

## Education

# Mock Shipwreck: Mapping the Past



### Grade Level

- Grades 9 – 12

### Timeframe

- 45 – 90 minutes

### Materials

- Mock shipwreck tarp/outline
- Tape (scotch/duct)
- 30ft measuring tape
- Shorter measuring tape (enough for each pair/group of students)
- Clipboards (enough for each pair/group of students)
- Log Sheets (provided)
- Dive Slate (provided)

### Key Words

- Maritime Archaeology
- Site Plan
- Baseline
- Scale Factor



### Activity Summary

Maritime archaeology is a field of study that provides many career opportunities based in science, technology, engineering, and mathematics (STEM). The focus of this lesson is the creation of a shipwreck site plan. The students engage in teamwork as “divers” to create sectioned, scaled drawings of a mock shipwreck. The students make connections to maritime history, mathematics, and technology.

**NOTE:** Extension activities incorporate English language and social studies.

### Learning Objectives

Students will be able to:

- Define maritime archaeology and describe its importance to our national maritime heritage.
- Employ measuring and scaling techniques to sketch drawings of a mock shipwreck to better understand how divers document an actual shipwreck.
- Determine the scale factor of their drawing in relation to the mock shipwreck.
- Make inferences about the mock shipwreck based on observations.

### Background Information

During World War II, many battles were fought on foreign shores. However, few people know about those fought closer to home. The Battle of the Atlantic consisted of several skirmishes and decisive maneuvers between German U-boats and Allied and merchant ships all along the coasts of Europe and the United States.

The German U-boats were under orders to prevent merchant vessels from getting supplies to Allied nations. The United States deployed their own ships to act as defensive escorts armed with anti-submarine artillery. Many German and Allied and merchant ships fought and sank off the North Carolina and Virginia coasts.

The wrecks of these sunken ships still lie at the bottom of the ocean. It is the job of maritime archaeologists to find and study these links to our past in order to understand our history, conserve our heritage, and honor the memory of those who died defending our nation's future.

## Vocabulary

**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

**SITE PLAN** – a scaled drawing of a shipwreck and its artifacts as it lies on the bottom of the sea or lake

**BASELINE** – reference line running along the length of the ship through the center from the bow to the stern

**BASELINE OFFSET** – measure of perpendicular line from baseline to point of interest

**BOW** – front      **STARBOARD** – right (facing the front)

**STERN** – back      **PORT** – left (facing the front)

**SCALE FACTOR** – ratio of scaled figure/image to original figure/image

## Preparation

- Set-up the mock shipwreck
  - Use diagram on *Teacher's Page* or create your own shipwreck outline on canvas, bed sheets, pavement, or other large surface (approximately 20ft) using tape, chalk, marker, or other medium of your choice.
- Download and print *Log Sheets* based on unit of measurement class uses
- Optional—Place 3-dimensional objects on template to represent key artifacts

## Procedure

Provide background information on shipwrecks, the Battle of the Atlantic, the role of maritime archaeology in the study of history, the use of a site plan as a visual aid to archaeologists, and the purpose of scaling a large object as a smaller image.

### Activity 1: Sketching Sections of the Wreck

1. Give each student a *Mapping a Shipwreck Student Activity Sheet*.
2. Group the students into pairs with one as the **Measurer** and the other as **Recorder**.
3. Give each pair of students a measuring tape, clipboard, and *Log Sheet*. Have students write their names on the back of their log sheet. Each *Log Sheet* designates a specific section of the ship. Students should note their section.
4. Discuss the scaling required: 1 square on the *Log Sheet* grid is equivalent to 2 inches on the tape measure.

