do one, as the role of the "student as teacher" is more important than everyone trying every station. The Station Cards may be singular index cards or a small passport-type booklet that may carry the theme across the pages. These may be collected to check for understanding.
- **Compass Station** – students who investigated the compass should complete this station. You may wish to use this resource sheet from NOAA

(http://oceanservice.noaa.gov/education/for_fun/MakeyourownCompass.pdf), but the question about how a water compass would be used on a ship may not be obvious in a stationary classroom. If necessary, have a larger container of water (bucket) with a flat-bottomed bowl placed on the water. Have the students put one of the completed compasses in the bowl and then have them tap the side of the bucket to make “waves.” What challenges do they now see?

- **Shipbuilding Station** – Using aluminum foil or a single piece of paper and tape, have students make a ship that can carry the most cargo. For designs on paper sailboats, please see: <http://www.kidsmakestuff.com/articles/show/e9eg>
 - Using pennies or marbles, see how much “cargo” their ships can carry before sinking.
 - What strategies seem the most successful? Why?
 - What materials would have been used in the 19th century to build ships? How would they repair them if they were at sea when a problem occurred?
 - For further investigation: How were whale ships designed? How were whale ships different from whale boats? <http://www.mysticseaport.org/38thvoyage/whaleboats-for-the-charles-w-morgan/> For further information on schooners: <https://suite.io/darlasue-dollman/22rf22d>
- **Shanty Station** -- This one may require headphones if it will be disruptive to the rest of the activities going on. There are several sources for shanties, but this site provides some background information as well as some YouTube clips to the songs (<http://www.artofmanliness.com/2008/09/23/the-10-manliest-sea-shanties/>). If your district has blocked YouTube, or if you’d rather students just investigate lyrics, this is a comprehensive list of song lyrics: <http://shanty.rendance.org/lyrics/> What was the purpose of sea shanties? Could they work in other situations today? Have students create a shanty about the school, doing homework, or some other “task” in their day. If you are adventurous and have a sense of humor, have them write a shanty about you (as many of the shanties were about the “captain” of the ship)!
- **Sextant Station** – Although this one is best done at night, you could replicate the task during the day by setting up flashlights along the ceiling! Small, LED lights may be placed on or near the ceiling in the classroom, ideally along the opposite wall of the station. Indicate which one is the reference point, and have students test their sextants using these indicators. NASA created a teacher page complete with directions and handouts on how students may make their own sextants: http://solarscience.msfc.nasa.gov/suntime/sxtnt_tchr.pdf You may wish to have students see the video How to Use a Sextant on the Mystic Seaport page (the link to the video is on the right side): http://educators.mysticseaport.org/artifacts/instrument_sextant/
- **Signal Flags Station** – Signal flags were used to communicate between other vessels. Flags could be flown singly or in combination to project different messages. Around the room, you may post signal flags (made of paper) and have students research the messages: <http://www.boatsafe.com/nauticalknowhow/flags.htm> . *You may wish to have students make signal flags for the classroom and generate the messages instead. Provide construction paper, scissors, glue/tape for the flags.*
- **Ocean Currents** – NOAA has an outstanding resource to have students predict ocean currents with a web-based prediction activity. This should be done at a computer as the data will be updated. <http://www.oar.noaa.gov/k12/html/oceancurrents2.html>

- **Knot Station** – Knots were important on sailing vessels. This animated website shows how to create knots step-by-step. Start with a bowline knot. Once mastered, other knots may be tried. Be sure to have enough pieces of rope in long enough lengths for this to work!
<http://www.animatedknots.com/indexboating.php>
- **Wave Station (optional)** – Students may experiment with wind and water to see how waves are generated. This will require a little bit of forethought as some materials may not be readily available (fan, etc.), but is well-worth the effort. The entire station setup may be found here:
http://www.eduplace.com/rdg/gen_act/ocean/wave.html
- **Weather Stations** – Tracking weather changes would be essential on the sea. Students in middle grades learn about weather, and these stations should tie in well with what they are learning in their science classrooms.

Barometer station – Although the materials for this station may not be authentic to the 19th century, the importance of sensing changes in barometric pressure while at sea would have been important. This guided lab sheet helps students create their own barometers: https://www.sercc.com/education_files/barometer.pdf To prolong the learning, have students keep their barometers going for several days and track the changes in pressure over an extended period of time.

