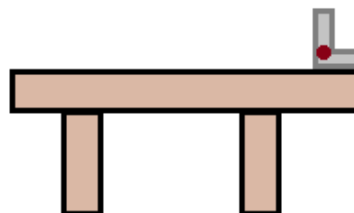


A projectile launcher is fastened to the edge of a lab table. It can be rotated to launch between vertically upward, and horizontally outward (90 degrees of difference). A projectile is situated inside of the launcher and is ready to fire.

The following additional lab materials are available to you:

- Protractor
- Stopwatch
- Motion Sensor (Radar Gun)
- Meter Stick
- Electronic Balance (Scale)
- Accelerometer
- String



1. Your first task is to determine the exit velocity of the projectile from the launcher. Your instructor mentions that aiming the launcher vertically upward would be the easiest way to do this. Which additional lab materials would you need to complete this task? Explain what you need them for.
2. Write a procedure that details your method for finding the exit velocity while the launcher is aimed vertically upward.

Now your instructor collects the projectile and repositions the launcher to an unknown angle between horizontal and vertical. He mentions that you may not adjust the launcher or fire any additional shots. You are given a flat target to place on the ground. Once placed, your instructor will fire the projectile from the situated launcher, and how close the shot lands to the center of the target determines your grade. Assume the launcher always fires with the same exit velocity.

3. Which lab materials would you need to complete this new task?
4. Write a procedure that details your method for finding the position of the flat target
5. Your instructor now gives your group a small garbage can in place of the flat target. The can is 30 cm tall, but has a small diameter. Your task is now to determine where to place the wastebasket so the projectile will land inside. Will the position of the cab be (when measured from the edge of the table) greater than, less than, or equal to the position of the flat target from part D? Explain your choice.