

SciGuide lesson: Using Real-Time Tide Data

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Grade Level: 9 - 12

Subject Area: Earth Science

SciGuide Resources: Data in the Classroom
<http://www.dataintheclassroom.org/content/sea-level/get-tide-data.html>

Standards Addressed: **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

- Motions and forces

Content Standard D: Earth and Space Science

- Energy in the earth system

Content Standard E: Science and Technology

- Understandings about science and technology

Time Required: Three 45-minute class periods.
Period 1: Research shipwreck and local conditions.
Period 2: Chart tides, currents, and weather in the area.
Period 3: Present plan to class and compare plans between groups.

Lesson Goal: The overall goal for this lesson is for students to use real-time tide data to develop a plan for the best time to excavate a ship wreck.

Learning Objectives:

- Students will be able to answer basic questions about tides, how to predict their occurrence and apply the information.
- Students will be able to create a chart to display the movement of tides and extrapolate the data to forecast future events.
- Students will be able to engage other learners through the product they create.

Prerequisite Knowledge: **Background**
Maritime salvage teams, treasure hunters, and archaeologists are often confronted with unidentified shipwrecks. While much can be learned from the study of the shipwreck site itself, important information can also be gleaned from linking the sunken vessel to the historical record. Maritime archaeologists make the link by comparing the observed characteristics of the shipwreck to the characteristics of ships known to have sunk in that vicinity. This combination of archival information and imagery can help produce a detailed picture of the vessel's physical construction and its activities, as well as offer insights into how and why it sank and if salvage operations are possible.

Prior to the beginning of salvage projects, archival research by examining books, newspapers, manuscripts, photographs, and paintings that document an area's maritime history. The information gathered from these sources formed the basis for a list of vessels wrecked in an area. Further historical research identified particular construction characteristics that would enable researchers to make a positive identification of the vessel once the correct wreck was explored and mapped. These characteristics included the steamship's length and breadth and its construction.

Many times stranded or disabled vessels require immediate rescue or salvage operations. Though rescue operations take place despite difficult conditions, salvage can often take place when conditions are favorable. Since many wrecks take place in areas where storms or hazards forced vessels onto shoals or shorelines, salvage operations rely on proper timing of tide, current, and weather.

Adapted from NOAA <http://oceanexplorer.noaa.gov/explorations/03portland/background/verify/verify.html>

Procedures/Instructional Strategy:

1. Students will build a tidal chart for predicting low tide and the best possible time for excavating a shipwreck.

Example shipwreck-

Corinthian, from <http://nswrecks.net/>

Date of wreck: December 14, 1918

Location: ~44° 17'16.86" N/66° 26'46.61" W

Other information: Grounded on ledge in 60' water and later broke up

Image: <http://nswrecks.net/ns-images/corinthian2.jpg>

<http://museum.gov.nsw.ca/mma/wrecks/wrecks/shipwrecks.asp?ID=4451>

2. Divide the class into small groups of no more than four.

Explain the assignment:

- A. Use tidal, current, and weather data to determine the best time to excavate a shipwreck.
- B. Use NOAA website/references to determine timing and shipwreck sites to understand history of wrecks in the area.
- C. Explore the movement of the tides and determine the amount of time available to explore and recover the wreck
- D. Students will prepare written and oral plans that answers the following questions:
 - Timing of excavation
 - Safety concerns
 - Possible cause of ship wreck
 - Required equipment
 - Recommendations for preventing future ship wrecks in that area.

4. Give the students homework to research tides and coastal shipwrecks.

5. Ask students to evaluate each other's discussions.

Outcome/Assessment: Students will create a report that addresses all the criteria for an effective plan for predicting tides and excavating shipwrecks.
Points will be given on the following criteria:
A. Clear and concise plan - 20 pts
B. Organization - 20 pts
C. Level of details in plan - 20 pts
D. Use of existing resources - 20 pts
E. Plan to prevent additional local ship wrecks - 20 pts

Extensions:

- Students can create poems, tales or images that share their thoughts, feelings, and visions about ship wrecks.
- Collect and evaluate your own observations/research on shipwrecks.

Classroom Resources:

- Computer access for students (group size will determine number of computers)

Other Teaching Resources for this Theme:

The Search for Trouvadore 2006

<http://oceanexplorer.noaa.gov/explorations/06trouvadore/welcome.html>

Verifying the Wreck

<http://oceanexplorer.noaa.gov/explorations/03portland/background/verify/verify.html>

Audio Clips:

The Wreck of the Edmund Fitzgerald

http://en.wikipedia.org/wiki/The_Wreck_of_the_Edmund_Fitzgerald

Blogs

Scallop dragger stranded by tide

<http://bayoffundy.blogspot.com/2010/04/coastal-break-up-fundy-style.html>

