

## "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

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### 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 the

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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 lesson

### Displacement

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

### Forces on the Boat

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

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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 will

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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 instructions

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### **Time to Work on Revisions**

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

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## **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

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## **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

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