



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Weston D. Braun	Project Number S0902
Project Title Wireless Power Transfer: The Effect of an Intermediate Coil	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this project was to increase the efficiency of resonant wireless power transfer by utilizing a passive tuned coil placed between a transmitter and a receiver, and to determine the ideal placement of this intermediate coil.</p> <p>Methods/Materials I built a transmitter to drive a resonant coil as a wireless power transmitter. I then built two additional resonant coils, one with a resistor across the capacitor to measure the voltage across it (receiver). The receiver was placed one meter away from the transmitter, and voltage measurements were recorded with the transmitter operating. I then placed the third coil 5 cm from the transmitter, between the transmitter and the receiver. The voltage was recorded and the coil was moved in 5 cm increments towards the receiver, recording the voltage at each position. The experiment was conducted five times.</p> <p>Results The intermediate coil increased the voltage in all positions but one, when it was closest to the transmitter. The highest voltage was when the intermediate coil was 90 cm from the transmitter, where it averaged 389% of the voltage without the third coil. The voltage with the third coil in the middle was 29% greater than without the coil.</p> <p>Conclusions/Discussion My hypothesis was wrong. The intermediate coil increased the voltage in the receiver coil, however the highest increase was not when the coil was in the middle. I believe that peaks and dips when the intermediate coil was close to the transmitter or the receiver were due to the higher coupling of the coils, which changed their resonant frequency.</p>	
Summary Statement The use of a passive tuned coil to increase efficiency of resonant wireless power transfer is investigated.	
Help Received Used high school metal shop equipment to cut wire coils	