

Ping Pong Shooter Design and Analysis**Report Requirements:**

1. Title Page
2. Abstract
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6. Test Setup and Procedure
7. Theory (equation development and solution method)
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Objective:

The objective of this lab is to design a ping pong ball shooter that uses air to propel a ping pong ball to specified targets. Two tests are to be performed 1) forward test in which the design should propel the ball forward 20 ft and 2) curved test in which the design should propel the ball forward 20 ft and sideways 2 ft. For your design, develop and solve equations required to predict the trajectory and distance the ball will travel as a function of initial conditions.

Test Procedure:

To be specified by each group. Each group may have three attempts to obtain bonus points.

Requirements:

1. Beginning with fundamental equation of motion, develop equations required to predict position and distance ball will travel as a function of initial conditions.
2. Solve equations and plot acceleration, velocity, and position as a function of time.
3. The initial launch must be directed straight towards the forward bucket. Height and launch angle are part of the design, although height must be less than 6 ft from ground.

Remember to include in the report:

Make sure you justify all assumptions made. Must itemize the cost of all parts used in your group's design (max allowable cost is \$30).

Grading:

- 40% experimental (ball must fly at least 10 ft forward (forward test), ball must curve at least 1/2 ft (curved test))
- 50% theoretical (report requirements above including equation development and solution)
- 10% peer evaluation
- 5 pt bonus for making ball in bucket (forward test).
- 5 pt bonus for making ball in bucket (curved test).
- 5 pt bonus for the ball that curves the most in the shortest forward distance (smallest radius of curvature)
- 5 pt bonus for the ball that flies the farthest when launched horizontally at a height of 3 ft.

Due Date: Report is due before close of business on or before May 4th.