



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Ethan C. Hung</b>	<b>Project Number</b> <b>J1012</b>
<b>Project Title</b> <b>Reducing Global Warming through Chemosynthesis</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The point of my project was to see if I could use bacteria, specifically chemosynthetic bacteria, as a replacement for absorbing carbon dioxide instead of plants. Plants use photosynthesis, and in order to compare apple to apple, I used a photosynthetic bacteria to compare to the chemosynthetic bacteria.</p> <p><b>Methods/Materials</b> I used a Vernier Labquest Mini, Vernier CO(2) sensor, Version 10.3 Vernier LoggerPro software in order to measure the CO(2) level in the sealed container. I sealed the bottle in with petroleum jelly, in order to make sure I had a true air seal. I borrowed the bottle, Vernier CO2 sensor, and Vernier Labquest Mini from my mentor Dr. Todd Haney. I also ordered the two bacterial strains, Synechococcus elongatus and Thiomicrospira crunogena from ATCC through my mentor's school. The incubator for maintaining temperature was also borrowed from my mentor and was used at Sage Hill School as that was where the bacteria was kept alive when we first got the bacteria. Also, the medium was mixed by my mentor and I at Sage Hill School.</p> <p><b>Results</b> During my experiment, the two bacterial strains I used absorbed carbon dioxide at a fairly fast and regular rate over time. In the end, the photosynthetic bacteria absorbed carbon dioxide until the carbon dioxide level was around 50 ppm (parts per million) lower. However, the chemosynthetic bacteria's carbon dioxide level dropped over 200 ppm by the end of the project.</p> <p><b>Conclusions/Discussion</b> The chemosynthetic bacteria absorbed 4 times as much carbon dioxide as the photosynthetic bacteria. This means that the chemosynthetic bacteria may be a better source for absorbing greenhouse gases such as carbon dioxide than plants.</p>	
<b>Summary Statement</b> Chemosynthetic bacteria are more efficient than photosynthetic bacteria in absorbing greenhouse gases, such as carbon dioxide.	
<b>Help Received</b> Dr. Todd Haney, from Sage Hill School provided much-needed assistance in materials, equipment, and advice. Sage Hill provided the laboratory in which I worked at. Also, my parents provided all of the financial help I needed. Lastly, Ms. Elizabeth O'hara at ATCC greatly reduced the cost of the bacterial	