Name(s)	**Project Number**
Michael R. Julian	**J1809**

Project Title

Magnetic Levitation vs. Gravity

Abstract

Objectives/Goals
The goal of my project is to answer the question: how does the magnetic levitation distance between two objects vary with weight? My hypotesis is that if I align two magnets, both with their south poles facing each other and I increase the mass on one of the magnets, the distance will get smaller.

Methods/Materials
I created a vertical structure out of LEGO building blocks, then I added 4 magnets onto the stationary base and the top mobile disk. I also used several LEGO bricks of known and equal weight to increase the mass of the top mobile disk. The experimental procedure included the following steps: 1) add two LEGO blocks on top of the mobile disk to increase its mass, 2) measure and record the distance between the disk and the stationary base. I repeated this procedure several times and recorded the data in my notebook. I performed three trials.

Results
I plotted the experimental data for three trials into a graph using the Matlab software. I also computed and plotted the average of the three trials. After I took a look at the graphs and the data I collected, I concluded that my hypothesis was confirmed. The distance between the stationary base and the mobile disk decreased every time I added more mass.

Conclusions/Discussion
In this experiment the role of gravity is shown to prove that if you add mass to an object that is suspended in the air, due to magnetic levitation, then the distance between the object and the base will decrease. It was interesting to learn that the relationship between weight and distance is non-linear.

Summary Statement

This project demonstrates that the distance between two objects, due to magnetic levitation, decreases non-linearly as the gravity force increases due to the increased weight of the top object.

Help Received

My father taught me about magnetic levitation and helped me design the LEGO structure. I built it and made all the measurements myself. My mother helped me to plot the data in Matlab.