



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

<b>Name(s)</b> <b>Gunnar H. McCormick</b>	<b>Project Number</b> <b>J0212</b>
<b>Project Title</b> <b>Pee Power: Building a Microbial Fuel Cell in an Attempt to Find More Renewable Energy Sources</b>	
<div><div><b>Objectives/Goals</b> My project investigated possible sources of renewable energy, and the best way to build a microbial fuel cell in order to maximize the electrical output. My goals were to figure out which source produced the most power in a microbial fuel cell, and to get more than 220 millivolts.</div><div><b>Methods/Materials</b> I built a homemade microbial fuel cell. I tested its output in volts with using ocean water as a source. I then made numerous improvements to my microbial fuel cell with by testing different sizes of the salt bridge, a second pump, and different sizes of electrodes in an attempt to maximize its electrical output. When I reached the most successful combination, I tested it with mud and urine as well.</div><div><b>Results</b> The most successful design was the fuel cell with the larger salt bridge, a second air pump, and one electrode of each size. I got a maximum output of 401 millivolts with ocean water, a maximum output of 360 millivolts with mud, and a maximum output of 345 millivolts with urine.</div><div><b>Conclusions/Discussion</b> My data shows that larger salt bridges, more oxygen, and different sized electrodes increased the electrical output of microbial fuel cells. Ocean water produced the most energy; mud and urine were just about even.</div></div>	
<b>Summary Statement</b> My project is about building a microbial fuel cell to find more renewable energy sources, and to maximize its output.	
<b>Help Received</b> Dad helped to drill holes; Mom helped edit my paper and glue down my board; Ms. Work helped me to fill out this application.	