

Wind Bag Wonders

Explore the findings of scientist Daniel Bernoulli and amaze your friends by using a single breath of air to fill a large bag.

TEKS:

8.10 The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:

8.10b Identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts.

How To:

1. Estimate (or make a hypothesis) on how many breaths it takes to blow up the bag. Explore your hypothesis by blowing into a small opening at the bag's opened end a few times. Based on the sample, approximate how many more breaths would be needed to fill the bag entirely.
2. Do you think it might be possible to blow the bag up using just one breath?
3. It is indeed possible! Hold the bag open approximately at a 1 to 3-foot distance from your mouth.
4. Using only one breath, blow as hard as you can to fill it up, then quickly squeeze the bag's end closed with your hands.
5. For more fun, have a race! One person can fill the bag using the traditional approach, and the second person can fill their bag by blowing into a large opening of the bag from approximately a two- to three-foot distance.

Materials:

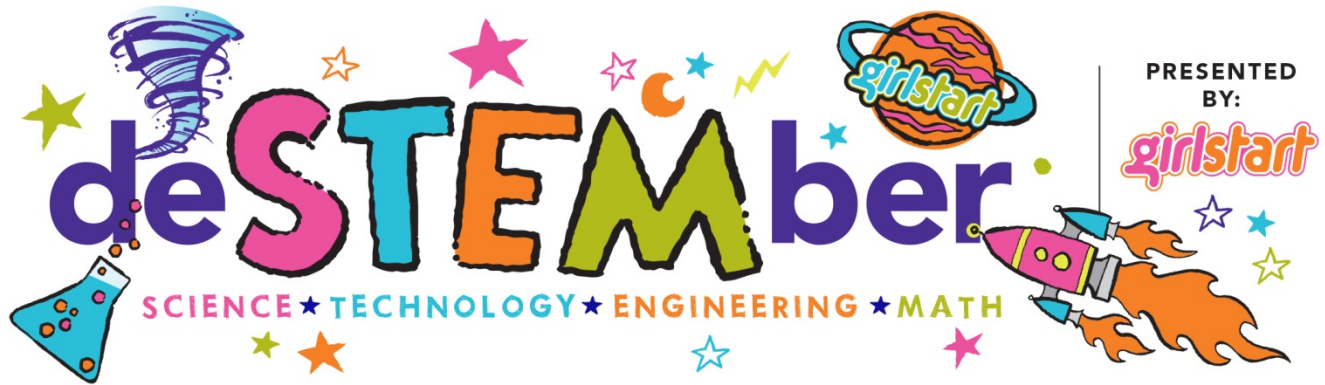
For each participant:

- A Diaper Genie bag -OR-
- A 10-gallon or larger plastic trash bag -OR-
- Steve Spangler Windbag™ - available through Steve Spangler Science at www.stevespanglerscience.com

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Why Does It Work?

In the early 1700s, a Swiss mathematician and scientist by the name of Daniel Bernoulli discovered that the faster air travels, the lower the pressure it exerts. In this experiment, the stream of moving air creates an area of lower pressure, which attracts high pressure air adjacent to the stream of air from your lungs. As a result, it is not just a single breath of air that fills the trash bag, but rather air from the surrounding area also. Our atmosphere is always trying to maintain steady air pressure. As a consequence, an area of high pressure will move toward an area of low air pressure in an attempt to restore balance. Pressure will never be steady around the Earth, however, no matter how hard the atmosphere tries to balance itself. This is due to the Sun's uneven heating of the Earth's surface, which creates ever-changing areas of high pressure and low pressure.

Career Connection:

Atmospheric Research: Meteorologists can have many different jobs, including daily weather forecasting, atmospheric research, and teaching. "Atmospheric research seeks to answer questions about our understanding of the atmosphere and how it works and impacts us." Read more here: <http://www.ametsoc.org/careercenter/careers.html>

Resource:

- University Corporation for Atmospheric Research - <http://scied.ucar.edu/>

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