



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Georgia G. Miller	Project Number J1917
Project Title How Does the Wavelength of Light Affect Photosynthesis in Elodea?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective is to compare the effect of short versus long wavelengths of light on photosynthesis in elodea, or pond weed, to test the hypothesis that high energy wavelengths are most effective at producing photosynthesis.</p> <p>Methods/Materials Colored light gels are taped over clamp lamps to turn light into five separate colors: violet, blue, green, yellow and red. A control lamp has no colored gel. The lights are positioned over test tubes that contain a three-inch-long strand of elodea floating in a solution of Bromothymol blue. The color of Bromothymol blue acts as a measure of photosynthesis by indicating the uptake of carbon dioxide over time.</p> <p>Results In a series of three experiments, variables were adjusted to compare the effect of violet-blue light (short wavelength) and red-yellow light (long wavelength.) After two experiments with inconclusive results, the third procedure showed a clear difference in the rate of photosynthesis. The data showed that the short wavelength light produced photosynthesis at twice the rate of the long wavelength light.</p> <p>Conclusions/Discussion The first two of the three experiments did not produce usable data, but they were helpful because they showed how the experiment should be redesigned. This was a valuable lesson in using the scientific method. Even though the hypothesis was proven correct, the conclusion cannot be drawn that one wavelength is more important than others. Plants develop best under a balanced light spectrum. Photosynthesis has been studied for more than 100 years, but we do not know everything about how the process of photosynthesis differs by plant. In that way, this project contributed to the body of research on photosynthesis.</p>	
Summary Statement This project is about how the wavelength of light affects the rate of photosynthesis.	
Help Received Father helped set up the lights for the experiment in the garage.	