



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

Name(s) Rachael S. Green	Project Number J1019
Project Title Wave Energy	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My purpose was to invent and build a device that can harness the kinetic energy of the ocean waves to create an ecologically friendly, renewable source of electricity.</p> <p>Methods/Materials A surfboard was reshaped into a buoy which was anchored in the ocean. Due to its shape, it dives through the waves and repetitively moves through a 90 degree arc. This rocking motion causes a magnet to slide through a copper coil creating electricity. The generators in my prototype were waterproof, shakable flashlights. The location of the trials was the Humboldt Bay entrance, due to non-breaking, ocean type waves, easily accessible to shore. Test times were standardized to 1 hour. Wave data at the time of the tests was obtained from the NOAA buoy, Humboldt Bay. The electricity produced was measured in a darkroom. A stopwatch measured the length of time each flashlight's disc of light was visible from a standardized viewing distance.</p> <p>Results The ocean wave tests proved the hypothesis to be correct by generating electricity on multiple trials. First, larger waves generated more electricity than smaller waves. Second, flashlight #1 was more efficient than flashlight #2; however, both were able to generate, store, and provide usable light from the kinetic energy of the ocean.</p> <p>Conclusions/Discussion I have proven that it is possible for a 7th grader to design and build a device which can generate small amounts of electricity from the ocean waves. The design of my buoy was based on observations and experiences in my life. The buoy had to ride the waves, which is why I used a surfboard for the body. The repeating motion that I needed to charge the flashlights reminded me of the feeding motion of ducks. The diving motion of the "Duckie" is a key innovation because it eliminates moving parts which are vulnerable in the harsh marine environment. Background research showed that even universities with large budgets have been frustrated by breakages to their complex prototypes in the ocean waves. My next step in this project will be to create a more powerful generator and maximize the electricity produced from this small buoy. I plan to build my next buoy from more ecologically friendly materials. In conclusion, I hope my idea is part of a future where humans use their science to have a less detrimental impact on the planet. Perhaps the largest untapped source of energy in that future is the ocean.</p>	
Summary Statement The purpose of my project was to invent a device that can harness the energy of the ocean waves to create usable electricity.	
Help Received Father assisted with fiberglass application to buoy, ocean testing of buoy, and transportation to beach.	