



Steamship *Portland*

Do You Have a Sinking Feeling?

FOCUS

Marine archaeology

GRADE LEVEL

9-12 (Earth Science/Mathematics)

FOCUS QUESTION

How can marine archaeologists use historical and archaeological data to draw inferences about shipwrecks?

LEARNING OBJECTIVES

Students will be able to plot the position of a vessel given two bearings from the vessel on appropriate landmarks.

Students will be able to draw inferences about a shipwreck given information on the location and characteristics of artifacts from the wreck.

Students will be able to explain how the debris field associated with a shipwreck gives clues about the circumstances of the vessel's sinking.

MATERIALS

- Copies of "Last Entries from the Logbook of the Sloop *Hollis Blanchard*," "Grid Reference System for Unidentified Shipwreck Q11WRK5," and "List of Artifacts Retrieved from Unidentified Shipwreck Q11WRK5," one copy for each student group
- Copies of nautical chart of Hampton Harbor, one copy for each student group (see Learning Procedure)

AUDIO/VISUAL MATERIALS

- Marker board and markers or overhead projector and transparencies for group discussions

TEACHING TIME

One or two 45-minute class periods

SEATING ARRANGEMENT

Groups of 2-4 students

MAXIMUM NUMBER OF STUDENTS

30

KEY WORDS

Debris field
Marine archaeology
Portland Gale of 1898
Shipwreck
Artifact

BACKGROUND INFORMATION

On Thanksgiving Saturday, November 26, 1898, the passenger steamship *Portland* left Boston Harbor with more than 190 passengers and crew bound for Portland, Maine. The *Portland* was a state-of-the-art, luxury ship with velvet carpets, mahogany furniture, and airy staterooms. By 1898, paddlewheel steamboats had revolutionized transportation in the United States. Faster and more reliable than sailing ships, paddlewheelers could also maneuver in waters that were too shallow for sailing ships. By the 1870's, many people routinely boarded steamboats to travel between port cities. But the paddle-wheelers had a serious flaw: they were built long and narrow (the *Portland*

was 281 feet long and 62 feet wide), and this shape combined with a shallow draft (the *Portland's* keel was only 11 feet below the water line) made these ships extremely unstable in high seas. When the *Portland* steamed out of Boston Harbor, she ran straight into a monster storm moving up the Atlantic coast with northeasterly winds gusting to 90 mph, dense snow, and temperatures well below freezing. Facing a roaring northeasterly wind, the captain could not turn back: to have done so would have placed the ship broadside to wind and waves that would surely have capsized her. The only choice was to continue to head northeast into the waves, and hope to ride out the storm. Four hours after her departure, a vessel believed to have been the *Portland* was seen near Thatcher Island, about 30 miles northeast of Boston. But the *Portland* was apparently unable to make much more progress against the storm.

At 5:45 a.m. on the morning of November 27, four short blasts on a ship's steam whistle told the keeper of the Race Point Life-Saving Station on Cape Cod that a vessel was in trouble. Seventeen hours later, life jackets, debris, and human bodies washed ashore near the the Race Point station, confirming that the *Portland* and everyone aboard had been lost in one of New England's worst maritime disasters. The loss of the *Portland* underscored the inherent instability of sidewheel paddleboats. Sidewheelers were gradually replaced by propeller-driven boats, which have a lower center of gravity.

For 90 years, the location of the *Portland* wreck was unknown, despite intense and continuing public interest. Then in April 1989, members of the Historical Maritime Group of New England found wreckage more than 300 feet deep that they were certain had been the *Portland*. Because of the depth, however, the discoverers were unable to obtain photographs or other evidence that could confirm their find. Thirteen years later, on August 29, 2002, the U.S. Commerce Department's National Oceanic and Atmospheric Administration

(NOAA) confirmed that the wreck of the *Portland* had been found within NOAA's Stellwagen Bank National Marine Sanctuary. Using side-scan sonar and a remotely operated vehicle (ROV), scientists obtained high-quality video and side-scan images in a joint research mission of the Stellwagen Bank National Marine Sanctuary and the National Undersea Research Center at the University of Connecticut.

Massive storms during late October and November are not particularly unusual in the New England states. At this time of the year, large cold air masses from Canada cross the midwestern states on a regular basis. At the same time, the Atlantic Ocean retains its summer heat and these warm waters sometimes spawn hurricanes. When the east-moving cold air masses encounter the warm, humid oceanic air, the result is what New Englanders call "Nor'easters:" storms that are often severe, and are often the cause of maritime disasters.

