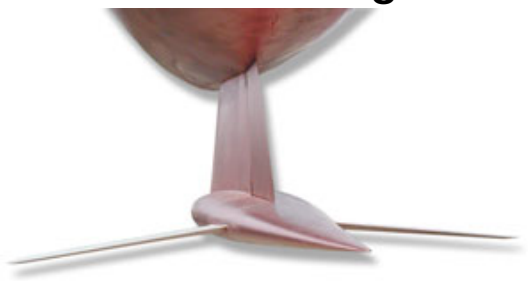
"The Science of Sailing" - Curriculum



Learning objectives

Students will:

- Gain an understanding of physics and mathematics concepts in the Science of Sailing
- Apply these concepts to designing a sailboat

Timing : Eight 90-minute sessions (can alternatively be presented in 16 45-minute or 24

Lesson 1: Vocabulary and Introduction to Sailboats

Introduction:
What is a Sailboat?

Provide an introduction to the course and explore the components that make up a sailboat. Explore how

Parts of the Boat

Provide an overview of terminology so the course can progress at the desired pace. Describe the parts

Parts of the Sail

Familiarize students with the various components of sails used. While teaching the vocabulary, explain v

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Lesson 2: History of Sailboats and Boat Design

History of Progression of Sailboats

Sailboats have a long history which provides important insights into why boats

Historical Designs

Provide a list and set of historical designs for students to reference while desi

Modern Designs

Provide a list and set of modern designs as well so students can work on imp

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Lesson 3: How a Sailboat Works - Part 1

Hulls

Provide an explanation of different hull types and why designs differ. Introduc

Sails

Describe different sail configurations and explain the reasons why some boats

Fluid Dynamics

Provide an introduction to fluid dynamics and theories that will be applied to th

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Lesson 4: How a Sailboat Works - Part 2

Buoyancy

Since boats are designed to be on the water, they need to float. A buoyancy l

Displacement

Displacement is key in how a boat moves through the water. Without displacin

Forces on the Boat

Provide a physics lesson on all the forces that have been discussed up to this

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Lesson 5: Stability

Center of Gravity

Center of gravity is linked to buoyancy and displacement. Expand the lesson

Center of Buoyancy

Center of buoyancy determines where and when the lever arm created by the

Initial Stability vs. Ultimate Stability

When combining the center of gravity and center of buoyancy lessons, you wi

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Lesson 6: Rough Draft and Peer Revisions

Checking Designs

Assign students to small groups (usually four or less) and instruct them to put

Peer Workshop

Have students incorporate their classmates' feedback and additional instructo

Time to Work on Revisions

Students will be excited about what their classmates have told them and they

Lesson 7: Boat Design and Utility

How Location can Affect Sailing Situations

Different boats are made for different regions of the world. Remind students of this and allow them to thi

Catamaran cruisers are preferred in the Caribbean due to the space they provide and because they don

Activities Allowed

Certain boats have restrictions on what can be done on them. For example, a

Construction Materials

What materials will be chosen to build their design? Different materials have c

Lesson 8: Final Paper and Presentations

Final Exam

The amount of math and science learned in this class allows for a final test to

Papers

A final paper should be submitted to demonstrate that this class is teaching cross-curricular skills such a

Boat Design Presentation

Students should give a final presentation to improve their public speaking abil