

Mock Shipwreck: Exploring the USS *Monitor*

NOAA's *Monitor* National Marine Sanctuary
(Based on Mock Shipwreck Lesson Plan developed by
Kate Thompson. Credit below)

VIRGINIA STANDARDS OF LEARNING

(Math) 4.5, 4.6, 4.11, 4.13, 4.15, 4.17, 5.3, 5.8, 5.11; (Science) 5.1c,e, 6.2, 6.11; (Virginia Studies) 1a,d; (Art) 5.4, 5.5, 5.7; (Physical Science) 1, (Humanities/Sciences) 6.7

FOCUS

Maritime Archaeology

GRADE LEVEL

4 – 6 grade physical and social science

FOCUS QUESTION

What techniques do maritime archaeologists use to create a site plan?

What factors influence an underwater archaeological site?

Why should underwater archaeological sites be preserved?

Why is the USS *Monitor* protected?

LEARNING OBJECTIVES

Students will gather data from physical clues. Students will learn to form hypotheses based on observed data.

Students will map artifacts into an archaeology site plan.

Students will use the data gathered to develop evidence.

MATERIALS

Site plan to record wreck measurements and observations

Mock shipwreck (set up in the classroom, or outside in a grassy or paved area)

Measuring tape or 50 ft of nylon line

Clipboard, ruler, compass, plastic, pencils and paper for each group of three to four students

Artifacts to discover
Model of the USS *Monitor*

PREPARATION

1. Prior to students entering the room put together a mock shipwreck with either canvas, large paper, or materials from the classroom. (See figure 1-This mock wreck was made of 1 piece of painter's canvas with the *Monitor* site plan painted on). Create visible datum points on the mock wreck for students to measure to and from the artifacts.

2. Review the background document that accompanies this lesson plan for information on the history, designation, recovery and conservation efforts associated with the USS *Monitor*.

AUDIO/VISUAL MATERIALS

Chalkboard, marker board, flip chart or overhead projector to facilitate presentations and data summaries.

TEACHING TIME

One 45-minute class period.

SEATING ARRANGEMENT

Six groups of four for a class of 24 will evenly distribute the work among the teams. If the class is smaller or larger create as many groups of three or four as possible.

KEY WORDS

Maritime Archaeology

Site Plan

Datum Point

Bow

Stern

Port

Starboard

Artifact

Keel

Preservation



BACKGROUND INFORMATION

This activity is based on the survey technique that archaeologists use underwater to document a shipwreck. The wreck site of the USS *Monitor* was located in 1974. The wreck was designated our nation's first national marine sanctuary in 1975. The National Oceanic and Atmospheric Administration (NOAA) protects a one-nautical mile column of water around the shipwreck. The wreck lies upside down in 230 feet of water 16.1 miles off the coast of Cape Hatteras, North Carolina.

To be able to piece together the puzzle remains, a team of maritime archaeologists must collect data and create a detailed drawing of the wreck called a **site plan**. The *Monitor*, once documented, has been compared to original ship design plans to determine the changes taken place over time on the wreck site.

The technique most commonly used by archaeologists to map found artifacts into a site plan is called triangulation. This is a simple form of survey by measuring horizontally from two known points to a third, and then producing a scale drawing using a compass to draw an arc from each measured point on graph paper at the distance measured on the wreck. Where the two arcs intersect gives the plotted position of the third point. Accuracy is increased if the measurements are taken from three known points because survey or drawing errors become more apparent.

Tell students that archaeologists are like detectives. They search for evidence and analyze clues to reach a conclusion. Students will not only use the triangulation technique to map the artifacts into their site plan, but they will use their deductive reasoning skills to answer questions about the wreck specific to their observations. To thoroughly understand

some of these concepts, please visit the following website resources for reference:

<http://www.cyberpursuits.com/archeo/uw-arch.asp>

<http://www.culture.gouv.fr/culture/archeosm/en>

<http://www.pophaus.com/underwater>

LEARNING PROCEDURE

1. Define archaeology for the students, and the difficulties of working on a site underwater (time limit, lack of communication and variable sea states). Explain how each group must work in teams to document the site, and then have them record general observations as they take their first "dive".
2. Pass out the site plan of the *Monitor*. Also, remind them that they are divers without any communication gear and cannot talk to one another. Provide each student with the international diver hand signal sheet for their reference to review while preparing for their dive. However, often times wreck sites have low visibility making it difficult to communicate. Explain to the students that they must communicate with their measuring tape, hand signals and drawing slates. Make sure each student group creates a dive plan before diving to the *Monitor* wreck site.

A dive plan is developed to ensure all members of the dive party understand what the goals of the dive will be before the dive, and to ensure that all dives are safely conducted. This is an important concept to relay to the students. All dives are limited by time, the depth of their dive, and the air in their tank. All of the students should understand each of their roles when planning their "dive" to the site. So, if miscommunication occurs while on the site the dive can be called because the plan has not been followed. This is a good section used to teach teamwork and communication skills.

3. COMMUNICATION-each student on the team has a role to play. The first student



records; another is in charge of the “zero” end of the measuring tape, or the end where the units of measurement begin; the third student is the “measure” end of the tape, or the end where the numbers increase. The measure end is also in charge of the tape and communication. The recorder is always next to the smart end writing the information down as each point is measured. One pull of the tape means to move to the next measurement, while two pulls of the tape means to come to the smart end for discussion. If there is a fourth team member, he/she will become the site planner to make sure the original dive plan is being followed. The planner has the ultimate decision to call (stop) the “dive” if it is not according to the original plan set before the project began.

