



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Daniel J. Feeny</b>	<b>Project Number</b> <b>J1107</b>
<b>Project Title</b> <b>Forcing Diversity: Are Waves the Dominant Force Driving Biodiversity in the Intertidal Zone?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose is to develop a device to quantify wave force and, using this device, determine if wave forces affect the diversity of algae and invertebrates in the intertidal zone.</p> <p><b>Methods/Materials</b> A force meter was designed that consisted of a spring attached to a lightweight ball that was pulled on by wave action. A transect going from low tide to high tide had five quadrants, three meters apart, and an additional force meter adjacent to one quadrant. The diversity of organisms was recorded in each quadrant and the Shannon Diversity Index calculated. Force meters were anchored in each quadrant for twenty-four hours. A spring constant was calculated and used to determine wave force. Wave forces were plotted as a function of the Shannon Index.</p> <p><b>Results</b> Wave forces varied randomly both parallel and perpendicular to the shore; surprisingly there was no correlation between wave force and distance from low tide zone. Meters placed horizontally and within two feet of each other had forces that varied by 40%. The highest wave force was three times the lowest. Wave forces could not be correlated to diversity. The largest force at the low tide zone had an abundance of life and lowest force closest to the high tide zone had mostly encrusting sponge. Diversity as a function of wave force also did not follow the Intermediate Disturbance Hypothesis.</p> <p><b>Conclusions/Discussion</b> Wave force is not the largest determining factor in the diversity of organisms in the intertidal zone. Rather than one factor, such as wave force, driving diversity, the situation is more complicated and probably a function of several things, such as terrain, which affects wave force, and desiccation.</p>	
<b>Summary Statement</b> This project determines if diversity in the intertidal zone is a function of wave force.	
<b>Help Received</b> My mother drove me to the ocean, my siter tuaght me to use Excel, people from the hardware store explained how to drill holes in bedrock and with some technical aspects of my force meter.	