



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Shakson K. Isaac</b>	<b>Project Number</b> <b>J0298</b>
<b>Project Title</b> <b>Soil Bacteria Battery: Can Soil Bacteria Save the Earth?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to see if soil bacteria could generate energy as in a battery by decomposing organic matter. Theoretically speaking if this worked it could be put into a generator and charge the house. My goal was to achieve the power of the soil bacteria getting to a point until it reached a voltage over one. If this worked in the future I would want to make a generator and use different ratios of the type of organic matter (coffee grounds, sugar water, or compost) to the soil. I would also like to have a microscope to see which bacteria make the voltage higher.</p> <p><b>Methods/Materials</b> In the experiment, I had one control and four manipulating variables regular soil (200g), coffee ground (4 tbs.) with soil, compost (2 tbs. ) with soil, 10% sugar water mixed with soil, and 10% salt water mixed with soil. Then you would put the moisture level (5 out of 10) the same. Next you would add copper and zinc to make a battery. After that you cover each of the 5 cups up with plastic wrap. Finally you would check the voltage using a multimeter.</p> <p><b>Results</b> The coffee grounds clearly performed the best out of all the three experiments and made the highest voltage of 1.02. In experiment 1 sugar water had the highest voltage overall. Compost had the second highest voltage and coffee ground had the third highest voltage overall. In experiment 2 coffee grounds had the highest voltage overall. Sugar water had the second highest voltage and compost had the third highest voltage. In experiment 3 coffee ground had the highest voltage overall. Compost had the second highest voltage and sugar water had the third highest voltage. When I checked the voltage of the 3rd experiment again 3 months later from January coffee ground had a voltage of 1.01.</p> <p><b>Conclusions/Discussion</b> In my conclusion I learned that when soil bacteria decompose organic matter they do generate electricity. I suppose coffee ground went over 1.00 voltage because it was moist and the soil bacteria probably ate the coffee grounds slower and conserves the energy more than sugar water soil. I think that sugar water soil has a high voltage but wasn't as high as coffee ground soil because the soil bacteria probably ate the sugar water quickly and after that it doesn't have a very high voltage anymore.</p>	
<b>Summary Statement</b> This project displays the effect of the soil bacteria voltage when it decomposes organic matter.	
<b>Help Received</b> My mother helped me start a schedule. Mr. Tyler answered some of my questions. My dad helped me with materials.	