5. Have the students identify the BOW, STERN, STARBOARD side, and PORT side of the shipwreck.
6. Students with the "Starboard Side" *Log Sheets* stand on the starboard side of the mock shipwreck template. Students with the "Port Side" *Log Sheets* stand on the port side.
7. While the students observe, the instructor sets up the BASELINE, securing the measuring tape from the bow to the stern.
8. Have students identify the baseline on their *Log Sheet*, and stand along the edge of the mock shipwreck template in accordance to their measured section.
9. Once each group is positioned in their section, the **Measurer** begins to measure the BASELINE OFFSETS of the edges of the wreck. The **Recorder** sketches the indicated edges on the *Log Sheet* using scale.
10. Once the edges of the wreck are finished, the **Measurer** measures the BASELINE OFFSETS of any key structural features/artifacts, while the **Recorder** sketches the indicating points for each key feature/artifact.

### Discussion Questions

- Why is a uniform scale (1square = 2 inches) important?
- Why should the work be split among teams? Consider limited dive time, size of the wreck, weather conditions, etc.
- What are the key structural features divers should focus on?

## Extension

- As an added challenge, specify that as divers, they may not speak while taking measurements. Instead, they must communicate using pre-arranged hand signals; monitor time with a stopwatch; and create a “dive plan”.

## Activity 2: The Site Plan

1. Once all students have completed their sketches, the class comes together to create the site plan.
2. The port side *Log Sheets* are lined up on the grids (overlap pages). The starboard side *Log Sheets* are lined up on the grids (overlap pages). Attach the *Log Sheets* with tape.
3. Have the port and starboard sides come together, lined up on the baseline, and then taped.
4. The result will be a scaled class sketch of the mock shipwreck.

## Discussion Questions

- Does the site plan look like the mock shipwreck? Are key structural features and/or artifacts represented?
- What techniques did you use to measure? Were some methods more efficient than others?
- In looking at the site plan created, is there any damage noted on the shipwreck? If so, is it from natural erosion? Battle? Storm?
- For the diving extension
  - How did you and your partner communicate?
  - How did you manage the time constraint? Did you feel rushed? Did it help you focus on key details?
  - Did having a dive plan help you with communication and time limits? Did you follow the dive plan? If you deviated from the plan, why?

## Activity 2 Extensions

- Instructor scans/takes pictures of the individual *Log Sheets*. The students use a computer/Smartboard to line up the sketches into a site plan.
- Show students a Dive Slate (these can be requested at [monitor@noaa.gov](mailto:monitor@noaa.gov)). Explain that maritime archaeologists use the site plan to create dive slates, which are used to inform and educate recreational divers on the history of the shipwreck.
- Students create a dive slate with information on their ship (when it was built, when it sank, why it sank, etc.) Students can research and use the actual history of a known shipwreck, or they can create a history (using what they inferred about the damage to the ship and artifacts found).
- Create a map with coordinates of the shipwreck and include on the dive slate.
- English Language: Go to NOAA’s Monitor National Marine Sanctuary website, <http://sanctuaries.noaa.gov/missions/battleofheatlantic/archives.html>, and read the mission logs/blogs detailing real divers’ experiences on an expedition. Have students write an article about the “diving expedition”, including divers’ methods, observations, and inferences.



Diver measuring and documenting shipwreck, Courtesy: NOAA

## Education Standards

<b>National Education Standards</b>	<p><u>Math:</u> (9-12) Geometry – analyze characteristics and properties; use visualization, spatial reasoning, and geometric modeling to solve problems. (9-12) Measurement – understand measurable attributes; apply appropriate techniques</p> <p><u>U.S History:</u> (5-12) Era 8: (3) – the causes and course of World War II, the character of the war at home and abroad</p> <p><u>English Language:</u> (4) – Students adjust their use of spoken, written, and visual language to communicate effectively with a variety of audiences and for different purposes. (5) – students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.</p>
<b>Virginia Education Standards</b>	<p><u>Math:</u> Geometry G.8 – Similarity: scale, ratio <u>History and Social Science:</u> USII.7; VUS.11, VUS.12 <u>English Language:</u> 9.6; 10.7,10; 12.7</p>
<b>Ocean Literacy Principles</b>	<p>6. The ocean and humans are inextricably interconnected (c) 7. The ocean is largely unexplored (a, f)</p>

## Resources

### Websites

#### Monitor National Marine Sanctuary

Read about the Battle of the Atlantic, including German, Allied, and merchant vessels involved. Read blogs chronicling first-hand experiences during diving expeditions on the shipwrecks.

