

# The Forces of Wind: Sailing Activity Sheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_

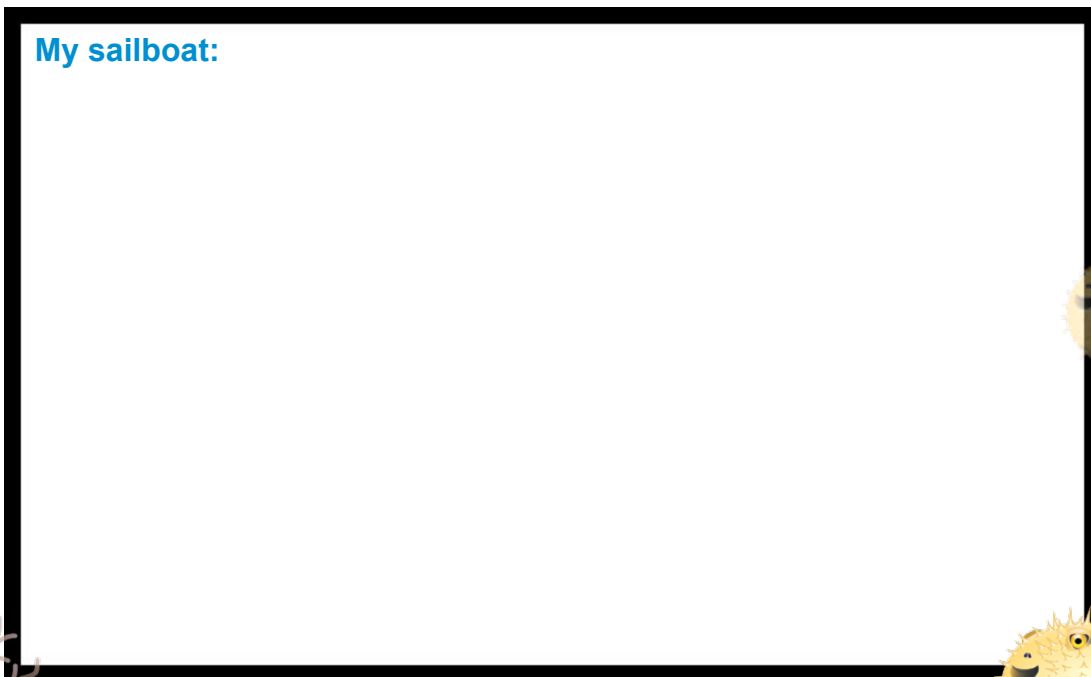
## Build your sailboat!

1. Gather your materials to build a sailboat and model the winds!
  - a. **Boat building suggestions:** Boat base (e.g. egg carton, cardboard, plastic container, foil, heavy paper), mast (e.g. wooden skewer, chopsticks, popsicle sticks, craft sticks, small tree branches), sail (e.g. construction paper, rigid cloth, foil, glue, string, tape)  
**Optional:** Pennies to add weight to the boats.
  - b. **Testing the wind:** large tray or bucket to hold water, fan, hairdryer  
**Optional:** Straw (metal or silicone to limit the use of single use plastics)

*Note: the procedure may vary depending on what materials you use. Below are suggested guidelines.*

2. Create a boat base from your chosen material (i.e. folded tinfoil, cardboard box, plastic container).
3. Cut a rectangle from construction paper to make your sail. Decorate it!
4. Poke two small holes in line at the top and bottom of the sail. Get help from your teacher as needed!
5. Attach the sail to the mast (chopstick, skewer, stick, or similar material) by guiding the stick through the holes. Add tape or glue as necessary to secure it.
6. Create an 'ocean' (tray of water) and place your sailboat on the surface of the water.
7. Optional: add pennies or other items to the boat to create weight.
8. Draw a picture of what your boat looks like. Label the parts.

