



ST. AUGUSTINE LIGHTHOUSE & MARITIME MUSEUM

Shipwreck CSI

Outreach Program Lesson Plan

Grades 3rd-5th

Learning Objectives: Upon completion, students will be able to...

- I. Define "maritime archaeology" and describe the work maritime archaeologists do.
- II. Examine artifact's physical characteristics and record them accurately on an artifact analysis sheet.
- III. Analyze artifacts' position on site map and make determinations about the shipwreck.

Florida State Educational Standards:

3rd Grade:

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|------------|------------|------------|------------|------------|---------------|
| SC.3.N.1.2 | SC.3.N.1.3 | SC.3.N.1.4 | SC.3.N.1.5 | SC.3.N.1.6 | SC.3.P.8.3 |
| SS.3.A.1.1 | SS.3.G.1.1 | SS.3.G.1.2 | SS.3.G.1.4 | SS.3.G.1.6 | MAFS.3.MD.3.6 |

4th Grade:

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|------------|------------|------------|------------|------------|
| SC.4.N.1.1 | SC.4.N.1.3 | SC.4.N.1.5 | SC.4.N.1.6 | SC.4.N.1.7 |
| SS.4.A.1.1 | SS.4.A.3.3 | SS.4.A.3.7 | SS.4.G.1.1 | SS.4.G.1.4 |

5th Grade:

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|------------|------------|------------|------------|
| SC.5.N.1.1 | SC.5.N.1.2 | SC.5.N.1.5 | SC.5.N.1.6 |
| SS.5.A.1.1 | SS.5.A.4.4 | SS.5.G.1.4 | |

Introduction Finding a shipwreck yields more questions than answers. What ship is it? Who was on it? Where was it going? What was it carrying? Maritime archaeologists try to answer these questions and more through a variety of methods. They use archaeological remains, historical records, and careful observation to recover a lost piece of history. Mathematics and science skills are required for shipwreck inquiry as well. This project will simulate the techniques maritime archaeologists use as participants piece together the story of a shipwreck from the historical records and archaeological remains, finding clues and combining their theories and observations into a single account of the doomed ship.

Materials and Resources

- Shipwreck Quilt or Site Plan Map
- Small concretion cards to go on quilt
- Large concretion print outs
- Large x-ray print outs
- Small artifact grouping cards that go on quilt
- Small, individual artifact cards
- Artifact Analysis sheets
- Pencils
- projector & screen or tablets for PowerPoint

Direct Instruction

Introduction to Maritime (VC Breezeway – 5 minutes)

- Ask if anyone can define the word *maritime*.
Maritime means of, related to, or adjacent to the sea.
- Ask the students to identify things that are *maritime*.
Encourage answers using *accepting responses* (nodding head, clarifying answers, etc.)
- Explain why the maritime hammock is called that.
It is mature sand dunes that are inland enough due to deposition and changes in the coastline to allow for the growth of vegetation, animals, reptiles, and insects that normally would not live in sand dunes.

Introduction to Archaeology (Keepers' House Gallery – 5 minutes)

- Ask the students for a definition of the word *archaeology*.
Again, be accepting of responses, even incorrect ones.
- If no one gives a good definition, explain that archaeology is the study of peoples of the past by analyzing evidence they left behind.
- Have the students give examples of evidence archaeologists might find to examine.
Emphasize that the items archaeologists find are called *artifacts*.

Introduction to Maritime Archaeology (Keepers' House Gallery – 5-10 minutes)

- Explain to the students that we have *maritime archaeologists* working at the lighthouse. Ask the students, given what they now know regarding *maritime* and *archaeology*, to explain or guess what these maritime archaeologists do or what kind of artifacts they find.
- Show short PowerPoint on methods utilized by marine archaeologists (I:\Education\Lesson Plans [Current]\Maritime Archaeology Programs\2016 Shipwreck CSI\underwater general mapping) or show the short video *9m46s* (http://www.staugustinelighthouse.org/LAMP/Research/Storm%20Wreck/storm_video)