In this lesson, students will analyze historical and archeological data to draw inferences about shipwrecks.

LEARNING PROCEDURE

1. Download chart n13278i.tif (nautical chart of Hampton Harbor) from <http://www.state.ma.us/mgis/noaacharts.htm>. You may also want to download a copy of "The *Portland* Gale" from <http://www.hazegray.org> for more information on the *Portland* and the monster storm of 1898. Visit <http://oceanexplorer.noaa.gov> for up-to-date information on the 2003 Steamship *Portland* Expedition.
2. Tell students that they are going to assume the role of consulting marine archaeologists investigating shipwrecks, and that they have two assignments. The first is to locate the probable site of a ship that sank many years ago. The second is to use artifacts collected from an unidentified wreck to answer questions about the age of the vessel, its purpose, who was aboard, and why it sank.

3. Distribute one copy of “Nautical Chart of Hampton Harbor” and one copy of “Last Entries from the Logbook of the Sloop *Hollis Blanchard*” to each student group. Explain that the *Hollis Blanchard* was a trading sloop that was lost in the early 1900’s somewhere in Hampton Harbor, Massachusetts during a violent Nor’easter. Though wreck of the ship was never found, we have the extraordinary good fortune to have discovered the ship’s log in an antique shop in Boston. Apparently, the logbook mysteriously came ashore and was picked up by a young boy walking along the beach after the storm. The boy decided it wasn’t very interesting, tossed it into an old chest, and promptly forgot about it. Over the following years, the boy grew up, lived a long life, and finally died. His son discovered the old chest while he was cleaning out his father’s house, but didn’t pay any attention to the contents. The chest was sold to an antique dealer along with many other items. Yesterday, one of our marine archaeologist colleagues happened into the antique dealer’s store, spotted the old logbook, and realized what he had found. Today, we will try to pinpoint the probable site of the wreck of the *Blanchard*!

Have students plot the last five entries from the *Blanchard*’s logbook using protractors. Assume that the longitude lines on the chart indicate true north, that bearings are true (i.e., not affected by magnetic variation or compass deviation), and that major landmarks used for coastwise navigation have not changed since the time of the *Blanchard*. Students will have to decipher the captain’s abbreviations. If they need help, “GBH” probably stands for Great Boars Head, “ThosRk” is probably Thomas Rock, “WTank” most likely is the old Tank shown on the chart, and “JLite” could very well be the old lighthouse at the end of the jetty. The skipper was clearly in a hurry, since it is customary to use three bearings to establish a position or “fix,” but if he was careful, his notes may still be helpful. Tell students that local weather records show that the wind was

blowing at 60 mph out of the northwest at the time these entries were made in the *Blanchard*’s log.

When students have completed charting the five positions, ask each group to speculate on what happened to the *Blanchard* and where her wreck might be. Figure 1 shows the ten bearings from the logbook, and their corresponding positions within the harbor. Being a sailing vessel, the *Blanchard* was obliged to tack into the harbor, which would have been extremely difficult under the reported weather conditions. Evidently, the skipper hoped to be able to approach close enough to run inside the Inner and Outer Sunk Rocks, and then work his way into the shelter of the inner harbor. Alas, his ship was dismantled just to windward of Old Cellar Rock, and the *Blanchard* was driven onto the rock by the strong northwest wind. Wreckage from the *Blanchard* may lie near the Inner and Outer Sunk Rocks, but it is also possible that the storm pushed the *Blanchard*’s remains past the rocks and into the deeper water to the southeast. We can’t be confident of a specific location for the wreck of the *Blanchard*; but we have narrowed our search area!

4. Distribute one copy of “Grid Reference System for Unidentified Shipwreck Q11WRK5” and one copy of “List of Artifacts Retrieved from Unidentified Shipwreck Q11WRK5” to each student group. Explain that that a grid system is often used in archaeological investigations to prepare a precise record of a debris field and to document the exact location of artifacts and their relationship to each other (you may want to remind students that they have used grids to express location if they have ever played Battleship, or even Bingo). Have students prepare a brief report, summarizing their interpretation of the artifacts, with specific reference to clues about:
- the specific identity of the wreck
 - age of the vessel

- the vessel's purpose
- who was aboard
- why the vessel sank

If students have trouble approaching this problem, suggest that they organize the artifacts by location, including depth below the surface, then consider what the artifacts may suggest with regard to the above questions.

