Projectile Lab

<u>Purpose</u> - to determine the graph shapes of motion and velocity of a type 1 projectile, and successfully apply the concepts of projectiles in a type 2 problem.

<u>Procedure</u> - **Part 1**-

1.) Open desk top tools, click on physics apps, and then open Interactive Physics.

2.) Select File open, change to I drive, double click handout, double click Wilkison, select type 1 Projectile IP.

3.) Use the slider to set the initial velocity in the x-direction to $+1.0\frac{m}{s}$, run and record the graphs. Determine which graph is of the x-position, y-position, x-velocity, and y-velocity sketch and label them.

4.) Reset and change the x-velocity to $+3.0\frac{m}{s}$.

5.) Sketch the y-velocity graph, label when the mass leaves the table, and when it bounces on your graph and calculate the slope during the time the object falls. You can step the experiment back frame by frame, and click on the arrow → in the bottom left hand area of the page to get values of the $\vec{v}_y$. Clicking <u>twice</u> on the arrow in the upper left corner of the $\vec{v}_y$ graph will allow you to see values for the points along the graphed line.

6.) Reset the experiment and change $\vec{v}_x$ to $+5.00\frac{m}{s}$. Run and Sketch the graphs of $\vec{d}_x$ and $\vec{v}_x$.

Part 2 -

1.) All calculations must be done prior to running the experiment. **<u>You will have only one chance at successful completion</u>**, so double check between you and your partner.

2.) A type 2 projectile must have a range of $6.5\ m$ and be launched on an angle given by the teacher. Calculate the $\vec{v}_x$ and $\vec{v}_y$ needed in order to accomplish this task.

3.) When done proceed to your teacher and verify that you have done this correctly. **4 marks** for success, **3 marks** for a shot that rebounds in off the edge. No marks for any other shot.

<u>Discussion</u> -

1.) How does increasing the $\vec{v}_x$ change the graphs of velocity in part 1 in both horizontal and vertical direction?

2.) What is the meaning of the slope calculated in step 5, part 1?

3.) Name any "real world" application of projectiles, not including sports or cats.

<u>Conclusion</u> – state how the graph of velocity and displacement in the x and y directions looks and what this means is occurring with these velocities and displacements of the object for a type 1 projectile.