



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Philip N. Combiths	Project Number 22472
Project Title Changes in Volt/Strength Proportions in Electromagnets	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Problem Statement: Does the proportion of voltage to strength of an electromagnet change as the amount of volts of electricity increases?</p> <p>Hypothesis: I believe that the proportion of voltage to strength of an electromagnet will begin to lessen as the voltage increases.</p> <p>Methods/Materials Materials: 1 iron Allen wrench; 2 battery holding devices; 2 copper clips; 5 m. insulated aluminum wire; 2 m. non-insulated copper wire; 100g. iron fillings; 1 voltage meter; 1 electronic scale; 1 magnetic field probe</p> <p>Procedures: A. Construct an electromagnet from an Allen wrench, batteries, and wire. B. Voltage of batteries used was measured. C. Magnetic force of electromagnet was tested with probe. D. Electromagnet was placed over iron fillings for five seconds. E. Electromagnet was moved onto electronic scale and fillings were dropped. F. Fillings were measured. G. Experiment was repeated with a different voltages.</p> <p>Results Results: The proportion of voltage to weight got smaller as the voltage increased.</p> <p>Conclusions/Discussion Conclusion: My conclusion is that as the voltage increases, the electrons in the wire become crowded and work less efficiently, forcing the increase in the electromagnet's strength to lessen.</p>	
Summary Statement It compares the proportional changes in electromagnet strength with varying voltages.	
Help Received My parents drove me to stores to buy equipment.	