



a Really Good Stuff® brand

MAKING SCIENCE FUN!

The Amazing Windbag

You can inflate an eight foot long bag with just one breath! Don't believe us? Well, you've clearly never seen Bernoulli's Principle at work with colorful air-tubes called Windbags. Windbags are just like balloons in that you can blow them up, but they do not share the elastic quality of a balloon. That means that Windbags are easier to inflate than normal balloons and there are a ton of creative things you can do with Windbags.

Here's What You'll Need...

- Windbags
- Rubber bands
- Two tables of similar size
- A bunch of deep breaths

You'll want to practice this experiment beforehand to make sure you've got it down!

Let's Try It!

How many breaths would it take to blow up an eight foot long bag? Depending on the size of the person, it may take anywhere from 10 to 50 breaths of air. However, with a little practice you will be able to inflate this colorful tube in only one breath!



1. Tie a knot in one end of the bag. Invite a friend to blow up the bag, keeping track of the number of breaths it takes. Then, let all of the air out of the bag. Explain to your friend that you can blow up the bag in one breath.
2. Have your friend assist you by holding onto the closed end of the bag. Hold the open end of the bag approximately 10 inches away from your mouth. Using only one breath, blow as hard as you can into the bag. Remember to stay about 10 inches away from the bag when you blow.
3. Quickly seal the bag with your hand so that none of the air escapes.

How Does It Work?

The Windbag quickly inflates because air from the atmosphere is being drawn into the bag along with the stream of air from your lungs. Here's the technical explanation. In 1738, Daniel Bernoulli observed that a fast moving stream of air is surrounded by an area of low atmospheric pressure. In fact, the faster the stream of air moves, the more the air pressure around the swiftly moving air drops. This phenomenon is called Bernoulli's Principle.

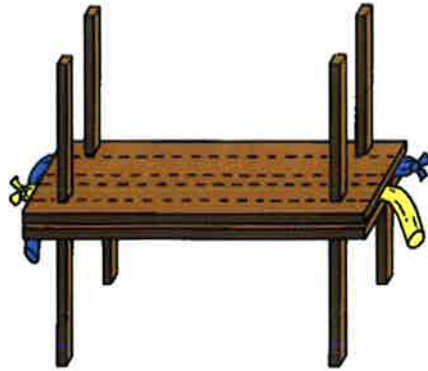
When you blow into the Windbag, higher pressure air in the atmosphere forces its way into the area of low pressure created by the stream of air from your lungs. In other words, air in the atmosphere is drawn into the Windbag at the same time that the air from your lungs is entering the bag. Fire fighters use this principle to force smoke out of a building. Instead of placing fans up against the doorway or window, a small space is left between the opening and the fan in order to force a great amount of air into the building. Fire fighters call this "positive air flow."



Take It Further: Floating Tables!

Windbags are made out of thin tubes of plastic that will easily burst if too much pressure is applied. However, in this experiment you will be able to use two Windbags to lift several hundred pounds of weight. You won't believe your eyes!

1. Prepare two Windbags by tying a knot in one end of each bag.
2. Spread the Windbags out flat on one table with the open ends hanging well over the opposite edges.
3. Ask for several people to help you position another identical table upside down on top of the first table. The two Windbags should be sandwiched in between the tops of the two tables.
4. Ask each helper to kneel down by the ends of the table and begin blowing into the bags. Remind them to squeeze the Windbags closed after each breath and not to let any air escape.
5. The force of the air in the Windbags will slowly cause the inverted table to rise!



Invite more people to come up and sit on the inverted table. Roughly estimate the weight of the table and the people who are sitting on it. Warn the people not to get their fingers caught in between the tables. As the two people at the ends of the table blow into the Windbags, the table and the people on the table will rise. Our creative team of pencil pushers did a quick calculation and arrived at the conclusion that two Windbags will support up to 2,000 pounds of weight. Remember, firefighters and rescue workers routinely use long, airtight canvas tubes and an air compressor to lift cars, huge rocks, or other objects that may be preventing a rescue.

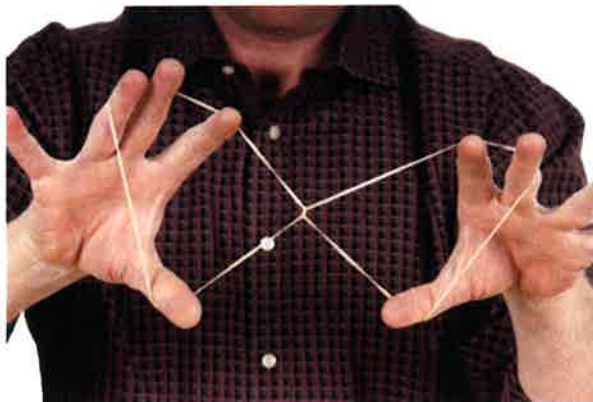
How Does It Work?

The science behind the lifting table can be explained by Pascal's Law. His experiments with fluids led him to a conclusion that the pressure exerted on a confined fluid (in this case the air in the bag) exerts equal pressure in all directions. In other words, the compressed air is exerting pressure underneath the inverted table equally throughout the long Windbag. This same principle is being applied when you pump up a bicycle tire or when an auto mechanic uses an air lift in a garage.



Take It Further: Building Shapes and Structures

Build three-dimensional geometric shapes and giant balloon animals by joining several Windbags together. You'll need rubber bands for this. Hook two rubber bands together by laying two on top of each other and pulling them through each other in opposite directions. Use the rubber bands to arrange the tubes in various shapes. Make giant cubes, triangles, pyramids, or any other shape imaginable. Experts Windbag architects can even build giant balloon animals.





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Airwave - Tie a knot in one end of the bag. Hold open the other end and wave the Windbag up and down to scoop up some air. Run with it outside and allow the wind to inflate the tube.

Air Sailing - Toss, play catch, or sail the Windbag outside for hours of fun. Throw it like a football or a torpedo for the best distance. Uh-oh! Did you get a hole in one? Don't worry! Seal up the hole with clear tape and keep playing.

Wind Dancing - Inflate the Windbag and attach a piece of string to one end. Tie the Windbag to a tree branch or a fence and watch the Windbag dance in the wind. Get a bunch of them all tied to one area for a real visual masterpiece.

Decorate Your Windbag - You can decorate your Windbags! Use permanent markers to draw fun designs on the outside of the bag.

Send a Unique Letter to a Friend - Write a letter to a friend, but not on paper. Write the letter to your friend on an unrolled, un-inflated Windbag. Use a permanent marker for the best results. Once you've got your letter written, give the Windbag to your recipient and explain to them how to blow it up. They're in for a great surprise.

More Hands-On Science!

Item Number	Description
WWIN-600	4 Pack of Windbags
WWIN-750	32 Pack of Windbags
WWIN-900	100 Pack of Windbags
WAIR-500	The Air-Mazing Kit
W9860	All About Air Classroom Kit

