



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Alex P. Junge</b>	<b>Project Number</b> <b>J0299</b>
<b>Project Title</b> <b>The Effect Temperature Has on the Outcome of a Microbial Fuel Cell</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of this experiment was to determine how temperature affects the voltage outcome of a microbial fuel cell. The experiment consisted of 6 fuel cells and three different temperature ranges. The temperature ranges were: an average March temperature (30- 70°F), a very warm temperature (90-95°F), and a mild temperature (50 -60°F). Two fuel cells were tested in each temperature range.</p> <p><b>Methods/Materials</b> Each fuel cell was built the same way and consisted of the same amount of mud and water. The mud was taken from the same place in the pond. The voltage was measured two times a day at 7:00 am and 7:00 pm. The total duration for each experiment was 2 weeks long.</p> <p><b>Results</b> All of the fuel cells created voltage. The fuel cells in the warmest temperature (average of 93°F) range created the most voltage, while the fuel cells in the mild (average of 54° F) and average March temperature range created almost the same amount.</p> <p><b>Conclusions/Discussion</b> Like my hypothesis stated, the fuel cells placed in the warmest temperature (average of 93 °F) created the most voltage. B1 made an average of 359.2 mv while B2 made an average of 436.5 mv. The data from my experiment supported my hypothesis. The fuel cells placed in the mild and average outdoor March temperatures were very close. The lowest range of #A# produced an average of 211 mv while #C# produced 215 mv. The highest range of #A# produced 353 mv while #C# produced 296 mv.</p>	
<b>Summary Statement</b> By testing multiple microbial fuel cells in a very warm temperature range (controlled), a mild temperature range (controlled), and a variable temperature range (outdoor), this project showed which range generated the most electricity.	
<b>Help Received</b> Father helped in construction of fuel cells.	