



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) David Meyer	Project Number J0918
Project Title What Is the Most Efficient Way to Wirelessly Transmit Electricity?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals With the advent of portable consumer electronics, the world is now filled with millions of mobile battery powered devices. It would be very desirable to charge such devices wirelessly, thus allowing these mobile devices to be truly mobile.</p> <p>In this science fair project I will test and find the most efficient way to wirelessly transmit electricity using three methods.</p> <p>Methods/Materials Three methods were used: Inductive Coupling Method, Laser Method, and the Sound Method. The first method uses an inductive coupling transmitter and receiver to transmit the electricity as radio waves. The second method uses a laser and solar cell to transmit the electricity as photons (light). The third method uses a speaker and microphone to transmit the electricity as a pressure wave (sound).</p> <p>Results For the inductive coupling method, the efficiency was low overall and near zero for any distance beyond direct contact. For the laser method, the efficiency was quite high even at reasonable distances. For the sound method, the best results were achieved with the lowest frequency at the closest distance.</p> <p>Conclusions/Discussion The laser method was the most efficient way to wirelessly transmit electricity. Each method analyzed has its own advantages and disadvantages. The laser method worked very well over long distances and provided good efficiency; but requires line of sight and precise targeting of the laser. Also, it is unclear what effect lighting and atmospheric conditions would have on this method. The inductive coupling method did not require precise alignment; but worked poorly, if at all, over longer distances. Finally the sound method also did not require precise alignment and was viable at some distance; but the noise generated was extremely distracting and would not be tolerable on a day-to-day basis.</p> <p>The laser method seemed very promising and would be worth investigating further. Follow-up research should be done on the effect of lighting and atmospheric conditions (visibility, temperature, humidity, etc.).</p>	
Summary Statement This project explores three alternatives for the wireless transmission of electricity.	
Help Received Borrowed lab equipment from Santa Catalina School and help was received from the high school physics teacher.	