CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
J1809

Project Title
Does Temperature Affect a Magnetic Field's Strength?

Abstract

Objectives/Goals
My project's objective is to determine whether the temperature of a magnet will affect the strength of a magnet and its magnetic field.

Methods/Materials
I used 80 1.25 ceramic (ferrite) ring magnets. I tested 20 magnets in the following temperature testing environments: 1) a hot oven (204 deg. C), 2) room temperature (23 deg. C), 3) the refrigerator (2 deg. C), 4) and an ice chest filled with dry ice (-17 deg. C). Meanwhile, I placed 700 copper covered steel bb's in a paper bowl. Upon removing the magnets from their respective testing environments, and using one magnet at a time, I placed a magnet on a stone surface and placed the paper bowl with bb's on top of the magnet until the magnet attached to the bottom of the bowl. I then picked up the bowl and slowly poured the bb's into a second paper bowl until the only bb's remaining in the first bowl were those being held by the magnet's magnetic field. I then counted and recorded the number of bb's remaining in the first bowl and recorded the data for each magnet.

Results
The magnets exposed to the coldest testing environment (-17 deg. C) created the strongest magnetic field based upon the number and weight of the bb's held by the magnet with an average lifted weight of 73.02 grams. The magnets in the hot environment (204 deg. C) created the weakest magnetic field with an average lifted weight of 53.75 grams.

Conclusions/Discussion
From my results, I conclude that temperature does affect the strength of a magnetic field with the coldest environment creating the strongest magnetic field for a magnet and the hottest environment creating the weakest.

Summary Statement
This experiment explores whether a magnet's magnetic field is affected by extremely hot and freezing temperatures.

Help Received
My father helped me obtain the magnets. He purchased and handled the dry ice and then helped me test the magnets exposed to the two extreme temperature environments. He also helped me count and weigh the bb#s.