

Blow that boat!
Grade 3 – Understanding Matter and Energy

<h2 style="margin: 0;">Lesson Plan</h2>	Cross Curricular	N/A
	Safety Notes	Discuss safe use of scissors.

<p><b>Big Ideas</b></p> <p>Forces cause objects to speed up, slow down, or change direction through direct contact or through interaction at a distance.</p> <p>Forces in nature, such as high winds or water, can have a significant impact on humans and the environment, and need to be regarded with respect.</p>	<p><b>Specific Expectations</b></p> <p>2.2 investigate forces that cause an object to start moving, stop moving, or change direction</p> <p>2.3 conduct investigations to determine the effects of increasing or decreasing the amount of force applied to an object</p> <p>2.4 use technological problem-solving skills, and knowledge acquired from previous investigations, to design and build devices that use forces to create controlled movement.</p> <p>2.5 use appropriate science and technology vocabulary, including push, pull, load, distance, and speed, in oral and written communication.</p> <p>3.3 describe how different forces applied to an object at rest can cause the object to start, stop, attract, repel, or change direction.</p>
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**Description**

Students build a small sailboat with simple materials. Then we use the boat to explore the forces acting on it and how it affects the motion of the boat. Students will see how wind is needed to move the boat but can also become too strong for it.

<p><b>Materials</b></p> <p>For each team:</p> <ul style="list-style-type: none"> <li>• Tupperware like container</li> <li>• Straws or skewers</li> <li>• Tape</li> <li>• Paper and pencil</li> <li>• Scissors</li> </ul> <p>Also:</p> <ul style="list-style-type: none"> <li>• (Large if possible) basin for testing</li> </ul>	<p><b>Accommodations/Modifications</b></p> <p>N/A</p>
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## **Introduction**

Today we will be sailors! We are going to build our own little sailboat see how the wind can blow it around.

What things does a sailboat need so it works? (the hull, a mast, a sail)

### **Note:**

We are making a large simplification here in our discussion of how sail boats work by not talking about the workings and effects of an air foil at all. We will just talk about the direct force of the wind on a flat sail. This is valid, but a real sail boat can take advantage of its sails acting as air foils to move at angles to the wind and gain great speed as well.

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## **Action**

### **Building the boat**

It's time to build your boat. Be creative but also make sure to consider what will actually work!

- Take a container. This is your HULL. The hull is the main body of the ship that sits in the water.
- Tape a straw in the middle of the hull (width wise). You can choose to place it forward or further back along the length of the hull if you want. The straw should stick straight up. It is your mast.
- Cut out a piece of paper in the shape of a sail that fits your mast.
- Carefully tape the sail to your mast making sure it is straight and goes straight across the hull – not at an angle.

### **Testing the boat**

Now it is time to test the boat and investigate how the wind affects it. It would be best to have a basin available that each student team can use to test their boat. Depending on class size several setups will be necessary.

- Either ask students to complete the worksheet or use it as a guide to lead your explorations with them.
  - For example, you can perform the experiments as demonstrations for the whole class, taking a different groups' sail boat each time, but having the whole class watch and discuss the outcomes. Students could then repeat on their own.
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### Consolidation/Extension

- Discuss what you've learned:
    - Sail boats are powered by the force of the wind
    - A stronger wind makes them move faster.
    - Changing the direction of the wind or the sail can change the direction of motion.
    - Storms can be dangerous for sail boats. They can even capsize!
  
  - Possible extension: Show the class some pictures of actual sailboats. Some are provided in the accompanying PowerPoint presentation.
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Example of the type of sail boat your students could build.



Testing the sail boat.