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Gaussian Cannon

The purpose of my investigation was to find the orientation and type of magnets and steel ball bearings that will offer the greatest increase in velocity for a Gaussian cannon. I hypothesized that having the greatest amount of magnetic accelerators, greatest amount of steal ball bearings, greatest strength of magnets, and that the smallest size of steal ball bearings will produce the greatest increase in velocity.

The experiment involved putting magnetic accelerators along a track, and steal ball bearings behind each magnetic accelerator. I then varied the number of magnetic accelerators, the number of steal ball bearings, the size of magnets accelerators and the size of the steal ball bearings until I found the orientation that offered the greatest increase of initial velocity. To measure my data I measured the distance each steal ball bearing traveled from the end of the track, and used mathematic formulas to calculate the final velocity each orientation had.

The data I collected supported three of my four hypotheses. My hypotheses that the greatest amount of magnetic accelerators, greatest amount of steal ball bearings behind each magnetic accelerator, and having the smallest size of steal ball bearings would yield the greatest final velocity were proven correct while my hypothesis that the greatest size of neodymium magnets would yield the greatest final velocity were proven incorrect. The format that was able to give the greatest final velocity of 3.96m/s was by having four magnetic accelerators with 0.635 cm by 0.635 cm neodymium magnets and by having four 0.75 cm steal ball bearings behind each magnetic accelerator.