Make sure all members of the groups understand they must develop their plan before they “dive” to the *Monitor*. They will learn communication and planning at this stage of the process. The groups will also need to appoint tasks to each member before they “dive.” If there is extra time, allow each student to play each role on the team. This creates an enhanced learning experience for each student to understand each role.

4. Assign each dive team to one of the artifacts. Tell the students that divers from an earlier dive have informed us to use certain **datum points**, on the mock shipwreck designated as buttons with corresponding letters (in real life typically orange flags) located and measure the artifacts from.

Using a process called **triangulation**, the teams will map in the artifacts. They will need to take 4 measurements—to each side of the artifact from a specific datum point. In the “notes” section of their site plan they should assign letters and numbers to each side of the artifact: [From datum X to Side X of artifact =

5. After the dives are complete the teams should each record the measurements (in feet) that were taken by the recorder on their site plans in the “notes” section. They can then map the artifact in using a ruler and compass. The measurements taken on the mock shipwreck can be converted from feet to inches (1 foot on mock shipwreck = 1 inch on site plan). Students should measure out the two points and draw arcs on their plans with the compass. Where the arcs intersect is the location of their artifact.



Figure 1: Students measuring artifacts into the Monitor mock shipwreck

6. Lead a class discussion about each team’s observations. Have the students give a presentation on their site plans and where artifacts were located, their hypothesis on what the artifacts might have been used for, and how to protect the resource. Then, discuss the importance of preserving shipwrecks, and the significant roles that archaeologists play in re-telling the stories of our maritime past through submerged maritime heritage resources. Have the student research famous shipwrecks, and have them lead discussions as a team as to how those stories might have been altered by natural or human effects.

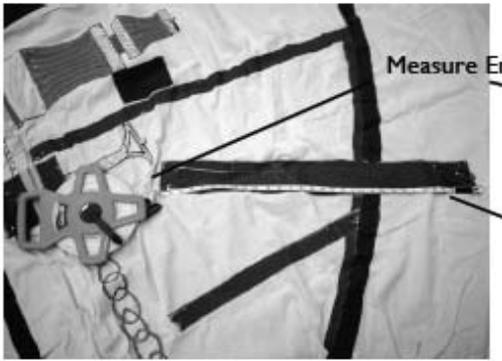


Figure 2-Measure End and Zero End

THE BRIDGE CONNECTION

<http://www.vims.edu/bridge>--Click on "Ocean Science Topics" in the navigation menu to the left, then "Human Activities," then "Heritage."

THE "ME" CONNECTION

Based on their observations of the wreck, students can write a short essay and prepare a brief oral presentation from the perspective of a member of the *Monitor's* crew. Have them describe their lives during that time period, and have them share some stories of adventure as if they were sailing on this vessel.

For more information on the *Monitor* and the *Monitor* National Marine Sanctuary visit <http://monitor.noaa.gov> and <http://monitorcenter.org>

CONNECTIONS TO OTHER SUBJECTS

English/Language Arts, Mathematics, Social Studies

EVALUATION

Evaluate the students by the accuracy of their artifact location on their site plan, their work as a team, and the observations they made of the wreck site as archaeologists.

EXTENSIONS

Visit <http://sanctuaries.noaa.gov/maritimeheritage> for information about education within the

Maritime Heritage Program in national marine sanctuaries.

Visit <http://channelislands.noaa.gov>, <http://thunderbay.noaa.gov> for websites referencing other shipwrecks in the sanctuary program.

RESOURCES

<http://oceanexplorer.noaa.gov>- other maritime archaeology lesson plans
<http://data2.itc.nps.gov/submerged>- the National Park Service information on shipwrecks
<http://www.gomr.mms.gov/homepg/lagniapp/shipwreck/> – US Department of the Interior Minerals Management Service publication,

NATIONAL SCIENCE EDUCATION STANDARDS

Content Standard A: Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Content Standard E: Science and Technology

- Abilities of technological design
- Understandings about science and technology

Content Standard F: Science in Personal & Social Perspectives

- Natural hazards
- Risks and benefits
- Science and technology in society

Content Standard G: History and Nature of Science

- Nature of science

FOR MORE INFORMATION

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CREDIT

If reproducing this lesson, cite NOAA's National Marine Sanctuary Program as the source, and provide the following URL for further information

<http://sanctuaries.noaa.gov/education/> Kate Thompson is an education liaison for NOAA's National Marine Sanctuary Program. She works with the national education coordinator to develop education programs and special projects throughout sanctuaries. She is also a NOAA working diver and trained maritime archaeologist enabling her to specialize in maritime heritage education.

KEY TERM DEFINITIONS

Maritime Archaeology- a discipline that studies human interaction with the sea, lakes and rivers through the study of vessels, shore side facilities, cargoes and human remains.

Triangulation- a simple form of survey by measuring horizontally from two known points to a third, and then producing a scale drawing using a compass to draw an arc from each measured point on graph paper at the distance measured on the wreck.

Site Plan- A detailed drawing of a collection of artifacts and/or features left by people who once lived or worked in a specific place.

Baseline- a line or standard by which things are measured or compared. In the case of a site plan, the main line that is used as a base of measurement from which site characteristics are measured.

Datum Point- key reference points used to measure artifacts or large features.

Bow- the front section of a ship or vessel.

Stern- the back section of a ship or vessel.

Port- The left-hand side of a ship or aircraft facing forward.

Starboard- The right-hand side of a ship or aircraft as one faces forward.

Keel- The lowest and most continuous line on a ship (wood or steel), This is usually referred to as the backbone of the vessel.

Artifact- A portable object(s) that has been modified, shaped, or utilized by humans.

Preservation- the activity of protecting something from loss or danger

