



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Joey A. Tuttobene	Project Number J0326
Project Title Measuring Voltage with Robots	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment was to work with robots to see how they can help save lives during unavoidable crises by investigating the dangers of live power lines.</p> <p>Methods/Materials A power source was used to emit a voltage through three different topsoils: sand, moist soil, and dirt. Two different robots with different mounting techniques for a 5V A/D converter offset to provide +/- 15V of measurement were tested on a five meter course to measure and record this voltage. One robot was portable and one was drivable. The hypothesis stated that sand would be the most conductive, carrying the voltage for one meter; the moist soil would be second in conductivity, conducting for half a meter; and the dirt would be the least conductive, with a radius of less than half of a meter.</p> <p>Results The portable, hand-held probe technique proved the most accurate for measurements and had a relatively linear relationship between distance to the power source and voltage. The robot-mounted sensor proved less reliable. This is because it only had half of the surface area the portable probe had actually in the ground. Sand proved most conductive, moist soil second, and dirt least conductive.</p> <p>Conclusions/Discussion The linearity of the voltage did not surprise me, but the unreliability of the robot-mounted sensor did. This makes sense though because the robot did not have a hydraulic ram to push the probes deep enough into the ground. The portable one had its probes hammered in. If a robot with these qualities were developed, it is clear that it could save lives by locating live power lines. My hypothesis was not supported by exact distance, but it was supported by conductivity order.</p>	
Summary Statement My project examined the possibility of robots measuring voltage in soil near power lines during a crisis.	
Help Received None	