**My sailboat:**



## Test the Winds:

1. Before testing the effect of wind on your sailboat, think about your hypotheses and record them on your data table:
  - a. How will the force of wind affect the motion of my sailboat? (i.e. Will there be a difference in your boat's movement when the wind is weaker compared to when the wind is stronger?)
  - b. How will the direction of wind affect the motion of my sailboat? (i.e. Will your boat move sideways, straight ahead, backwards, etc.?)
2. Conduct your trials:

### **Trial #1: Direct Winds:**

- a. Blow gently on your sailboat using your breath. You may also blow through straw to help direct your 'wind.' (Please use a metal, cardboard, or other type of non-plastic straw!)
- b. Record your observations on the data table.

### **Trial #2: Indirect Winds**

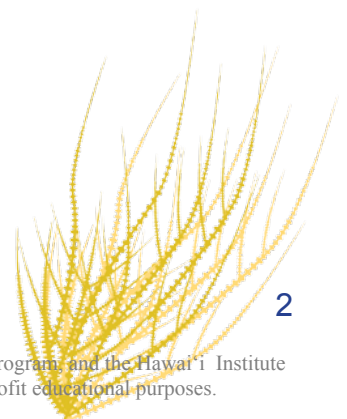
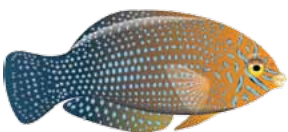
- a. Use a fan to blow wind toward your sailboat. Place the fan pointing in the general direction of the sailboat. Turn the fan onto the lowest setting.
- b. Record your observations on the data table

### **Trial #3: Strong Winds**

- a. Use a hairdryer to blow from different directions on your sailboat.
- b. Switch between high and low settings.
- c. Record your observations on the data table.

### **Trial #4: Equal Winds**

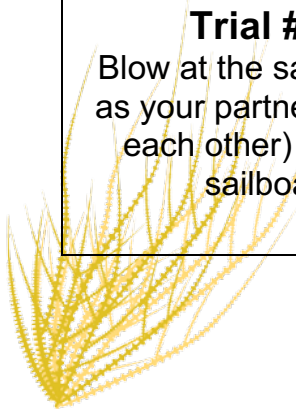
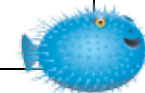
- a. Using either hairdryers or your breath, blow on one side of your sailboat while your partner blows with the same force on the opposite side.
- b. Record your observations on the data table.



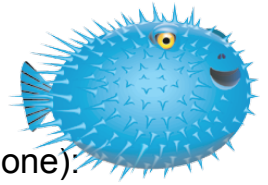
# Force of the Winds Data Table



<b>TEST:</b> <i>What will I do?</i>	<b>PREDICTION:</b> <i>What will happen?</i>	<b>OBSERVATION DATA:</b> <i>What do I observe?</i> (Note: use words and/or a labeled drawing)
<b>Trial #1:</b> Blow <i>directly</i> on the sailboat		
<b>Trial #2:</b> Blow <i>indirectly</i> towards the sailboat		
<b>Trial #3:</b> Blow <i>strongly</i> on the sailboat		
<b>Trial #4:</b> Blow at the same time as your partner (facing each other) on the sailboat		



## Activity Questions



1. When a sailboat is floating but not moving, the forces acting on it are (circle one):
  - a. Balanced
  - b. Unbalanced
2. When a sailboat is moving, the forces acting on it are (circle one):
  - a. Balanced
  - b. Unbalanced
3. When your boat is not moving, there are forces acting on it to keep it floating on the water. However the boat does not move because those forces are balanced.
  - a. What balanced forces are acting on the floating sailboat?
  - b. What additional forces could you apply to cause the boat to move?
4. What happened when you blew gently on the sailboat?
5. What happened when you blew harder?
6. What changed when your partner blew at the same time as you? Were the forces balanced or unbalanced?
7. When you push a ball and it rolls on the floor, is this a balanced or unbalanced force?
8. You have been testing wind as an unbalanced force that moves sailboats. Give an example of another unbalanced force that can cause an object to move.
9. How might sailors use the knowledge of winds to plan for voyages?

