CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Benjamin J. Bairrington

Project Number
J0703

Project Title
Infinite Power of Electromagnets

Abstract

Objectives/Goals
My objective in doing this project is to learn more about electromagnetism used for a future design of cars and transportation. Using my homemade electromagnets, I think I can increase their power by wrapping more coils of wire around them, I think I can magnetically levitate a car on a rail, and I think I can make the car move forward through an electromagnetic tube.

Methods/Materials
In the first step to study electromagnetism, I wrapped fine wire around a nail, attached to a battery, to pick up staples. In the next step, I constructed a wooden rail and attached magnets to levitate a cardboard car. Finally, I tried to move the levitated car down the rail, through a tube, wrapped with about 600 coils of heavy wire, to induce a more powerful electromagnetic field than the nail.

Results
In the first step, the nail wrapped with 10 more wraps each time, consistently showed an increase in electromagnetism by picking up a greater number of staples. Next, the cardboard car levitated on the rail higher with flat circular magnets, but the flat bar magnets, positioned closely together, allowed the car to move forward more smoothly. The last step showed that a metal coin bank tube moved faster through the electromagnetic tube or tunnel than the other designs.

Conclusions/Discussion
My results supported my hypothesis in experiments one and two because more wraps of wire made the electromagnet more powerful, and I was able to levitate my car with repelling magnets on a rail. My hypothesis in experiment three was incorrect. I could not make my levitating car move on its own, down a rail, through the electromagnetic tube, EMT, but I discovered that the metal tube would move rapidly, on its own, through the EMT. Someday with more efficient methods of building EMT's, and generating electricity for the EMT, our planet might be criss-crossed with tunnels over land, and under the oceans, where people can safely travel at high speeds without further pollution.

Summary Statement
To explore strengths of electromagnetism and use it to move an object through an electromagnetic tube.

Help Received
Father helped type report and set up equipment.