



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Evan A. Patel</b>	<b>Project Number</b> <b>S1109</b>
<b>Project Title</b> <b>Intertidal Acidification: A Study on Local Adaptation</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The implications of ocean acidification on marine organisms, specifically intertidal relationships, are vast. As the acidity of ocean waters increases, we find severe impacts on populations of marine animals. Calcifying organisms are especially affected as dropping pH levels hinder their ability to protect themselves. The purpose of this research is to determine the role of evolution in this changing environment and to examine phenotypic changes in mussel shells along the US West Coast to explore the evolutionary capacity of these marine intertidal organisms. We seek to determine the role of evolution in this changing environment. <b>Methods/Materials</b> Used equipment at UC Santa Cruz Joseph M. Long Marine Lab for experiment(High Resolution cameras, point micrometers, JMP Pro computer program for data analysis). Analyzed 432 mussel shells collected from US West Coast. Collected mussels from four sites with varying ocean pH levels. Used my own Macbook Pro computer. <b>Results</b> I found that there was significant deviation in physical traits of mussels found in lower pH waters in the north from the standard set by the three higher pH waters in the south. Through the analysis of these physical traits we were able to compile convincing evidence that local adaptation may be occurring in regions significantly impacted by ocean acidification. <b>Conclusions/Discussion</b> As ocean acidification moves to the forefront of global issues, it is important to examine the extent to which such a change will impact our world. The tolerance of organisms to adapt to acidifying conditions is crucial in forecasting the ramifications of climate change. This study helps deepen our understanding of climate change through evolution and determine how drastic a change it will bring to marine organisms.	
<b>Summary Statement</b> I examined the impact of ocean acidification on the California Mussel, <i>M. Californianus</i> , by analyzing shells and determined that there is a definite possibility that marine organisms are adapting to dropping ocean pH levels.	
<b>Help Received</b> I received help from my mentor, Gina Contolini, a graduate student at UC Santa Cruz. My parents played a huge role with support and transportation to the lab over the summer. My Honors Biology, Honors Physics, and AP Language and Composition teachers all helped review my paper I wrote on the research.	