PLTW Flight and Space Virtual Learning

8th Grade/Bernoulli's Bag

April 10, 2020

8th Grade/Flight and Space
Lesson: April 10, 2020
Day 2 of 2

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

Warm-Ups:

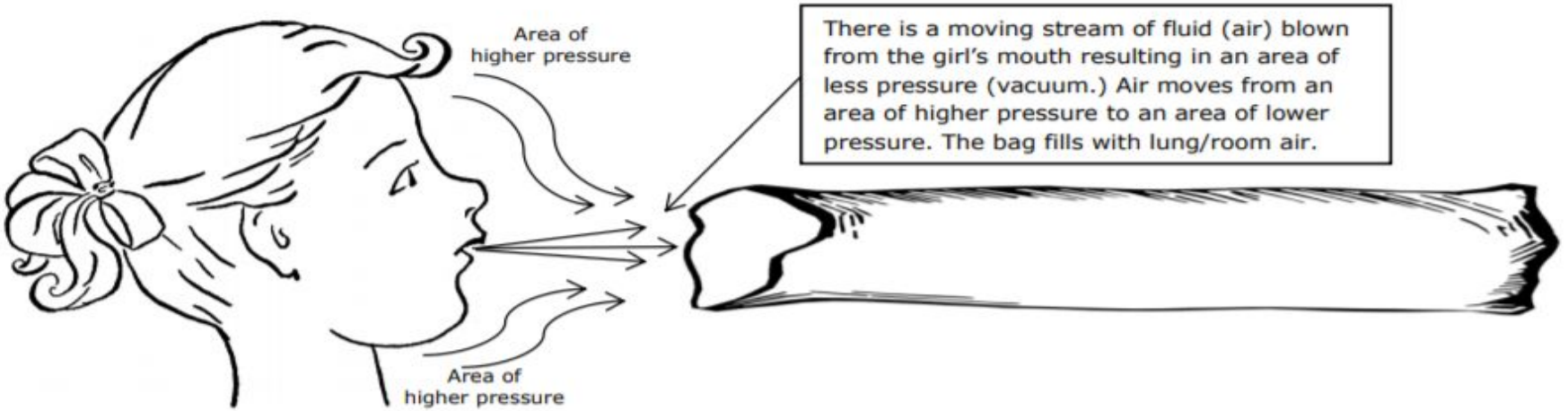
See Bernoulli's Bag experiment here

Learn about how the coanda effect helps make airplane wings effective here

Lesson Introduction/Background Information:

Background: Daniel Bernoulli was a Swiss mathematician during the eighteenth century. Bernoulli studied a physical phenomenon/relationship between the velocity of a fluid and pressure. His observations and applied mathematical explanations became known as Bernoulli's Principle.

You should have found more success inflating your bag using Bernoulli's Principle:



Lesson Introduction/Background Information:

Bernoulli's Principle describes a phenomenon in which the pressure (pressure is the amount of force applied over an area) of a fluid (gas or liquid) changes with a change in the velocity of the fluid. Bernoulli observed that an increase in the velocity of the fluid resulted in a decrease in the pressure of the fluid. Also, a decrease in the velocity of a fluid resulted in an increase in the pressure.

Flight is a very complex integration of many factors including drag, Bernoulli's Principle, Newton's 3rd Law of Motion, gravity, Coanda effect, angle of attack, and downwash.

Practice:

Draw the diagram of an airfoil (which is the cross section of an airplane wing) Label the areas of low pressure and high pressure.

