



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Emma L. Payne	Project Number J1515
Project Title Is Global Warming Algae Forming? The Effect of Temperature on Spirulina Growth Rate	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The rising temperatures associated with global warming are a cause of great concern. Carbon dioxide is building up in the atmosphere. To reduce the amount of CO₂ in the atmosphere, we need something to take it away. Algae sequesters carbon dioxide. The objective of my experiment was to determine what temperature algae grows the best in. This experiment seeks to determine if algae growth is increased when grown in a warmer temperature.</p> <p>Methods/Materials In my experiment, test tubes containing an algae culture were heated to temperatures ranging from room temperature to 40°C. This was accomplished by preparing test tubes with different numbers of windings of thin magnet wire. The test tubes were then wired in series so that a constant electrical current flowed through each. In this way, the power (heating) for each test tube was systematically varied. Daily photographs were taken of all the test tubes. These images were subsequently analyzed with an image processing program to extract density as a function of time. In this experiment, I assumed the algae population is proportional to the color density.</p> <p>Results My results showed that the test tube heated to an intermediate temperature (28°C) had the greatest color density change, meaning it had the highest algae growth rate. Temperatures on either side of this value demonstrated less color density change.</p> <p>Conclusions/Discussion In the end I learned that algae grows best at a moderately elevated temperature. The result suggests increased carbon consumption can be expected from global algae population as both a result and a mitigation of global warming. However the experiment also showed that this is only true if colony temperatures remain below 30°C.</p>	
Summary Statement Spirulina algae growth rate was studied as a function of temperature, and intermediate temperatures showed the highest growth rate.	
Help Received Mr. Wright (my science teacher), and Mr. Nestlerode (my science fair advisor), and my Dad	