Flat shot trajectory!   Name_____

Purpose: To accurately calculate range of a projectile

Procedure: Launch the projectile straight horizontally 4 times. Measure d_h and take average. Measure Projectile's launch height and calculate t_{down}. Calculate V_h. Measure table height and calculate t_{down} to floor. Calculate d_h. Test range measurements with the teacher watching. (No practice shots!)

Formulas:

$$d_h = v_h t$$

$$t_{down} = \sqrt{\frac{2d_v}{g}}$$

$$\% \text{ diff} = \frac{(actual - calculated)}{actual} * 100$$

Data: be sure to convert to m from cm!   **Calculations:**

Average d_h to table		m	Time down to table		s
Launch Height (d_v)		m	Initial V_h		m/s
Table Height		m	Time down to floor		s
Total Height (d_v)		m	d_h to floor (calculated)		m
Measure this AFTER all the calculations			See formula above		
Actual d_h to floor		m	Percent Difference		%

Questions:

1. What formula did you use to calculate d_h?   Why?

2. Is wind resistance a factor here? How big of one?   Why?

3. What happens to the vertical component of the velocity the longer the projectile falls?

4. What happens to the Horizontal component of the velocity?

5. What things in real life act like this?

Panel 1: I LIKE HOMEWORK. HOMEWORK MAKES ME HAPPY.

Panel 2: I DON'T WANT TO GO OUTSIDE. I WANT TO DO MATH PROBLEMS.

Panel 3: BLEHHH

Panel 4: MY BRAIN ALWAYS REJECTS ATTITUDE TRANSPLANTS.

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