Guided Practice

Shipwreck Quilt Activity (Keeper's House Gallery – 30 Minutes)

- Maritime archaeologists often work on shipwrecks. **Explain how** archaeologists will **grid a shipwreck** so that it is easier to recreate the shipwreck site in their offices.
- **Show** the students the shipwreck **quilt** (or the Site Plan Map) with the grid and the **concretion cards attached**. Explain that archaeologists record where they find an artifact before removing it.
- Ask students if they know what the artifacts are on the quilt. **Explain what concretions are**. Larger artifacts are mapped and some are removed for further study. If these artifacts are metal, like iron, they may be encased in a concretion. A concretion is formed similar to when a ship is sunk to form an artificial reef. Iron is less toxic to plants and animals so they will attach themselves. As these organisms die they create calcium carbonate. The calcium carbonate mixes with chemicals being released by the iron as it rusts and decays. This forms the concretion, which can increase in size over time and may have many artifacts "cocooned" inside. The conservation of concretions is a science and can take many years before the artifact is stabilized for museum display.

- **Show** the students an **example concretion** (if have). Ask students what they think is inside the concretion. Ask if there is any way we could see what's inside the concretion without breaking it open.
- Next, **show** the students the **musket concretion example** and use it as a guide for activity instruction. Ask them what they think is inside.
- **Show** the **musket x-ray example**. Explain that before beginning the conservation processes on the concretions, an x-ray may be taken to see what is inside. This way, the archaeologist can prioritize which concretion should be worked on next and conduct research about what each artifact is. This can be difficult and take a long time to find the correct match. Archaeologists use books, internet searches, historic photographs or drawings, other experts, and any source that can help. An archaeologist has to have patience and pay attention to detail in order to make sure they are correct.
- **Show the musket examples** to see which one might be the best match when compared to the x-ray. Talk it through and explain that the comparative resources are facing to the right, when the plate seen in the x-ray is actually on the back of the gun when facing to the right.
- **Show pictures of the musket facing to the left** and discuss the patterns which might best fit. Ask what else might help figure out what the artifact in the x-ray is? Answers: measurements, removing it, ultrasound, other technology, etc.
- **Ask the students if they "Can help the archaeologists research by determining which artifact picture best matches the artifact in the x-ray?"**
- **Break students into groups (there are 11 concretion sheets). Let each group pick a concretion from the quilt** (if using Site Plan Map then give them a concretion, but show them where on the map it came from) and find the matching larger concretion print out (they are numbered).
- **Ask them to analyze the concretion** and write what artifact or artifacts they think are in it on the Artifact Analysis sheet.
- **Have them find the x-ray that matches their concretion.** Once again, have them analyze the object(s) in the x-ray and write down what they think they are on the Artifact Analysis sheet.
- Next, they need to look through the **small, individual artifact pictures to find the one(s) that best matches what they see in the x-ray**. Try to find pictures for as many artifacts as they can within the time allotted. Warn them that there are many similar pictures, like the musket example, but they want to be as precise as possible.
- Once time is up or all groups seem to have found the matching picture(s), have **each group find the grouped artifact card that goes with their**

concretion (they are numbered). Let them know that this card is either the actual artifact removed from the concretion or it is the best likeness of the artifact.

- **Ask them to compare the artifacts in the grouped artifacts card to the one(s) they chose as a match.** Did they choose wisely? Now have them **write down on the Artifact Analysis sheet** what they believe the artifact(s) from the card tells them about the people that were on the ship.
- **Use the staff answer sheet** to go over the artifacts in each group's concretion if necessary.
- **If there is time**, have each group map the grouped artifact card back onto the quilt **or** simply replace the concretion on the quilt with the grouped artifact card. Skip this part if using the Site Plan Map. **Discuss** the assemblage/artifact layout on the quilt and what that might mean.

Assessment – 10 minutes

Use this time to ask questions of the students that test their recall of topics covered in the lesson. Ask questions like:

- What do maritime archaeologists do?
- Why is it important to be accurate?

