CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Erik W. Young

Project Number
J0236

Project Title
Flying Trains: Magnetically Levitated Transportation

Abstract

Objectives/Goals

Objective
Make a magnetically levitated model train move on it#s own using magnetic forces.
Hypothesis
If the electromagnets on the track are pulsed in a certain direction, then the train should move on it#s own in that direction.

Methods/Materials

In this project I went through several designs, all of which had certain design flaws such as tipping, not moving, etc. Only my fourth design actually moved the train down the track. It consisted of 48 hand wound electromagnets, 10 ft. of large copper wire, and two six-foot boards.

Results

Based on prior research I first tried making a car according to a procedure that had already been done by someone else, with the car sitting in a flat-bottomed trough. I then thought about how real maglev trains work, with the track shaped like an upside-down #T#. I then decided to expand on the ideas above and modified my track and train. I then saw that the foil was not giving very good contact to that brush on the train, so I tried flattening some copper wire, sticking it down through the board and winding the positive wire from the electromagnets around the bottom.

Conclusions/Discussion

In my first design I was able to levitate my car, but, if I gave it a push, it would immediately tip over. In my second design, the upside down #T#, I was able to levitate the car. In my third design, the automatic switching of the electromagnets by the car was partially successful; it only worked when everything was set up just perfectly and it got just the right starting velocity. In my fourth and final design, I think it worked very well because the electromagnets were closer together so that the train only had to boost itself half the distance than before.

Summary Statement

In this project I atempted to make a model Maglev train move by itself using magnetic forces.

Help Received

My Dad helped develop some of the designs. He also helped wind the electromagnets and he covered all expenses