



Independence Seaport Museum

INDEPENDENCE SEAPORT MUSEUM ACTIVITY PACKET

Grades 9-12

Dear Teacher:

We are so excited that you scheduled a visit to the Independence Seaport Museum with your class! To complement your students' visit to the museum, we have created this packet to use in the classroom. We hope the activities included will enhance your visit and inspire your students to want to learn more.

About the Packet:

The activities in this packet are designed to encourage creative thinking and introduce students to the topics of boats and sailors. In the classroom activities are split into two. The first activity allows students to learn about longitude in a fun way and the second activity is on a controversial issue.

In the classroom activities:

Activity 1: *Create Your Own Submarine*

How does a Submarine plunge into the water down to the murky depths? Students can build a Sub to find out!

Activity 2: *Should we dredge the Delaware River?*

Dredging on the Delaware River has been a controversial topic. Students can debate both sides of this ecological issue.

US Standards: NL-ENG.K-12.8, NS.9-12.6

PA Standards: 1.6, 2.3, 2.6, 4.2, 4.5, 6.1, 7.2

NJ Standards: SL.6.2, 5.2, 5.3, 6.1, 6.3

DE Standards: History 1, History 2, Science 8



In the classroom activities

Create Your Own Submarine

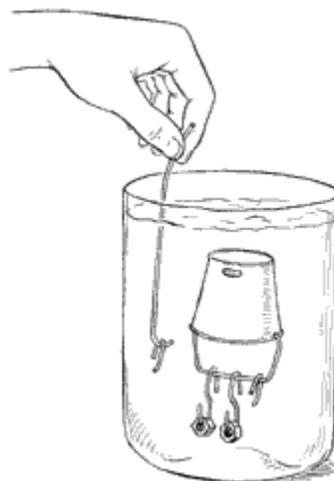
A submarine is not just a silent shape gliding smoothly along under the sea. The submarine's crew is constantly making adjustments to keep it from bobbing to the surface or sinking below its safe depth. Here's an activity that lets you be the submarine captain.

Procedure

1. Your teacher will demonstrate how to make your submarine. Use markers to name your submarine.
2. Fill your soda bottle "diving tank" to within a half-inch (12.7 mm) of the top and stir in a few drops of dishwashing liquid. Place your submarine bottom-side up in the tank where it will float like an actual submarine floats on the surface.
3. Sink the submarine by pushing lightly with your finger. What happens when you release it?
4. Carefully add ballast by hanging pieces of paper-clip wire and metal washers to the paper clip hanging from your submarine until it starts to dive. What happens to the submarine as you add more ballast?



Now for the challenging part, can you make your submarine behave like a real submarine? Can you get the ballast just right so that it is neutrally buoyant, that is, its weight is equal to the water's buoyant force? You'll know you have succeeded if your submarine goes neither up nor down—it stays at the depth it is at.



Should we dredge the Delaware River?

The facts:

- ⊗ \$300+ million and approx. 4 years to complete.
- ⊗ Deepen the shipping channel from 40 to 45 feet (400 to 800 feet wide)
- ⊗ 23 million cubic yards of sludge would be removed.
- ⊗ Dredging would be performed from the mouth of Delaware Bay to Port of Philadelphia (100 miles)

Why do it?

It would allow larger cargo ships and oil tankers to navigate to Philadelphia and oil refineries in Delaware (where 80 percent of the oil and gas in the Northeast is processed and most tropical fruit passes through).

- ⊗ Increase Philadelphia's maritime industry and provide new jobs.
- ⊗ Save the oil refineries around Philadelphia an estimated \$32 million/yr.
- ⊗ Keep the larger cargo ships from looking for alternate destinations.

Environmental Concern:

- ⊗ Freshwater aquifers that supply drinking water to southern New Jersey.
- ⊗ Wintering grounds of the blue crab.
- ⊗ Recently re-established oyster beds and recovering fish and aquatic life.
- ⊗ Mercury, PCB's, pesticides buried in the sludge which could contaminate the water if dredged.
- ⊗ Same contamination problems wherever the sludge is disposed.
- ⊗ Bring the salt line more than a mile upriver.