



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> <b>Omer Cohen</b>	<b>Project Number</b> <b>S1105</b>
<b>Project Title</b> <b>Iron Fertilization in Relation to Oceanic pH</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Ocean acidification and effects of climate change are important areas of research due to global impact. Ocean acidification occurs primarily because the ocean is a sink for carbon dioxide. As a result ecosystems of pH sensitive organisms such as coral reefs are lethally effected. The purpose of this experiment was to investigate whether lowering the pH can stimulate cyanobacteria growth by increasing the bioavailability of iron. Increased cyanobacteria density leads to decreased carbon dioxide levels. <b>Methods/Materials</b> In the first experiment, <i>Synechococcus</i> sp. growth was examined following incubation in Gulf of Maine seawater at 22°C under a 13/11 light-dark cycle. The dependent variable, cell density, was measured using a hemocytometer. The independent variables were iron concentration and initial pH. In the second experiment, the dependent variable was final pH. One trial, four samples for each variable were tested in duplicate. <b>Results</b> <i>Synechococcus</i> sp. density was generally found to be significantly increased at higher pH levels at concentrations of 6 and 12uM iron chloride. Growth did not significantly change in the absence of iron chloride. <b>Conclusions/Discussion</b> The results from these experiments do not support the hypothesis that with decreasing pH <i>Synechococcus</i> sp. would grow faster due to increased bioavailability of iron. However they raised interesting questions related to the reproductive ability of <i>Synechococcus</i> sp. at different pH levels. This also raised the question as to whether this species would survive conditions of lower pH levels in the ocean associated with ocean acidification.	
<b>Summary Statement</b> The purpose of this experiment was to investigate if lowering the pH in the ocean itself increases the bioavailability of iron which in turn would help decrease the level of carbon dioxide.	
<b>Help Received</b> High School teacher Dr. J. Willoughby, served as a mentor.	