<http://sanctuaries.noaa.gov/missions/battleoftheatlantic/archives.html>

#### NOAA National Marine Sanctuaries

Learn about the sanctuaries around the U.S.; educational resources; science data/research; maritime heritage projects; management policies; photo and video catalog; and publications.

<http://sanctuaries.noaa.gov/library/welcome.html>

#### UNC Coastal Studies Institute

Learn how UNC CSI partner with NOAA to explore WWII shipwrecks.

<http://csi.northcarolina.edu/content/research/battleofatlantic.htm>

### Watch Video to Learn How Maritime Archaeologists Document Shipwrecks

[http://sanctuaries.noaa.gov/missions/battleoftheatlantic2/og\\_082009.html](http://sanctuaries.noaa.gov/missions/battleoftheatlantic2/og_082009.html)

### Learn more about careers in maritime archaeology:

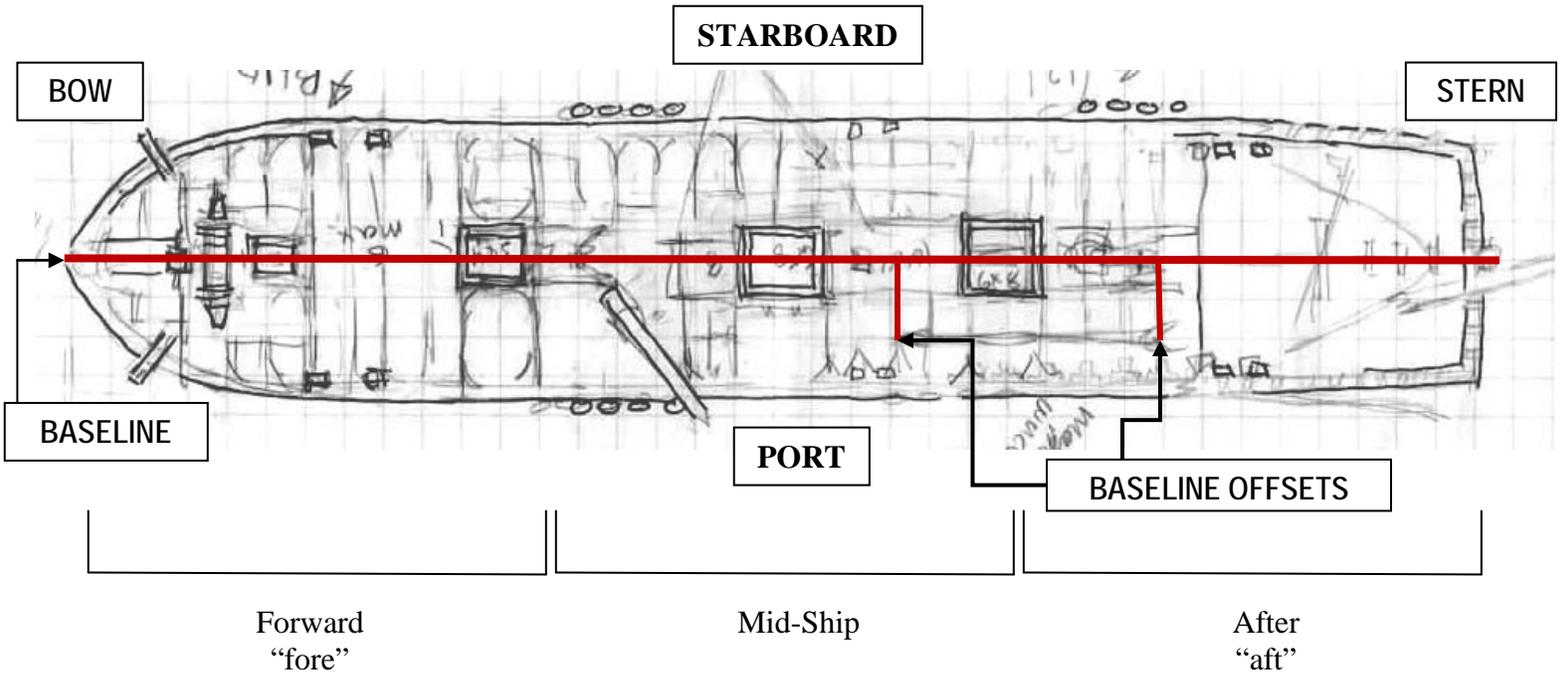
- Nautical Archaeology at Texas A&M University <http://nautarch.tamu.edu/>
- Program in Maritime Studies at East Carolina University <http://www.ecu.edu/cs-cas/maritime/>
- NOAA's Ocean Explorer <http://oceanexplorer.noaa.gov/edu/oceanage/>
- NOAA's National Marine Sanctuaries—Spotlight on Careers [http://sanctuaries.noaa.gov/news/features/tane\\_casserley.html](http://sanctuaries.noaa.gov/news/features/tane_casserley.html)

