

Name: _____ Per: _____ Date Due: _____ EN _____

Nerf Gun Science

Materials: nerf gun and measuring tape

Procedure:

1. Carefully fire your nerf gun several times. Individually, jot down 4-5 different observations about the motion of the projectile. Record information (description) about velocity, length of travel and time in air.

--

2. Now get together as a group and discuss your observations. Add any additional observations.
3. Now, we will look at **Muzzle Velocity**. The muzzle velocity is the velocity in which the projectile leaves the gun. To calculate the muzzle velocity, you will need your nerf gun with the muzzle pointing straight up. Record the time required for the projectile to leave the muzzle and return. Do 5 trials and find the average of the round trip.

Trial 1	
Trial 2	
Trial 3	
Trial 4	
Trial 5	

4. Calculate the average of the five trials: _____ (round trip)
Show your work:

5. Using the formula, calculate the muzzle velocity of you gun. _____

$$V(\text{muzzle}) = g (\text{acceleration due to gravity}) \times t (\text{half the time of the round trip})$$

Show your work:

6. Using a protractor, aim the muzzle of your gun at 7 different angles. Record the angle of the muzzle and the distance each projectile travels.

Muzzle Angle	Distance Projectile Traveled

7. Using a sheet of graph paper, graph the results of the table.
8. Using your graph, which muzzle angle would you use if you wanted a projectile to travel the farthest? Explain