



PLTW Flight and Space Virtual Learning

8th Grade/Bernoulli's Paper Bag Mask

April 13, 2020



8th Grade/Flight and Space
Lesson: April 13, 2020
Day 1 of 2

Objective/Learning Target:
Students will understand Bernoulli's Principle of fluid dynamics and how it relates to flight.

Lesson Introduction/Background Information:

In this lesson, students will learn about forces and motion as they see how the work of Daniel Bernoulli helps explain flight. Check out this [video](#)

Students will make a paper bag mask with a protruding paper tongue, which they will use to experiment with the Bernoulli Principle. The students will be able to explain the Bernoulli Principle after they have observed it in action during the experiment.

Practice:

Paper Bag Mask Experiment:

Materials: (if you don't have these exact items try to find a similar item.)

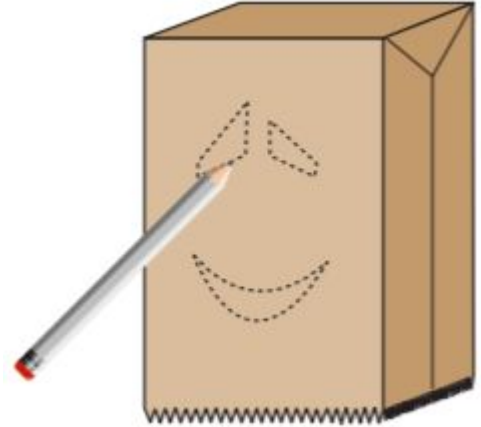
Large paper grocery bag

Scissors

Tape or glue

Notebook Paper

Writing utensil



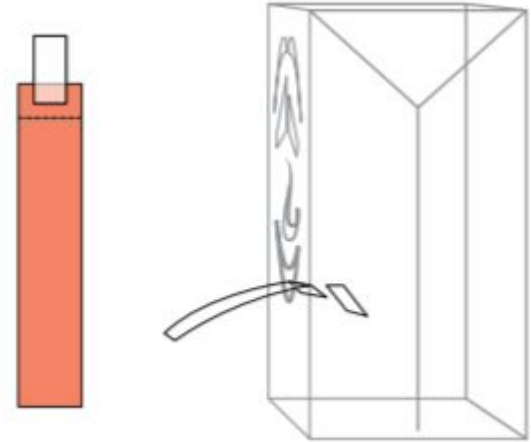
Procedure:

- Put the paper bag over your head and make marks on the outside of the bag to show the location of your eyes, nose, and mouth.

Practice:

Procedure continued:

- Remove the bag from your head and draw a face around the marks you made.
- Cut out holes for each eye and the mouth.
- Make a paper tongue from the paper approximately 1 ½ inches wide and 8 inches long.
- Fold down one end of the tongue to create a ¼ inch tab.
- Tape or glue the tab to the inside of the bag along the lower middle edge of the mouth.



Practice:

Time for the experiment!

Write down your prediction: What will happen when you blow air over the top of the tongue?

Now put the mask on and blow air over the top of the tongue. Write down your results.

Experiment with different forces of blowing air. Blow softer and harder. Write down the difference that it makes.



Self-Assessment:

Write down how you believe Bernoulli's Principle explains the movement of the paper tongue.



Extend Your Learning/Continued Practice:

Here is the [Paper Bag Mask Experiment](#) in case your experiment didn't turn out as expected.

The [Coanda Effect](#) works in conjunction with the Bernoulli Principle to help explain how the low pressure is created above an airfoil. The low pressure is what creates lift!