Air Cannon Investigation: Ready, Aim, Fire!

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.

1. 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.

2. Sketch and jot notes about this process in your engineering design journals. You are to record one or two prototypes of your air cannon.

3. Collect materials provided in the classroom for building it.

4. 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.

5. 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.

6. Once you have determined the best method for shooting your air cannon, use what you have learned to respond to the following:
   a. How does the force of pushing the bag impact the cotton ball?
   b. 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?
   c. Does the size of the cup or container make a difference in how far the cotton ball goes?
   d. 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.

7. Think about whether the results would be different with a different air cannon. Record your thoughts/responses.

8. 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?

9. 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?

10. 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.

From the April 2015 issue of...