



CAPE COD MARITIME MUSEUM

PO Box 443 | 135 SOUTH STREET | HYANNIS, MA 02601

PH. 508-775-1723 | FAX 508-775-1706 | INFO@CAPECODMARITIMEMUSEUM.ORG

WWW.CAPECODMARITIMEMUSEUM.ORG

Buoyancy Theory & Application

Lesson Goal:

This lesson explores Archimedes' Principle, the law of buoyancy. The law states "any object, wholly or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object." (NOAA) How do buoyancy, density, force and air pressure interact so an object will either sink or float?

Lesson Objectives:

The students will:

- learn Archimedes' Principle- the theory of buoyancy & density, force, air pressure.
- observe how cold water, from ice, moves through warm water.
- construct & test boats that can float, from balls of clay that cannot float.
- know that buoyant force opposes gravitational force.
- work in teams, designing & creating own boat hull.

Assessment:

The teacher will:

- observe students making their clay boats.
- facilitate discussion regarding boat designs.
- analyze student observations for correct use of buoyancy language.
- observe which designs float, which do not.
- encourage students to analyze the different designs and explain their design to class.
- review vocabulary needed- buoyancy, density, mass, weight, gravitational force.

Frameworks:

- *PreK-PS1 Matter and its Interactions* PreK-PS1-2(MA)
- *PreK-PS2 Motion and Stability* PreK-PS2-1(MA)
- *K-2-ETS1 Engineering Design* K-2-ETS1-1; K-2-ETS1-2
- *3-PS2 Motion and Stability* 3-PS2-1
- *3-5 ETS1 Engineering Design* 3-5-ETS1-1; 3-5-ETS1-2
- *4-ESS3 Earth and Human Activity* 4-ESS3-1
- *3-5 ETS1 Engineering Design* 3-5 ETS1-3; 3-5 ETS1-5(MA)
- *3-5-ETS2 Technological Systems* 3-5-ETS2-1(MA); 3-5-ETS2-2(MA)
- *MS-ETS1 Engineering Design* MS-ETS1-1; MS-ETS1-5(MA); MS-ETS1-6(MA)
- *MS-ETS2 Materials, Tools and Manufacturing* MS-ETS2-5(MA)

For More Information About this Class:

This class can be designed by the Museum staff for any grade level from k-12, and can be taught at the Museum or in the school classroom. To see how it can meet your educational needs, and for an estimate of costs per students, please contact CCMM's Education Coordinator and STEM teacher, Deirdre Detjens, at 508-775-1723 or ddetjens@capecodmaritimemuseum.org

CCMM Education Mission:

Cape Cod Maritime Museum provides students and educators of all ages, real-world, interactive, inquiry-based, learning opportunities utilizing Cape Cod centric pedagogy to inspire an enduring connection with Cape Cod maritime culture. With a comprehensive suite of educational programs, our science, technology, engineering, art and math topics drawn from our own coastal marine environment enabling students to embrace new knowledge and skills in a way that is relevant to Cape Cod and our local culture. All classes are based in an appreciation and respect for Cape Cod's maritime past, present and future.