



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jack F. Pecoraro	Project Number J0922
Project Title Factors Affecting Electromagnet Strength	
Abstract Objectives/Goals My objective was to understand key factors affecting electromagnet strength. Specifically, how the number of wire windings and voltage applied to those windings, affects how much weight can be lifted. Methods/Materials Four electromagnets were built over identical iron cores (4# long bolts) with wire winding counts of 50, 100, 150, and 200 turns. The strength of each electromagnet was measured by the weight of steel BBs and iron block which could be lifted as different voltages (1.5, 3.0, and 6.0 Volts) were applied to the windings of each electromagnet. Averages were determined based on 5 trials for each combination of windings, voltage, and material lifted. Results Electromagnet strength was shown to increase in proportion with both the number of windings and voltage applied. The amount of weight that could be lifted was also strongly affected by the material being lifted. The magnets were able to lift 10 times as much iron block as steel BBs. Conclusions/Discussion The results supported my hypotheses and research suggesting that there should be a proportional relationship between the independent variables (windings and voltage) and electromagnet strength. Other important variables identified are the type and form of the material being lifted and the geometry of the windings on the electromagnet.	
Summary Statement My project is about understanding the factors which affect the strength of electromagnets.	
Help Received Dad helped with methods and data analysis. Mom helped with project board, Uncle helped with data analysis.	