

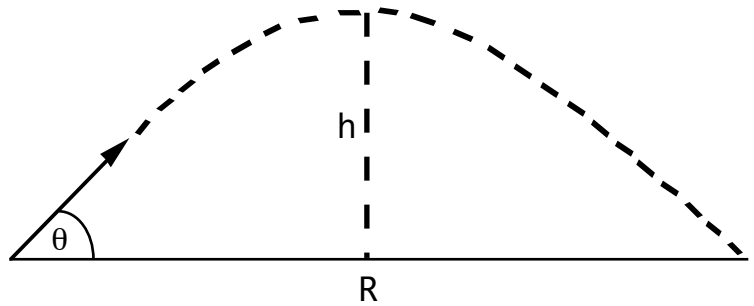
Name \_\_\_\_\_

# Projectile Motion

**A. Solve the problem and fill in the chart with the requested information.**

A nerf gun fires a ball at a speed of 25 m/s at an angle of  $5^\circ$  above the horizontal. What height does the ball reach? How long is the ball in the air? What is the ball's horizontal range?

Sample Calculations:



	Initial Angle ( $\theta$ )	Muzzle Velocity (m/s)	Maximum Height (m)	Time (s)	Range (m)
<b>Trial 1</b>	<b><math>25^\circ</math></b>	<b>25</b>			
<b>Trial 2</b>	<b><math>40^\circ</math></b>	<b>36</b>			
<b>Trial 3</b>	<b><math>35^\circ</math></b>	<b>15</b>			
<b>Trial 4</b>	<b><math>62^\circ</math></b>	<b>72</b>			

**Table 1: Predicted values for projectile motion**

**B. Verifying values via the Internet**

In the computer room, login and go online. Enter the web address

[http://Galileo.phys.Virginia.EDU/classes/109N/more\\_stuff/Applets/ProjectileMotion/jarapplet.html](http://Galileo.phys.Virginia.EDU/classes/109N/more_stuff/Applets/ProjectileMotion/jarapplet.html)

Now enter values into the java applet and fill in the time and range columns of the table.

	<b>Initial Angle (<math>\theta</math>)</b>	<b>Muzzle Velocity (m/s)</b>	<b>Time (s)</b>	<b>Range (m)</b>
<b>Trial 1</b>	<b>25°</b>	<b>25</b>		
<b>Trial 2</b>	<b>40°</b>	<b>36</b>		
<b>Trial 3</b>	<b>35°</b>	<b>15</b>		
<b>Trial 4</b>	<b>62°</b>	<b>72</b>		

**Table 2: Computer generated values for projectile motion**

1. Make a fifth trial (using the values from trial 4) where you only change the mass of the projectile from 10.0 kg to 1.0 kg. Does this affect the path of the projectile? Explain.
  
2. Your classmate says, “ Can you explain why the velocity of a projectile stays at a constant 9.8 m/s? ” Explain what, if anything, is wrong with this statement using the physics you have learned.