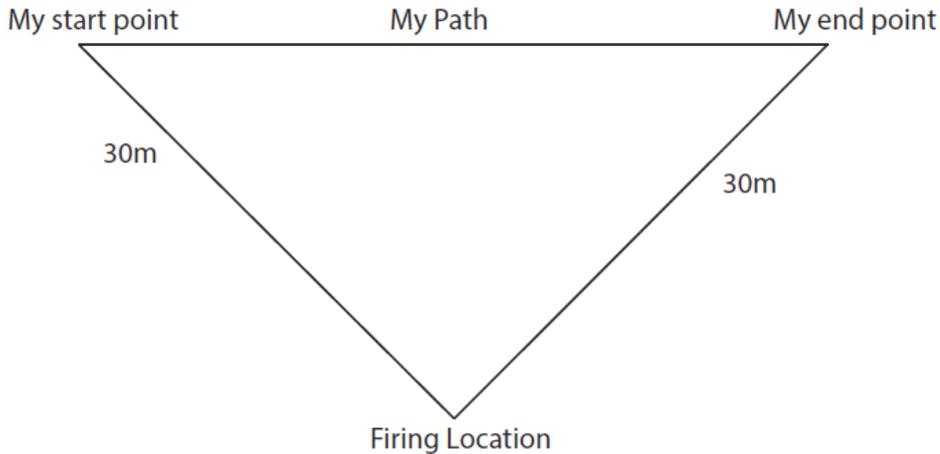


Water Balloon Launcher – 150 points

For this project you will form groups of 3 or 4. Your group will build a water balloon launcher. Here is the tricky part; you will have to build a launcher that will hit a moving target. This moving target will be me (your teacher). You must use balloons that are called “water balloons” and they must explode when they hit me.

I will start off at a 45-degree angle to you and will be 30m away from you and I will start walking horizontally at 0.50m/s. I will walk until I am 30m away from you on the “other side” of you (see image below). I will tell you to prepare your first shot. Then I will blow a whistle (or make some other noise) and start walking. You can launch as many balloons at me as you can in that time frame.



You will have to do video analysis on the launcher. You will take a video of a balloon launching, and then use Logger Pro (and other mathematics, formulas, etc.) to figure out the following: average acceleration of balloon while being launched, average force on balloon during launch, total time of flight, approximate velocity when leaving the launcher.

Point breakdown:

10 points – Being able to launch a balloon and hit me.

40 points – Video Analysis (to be done in the paper, see below)

100 points – Written paper (1 paper per group). You need to talk about the preparation and design of the launcher. The analysis for the video (all the math, etc.). Finally, and most importantly, the physics behind it all. Make sure you cover all these things. Review of how you launcher did during the day of the launching at me.

EXTRA CREDIT

20 points – Hitting me with your first shot.

10 points each – hitting me with more than 1 balloon. Example – hit me with 3 balloons (not with first launch) would be 20 extra points.