



# CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

<b>Name(s)</b> <b>Divya Siddarth</b>	<b>Project Number</b> <b>J1227</b>
<b>Project Title</b> <b>Acid Ocean: The Effect of pH on Calcifying Organisms</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of my experiment is to investigate the effect of pH on clam shells. I hypothesize that the lower the pH of the ocean water, the more weight the shells will lose after 10 weeks.</p> <p><b>Methods/Materials</b> I prepared about 15l of ocean water by mixing the recommended amount of Instant Ocean salt and filtered tap water in a bucket. I adjusted the pH to be close to 8.1 by adding tap water or Instant Ocean salt as necessary. This ocean water was then divided into 5 parts. To 4 of these parts, I added drops of vinegar such that I obtained ocean water with pH of 8.0, 7.8, 7.6 and 7.4. The pH of all the solutions was measured with an electronic pH meter. I cleaned about 300g of clam shells and dried them thoroughly. I carefully weighed approximately 20g of shells using an electronic scale and placed the shells in a clean 1l glass jar, which I filled to the brim with one of the five ocean water samples. I then repeated this procedure three times for each of the five pH values. After 10 weeks, each of the jars was drained carefully by emptying it through a sieve over a sink. The shells were rinsed and dried thoroughly with paper towels. They were then weighed with the same scale as before. All data were recorded in a lab notebook.</p> <p><b>Results</b> The weight loss by the clam shells increased as the pH of the ocean water was decreased. The rate of decrease was not constant: there was very little or no loss in weight at pHs of 8.1 and 8.0. As the pH was decreased from 8.0 to 7.4, the weight loss gradually increased from .01g to .02g.</p> <p><b>Conclusions/Discussion</b> Increasing the acidity of the ocean water has a small but measurable effect on the weight lost by the clam shells: the lower the pH, the greater the weight loss. My results suggest that even over a relatively short period of time, decreases in pH can have demonstrable effects on calcifying organisms, with significant weight loss occurring at pHs below 8.0. These findings raise concerns regarding the future of calcifying marine species if the current rate of carbon dioxide emissions is continued.</p>	
<b>Summary Statement</b> My experiment demonstrated that clam shells lose weight as the ocean water is made increasingly acidic.	
<b>Help Received</b> Dr. Kepe, Department of Pharmacology, UCLA, guided me in the use of the digital pH meter in his laboratory.	