CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Anthony J. Martin

Project Number
J0909

Project Title
The Effect of Core Size and Wire Size on Electromagnet Strength

Abstract

Objectives/Goals
My objective is to find out the effect of core size and wire size on electromagnet strength.

Methods/Materials
A 20cm length of wire was wrapped 17 times around a nail. The ends of the wire were stripped to attach to a battery. One wire end was attached to the positive side of a battery, the other wire end was attached to the negative side of the battery. The nail was placed into a pile of 100 paperclips for 2 seconds, and lifted so that the number of attached paperclips could be counted. This was repeated 100 times with the thick wire (12 gauge) and then with a thin wire (14 gauge). Next the core size was tested by wrapping a 12 gauge wire, 17 times around a thick nail and connected to a battery as stated above. The nail was placed into a pile of 100 paperclips for 2 seconds, and lifted so that the number of paperclips could be counted. This procedure was repeated with a thin nail.

Results
The electromagnet with the thick wire (12 gauge) consistently held more paperclips than the electromagnet with the thin wire (14 gauge). The difference however was not a significant one. The electromagnet with the thick
core cosistently held more paperclips than the electromagnet with the thin core. For this portion of the experiment there was a significant difference.

Conclusions/Discussion
My conclusion is that the electromagnet with the thick core is stronger than the electromagnet with the thin core. Wire size did not make a significant difference in electromagnet strength.

Summary Statement
My project is about the effect of core size and wire size on the strength of an electromagnet.

Help Received
Father helped by teaching me how to strip the wire ends.