CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
Nitya M. Furtado

Project Number
J1613

Project Title
Magnetic Magic

Abstract

Objectives/Goals
The objective is to determine the effect of temperature on the strength of a magnet.

Methods/Materials
6 magnets of identical size and shape were placed at room temperature(200C), refrigerator(40C), freezer(-160C), or oven at 800C, 1000C, and 2000C for 1 hour. The magnetic strength was measured by counting the number of metal clips picked up by each magnet.

Results
All magnets used in the study were placed at room temperature to obtain the control strength for each magnet(Table #1). In this study, Magnet #1, at -160C showed an increase in the number of paperclips it picked up, compared to clips picked up at room temperature(Table #2). Magnet #2, at 40C and #3, at 200C showed no significant difference in number of clips picked up. Magnet #s 4, 5 and 6, at 800C, 1000C and 2000C resp., however, picked up fewer metal clips(Table #2) Figure 1 shows the average number of metal clips picked up by the magnets at different temperatures. Figure 2 shows the relative magnetic strength of the magnets at different test temperatures.

Conclusions/Discussion
The first thing I did was to test the magnetic strength of all the magnets at room temperature. By doing this, I could compare the experimental data with the control or initial data to estimate differences in magnetic strength. When each magnet was exposed to the chosen temperature, there was a visible difference noticed in the relative magnetic strength. When I placed the magnet at higher temperatures, I observed a dramatic decrease in number of paper clips picked up. Magnet #6, in particular was not able to pick up even a 100 clips. When I plotted my data for all the magnets, I could see much of the magnetic strength appears to be lost due to the exposure to high temperature. I also observed that more metal clips were picked up by magnets in cooler temperatures. From the data, I can conclude that cold temperatures also have a significant effect on the magnetic strength of each magnet. My data shows that as temperature is changed, magnetic strength is affected. Based on my data, I would be interested to use other types of magnets and a wide range of lower temperatures to check the effect of colder temperatures on magnets. The magic of magnetism lies in the arrangement of its molecules. Molecules are made up of atoms and atoms have magnetic properties. I think that increasing the strength of magnets may find new uses in many different fields.

Summary Statement
My project is about the effect of temperature on the strength of a magnet.

Help Received
My cousin helped with use of excel to display my data.