Name _____ Hour _____

Fun with 2-Dimensional Motion Lab

STATION 1-4 ARE DUE _____, STATION 5 IS WORTH A STICKER

Station 1: **STOMP ROCKET**

Place the stomp rocket at a 45° angle and gently stomp it. Measure the time the rocket is in the air. **Calculate the maximum height** of the rocket during its flight. Make sure you use the right Δt in your equation!

____2.4____ sec

_____1.2____ ½ Δt

Δy =

Station 2: **MARBLE SHOOTER**

Find a marble shooter and hook it on the table so that it will shoot off one side. Pull back the spring and shoot the marble. Measure the height of the table and the distance the marble lands away from the shooter. **Calculate the horizontal velocity** of the marble as it leaves the shooter. **Please do not lose the marble!**

____2.15 m_____ Δx _____0.91 m_____ Δy

Vx =

Station 3: **Nerf Disc Launcher**

Place the disc launcher on the floor at some angle. Shoot the disc and measure how far the disc travels (Δx) and the time it is in the air. **Calculate the actual velocity** and the **angle** the disc left with. (You will need to find Vx and Viy using equations first!)

____10.5 m_____ Δx _____3.45___ sec

Vx = _____
Viy = _____
V = _____
θ = _____ N of E

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Station 4: **Pig Popper**

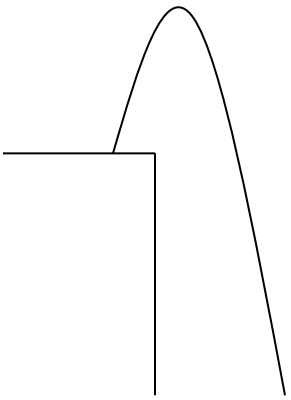
Part 1: Squeeze the pig's tummy to pop the ball out of its mouth. It should travel as a **horizontal projectile**. Measure the vertical and horizontal distance the ball travels. Calculate the **horizontal velocity** with which the ball leaves the pig's mouth.

___2.65 m_____ Δx ___1.10 m____ Δy

Vx =

Optional: Station 4 Part 2…for 1 sticker if done by end of hour.

Place a pig face up on a table. Squeeze the pig's tummy so the ball leaves the mouth at a 45° angle with the same force as you did in part 1. **(Your V_x from part 1 becomes the starting velocity (V) in this problem)** It should land on the floor below the table. Use your velocity and angle to find the V_x, V_{iy}. Then you need to find the time to the peak in order to find the Δy and **TOTAL DISTANCE** the ball travels from the **PEAK TO FLOOR.** Finally you can find the **VELOCITY** of the ball right before it hits the floor. **This is TRICKY!** You will need to use projectile equations to find Δy to the top and then a 1-D equation to find the V_f at the bottom. Don't forget to measure the height of the table!



height of table = ____0.91 _____ m

θ = 45° and velocity = _____
(from part 1)

V_x = _____

V_{iy} = _____

Δy from **PEAK TO BOTTOM** = _____

V_f at bottom = _____