Wind Vane station – This may be done inside, but may be best tested outside. The materials to make a wind vane are easily accessible in a classroom. As an extension, have this station set up near the Wave Station (above) to see how wind direction would affect waves.

http://teacher.scholastic.com/activities/wwatch/gather_data/windvane.htm

This list is not comprehensive. If you have enough room in your classroom, you may also set up stations on the history of whaling, military ships/sea battles, cultural interactions, etc.

Synthesize & Evaluate: *This section is intended to draw the learning together. This may take one or several days to complete, depending on the ages of the students in your classroom. Depending on the teacher's expectations, this part may be a written assignment, a visual display, a role-play, or other assessment method.*

- What connections are drawn between the research from the first day and the investigations today? Are any questions answered? Are there new questions generated?
- Have students reconsider the two essential questions. Have them discuss them in their research groups and then as an entire class. You may wish to use this discussion and/or written response to the essential questions as a singular summative assessment.
- What new understandings about changing technology from the 19th century developed into 21st century technology?
- *Closure:* Re-read the opening poem and examine the questions raised by the poem. Does the investigation clarify any of the questions? How did the author feel about being at sea?

Additional Options for Summative Assessments: This inquiry project is intended to be shared with the school community. Ideally, the results should be shared as though students are presenting an interactive “museum” where they explain their understandings and demonstrate the stations. Students should be encouraged to make the “museum” as interactive as possible – musicians may perform shanties, students may model shipbuilding, knot-tying, etc.

The following are additional options for summative assessments:

- Research one of the whale ship voyages plotted on the Mystic Seaport page. Plot out all of the ports-of-call on a large world map (perhaps using the National Geographic Mapmaker Kit http://education.nationalgeographic.com/education/programs/nat-geo-mapmaker-kits/?ar_a=1). Have classmates each research a different voyage and compare the routes and places visited. What might students infer about the cultural interactions that may take place in these locations? If a 19th century mariner was having these cultural interactions, what would s/he learn about the world, the people, new technologies, etc.?
- Create a play about the stories of life at sea in the 19th century. It may be good to include the stories of those left behind on land, too. Cast all of your classmates as characters in the play. Who would play which parts? Where would you start the play (both geographically and historically)? If needed, there are letters to and from mariners available on the Mystic Seaport Living Documents page which may serve as inspiration! <http://educators.mysticseaport.org/documents/>
- Create a digital storybook about the roles of mariners and life at sea in the 19th century (there are online tools such as Story Jumper that will guide you and help you to publish the story <http://www.storyjumper.com/>)
- Create an artistic project – a painting, drawing, a song (sea shanty or even a rap song!), a puppet show, a music video, or even a film. The students should clearly reflect understanding of the essential question and relate their project to life at sea in the 19th century.
- Design a monument – look around your community and find the monuments. What and/or who do they represent? What would a monument to a mariner look like? Why? Design a monument for a local mariner (this may require some local research with your historical society). What would the monument represent? What images would be in it? (**Note:** *If you cannot locate a local monument, use this image from the New York Park Service <http://www.nycgovparks.org/parks/battery-park/monuments/1939>). Students may create a drawing, sculpture, an up-cycled diagram (using recyclable materials), etc. to demonstrate their design. They should be able to clearly articulate the purpose and function of the monument.*
- Design a whaleship – research whaleship design and figure out how to make a model of one. What materials would you use? How would you make it seaworthy (waterproof)? How would you design the sails and the rigging? For information about whaleship construction, see the Mystic Seaport website and search “Charles W. Morgan.” In addition, the Mayflower II is being restored at the Seaport, so although it isn’t a whaling ship, the techniques used on earlier sea-going vessels helped to shape the whaleship design.

- Create an “authentic” 19th century newspaper – student reporters may write “news” articles, advertisements, editorials that may have appeared in a port town in the 19th century. The news should be connected to life at sea (perhaps advertisements for whale oil lamps, “help wanted” sections for skilled mariners, news reports from ships, etc.)

Rubrics: Rubrics were intentionally left off of this unit as the final product really is in the hands of the individual teacher. However, the Object Analysis documents at the start of this unit may serve as formative assessments, and you may wish to use check in/check out lists for understanding, exit cards, or inquiry-investigation rubrics. The Station Cards in the “Testing Theories” tasks may also be developed by the teacher depending on the level of the students and the depth of the inquiry. As each student’s learning will vary due to the tasks (s)he will complete, having an overall rubric would not be appropriate for all students.