



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

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<b>Project Title</b> Wave Rider	
<b>Abstract</b> <b>Objectives/Goals</b> The goal of my project was to find out if a buoy could be 'tuned' to a wave in order to maximize energy output. If this was possible, wave energy devices could be altered in order to get the most energy out of each wave. <b>Methods/Materials</b> I used a wave 'tub' with a buoy apparatus which was filmed and evaluated to collect data. The waves were made with consistent strokes of a board every second for 60 seconds. When the buoy floated up and down on the water a needle lifted the end of a dashpot (the resistance or work the wave is doing.) There was three different dashpots tested: air, water and oil. The end of the needle moved up and down next to a ruler which was filmed. Afterwards, I looked frame by frame on the movie and evaluated the average high and depth of the needle. I changed the depth of the buoy by adding different amounts of weights to it, and perhaps 'tuning' the buoy to the wave. <b>Results</b> The prime number of weights for each dashpot were: one weight to the air dashpot, two weights to the water dashpot, and three weights to the air dashpot. Contrary to my previous belief, no weights with the air dashpot was not the best. The reason was because the farther down the buoy was in the water, the more it sprung back up. After the waves got into a rhythm, the weighted buoy would spring back up higher and higher. <b>Conclusions/Discussion</b> In conclusion, the one weight to air dashpot was the best. The reason was because the buoy started to spring up and down harder and harder as the waves and buoy became rhythmic. It is possible to tune a buoy to a wave, and it can help improve the amount of energy collected. Therefore, wave energy devices could be altered in depth to get the most energy out of each swell. The best location for a device like this would be further off shore because the waves are more consistent and repetitive.	
<b>Summary Statement</b> Tuning a buoy to a wave to maximize energy output.	
<b>Help Received</b> Engineer at Dad's work helped with dashpot, Dad helped with powertools	