

# PHYS 220 - PROJECTILE MOTION

*Materials and equipment:* Instructor Demonstration Pasco Projectile Launcher, wooden hoops, string, tape.

Each group will be assigned a distance from the Projectile Launcher. Your challenge is to hang a wooden hoop at your assigned distance such that the projectile will fly through the middle of your hoop when launched.

Group 1: 1.50 m

Group 2: 3.00 m

Group 3: 6.00 m

Group 4: 7.50 m

Group 5: 10.00 m

Group 6: 4.50 m

Group 7: 9.00 m

**The projectile will not be launched until every group is satisfied with their hoop position. 30% of your lab grade is based on the ball successfully going through your group's hoop.** The remainder of your lab grade will be based on a brief description of your approach to this problem including all calculations.

Your instructor painstakingly collected data from multiple launches of the projectile and calculated the launch speed of the projectile for your use.

When launched from the "X-LONG Range" setting at an angle of  $30^\circ$ , the launch speed was found to be 12.107 m/s (how fast is this in miles per hour?). During launch trials the projectile's final position varied by a maximum of 1.7 cm which is very precise!

**WARNING: ONLY THE INSTRUCTOR IS AUTHORIZED TO LAUNCH THE PROJECTILE**

Useful Equations:

$$x_f = x_i + v_i \Delta t + \frac{1}{2} a (\Delta t)^2$$

$$v_f = v_i + a \Delta t$$

$$v_f^2 = v_i^2 + 2a(\Delta x)$$