

Date \_\_\_\_\_

Name \_\_\_\_\_

# Air Cannon Investigation: Ready, Aim, Fire!

## Materials you will need

- |                      |                              |                             |
|----------------------|------------------------------|-----------------------------|
| • A cup or container | • Cotton balls or puff balls | • Duct tape or packing tape |
| • A plastic bag      | • Scissors                   | • A tape measure            |

Today you will create your own version of a cannon that can shoot a cannonball.

Throughout the process, we will be using STEM concepts to help us create cannons, investigate how they can shoot a cotton ball, and collect data from these instruments to make sense of important principles we are studying.

- Once you have determined the best method for shooting your air cannon, use what you have learned to respond to the following:
  - How does the force of pushing the bag impact the cotton ball?
  - Does the size of the bag matter when you fire the cotton ball? In other words, will the cotton ball go farther with a bigger bag? How do you know?
  - Does the size of the cup or container make a difference in how far the cotton ball goes?
  - Shoot your air cannon at least ten times and take measurements (using the tape measures) of how far the cotton ball goes. Record these data in a chart. Using these data, find the mean, median, and mode.
- Think about whether the results would be different with a different air cannon. Record your thoughts/responses.
- Now connect with another classmate. Look at his or her air cannon and data that were generated. How are the results similar to yours? How are they different?
- With your partner, create a new air cannon. Shoot it ten times per person (for a total of twenty times) and take measurements of how far the cotton ball travels for each shot. How are the data the same? Different?
- Based on your air cannons, make some conclusions about the “best” cannon and reasons it is the best. Be sure to use data to support your results.

- Think about how to build your own air cannon using the identified materials. Your goal is to have the cannon shoot a cotton ball as far as possible.
- Sketch and jot notes about this process in your engineering design journals. You are to record one or two prototypes of your air cannon.
- Collect materials provided in the classroom for building it.
- Build the air cannon. Don't forget to cut a hole in the cup or container for the cotton ball. Predict how far it will shoot it out.
- Test it. How does your prediction match the actual launch of the cotton ball? You may wish to test several variables before proceeding. For example, try a different method for “loading” the air cannon with air, or experiment with different techniques of applying force to “shoot” the cannon.