#### Acknowledgement

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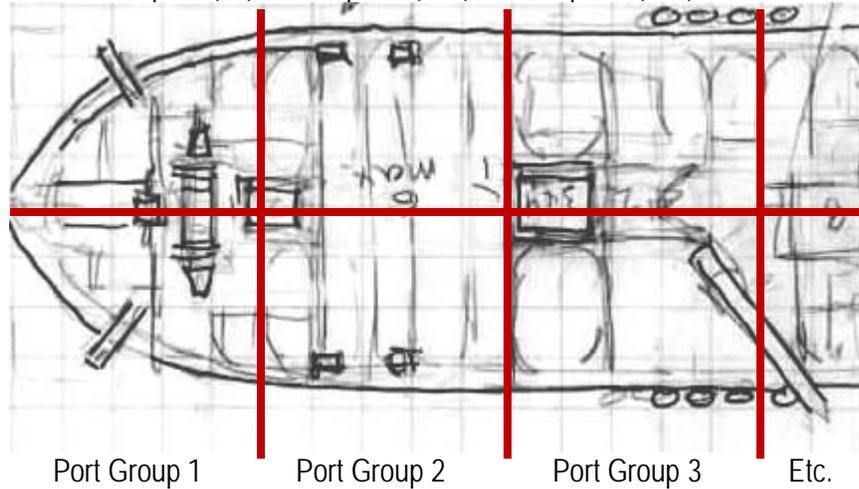
# Teacher Page

## Outline of a Shipwreck with Vocabulary Words



- Sample *Log Sheet* sections based on larger template of mock shipwreck
  - ❖ The number of sections can be modified based on the length of the mock shipwreck and/or number of students participating in the activity. (Ex. 30ft → 5ft sections, 24 students)

Starboard Group 1 (5ft) St. Grp 2 (10ft) St. Grp 3 (15ft) Etc.

