

Projectile Lab 100pts

### RULES:

- 1) **NO Firing of Nerf guns except to collect experimental data (this is pertains to firing at other members of the class, student body, teachers, walls, white boards, etc.) This will result in an exclusion from your lab group and a zero on the lab report, and information sent to the honor board.**
- 2) **All Nerf guns must be returned to me by the end of class.**
- 3) **All Nerf darts must be returned to me by the end of class.**
- 4) **No use of the Nerf guns outside of class time.**
- 5) **Do not let other students use the Nerf guns.**

This is an open ended lab. You have till Friday September 28th to complete the Experimental part of the lab. The full lab report is due on Tuesday 10/2/2018 by 6pm. Each group will design an experimental protocol and use projectile equations to determine four main objectives:

- 1) What are the muzzle velocities of the Nerf guns velocity (in meters per second)? And which Nerf guns has the greatest muzzle velocity in meters per second?
- 2) Which Nerf gun is the most precise?
- 3) Which bullet shoots the furthest?
- 4) Which bullet is the most precise?

WHAT ARE YOUR HYPOTHESESE?

You should have at least 4

- |                               |                            |
|-------------------------------|----------------------------|
| 1) <b>Gun Muzzle velocity</b> | 2) <b>Gun Precision</b>    |
| 2) <b>Bullet Velocity</b>     | 3) <b>Bullet Precision</b> |

You can write them like this:

Most precise Gun1 > Gun2 > Gun3 Least precise

**INTRODUCTION:**

3-5 paragraphs

Last paragraph must have

- “In this study ...” Synopsis
- Explain the hypothesis and whether you reject or accept it based on your data.
- Also provide real data #s

**MATERIALS AND METHODS**

- Nerf Guns
  - a. Nerf DoubleStrike
  - b. Nerf Firestrike elite
  - c. ZURU single shot
- Darts:
  - a. Velcro dart
  - b. Whistler Dart
  - c. Hard Plastic tip
  - d. Sucker Tip dart
- Meter sticks

Explain physics equations used:

The precision testing must utilize an angled shot.

Questions to address:

- What would be your controls?
- What would be the independent variable for this experiment?
- What would be the dependent variable for this experiment?
- How many Trials (shots) must be fired to satisfy your conclusions?

**RESULTS:**

Introduction paragraph

**Figure 1: Data for determining Nerf gun muzzle velocities.**

Paragraph explaining data

**Figure 2: Data for determining Nerf gun precision.**

Paragraph explaining data

**Figure 3: Data for determining Nerf dart muzzle velocities**

Paragraph explaining data

**Figure 4: Data for determining Nerf dart precision.**

Paragraph explaining data

**CONCLUSION:**

- Determine which gun has the highest muzzle velocity
- Determine which gun is the most precise
- Determine which dart has the highest muzzle velocity
- Determine which dart is the most precise
- Determine your variances in your data
- Do you reject or accept your hypotheses?