



# Mysteries of the Deep

## Activity 1: Grades 5-8

### Life Sized Drawing

In an attempt to break the Union blockade of Charleston harbor, the Confederates pursued the development of a human-powered submarine. Named the CSS H.L. *Hunley*, this vessel became the first submarine to sink an enemy warship in battle. On the evening of February 17 1864, the *Hunley* attached a torpedo to the hull of the federal sloop-of-war, USS *Housatonic*. As the *Hunley* pulled away from its target, an attached cord triggered the explosion that sank the *Housatonic*. Although the *Hunley* signaled a successful mission, it never returned to port. Over 130 years later the *Hunley* wreck was discovered and eventually raised.

This activity page will offer:

- Insight into the actual dimension of the Hunley
- An opportunity to sketch a full-scale drawing of the Hunley
- The opportunity to use math and measuring skills

### Scaling Up a Drawing

Scale drawings are often used to represent objects that would be too large or too small to reasonably illustrate at their actual size. In this activity, you'll use a scale drawing of the Hunley as a model from which to draw a full-scale version of this vessel.

## INSIDE THE *HUNLEY*



1	Rear Ballast Tank	10	Bellows Equipment
2 - 3	1st. Officer Positions (Crank, Ballast Tank)	11	Captain's Position (Helm, Ballast Tank)
4 - 9	Crew Positions (Crankshaft)	12	Forward Ballast Tank



### **MATERIALS**

- Chalk
- Kite string
- Ruler

**CAUTION:** Remind students not to inhale the chalk dust. It is an irritant and can be harmful if breathed in.

### **PROCEDURE**

1. Work with a small group of students in an outdoor area identified by your instructor.
2. Brainstorm a technique for laying out a 40- foot long and 6-foot wide grid on the ground. The grid will be drawn with chalk onto the exposed ground surface. The lines must be spaced 2-feet apart.
3. To produce the grid lines, cover a length of kite string with chalk dust. Two students hold opposite ends of the string against the ground. The third student "snaps" the chalked string to the ground recording its impact in chalk dust. You might need to thicken the line by drawing over

it with chalk to make it easier to see.

4. To simplify the copying process, you might want to number the squares on both the scale drawing and the full-scale chalk grid. Then, box-by-box, copy the outline of the submarine from the page to the ground.

## Questions

1. If each chalked grid box represents a two-foot by two-foot square, how long is the submarine?
2. How could you create a larger drawing of the submarine, but still retain its scale dimensions?
3. How might increasing the number of lines in the scaled down grid affect the accuracy of the final drawing?

## EXTENSIONS

### Tight Fit

The hatch through which the crew entered the Hunley was a tight fit. It was an oval shape that measured 14 inches by 15¾ inches. Cut out a piece of string and arrange it to these dimensions. Then, imagine older sailors slipping through this tight portal during an emergency.

### Reporting for the Confederacy

Suppose you were a Civil War reporter who was allowed to examine the Hunley and interview its crew before the submarine's final mission? What might the crew confide concerning the upcoming mission? Think about it. Then create a story that would be published in the Charleston Gazette on the morning following the sinking of the Housatonic and loss of the Hunley.

### Submarine Defense

Suppose that the Confederacy had perfected and produced a fleet of Hunley-like submarines. If you were a Union admiral wishing to protect your blockade vessels, what sort of anti-submarine measures would you develop? What types of antisubmarine weapons could you implement using the technology of the 1860s?

### U-boats

During World War I, about 50 years after the sinking of the Hunley, the German navy nearly dominated the seas using its fleet of U-boats. Research these vessels and prepare a presentation that addresses the advancements in these weapons. How were the German U-boats of WWI different in design and stealth from this Confederate prototype? How did the action of the torpedo change? How do today's submarines compare to the undersea vessels employed during this "war to end all wars"?

## **WEB CONNECTION**

### **[Friends of the Hunley - Inside the Hunley](http://www.hunley.org/main_index.asp?CONTENT=INSIDE)**

*[http://www.hunley.org/main\\_index.asp?CONTENT=INSIDE](http://www.hunley.org/main_index.asp?CONTENT=INSIDE)*

An interactive panorama of the inside of the submarine hull

### **[Friends of the Hunley - Recovery](http://www.hunley.org/main_index.asp?CONTENT=RECOVERYDAY)**

*[http://www.hunley.org/main\\_index.asp?CONTENT=RECOVERYDAY](http://www.hunley.org/main_index.asp?CONTENT=RECOVERYDAY)*

Information about the recovery of the submarine

### **[Archeology in the Hunley](http://home.att.net/~JVNautilus/Hunley/Hunleyarchaeology.html)**

*<http://home.att.net/~JVNautilus/Hunley/Hunleyarchaeology.html>*

Site that illustrates the hatchways and locking systems employed to keep the hull watertight.

The activities in this guide were contributed by Michael DiSpezio, a Massachusetts-based science writer and author of "Critical Thinking Puzzles" and "Awesome Experiments in Light & Sound" (Sterling Publishing Co., NY).

#### **Academic Advisors for this Guide:**

Corrine Lowen, Science Department, Wayland Public Schools, Wayland, MA

Suzanne Panico, Science Teacher Mentor, Cambridge Public Schools, Cambridge, MA

Anne E. Jones, Science Department, Wayland Middle School, Wayland, MA

Gary Pinkall, Middle School Science Teacher, Great Bend Public Schools, Great Bend, KS

# Mysteries of the Deep

*Activity 1: Grades 5-8*

## **Life Sized Drawing**

### **Questions**

1. If each chalked grid box represents a two-foot by two-foot square, how long is the submarine?  
**(40 feet)**
2. How could you create a larger drawing of the submarine, but still retain its scale dimensions?  
**(Create the chalk grid with a greater distance between the lines)**
3. How might increasing the number of lines in the scaled down grid affect the accuracy of the final drawing?  
**(With additional reference lines, the copying process might be more accurate)**

### **CURRICULUM LINKS**

#### **Life Science**

Scale  
Models  
Technology

### **NATIONAL SCIENCE STANDARDS (Grades 5-8)**

#### **Science as Inquiry- Content Standard A**

Students will use mathematics as a tool for gathering data.

Students will observe a model and base explanations on that model.

**Science in Personal and Social Perspectives - Content Standard F**

Students will think about scientific technology and its effect on society.