Projectile Motion – Physics Phun   **Name:**_____ **#:**____

Go to tigerphysics.org → Unit 7 → Use the PhET website http://www.tigerphysics.org/unit-7-projectile-motion.html . Using the PhET website, explore projectile motion and answer these questions:

<u>Type up your answers up on the Google Doc.</u> Make your answers BOLD so they show up.

Use the INTRO part of the simulation for Part 1

1. Play with the simulation. What are some things you observe when you change settings? (Hint: You should discuss more than one setting.) (Use the PhET simulation.)

2. Set the cannon at 0 meters above the ground. What happens when you launch a projectile at the same angle but change the initial velocity? *Fill in data table and then summarize results in a couple of sentences.*

Question 2	
Launch Angle:_____	
Initial Velocity	Range

3. What happens when you launch a projectile at the same velocity but change the initial angle? *Fill in data table and then summarize results in a couple of sentences.*

Question 3			
Initial Launch Velocity:_____			
Angle (degrees)	Range	Angle (degrees)	Range
10		50	
15		55	
20		60	
25		65	
30		70	
35		75	
40		80	
45		85	

30.06 meters

Figure 3

Time | - |
Range | - |
Height | - |
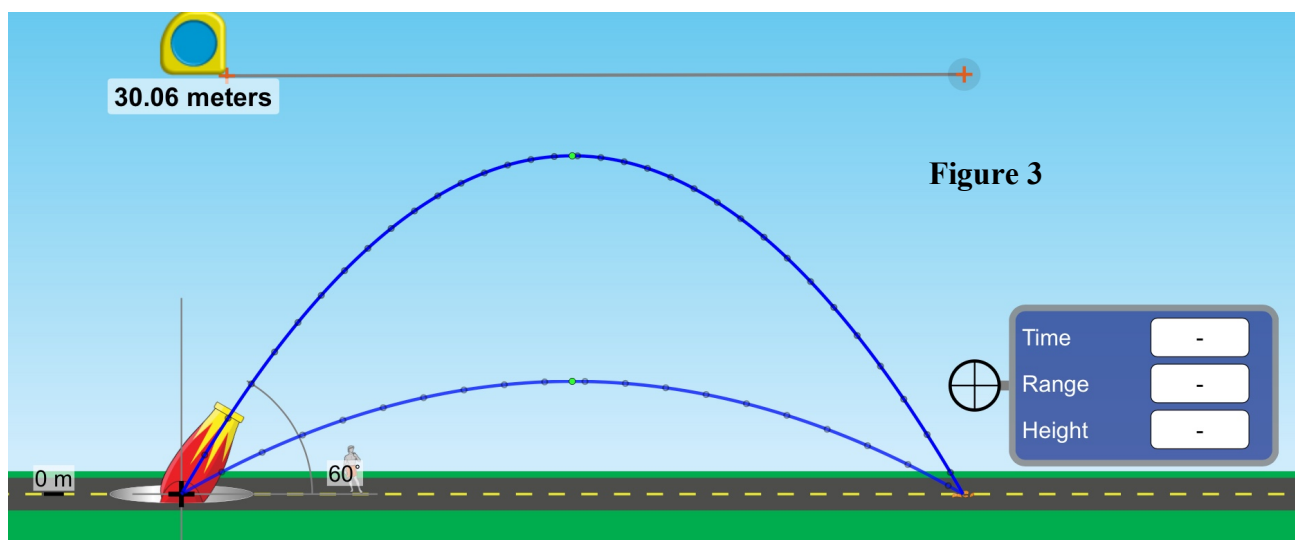
4. Can you find multiple launch angles that will land on the same spot along the horizontal line extending from the cannon? What is true about those angles if they exist? Use the tape measure or range finder device as shown in the picture above to find the range (horizontal distance). *Fill in data table and then summarize results in a couple of sentences.*

Question 4		
Initial Launch Velocity: _____		
Angle	Angle that hits same range	Range

5. What launch angles have the longest time in flight? Shortest? What are the trends? *Fill in data table and then summarize results in a couple of sentences.*

Question 5	
Initial Launch Velocity:	
Angle	Time
10	
20	
30	
40	
50	
60	
70	
80	
90	

6. What happens when you change the vertical launch height? What are the trends? *Fill in data table and then summarize results in a couple of sentences.*

Question 6	
Initial Launch Velocity: _____	
Initial Launch Angle: _____	
Launch Height	**Range**

Part Deux:
Go to the LAB part of the PhET Simulation

Experimental Design Projectile Motion

Pick a setting to change (Mass, Diameter, Gravity, Air Resistance) and see what affects it has on **Time** in flight, **range**, or **max height**. What do you think will happen when you change the setting? In other words what do you think is the trend? Design a procedure to test the effects of changing one of the settings on the simulation. Then systematically change the settings and record the data.

(a) Setting you are going to test:

(b) Prediction:

(c) Design an experiment for determining the relationship between _____ and _____.

    (i) Draw a diagram of the experimental setup for the pendulum. In your diagram, indicate each quantity that would be measured and draw or state what equipment would be used to measure each quantity.

    (ii) Describe the overall procedure to be used, including any steps necessary to reduce experimental uncertainty. Give enough detail so that another student could replicate the experiment.

(d) Based on the data, what conclusion can you make about the hypothesis.

(e) Compare your results to other physics students. Site specific students and their results.