Have each student group make an oral presentation of their conclusions, summarizing their inferences on a marker board or overhead transparency. Lead a discussion of these results. The large paddlewheels near the middle of the ship clearly suggest a sidewheel paddleboat. This was a large vessel for a paddlewheeler; over 280 feet. The diamond shaped metal structure is probably the remains of a walking beam engine, a common design in ships of this type. The fact that this was a large paddlewheeler narrows its probable vintage to between 1890 and 1910. Artifacts in quadrats D10, D13, and G10 suggest that men, women, and children may have been aboard, and these areas may have been staterooms. The fact that artifacts in these areas were close to the surface suggests that these staterooms were on or near the deck of the vessel. Eating utensils recovered from more than 2m below the surface suggest a dining area, located on a lower deck. Engraved silver flatware and the carved wooden plank are valuable clues, suggesting that the name of the vessel may have begun with the letter "P" and ended with the letters "rtland." Many of the artifacts suggest wealth and luxury. This vessel almost certainly carried some wealthy passengers.

Encourage students to think about the size of the debris field. Ships that sink suddenly (such as those sunk in battle) often have a rather small debris field. Ships that sink with lots of movement, on the other hand (such as ships sunk in storms) are likely to have larger debris fields. This ship has an extensive debris field, suggest-

ing that a lot of motion, possibly due to a storm, was involved in her sinking.

5. Briefly review the story of the *Portland* and the gale of 1898. Students will probably realize that the "unidentified wreck" has been modeled after the *Portland*. The did have a dining salon on a lower deck forward of the engines, and staterooms on deck around the edge of the ship. Evidence collected during explorations of 2002 suggests that the entire superstructure of the ship may have been swept away by a huge wave, leaving the hull to fill and sink. For purposes of this activity, the mystery wreck has been allowed to keep the forward portion of her superstructure to provide more "artifacts" for student analysis.

[Note: While the artifacts activity is based on some of the known facts about the *Portland* and her sinking, the wreck of the *Hollis Blanchard* is entirely fictitious. *Hollis Blanchard* was, however, captain of the *Portland* on her final voyage.]

THE BRIDGE CONNECTION

<http://www.vims.edu/bridge/>

THE "ME" CONNECTION

Tell students to imagine that they are living 100 years in the future. Have them write a short essay comparing and contrasting the history of steamboats with the history of the airplane.

CONNECTIONS TO OTHER SUBJECTS

English/Language Arts

EVALUATION

Charts and written reports prepared in Steps 3 and 4 provide opportunities for assessment.

EXTENSIONS

Log on to <http://oceanexplorer.noaa.gov> to keep up with the latest Steamship *Portland* Expedition discoveries.

RESOURCES

Bachelder, P. D. and M. P. Smith. 2003. Four Short Blasts. The Gale of 1898 and the Loss of the Steamer *Portland*. The Provincial Press. Portland, ME.

<http://www.hazegray.org/> – Website with information on naval ships, photos, etc., and a page about the *Portland* Gale of 1898

<http://score.rims.k12.ca.us/activity/bubbles/> – Marine archaeology activity guide based on investigations of the wreck of a Spanish galleon; from the Schools of California Online Resources for Education website

http://www.historytv.com/classroom/admin/study_guide/archives/thc_guide.1378.html – Study guide for history channel program on steamboats on the Mississippi

<http://www.gomr.mms.gov/homepg/lagniapp/shipwreck/>
– US Department of the Interior Minerals Management Service publication, “Historic Shipwrecks of the Gulf of Mexico: A Teacher’s Resource”

<http://www.usatoday.com/weather/movies/ps/perfectstorm.htm>
– USA Today website with information about extreme storms

NATIONAL SCIENCE EDUCATION STANDARDS**Content Standard A: Science as Inquiry**

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

Content Standard D: Earth and Space Science

- Energy in the Earth system

Content Standard E: Science and Technology

- Abilities of technological design
- Understandings about science and technology

