



Make Your Own Exhibit

From the AirPlay Gallery: Bernoulli Blower

At Discovery Museum, we explore the power of air in our [AirPlay Gallery](#). One of our amazing air exhibits, **Bernoulli Blower**, can easily be created and explored at home. Why not give it a try? And please, share your experiences with us to the email address below—we'd love to know what you discover!



Supplies

Be sure to ask an adult for help as you gather your supplies to create the exhibit!

- Hairdryer, set on “cool” or “low heat” with any nozzle attachments removed
- Small, lightweight ball (such as a ping pong ball)
- Empty paper towel tube, toilet paper tube, or a tube made from rolled piece of paper



*Don't have the suggested supplies? We've got you covered! Check out the “**Get creative!**” section below.*

Exploration

- Turn on your hairdryer on. **Please be careful—hairdryers can get hot**, so make sure it is on the “cool” or “low heat” setting.
- Aim the hairdryer nozzle straight up.
- Hold your ball above the stream of air and let it go. Sometimes it helps to have two people for this part: one to hold the hairdryer and another person to place the ball in the air stream.

What do you notice?



Things to try

- Move your hairdryer in horizontal circles.
What do you observe about the ball?
- Slowly tilt your hairdryer in different directions
What happens to the ball?
- Grab your tube. While your ball is in the air stream, try to





slide the tube over the ball so that it acts as a tunnel for the ball (see photo).

What does the ball do when you put the tube over it?

Get creative!

Remember, experimenting is about trying new things, observing what happens, and then trying more new things. Not all of the supplies you try will work equally well with your exhibit, and that's ok! It's an experiment! Here are some questions to help you get creative...



- Don't have a ping-pong ball? What other kinds of balls can you test? Can you create a "ball" using a pom-pom or balled up piece of paper?
- Does your exhibit work with objects of other sizes, weights, shapes?
- If you don't have a tube that fits your ball, can you make one out of paper, aluminum foil, or something else around your house?
- What else do you want to try with your exhibit? Share your ideas with those in your house and see if they can help you make it happen!
- No hairdryer? No problem! Here are two of our favorite activities for playing with the power of air.

Lift a ball with the power of your breath

- Supplies: 1 small cup (3oz bathroom cup size works well), and a ball to fit inside your cup (a lightweight ball is a great start, but you can try a ball of paper or a pom-pom)
 - Start exploring
 - Place the ball in the cup.
 - What do you think will happen if you blow across the top of your cup? Try it!
- What do you notice about the ball?*
- Things to try
 - How far can you make the ball jump out of your cup? (keep trying to blow with different strength puffs and from different angles)
 - Can you catch your ball into a second cup?
 - Get creative!
 - Do you have other cups and balls you can use?
 - Which combination works the best? Why do you think that is?
 - Do the Discovery Museum Bernoulli Blower challenge below using your cup and ball!





Build a model of an airplane wing using a strip of paper

- Supplies: a strip of paper
 - Start exploring
 - Place one of the short sides of your strip of paper below your lower lip.
 - Blow across the paper.
- What do you notice about the paper?*
- Things to try
 - What does the paper do if you blow across it lightly?
 - What happens if you blow really hard?
 - Get creative!
 - Does anything change if you use a piece of paper of a different length? Different width?
 - What happens if you try to blow across two strips of paper?
 - Decorate your homemade airplane wing and fly it around the house!



What's going on?

When you turn on your hairdryer, does your ball dance in the stream of air?
When you move your hairdryer in circles, does your ball drop to the ground?
Why do you think your ball stays in the air?

The moving air coming out of your hairdryer creates something called *low pressure*. The low pressure exists in the moving air, and *high pressure* exists in the surrounding still air. The high-pressure acts like a spring, pushing the ball back into the low pressure of the moving air. Because of this pushing, the ball remains in the stream of air even when you move your hairdryer around. This discovery comes to us from back in the 1700s from a physicist named Daniel Bernoulli, and his discovery was named Bernoulli's Principle, hence the name Bernoulli Blowers.

Bernoulli's Principle even helps explain how airplanes stay in the sky! If you explored the **Get creative!** Activities above, you used Bernoulli's Principle to lift a ball or piece of paper into the air just as a plane gets lifted into the air. By blowing air across your cup or strip of paper, you created a *low-pressure* area above your object. According to Bernoulli's Principle, this difference in low pressure (moving air) and high pressure (still air) creates a force called *lift* that causes an object—like a ball, piece of paper, or airplane—to move towards the low-pressure area. This is one way air can move objects.



Discovery Museum Bernoulli Blower Challenge

Can you use your Bernoulli Blowers to get your ball to hit a target?

- Create a target for your ball—a box, a mark on the floor, a homemade mini basketball net, or whatever you can come up with.
- Using your favorite Bernoulli Blower supplies you have gathered, try to aim your Bernoulli Blower so that you hit your target when you slide your tube over your hovering ball.

Can you hit the target using balls of different sizes?

What happens when you use tubes of different sizes or shapes?

Can you create your own Bernoulli Blower game?

Share your discoveries with us!

We want to know about your Bernoulli Blower. Share your experience with us in any of the following ways:

- Draw a picture
- Take photos of your Bernoulli Blowers
- Write down which supplies were your favorites to use, why you liked making your own Bernoulli Blowers exhibit, what game you made up, or any other fun things about your Bernoulli Blowers.

Then email us at myhomediscoveries@discoveryacton.org.

And next time you're at the Discovery Museum, check out our Bernoulli Blowers exhibit and show us what you learned from the exhibit you created at home. We'll see you there!

Want even more Bernoulli fun?

Check out these resources!

- Science You can Do with a Leaf Blower: <https://www.fizzicseducation.com.au/articles/science-you-can-do-with-a-leafblower/>
- Cool Bernoulli's Principle Science Experiments – Bite Sized Experiments: https://www.youtube.com/watch?v=KFE98nje_L0
- Balancing a Ball: <https://www.exploratorium.edu/snacks/balancing-ball>