

# Projectile Mini Lab 2

## AP Physics C

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## Introduction

**The goal** of this lab is to determine the cross-sectional area of the tip of a water blaster.

**The materials** that we used include a water blaster, cameras, and a water blaster.

## Procedure

1. First, we set up the water blaster on top of a bench with a set height that we measured.
2. Then, we filled the water blaster with water, and measured the length of the water blaster.
3. Next, we set up two cameras to determine the time it took for the water blaster to squirt all the water in the blaster and to determine where the water landed from which we used meter sticks to find the displacement of the water.
4. We then repeated the experiment for a total of 5 trials.

## Data

Trial #	Displacement	Time of plunger	v1	v2
1	3.45	1.83	0.1950819672	10.94340959
2	3.55	1.92	0.1859375	11.26060987
3	1.14	4.36	0.08188073394	3.61608317
4	1.23	3.71	0.09622641509	3.901563421
5	1.77	3.23	0.1105263158	5.614444922

$$L = 0.357m$$

$$H = 0.487m$$

## Calculations

$$\text{velocity of the water blaster} = v_1 = \frac{L}{t}$$

$$\text{velocity of the water} = v_2 = \Delta x \sqrt{\frac{2H}{g}}$$

## Analysis

With the data we collected, we can find the cross-sectional area of the tip of the water blaster by using the slope of a  $v_1$  vs.  $v_2$  graph, and the slope of the graph below is  $0.0139m^2$  which is the cross-sectional area of the tip of the water blaster.

The relationship between v1 and v2 to determine A2

