

# Soaring Oklahoma: Aerospace & Defense

You Have Friends in High Places

**Lift is defined as a force available for overcoming the force of gravity.**

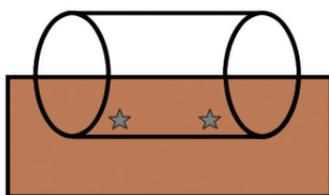
**TEACHERS:** Help your students to understand the concept of lift by walking them through the following experiment. For a video explaining this experiment in full, visit: <https://youtu.be/d4tpf4WyWbU>

## Materials

- One empty 2-Liter Plastic Bottle
- One pair of scissors
- Two paper clips
- One block of Styrofoam (4-6inches in length)
- One small electric fan
- One rectangular block of wood (10-12inches in length)
- Two screws and a screw-driver

## Step 1

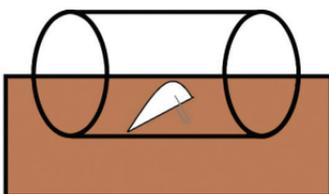
Remove all labels from the 2-liter bottle then, using your scissors, remove the top and bottom of your plastic bottle to create a tube. Attach the tube you created using the 2-liter bottle to the small block of wood by laying the tube on its side (horizontally) - use two screws to secure the tube to the block of wood.



## Step 2

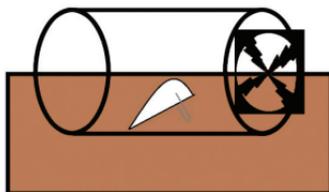
Use your block of Styrofoam to cut out an airfoil. The shape of the foil should be similar to the shape indicated below and should easily fit inside the tube created in Step 1.

Next, straighten out your paperclips. You will poke the paper clips through your plastic tube on each side and use them to hold your airfoil in place.



## Step 3

Apply a wind source. An 80 ml computerized fan is appropriate for this experiment. Fix the fan so that it faces into the tube pointing towards the higher end of your airfoil.



## Step 4

Turn on your wind source. Test the various settings on the fan (low, medium, high) and watch how each setting changes the lift of the airfoil.

## Discussion Questions

1. When the tip of the airfoil is pointing downward, what force is acting on it?
2. What force is used to overcome that force?