Projectile Motion Full Lab

Physics 40

**Objective**: Students will use their new understanding of projectile motion to track the motion of an object in two dimensions

**Your mission:** Your lab groups will predict and then find the actual x direction displacement of an object rolling off a particular height

**Set Up:**

**Data Acquisition**

Create a data table (by hand or on excel) that can record our “big 5” variables in X and in Y

**Procedures:**

Step One: Finding the Initial Velocity:

1. Place the ramp 0.5m from the edge of the bench.
2. Release the marble
3. Once the marble has LEFT the ramp, time how long it takes the marble to reach the edge of the table. Calculate Vix using
4. Find the average of 3+ trials. This will be your initial velocity in X.

Step Two: Calculating the projected X displacement

1. Measure the distance straight down from the top of the surface to the floor. This is the displacement in Y.
2. Using the equations and methods from class, calculate the projected X displacement.

Step Three: Finding the X & Y Displacement

1. Orient the ramp to face off the bench. Roll the marble off the bench. Record the distance it lands from the bench. This is your measured dx.
2. Repeat for 3+ trials

Step Four: Alter your ramp (make it steeper or flatter) and repeat steps 1-3.

Data Analysis

1. Find the average measured dx
2. Find the percent error in dx

Include in your conclusion.

Remember, conclusions include:

- What you observed vs what you expected

- Validity & assumptions

- Improvements to the lab

- Implications for further use