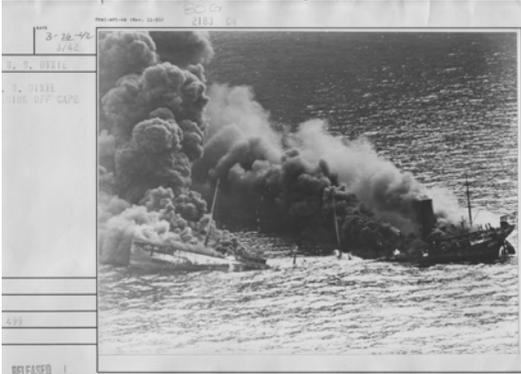


## Pictures

U-85 shipwreck photomosaic—made from hundreds of images stitched together



*Dixie Arrow* – Torpedo hit by U-77



Monitor National Marine Sanctuary diver with dive computer



U-85—Mapping conducted by team of divers

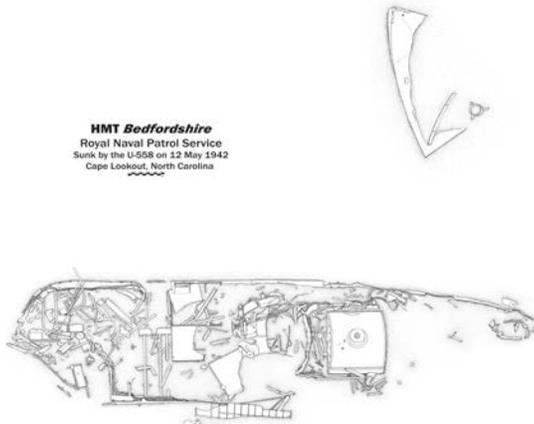


Site Plans – sections drawn by individual divers

Completed Site Plan—HMT *Bedfordshire*



**HMT *Bedfordshire***  
Royal Naval Patrol Service  
Sunk by the U-558 on 12 May 1942  
Cape Lookout, North Carolina



Name: \_\_\_\_\_  
Date: \_\_\_\_\_

## Mapping a Shipwreck Student Activity Sheet

Maritime Archaeology is

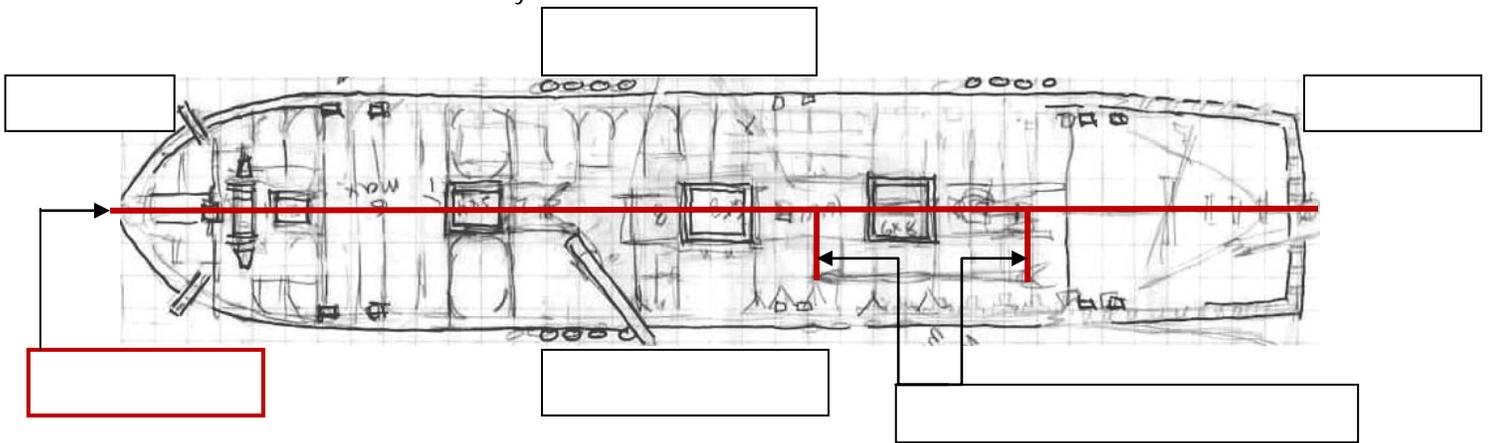
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Maritime archaeologists locate shipwrecks and record visual information in the form of photos, video, and sketches. This information is recorded in pieces that can be used to form a larger picture of the shipwreck.

Your job is to create a scaled drawing of a mock shipwreck by (1) sketching sections of the wreck and (2) combining the sections into a whole picture called a "Site Plan."

Fill in the blocks with the correct vocabulary.



Identify the section your group is responsible for: Side: \_\_\_\_\_ ft → \_\_\_\_\_ ft

Are you the **Measurer** or **Recorder**? (Circle one)

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The mock shipwreck has an overall length of \_\_\_\_\_ ft and a width of \_\_\_\_\_ ft.

The site plan shipwreck has an overall length \_\_\_\_\_ ft and a width \_\_\_\_\_ ft.

The **scale factor** is \_\_\_\_\_:

Did you observe any areas that were damaged? If so, what can you infer from your observations?

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