



# CALIFORNIA STATE SCIENCE FAIR 2006 PROJECT SUMMARY

<b>Name(s)</b> <b>Brittany Cheng; Shannon Lee; Audris Teh</b>	<b>Project Number</b> <b>J0707</b>
<b>Project Title</b> <b>Wave Energy Buoy</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our project was to simulate a wave energy buoy using magnets and springs that would generate electricity by converting wave energy to electrical energy. We would conduct several experiments using the buoy. The buoy had to meet a set of design criteria including low cost, a portable size, and the ability to make energy using electromagnetism.</p> <p><b>Methods/Materials</b> We built the buoy using wood, nails, and springs. The springs were used to simulate the movement of waves. Using an oscilloscope we measured the voltage of the electricity produced by the buoy under different circumstances. Our experiments involved several variables. First, we used magnets with different strengths: alnico and neodymium-iron-boron magnets. Secondly, we used magnetic wire with 25,000 and 15,000 coils. And finally, we experimented with different speeds of agitation of the magnet through the coil. We tabulated the results, graphed them, and analyzed the data.</p> <p><b>Results</b> We found out that using two alnico magnets instead of one would produce four times more electricity. Also, we concluded that using a coil of wire wrapped 25,000 times produced 4.375 times more electricity than using a coil of wire wrapped 15,000 times. Lastly, we discovered that the slower the speed of agitation the less voltage is generated. If the agitation was slower than a certain speed, the voltage would drop suddenly.</p> <p><b>Conclusions/Discussion</b> This project is significant because it addresses a new type of renewable energy source, wave energy. We conclude that the best conditions for a wave energy buoy would be rough longitudinal ocean waves, magnetic wire coiled many times, and a strong magnet. This was a successful project because we learned about renewable energy sources, experimented with magnetism, and learned about how using different types of coils, magnets, and agitation speeds affects the amount of electricity we can produce.</p>	
<b>Summary Statement</b> Our project was to simulate an electricity-generating wave energy buoy using magnets and springs, and experiment with magnets to create electricity, and study electromagnetism in a motion similar to waves.	
<b>Help Received</b> Audris' Mom helped supervise and gave us guidance; Peter Lawrence donated magnetic wire and NIB magnet; Shannon's Dad for the wood and oscilloscope; Audris' Dad for helping us cut and drill the wood.	