

Diagram 1: This is how you will need to position yourselves for this lab.

To determine the angle:

* Watch the balloon’s direction of motion in the first few frames of the video.
* Create a line based on the balloon’s position.
* Use a protractor to measure the angle of the balloon relative to the meter sticks.
* Estimate the displacement on the x-axis (meter sticks).
* Calculate average displacement on the x-axis (Δx) & average angle of release.

**Data Table**

|  |  |  |
| --- | --- | --- |
| Trial | Angle (Θ) | Displacement (Δx)  (Estimate based on decimeters) |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |
| Averages |  |  |

**Average Calculation Space**

**Table**

X Y Non-axis Variables

Δx= Δy= Θ=

Vx= Viy= Vi=

t= Vfy=

a = g = -9.8m/s2

**Post-lab questions**

1. What is the velocity of the balloon in the y-axis at the highest height? Why did it change from its initial velocity in the y-axis?

**The velocity at its highest point is zero because the ball is not moving up or down at that point.**

1. Why is half of the time used to calculate Δy?

**The half of the time is used to calculate Δy because the trajectory of the projectile is symmetrical with respect to the y-axis. In other words, we know that this moment is halfway through the balloon’s (cannonball) flight (t ½).**

1. Why is acceleration in m/s2 and not in m/s?

**Acceleration is calculated by dividing change in velocity by time. Since velocity can be measured in meters per second (m/s) and time can be measured in seconds (s), the unit is meter per second per second (m/s/s) or meters per second squared (m/s2), not meters per second (m/s).**