

## Boat Building

“Boat Building” is a lesson developed by Betsy Delaney, teacher at the John F. Kennedy Hyannis Museum. It is an extension of a previously developed second grade STEM unit: *Boat Designs for Cape Cod’s Stormy Seas*.

This lesson focuses on science, engineering, architecture, mathematics, and art. The lesson as designed is recommended for students in grades 2, 3, and 4.

### Standards

#### Massachusetts Department of Education Science and Technology/Engineering Curriculum Framework

##### Grade 2:

##### PS1. Matter and Its Interactions

**2-PS1-1.** Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency

##### ETS1. Engineering Design

**2.K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.

##### Grade 3:

##### ETS1. Engineering Design

**3.3-5-ETS1-2.** Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.

##### Grade 4:

##### ETS1. Engineering Design

**4.3-5-ETS1-3.** Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype.

**4.3-5-ETS1-5(MA).** Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem

### Introduction

President Kennedy loved water sports, especially swimming and sailing. When deciding to serve his country, he used these skills when he enlisted in the navy, where he served as the Captain of PT109. This introductory video helps students understand the PT109 and its’ role in World War II on the Pacific Ocean.

The timing of the lesson as designed is 1 to 2 hours. Our “Camp Kennedy” summer class where we used the lesson was three hours and included a walk to a nearby park for boat launching.

<https://www.youtube.com/watch?v=gUNxspgFSE4>

## The Lesson: Boat Design and Construction

Materials provided for this lesson include: half gallon milk cartons, Styrofoam, wood, cardboard, aluminum foil, paper product tubes, lightweight cloth, duct tape, sharpie markers for decorating.

The lesson will include the following concepts:

- *Sink or Float:* Students will test out a variety of materials for the buoyancy including but not limited to: wood, cardboard, paper, Styrofoam, plastic, and aluminum foil
- *Boat Designs:* Students will look at pictures of a variety of boats, discussing what makes their designs appropriate for the jobs that they do
- *Designing Your Boat:* Given a list of available materials, students will sketch their boat design in preparation for construction
- *Boat Building:* Using their design sketches, students will construct their boats
- *Sea Trials:* Students will walk over to a nearby park, launch their boats, and make observations about its seaworthiness
- *Boat Repairs:* Following our Sea trials, students will have time to make adjustments or repairs, so they can take the boats home and relaunch them
- *Written Reflection:* Students will share the results of their sea trials and ideas for modifications

If you choose to use this lesson, we would enjoy hearing from you! Please email Emily Mezzetti, Director of Education Programming, [emily@jfkhyannismuseum.org](mailto:emily@jfkhyannismuseum.org), with your feedback.