



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Jeffrey E. Jones	Project Number J1712
Project Title The Effect of Ocean Acidification on Emerald Crabs (Mithrax sculptus)	
Abstract Objectives/Goals Burning fossil fuels releases carbon dioxide (CO ₂) into the atmosphere. When CO ₂ reacts with saltwater, hydrogen and bicarbonate ions are released, resulting in ocean acidification (lower pH). Hydrogen ions combine with beneficial carbonate ions to create detrimental bicarbonate ions. As the amount of bicarbonate increases and carbonate decreases, pH of the saltwater is reduced, causing ocean acidification. The reduction of carbonate ions makes it difficult for organisms dependent upon calcium carbonate to maintain healthy shells. As those shells become thinner they make the organisms more susceptible to disease. My hypothesis states that the crabs in the test aquarium will grow at a slower rate than the crabs in the control aquarium because of reduced availability of carbonates to promote shell growth. Methods/Materials Burning fossil fuels releases carbon dioxide (CO ₂) into the atmosphere. When CO ₂ reacts with saltwater, hydrogen and bicarbonate ions are released, resulting in ocean acidification (lower pH). Hydrogen ions combine with beneficial carbonate ions to create detrimental bicarbonate ions. As the amount of bicarbonate increases and carbonate decreases, pH of the saltwater is reduced, causing ocean acidification. The reduction of carbonate ions makes it difficult for organisms dependent upon calcium carbonate to maintain healthy shells. As those shells become thinner they make the organisms more susceptible to disease. My hypothesis states that the crabs in the test aquarium will grow at a slower rate than the crabs in the control aquarium because of reduced availability of carbonates to promote shell growth. Results I setup two aquariums, one as control, one as test. I weighed the crabs every three days and inputted the data into a Microsoft Excel spreadsheet. I later analyzed my results and generated my conclusions. Crabs in the test aquarium (lower pH) tended to not grow in width nor gain weight as much as the crabs in the control aquarium. Conclusions/Discussion My hypothesis was partially supported in that the crabs in the test aquarium decreased in mean width as compared to the crabs in the control aquarium. I was surprised that the decrease in average width of the test crabs was not accompanied with a corresponding loss in weight. Even the crabs in the control aquarium did not seem to experience a change in weight. If the test were to be run again, I would try feeding both sets of crabs a greater amount of food. If the	
Summary Statement To determine and measure the effect and potential impact of ocean acidification caused by CO ₂ on crabs and similar sea-life.	
Help Received Parent wrote down measurements as I weighed and measured the crabs and returned them to the aquariums (my hands were wet)	