

Lab station instructions

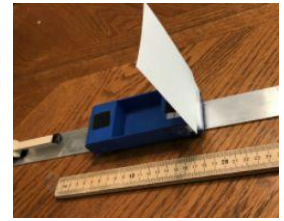
Station 1 Instructions

Watch the “[Lesson 9 - Station 1](#)” Video in google classroom. The instructions of how the experiment was conducted are below:

1. Launch the cart without a notecard-sail attached down the track using the launcher.

Reposition the fan in order to create wind conditions as follows:

- a. No wind (fan off)
 - b. Headwind (fan in front of cart)
 - c. Tailwind (fan behind cart)
2. Try each of these conditions using the same amount of launcher force each time.
 3. Notice how far the cart travels for each trial. Record your observations.
 4. Locate the cart with a notecard-sail attached to the front of the cart with tape.
 5. Hold the cart with the sail stationary with your hand and observe what happens to the shape of the sail when there is a fan blowing wind toward the front of the cart vs. toward the back of the cart.
 6. Repeat steps 1 through 3 for conditions a, b, and c using the cart with a notecard-sail attached. Be sure to keep constant the launcher force you used when the cart had no sail.



Station 2 Instructions

Examine the data sets provided and record observations and insights you have about interactions between moving objects and air.

Station 3 Instructions

1. Point the infrared thermometer at the surface of the rubber eraser and measure the temperature.
2. Do this for the surface of the table too. Record these initial temperatures.
3. Produce friction between the surface of the rubber eraser and the surface of the table by rubbing the eraser back and forth quickly over a small spot on the table top for 10 seconds.
4. After doing this, use the infrared thermometer to measure the temperature of the surface of the table and the surface of the eraser again.
5. Record your observations.
6. Point the infrared thermometer at the surface of each of the pieces of Styrofoam provided.
7. Produce friction between the surfaces of the two pieces of Styrofoam by rubbing them together quickly for 10 seconds.
8. After doing this, use the infrared thermometer to measure the temperature of the surface of each piece of Styrofoam.
9. Record your observations.

Station 4 Instructions

1. Examine the magnified images of different surfaces. What do you notice?
2. Record your observations.
3. Open the computer interactive (<https://www.openscienced.org/friction-simulation/>) showing the microscopic view of friction.
4. Press “play” and let the program run for several seconds. How does the motion of the objects and the particles that make up those objects change? You can reset and rewatch the simulation if needed.
5. Record your observations.