Also ask questions about their experience, research, and accuracy during the activity:

- Was it hard to find an exact artifact match?
- What kinds of documents or other information could have made your research easier or more accurate?
- As we look at the artifacts on ocean floor (quilt), what can we observe about the people that were aboard the ship that sank?
- Do you agree that studying the shipwreck can produce more questions than answers? What were some questions that came about from your research?

Also, be sure to answer any questions the students have about what they learned.

Keepers & Climbers – 30 minutes

This section of the lesson consists of a self-guided tour through the Keeper's House Museum and climbing the Lighthouse. If the class consists of more than 30 students and chaperones, the class will need to split to climb the tower. If that is the case, one half will climb while the other half goes into the museum and then they switch.

Strategies Used for Multi-Levels

Discuss with the teacher beforehand regarding any students with special needs and determine with them the best strategies for meeting those needs.

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Appendix A – Florida State Educational Standards

3rd Grade:

- SC.3.N.1.2 Compare the observations made by different groups using the same tools and seek reasons to explain the differences across groups.
- SC.3.N.1.3 Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.
- SC.3.N.1.4 Recognize the importance of communication among scientists.
- SC.3.N.1.5 Recognize that scientists question, discuss, and check each others' evidence and explanations.
- SC.3.N.1.6 Infer based on observation.
- SC.3.P.8.3 Compare materials and objects according to properties such as size, shape, color, texture, and hardness.
- SS.3.A.1.1 Analyze primary and secondary sources.
- SS.3.G.1.1 Use thematic maps, tables, charts, graphs, and photos to analyze geographic information.
- SS.3.G.1.2 Review basic map elements (coordinate grid, cardinal and intermediate directions, title, compass rose, scale, key/legend with symbols).
- SS.3.G.1.4 Name and identify the purpose of maps (physical, political, elevation, population).
- SS.3.G.1.6 Use maps to identify different types of scale to measure distances between two places.
- MAFS.3.MD.3.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

4th Grade:

- SC.4.N.1.1 Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.

- SC.4.N.1.3 Explain that science does not always follow a rigidly defined method ("the scientific method") but that science does involve the use of observations and empirical evidence.
- SC.4.N.1.4 Attempt reasonable answers to scientific questions and cite evidence in support.
- SC.4.N.1.5 Compare the methods and results of investigations done by other classmates.
- SC.4.N.1.6 Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.
- SC.4.N.1.7 Recognize and explain that scientists base their explanations on evidence.
- SS.4.A.1.1 Analyze primary and secondary resources to identify significant individuals and events throughout Florida history.
- SS.4.A.3.3 Identify the significance of St. Augustine as the oldest permanent European settlement in the United States.
- SS.4.A.3.7 Identify nations (Spain, France, England) that controlled Florida before it became a United States territory.
- SS.4.G.1.1 Identify physical features of Florida
- SS.4.G.1.4 Interpret political and physical maps using map elements (title, compass rose, cardinal directions, intermediate directions, symbols, legend, scale, longitude, latitude).
- LAFS.4.L.3.6 Acquire and use accurately general academic and domain-specific words and phrases as found in grade level appropriate texts, including those that signal precise actions, emotions, or states of being (e.g., *wildlife*, *conservation*, and *endangered* when discussing animal preservation).

5th Grade

- SC.5.N.1.1 Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- SC.5.N.1.2 Explain the difference between an experiment and other types of scientific investigation.
- SC.5.N.1.5 Recognize and explain that authentic scientific investigation frequently does not parallel the steps of "the scientific method."
- SC.5.N.1.6 Recognize and explain the difference between personal opinion/interpretation and verified observation.

- SC.5.N.2.1 Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.
- SS.5.A.1.1 Use primary and secondary sources to understand history.
- SS.5.A.4.4 Demonstrate an understanding of political, economic, and social aspects of daily colonial life in the thirteen colonies.
- SS.5.G.1.4 Construct maps, charts, and graphs to display geographic information.
- MAFS.5.G.1.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
- MAFS.5.G.1.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret