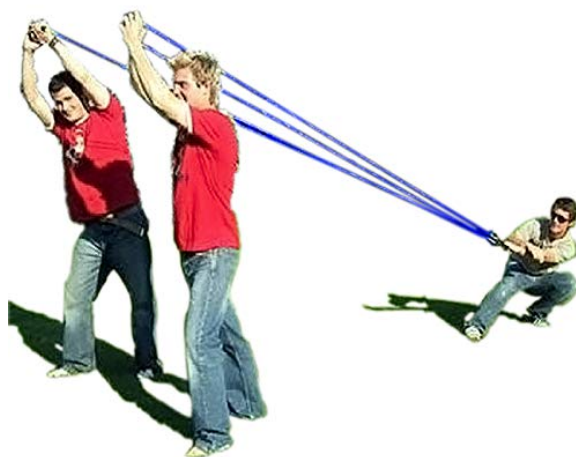


Projectile Motion Lab - Launching Water Balloons



Introduction (Use your notes and summarize, in a paragraph, what you know about projectile motion. Discuss the forces on a projectile. Discuss the horizontal and vertical velocities of a projectile. Include the factors that affect these factors. Discuss any acceleration that may be present for a projectile and why they exist. Do this in a paragraph form, NOT A LIST. **(5 pts)**)

Purpose To investigate projectile motion using a balloon launcher.

Materials

- Water Balloon Launcher
- Small Water Balloons
- Meter Sticks

Procedure (4 pts)

1. _____
2. _____
3. _____
4. _____

A. Contest 1 - Launch a water balloon - Greatest V_{iy} and Optimal Launch Angle wins!

Data - Phase 1 - Greatest V_{iy} (4 pts)

			Balloon Mass (kg)	V_x (m/s)	V_{iy} (m/s)	Overall Launch Speed (m/s)	Actual Launch Angle (Degrees)

3. Find V_x and V_{iy} (4 pts)

Vx Equations $V_x =$	V_{iy} Equations $V_{iy} =$
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5. Combine your horizontal and vertical velocities to find the launch speed of your balloon. **(4 pts)**

6. Using the conservation of energy, find the potential energy stored in your catapult before the balloon was launched. **(4 pts)**

6. If friction were negligible, what is the total energy of your balloon at the peak? **(4 pts)**

7. Use your V_x and V_y to find your launch angle. **Include a picture.** **(4 pts)**

8. Estimate the vertical acceleration of your water balloon while it was in flight? **(4 pts)**

B. Contest 2 - Launch a water balloon - Greatest d_x and closest to optimal angle wins!

1. What launch angle will you give you best chance to achieve the greatest

horizontal displacement **dx** ? _____ (4 pts)

2. What other factor will give you the best chance to achieve the greatest dx ? (4 pts)

3. Fill out the column headers 1 - 4 to show what variables you will measure. (4 pts)
(We will collect the data later)

Data - Contest II - Greatest V_x , AND Closest to Optimal Launch Angle

			Balloon Mass (kg)	V_x (m/s)	V_{iy} (m/s)	Overall Launch Speed (m/s)	Actual Launch Angle (Degrees)

4. Find V_x and V_{iy} (4 pts)

Vx Equations	V_{iy} Equations

5. Combine your horizontal and vertical velocities to find the launch speed of your balloon in Contest II? (4 pts)

6. Determine your launch angle. (4 pts)

Include a picture.

C. Contest 3 - Hit the teacher