Content Standard F: Science in Personal & Social Perspectives

- Natural and human-induced hazards

Content Standard G: History and Nature of Science

- Historical perspectives

FOR MORE INFORMATION

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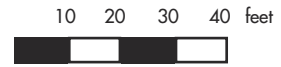
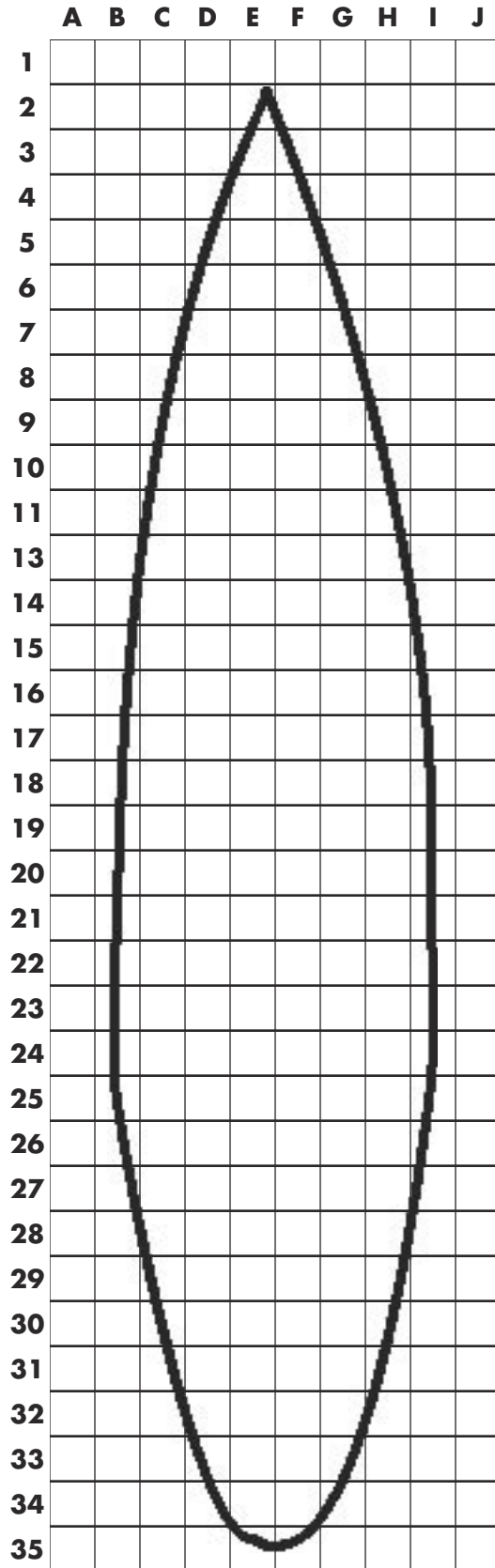
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<http://oceanexplorer.noaa.gov>

Student Handout

Grid Reference System for Unidentified Shipwreck Q11WRK5



Student Handout

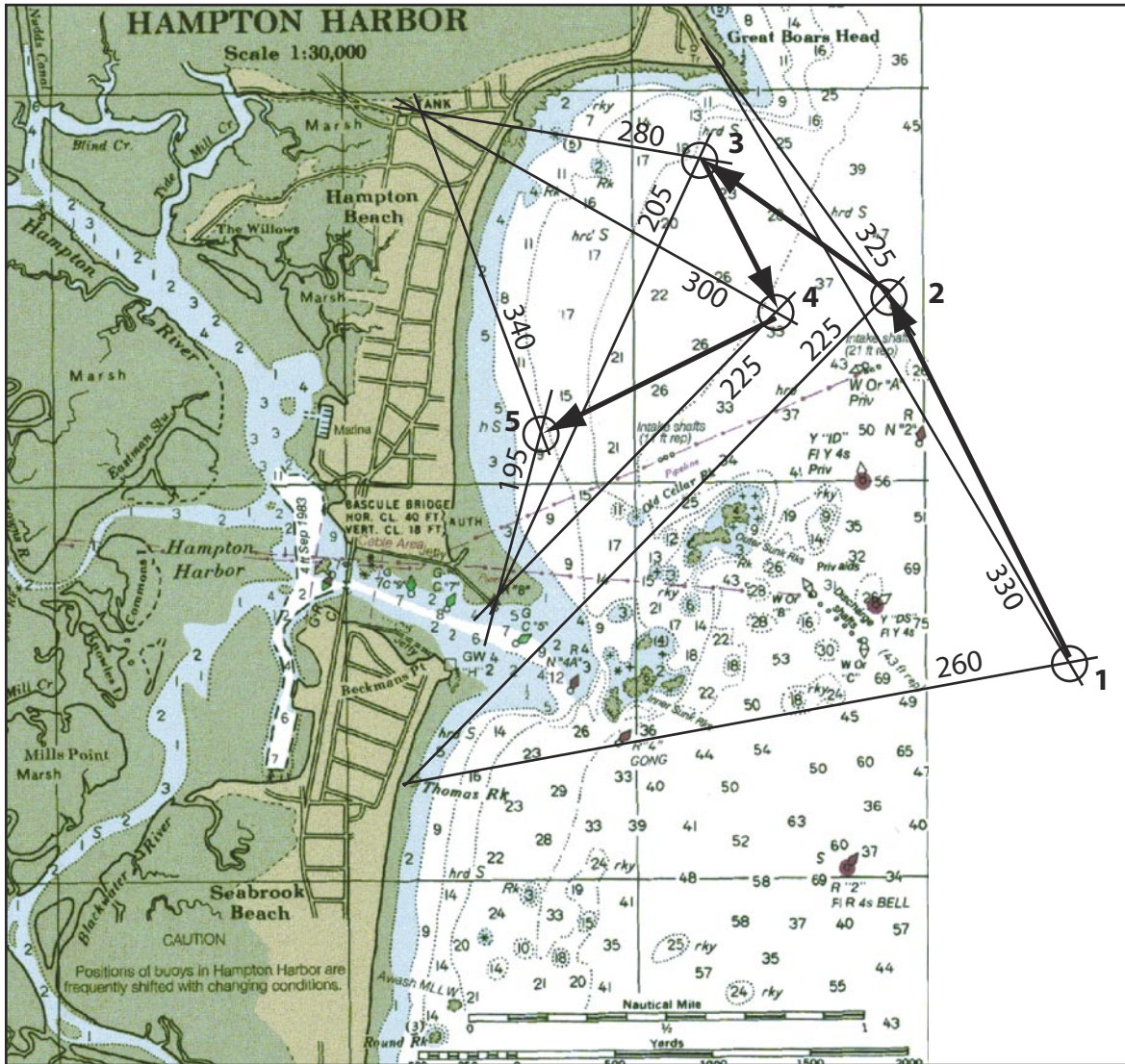
List of Artifacts Retrieved from Unidentified Shipwreck Q11WRK5

