



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Martin A. Quiroga	Project Number J0929
Project Title Measuring the Strength of Electromagnets	
Abstract Objectives/Goals My objective is to determine how the strength of an electromagnet changes by changing the number of loops in an electromagnet Methods/Materials The method used was to set up a stand (wood) with a carriage (wood) to hold the electromagnet (3 1/2 inch iron nail with copper wire) and change the carriage distance to the measuring device (a magnetic compass) while using a low voltage power source (4-AA batteries) connected to the electromagnet Results The strength of each electromagnet increased with an increase in the number of coils. This was observed when the magnetic compass needle deviated at greater distances as the electromagnets loops increased. Also the rate of change of needle deflection angle was greater for each centimeter the electromagnets with more loops were moved closer to the compass. Conclusions/Discussion My hypothesis was correct: the strength of electromagnets change with a change in the number of loops. The results were graphed showing the changes. However, a relation of the lines to the distance could not be developed in time. Further analysis and testing is required for that after making a few improvements to make the results more consistent, such as using a more reliable power source, or adapting an electric circuit that could keep the batteries from draining too fast. It was fun to create an experiment that actually worked.	
Summary Statement My project is about measuring the strength of electromagnets by changing the number of loops	
Help Received Father and Mother helped with the design and construction of the stand and testing equipment. Father helped with the testing and graphs. Mother helped with the report and display of this experiment. All efforts were done at home	