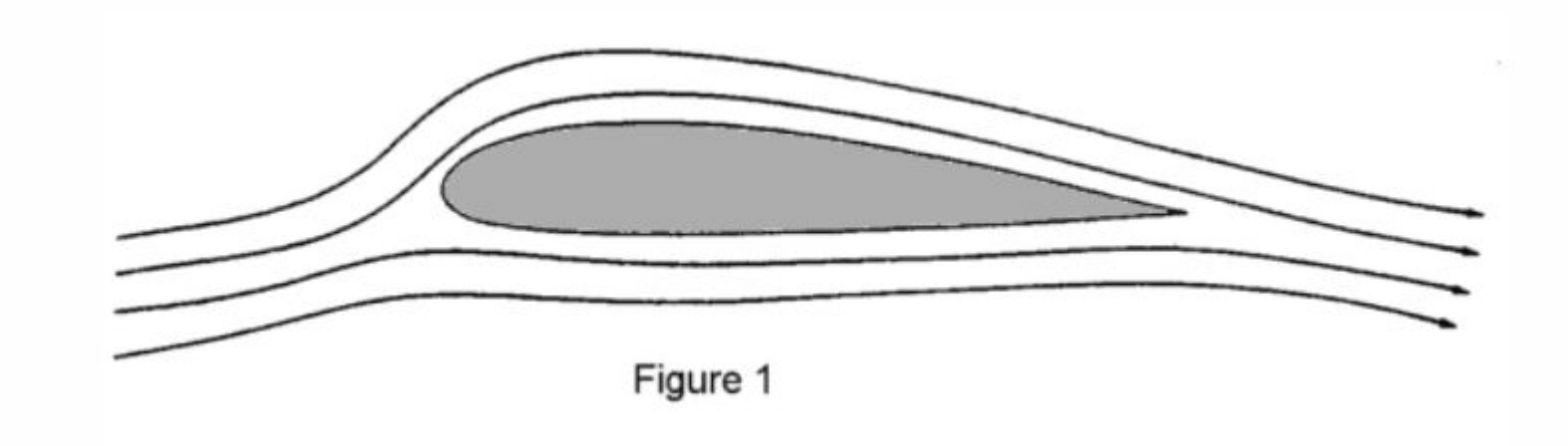
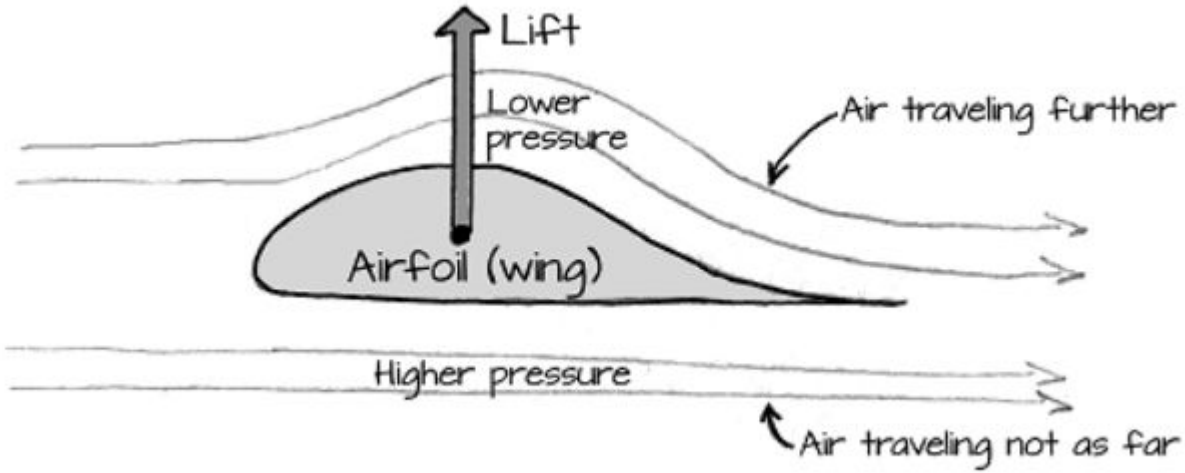


Figure 1

Practice:

Answer:



Self-Assessment:

Quickwrite a summary of your understanding of Bernoulli’s Principle.

Extend Your Learning/Continued Practice:

Learn more about Daniel Bernoulli famous family here

Learn more about Daniel Bernoulli here