



# AIR CANNON Activity Kit

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## What is an air cannon?

An air cannon is a tool that can have a large or narrow opening that releases a blast of air. The air being pushed out of a cannon when aimed in a specific area is known as a "blast zone."

**Air vortex** is a release of a spinning ring of air in the shape of a donut. If smoke is in the air, the air vortex is visible to the human eye. Imagine you blow out air and put your hand near your mouth, the air you feel on your hand is similar to the air that is released by an air vortex.

Not only are you going to be making an air cannon – but you will explore how changing the opening of the air cannon affects the puff of air that is released.

### Materials Needed for this Activity

- 3 balloons (these will become your barrel covers)
- 3 cardboard tubes (these will be the “barrels”)
- 3 paper cones (these can be bought or made)
- Tape
- Scissors
- Ruler
- 6 paper or plastic cups (or something else to use for your target)
- (Optional) markers/crayons



Visit the Science Circus Website for additional information about our materials list.

## Building the Barrel of Your Air Cannons

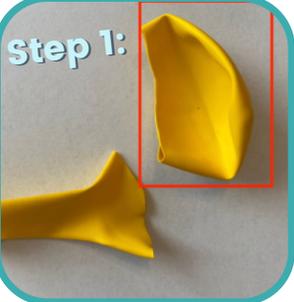
You will repeat this step three times (for three air cannons).

**step 1:** Cut the balloon and keep the rounded section.

**step 2:** Stretch the balloon over one end of your cardboard tube and secure it in place with tape. The balloon does not have to be pulled tightly, but try to avoid excess material.

**step 3:** (optional) using markers/crayons, decorate your barrel however you'd like.

step 1:



step 2:



May contain latex. Children under 8 years can choke or suffocate on uninflated or broken balloons. This activity is intended for use by adults and children who can read and follow directions and warnings. Adult supervision advised. Use for intended purposes only.

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Pull back on the balloon and release! You should hear a sound and a puff of air should be released from the open end of your cannon. Do this for each of the three barrels that you've built.

## Building Your Escape Opening

- Use one of the barrels that you've built (put the other two aside for now, we'll use them later)
- Measuring from the pointed end of the cone, cut one inch off the first paper cone.
- Tape the remaining section of cone (it should be open at both ends) to the open end (opposite of the balloon) of your barrel. It is ok if the base of your cone overlaps with the barrel.



## Explore!

Arrange your cups (or the targets that you've chosen) so that you can observe the strength of the puff of air. For example,

- How far away can your air cannon be from your targets and still make them move?
- Can your air cannon make your target topple over?



## Stop & think!

1. How would you draw what is going on inside the barrel as the balloon is being pulled back?
2. How would you draw what is going on inside the barrel after the balloon is released and the puff of air moves through the opening?



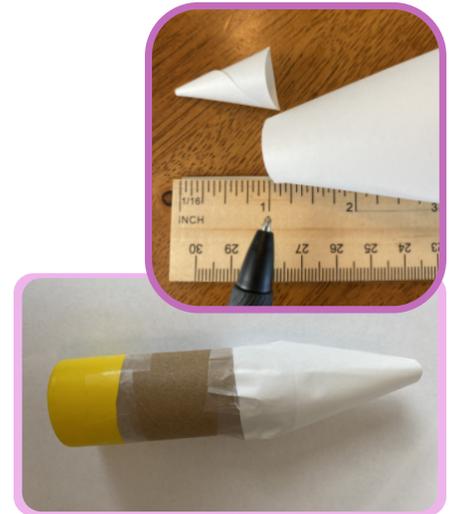
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How does the opening to the air cannon affect the puff of air that is released? Does the size of the escape opening matter?

Let's test this by making the size of your escape opening larger.

## Building Your Second Air Cannon

1. Again measuring from the pointed end of the cone, cut two inches off of the second paper cone.
2. Tape the remaining section of cone (it should be open at both ends) to the open end (opposite of the balloon) of your barrel.
3. It is ok if the base of your cone overlaps with the barrel.
4. Arrange your targets in the same way as before and test out your second air cannon.



Does your second air cannon work the same way as the first one?  
What is the same? What is different?

(Hint: think about how many targets move at a time, the distance between your air cannon and the target, the size of the puff of air, etc..)

## You choose!

You now have one barrel and one paper cone left. Decide how much of the cone you want to cut off (i.e. how large of an opening you want for your third air cannon). Once cut, attach this third paper cone to your final barrel.



## Stop & think!

- Before you test out your third air cannon, what do you think will happen?
- Why do you think this way?
- How can you use your results from your first two air cannons to predict the way your third air cannon will function?

Arrange your targets in the same way as before and test out your third air cannon.

## Going Further

Air cannons come in lots of shapes and sizes, and can even be made out of different materials. With parent permission, look around your house for objects that might be useful to make another air cannon. These items below could be promising...

As you design and test out your new air cannons, think about what is different about them:

1. The width and/or length of the barrel?
2. The strength of the balloon (or did you use something else)?
3. The size of the escape opening?



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