



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jeffrey E. Jones</b>	<b>Project Number</b>  34554
<b>Project Title</b> <b>Ocean Acidification and Brine Shrimp (<i>Artemia salina</i>)</b>	
<b>Abstract</b> <b>Objectives/Goals</b> When carbon dioxide reacts with saltwater, hydrogen and bicarbonate ions are released. Hydrogen ions combine with beneficial carbonate ions to create detrimental bicarbonate ions. As the bicarbonate ions increase and carbonate ions decrease, the pH of the saltwater is lowered (called ocean acidification). The reduction of carbonate ions makes it harder for organisms dependent upon calcium carbonate to maintain healthy shells. Their shells become thinner and make the organisms more susceptible to disease. The purpose of this project is to determine how ocean acidification affects Brine Shrimp ( <i>Artemia salina</i> ). <b>Methods/Materials</b> I hypothesize that the Brine Shrimp in the test aquarium (reduced pH) will grow and reproduce at a slower rate than the shrimp in the control aquarium (unmodified saltwater) because of reduced availability of carbonates to promote shell growth. When bicarbonates are formed, beneficial carbonate ions are taken out of the water. Animals such as shrimp use carbonates to make their skeletons and shells. The shrimp use up more energy as they make their shell. If the shrimp are not able to produce their shells, they will grow at a slower rate. It will be harder to reproduce if most of the shrimp's energy goes towards making a new shell. <b>Results</b> The shrimp in the Test Aquarium not only reproduced at a slower rate, but almost all the shrimp in the Test Aquarium had died by the end of the experiment. This was caused by the reduction of carbonate ions in the aquariums. When the levels of bicarbonate ions increased and the levels of carbonate ions decreased, the brine shrimp had to work harder to make their shells. Therefore, they had less energy to reproduce and, in some cases, perform necessary body functions. The control shrimp increased in numbers due to the availability of carbonate ions. They had enough energy to perform the necessary body functions. <b>Conclusions/Discussion</b> Since brine shrimp are a type of plankton, this would mean that the disappearance of brine shrimp would disrupt the whole oceanic food chain. If the brine shrimp dies, the small fish that eat the brine shrimp die. If the small fish die, then larger fish, such as mackerel, die. If the larger fish die, then even larger fish, such as tuna, die. If the even larger fish die, then largest fish, such as sharks and groupers, die. The death of the fish would lead to global starvation as well as the failure of many businesses.	
<b>Summary Statement</b> My project is about how Ocean Acidification affects the growth and reproduction of Brine Shrimp ( <i>Artemia salina</i> ) and how that impact on plankton can affect the ocean food chain, and indeed, the human food cycle.	
<b>Help Received</b> No help was received.	