iTEACH EDUCATOR RESOURCES

Wind Bags - Bernoulli's Principle

Have you ever said of someone who was talking too much, "He's just an old windbag"? Actually, windbags can be fun (think balloons), and they allow us to learn about an important property of moving air called Bernoulli's Principle.

Wind Tube

For this part of the experiment you will need a WindTube from Educational Innovations (may also be available as a Bernoulli Bag from other sources).

1. Stretch out the WindTube, and have someone else hold the closed end while you hold the open end.
• How many breaths does it take you to inflate the WindTube? If you inflated the WindTube like most people inflate a balloon or paper bag, then it probably took a lot of breaths. If you use Bernoulli's Principle however, you can inflate the bag with a single breath!

2. Get all of the air out of the WindTube, and again have someone hold the closed end while you hold the open end. Hold the WindTube about a foot from your face, and hold the open end wide open. Blow one big, long breath (like you are blowing out birthday candles) straight down the middle of the WindTube and close the open end off when you are done.
• Did it work? How were you able to fill the WindTube with only one breath?

3. Try it multiple times. Pay close attention to the "wave" of air that will make its way back toward the opening. Try to grab and close the bag just before this "wave" reaches the opening. When you blow one breath straight down the middle, your moving breath creates a stream of low-pressure air, which pulls air from the room into the bag with it. Have you ever been on the side of the road when a big bus or truck sped by? You probably felt the rush of air that the vehicle was pulling along with it. Your breath acts in the same way when you blow into the WindTube. It pulls some of the room air with it, so that you are able to fill the entire bag with only one breath.

Daniel Bernoulli was a Swiss physicist who lived from 1700 to 1782 and did pioneering work on the motions of fluids ("hydrodynamics"). A modern application of Bernoulli's Principle is the shape of airplane wings, which in part generate "lift" by making the air on the top of the wing move faster than the air under the wing.

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