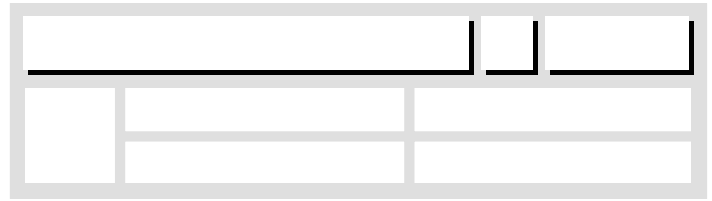


PhyzLab: Table Top Target Time

an investigation of projectile range

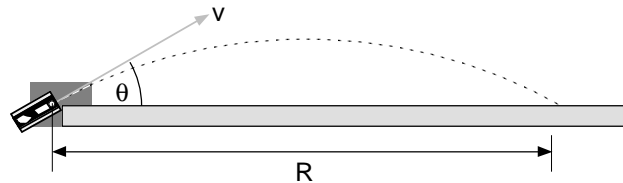


• Purpose •

Consider a projectile launched at an angle from a level surface, such as an artillery shell, a punted football, or a thrown baseball. It travels some distance before hitting the ground.

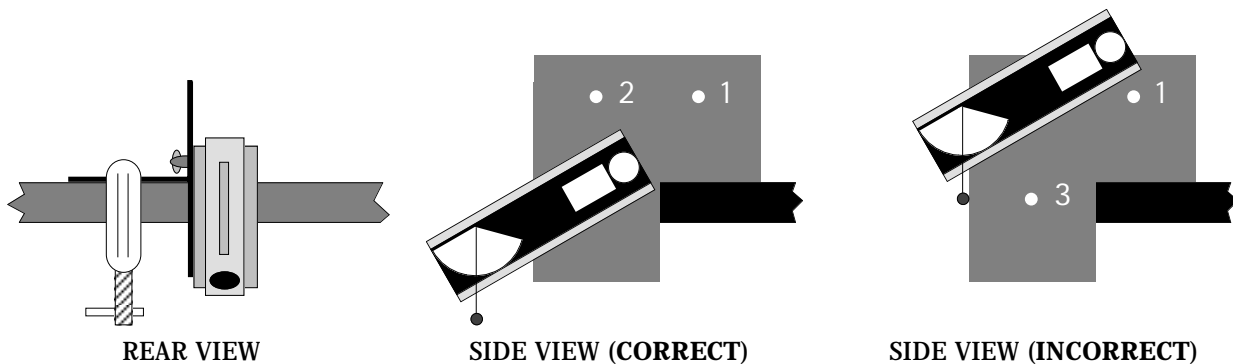
• Apparatus •

- ___ projectile launcher
- ___ C-clamp or table clamp
- ___ safety goggles
- ___ table
- ___ landing strip (fanfold computer paper, paper towel, or equivalent)
- ___ carbon paper
- ___ meterstick
- ___ access to adhesive tape



• Set Up •

1. Attach the black table-launcher plate to the table with a C-clamp or table clamp.
2. Use a black plastic wing-bolt to attach the launcher to the vertical section of the plate. Use hole #3 (the low hole near the table on the plate) as shown in the diagram. The bolt passes through the plate and attaches to the square nut in the side groove on the launcher. Attach the launcher so that the launch position of the ball (depicted by the white circle on the side of launcher) is as near to the level of the table as possible.



• Objectives •

- ___ 1. Determine the relationship—if one exists—between launch angle and range. Record data, analysis, calculations and conclusions on a separate sheet. Include a graph of Range vs. Launch Angle.

Procedural hints: Collect data for launch angles of 10°, 20°, 30°, 40°, 50°, 60°, 70°, and 80°. If the ball appears to have the same range for two launch angles, move the launcher or landing strip laterally (sideways) so that a fresh area of landing strip is used. Have a catcher (wearing goggles). Have one person be the launcher, have another person check the angle prior to each launch, have another person minding the carbon paper. Fire three shots for each angle and determine an average range for each launch angle. Range is the distance from the launch point to the landing point of a ball.

- ___ 2. Obtain a photogate timer and projectile launcher photogate bracket. Arrange them so that the initial speed (sometimes called "muzzle speed") can be determined. Determine the relationship—if one exists—between launch speed and range for a launch angle of 60°. You may need to arrange two tables end to end. Record data, analysis, calculations and conclusions on a separate sheet.