Grid Reference	Description
E19-E23 & F19-F23	Heavy metal structure, diamond shaped, partially buried
D10	Gentleman's gold ring, 55 cm from surface
E14	Heavy mahogany chair, velvet upholstery, 1 m from surface
D10	China plate, 2.5 m from surface
G10	China chamber pot, 50 cm from surface
D13	Silver flatware, engraved letter "P," 2.5 m from surface
F14	China cup, 2.5 m from surface
D10	Brandy flask, 50 cm from surface
F14	Domed skylight, 40 cm from surface
D13	Carved mahogany headboard, 70 cm from surface
F13	Ebony piano keyboard, 55 cm from surface
C19-C24	Massive paddlewheel, partially buried
G10	Child's rocking chair, mahogany, 60 cm from surface
D13	Lady's dress shoe, 65 cm from surface
G10	Shaving straight razor, 55 cm from surface
H17	Silver buckle, 70 cm from surface
D13	China chamber pot, 60 cm from surface
E11	Carving knife, 2.3 m from surface
D10	Man's leather dress shoe, 60 cm from surface
B13	Carved wooden plank, letters "RTLAND;" left side broken
E11	Silver serving platter, 2.3 m from surface
E5	Rusted iron mass, possibly chain
F21	Heavily rusted iron mass, possibly tools, 2.5 m from surface
E11	Ship's wheel, 30 cm from surface
D10	Small mahogany chest of drawers, 70 cm from surface
E33	Rudder, partially buried
G19-G24	Massive paddlewheel, partially buried
E17 & F17	Smokestacks

NOTE: Extensive debris around main wreck, mostly large timbers and pieces of heavy equipment; several lifeboat remnants outside main wreck. Less obvious structural debris in quadrats numbered 25 and higher; these quadrats contain mostly silt down to the apparent hull of the vessel at approximately 3.5 m.

Teacher Answer Key

Figure 1



○ 1 Probable position determined from bearings

➔ Probable sailing track of the *Hollis Blanchard*

— 325 — Bearing line

Student Handout

Last Entries from the Logbook of the Sloop *Hollis Blanchard*

11/27/06, 6:10 pm - GBH bears 330, THOSRK bears 260

11/27/06, 6:30 pm - GBH bears 325, THOSRK bears 225

11/27/06, 6:55 pm - WTank bears 280, JLite bears 205

11/27/06, 7:15 pm - WTank bears 300, JLite bears 225

11/27/06, 7:35 pm - Dismasted! WTank bears 340, JLite bears 195

Have mercy on our souls