

AIR CANNON

Objectives:

Students will understand:

- How to collect data and determine varying outcomes reliant upon the input of information
- That models can be representatives of something else
- Anyone can be a scientist and test hypothesis
- The varying speeds at which objects travel and the affect gravity has on objects
- That objects that weigh more typically will not travel as high as a heavier object
- That certain muscles need to be used to pull the rope to get the ball to go in the air
- For every action, there is an equal and opposite reaction

Standards Assessed:

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| • Scientific Method | • Understanding a push/pull can move an object |
| • Collecting Data | • Force and Motion |
| • Scientific Inquiry | • Muscular System |
| • Testing Hypothesis | • Simple Machines |
| • Models for Representation | • Problem Solving |
| • Effects of Gravity | • Newton's Laws |
| • Cause and Effect | |

New York Standards:

K: S1.1a, S1.2.3, S1.3, S1.3.2, PS5.1b, PS5.1c, PS5.1f, PE1a, PE1b

1st: S1.1a, S1.2.3, S1.3, S1.3.2, PS5.1b, PS5.1c, PS5.1f, PE1a, PE1b

2nd: S1.1a, S1.2.3, S1.3, S1.3.2, PS5.1b, PS5.1c, PS5.1f, PE1a, PE1b

3rd: S1.1a, S1.2.3, S1.3, S1.3.2, PS5.1b, PS5.1c, PS5.1f, PE1a, PE1b

4th: S1.1a, S1.2.3, S1.3, S1.3.2, PS5.1b, PS5.1c, PS5.1f, PE1a, PE1b

5th: S1.1.2, S1.2a, S1.2b, S2.2b, PS5.1b, PS5.1c, PS5.2a, PS5.2g, PE1a, PE1b

6th: S1.1.2, S1.2a, S1.2b, S2.2b, PS5.1b, PS5.1c, PS5.2a, PS5.2g, PE1a, PE1b

7th: S1.1.2, S1.2a, S1.2b, S2.2b, PS5.1b, PS5.1c, PS5.2a, PS5.2g, PE1a, PE1b

8th: S1.1.2, S1.2a, S1.2b, S2.2b, PS5.1b, PS5.1c, PS5.2a, PS5.2g, PE1a, PE1

Materials:

- Air Cannon Exhibit

AIR CANNON

Procedures:

The students will pull the rope at least twice to see how high they can launch the tennis ball. The students need to discuss the weight of the rope and how challenging it can be to pull it hard enough to achieve the maximum height of the tennis ball. Once back in the classroom the discussion needs to include muscular strength and how an adult would have an easier time pulling and releasing than a child. The students need to discuss strategies for pulling that could increase effectiveness, such as using two students instead of one or sitting instead of standing while pulling. If we lived on a planet without any gravitational pull, what would be the result if a person tried to pull the rope? Would the ball stay suspended? The class needs to discuss the use of a pulley system, and how by pulling the rope, it leads to the projection of another object. If an individual was to strengthen their pulling muscles by working out, would this increase the ease of pulling the rope?

Independent Practice: The exhibit is completely independent.

Assessment:

- Observation of the students with the exhibit
- Teacher observation of participation in classroom discussion
- Score on WonderWorks test

Modifications (Special Education Students):

Special education students may need assistance with pulling the rope.

Extensions (Gifted Education Students):

Gifted students may pull it twice to observe if they could get it to go higher the second time.

Generalization to other subjects:

Problem solving generalizes to all subject areas.