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Steamship *Portland*

Wreck Detectives

Focus
Marine archaeology

Grade Level
5-6 (Physical Science)

Focus Question
How can marine archaeologists use archaeological data to draw inferences about shipwrecks?

Learning Objectives
Students will be able to use a grid system to document the location of artifacts recovered from a model shipwreck site.

Students will be able to use data about the location and types of artifacts recovered from a model shipwreck site to draw inferences about the sunken ship and the people who were aboard.

Students will be able to identify and explain types of evidence and expertise that can help verify the nature and historical content of artifacts recovered from shipwrecks.

Materials
- ❒ Modeling clay
- ❒ A variety of small objects with different shapes, including marbles, safety pins, hairpins, popsicle sticks, coins, metal and rubber washers, screws, pencil stubs, beads, cheap jewelry, etc.
- ❒ 40 cm x 80 cm plastic tub, disposable aluminum roasting pan, plastic shoe box, or aquarium; one copy for each student group
- ❒ Sand to make a 5 cm to 8 cm layer on the bottom of each container
- ❒ Water to fill containers
- ❒ Plastic knives, spoons, forks
- ❒ Graph paper
- ❒ Toothpicks
- ❒ String
- ❒ Pencil and paper
- ❒ Magnet, one for each student group

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
Marine archaeology
Steamship *Portland*
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. These images suggest that the *Portland* may have been struck by one or more huge waves that carried away her superstructure and left the hull to fill with water and sink to the bottom of Massachusetts Bay.

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 activity, students will create their own versions of the wreck of the *Portland*, explore and document each other's wreck site, and present their findings to other archaeological teams.

Learning Procedure

[Note: This activity is based in part on the "Lost at Sea: Sunken Slave Ship" activity from Newton's Apple episode 1502. You can access this activity from http://www.ktca.org/newtons/15/sunken.html.]

1. You may 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 *Portland* Expedition.

2. Briefly review the story of the *Portland* and the gale of 1898. Tell students that the *Portland* was a state-of-the-art ship for its time. Its hull was sleek, white, gold-trimmed, and almost as long as a football field. She could easily carry 800 passengers, and her 1,500 horsepower engine gave her a top speed of 14 knots. In September, 1889, the Portland Evening Express described "richly carved mahogany furniture with wine-colored plush upholstery and velvet carpets on the floors." Remind students that many of the passengers that boarded the *Portland* on November 26 were returning home from Thanksgiving celebrations. Many children were aboard with their parents, possibly with gifts for the up-coming holiday season (even after more than 100 years, it's still very sad).

   Lead a brainstorming session with students focussed on what kinds of things might have been on board the *Portland* when she sank. Encourage students to think about the lifestyles of the passengers and the luxurious nature of the vessel, as well as the kinds of things that would be needed to operate a large ship and keep its passengers comfortable and happy during what was supposed to be a 10-hour voyage.

3. Tell students that their assignment is to create a shipwreck story based on what they know about the *Portland*. First, each group should write a short (one to five paragraphs) story about some of the people on board the *Portland*, and what kinds of objects would have been associated with these people. Each group should collect a variety of objects to represent things that might have been aboard the ship, and make a detailed list of their "artifacts," including size, shape, and material. Students should cover each of their artifacts with clay to model the encrustations marine archaeologists typically find on artifacts. Next, have each group cover the bottom of their container with a layer of sand, fill the container with water, and then arrange their artifacts in and under the sand. This arrangement should be based on some of the information included in their story.

   Remind students that the position of artifacts relative to each other often gives archaeologists important clues. For this reason, archaeologists investigating shipwreck sites often use a grid to help document where various artifacts are found. You may want to visit http://score.rims.k12.ca.us/activity/bubbles/ for more background information about archaeological investigations.

   Have each group move to another team's site to explore and excavate their artifacts. At this point, be sure each team keeps their short story a secret. Students should use string tied to toothpicks to set up a grid in the sand around the site, diagram the grid on graph paper, and then record the location where each artifact is discovered. Students should also use a data log to record the location and description of each object as it is found. Using plastic utensils and water, encrustations should be carefully removed, and the results recorded in the data log. Each group should analyze their data and write a short (up to five paragraphs) story that is consistent with the location and types of artifacts found.

4. Have each group present their findings and analytical story. Based on this story, discuss what kinds of additional evidence and professional expertise might be useful to verify the nature and historical content of the artifacts found at the model shipwreck site. Then have the group that created the site read their own story. Discuss similarities and differences between the two stories. Would the additional evidence and expertise discussed earlier have led to the "true" story?

Students should recognize that a variety of interpretations are often possible for archaeological and other scientific data. Sometimes, even when an hypothesis, theory, or story fits all of the available facts, it can still fail to accurately tell what actually happened.

The BRIDGE Connection

http://www.vims.edu/bridge/archive1200.html/

The "Me" Connection

Have students write a short essay about how marine archaeological investigations might be important to their own lives.

Connections to Other Subjects

English/Language Arts, Social Studies

Evaluation

Written reports and presentations prepared in Steps 3 and 4 provide opportunities for assessment.

Extensions

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

Watch the History Channel production of "Great Ships: The Riverboats" and/or the "Steamboats 'A Comin! " episode of "The Mighty Mississippi," (both available from http://store.aetv.com/html/) and check out study guides for these programs at http://www.historytv.com/classroom/admin/study_guide/archives/thc_guide.1378.html.

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.howstuffworks.com/steam1.htm – Animated explanation of how a steam engine works

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

http://pao.cnmoc.navy.mil/educate.neptune/quest/wavetide/waves.htm – Naval Meteorology and Oceanography Command website with information on waves and tides

http://school.discovery.com/lessonplans/programs/tidalwave/index.html – Discovery Channel School lesson plans on tsunamis (tidal waves)

National Science Education Standards

Content Standard A: Science As Inquiry

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

Content Standard B: Physical Science

- Properties and changes of properties in matter
- Motions and forces
- Transfer of energy

Content Standard D: Earth and Space Science

- Structure of 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 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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