



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Evan J. Lincoln	Project Number S2410
Project Title The Effect of LED Wavelength on the Phototaxis of Artemia	
<p style="text-align: center;">Abstract</p> <p>Methods/Materials</p> <p>First, I made a testing light box out of a plastic lid by making a hole in the flat top of it. Then, I took a sheet of graph paper and punched a hole the size of an LED in the center of it. I took a petri dish filled with the Artemia that were being grown in an aerated tank. I then placed the LED up through the bottom of the box to the hole, and held it there with the clay. Next, I turned off the lights and dispersed the Artemia around the dish randomly. I took a picture of the dish and turned on the LED. I waited five minutes and then took another picture. I repeated this test three times for each color LED, and tested four LED#s per day. I then counted the amount of Artemia in each ring of squares in each picture. After compiling these results into a table, I ran the Fisher#s Exact Test on each colored LED against the control LED, red, to determine the significance of my results, and to confirm that the behavior observed was not random. The following are my results.</p> <p>Results</p> <p>The results of this study have shown low to no sensitivity to longer wavelengths. This is shown by the Artemia in tests with longer wavelengths of 630 nm (Red), where the Artemia do not change from their random distribution when exposed to the light. The study also showed that there is an increasing sensitivity as the wavelength of the light decreases, where when the Artemia were exposed to 528 nm (Green), 471 nm(Blue), and 400nm (UV) light sources, they changed from a random distribution around the light source to a distribution highly concentrated around the light source. The data also showed that as the Artemia mature, they become even less sensitive to longer wavelengths and become more sensitive to shorter wavelengths. More specifically, the Artemia show no sensitivity to 528 nm (Green) light in the latter half of their life cycle.</p> <p>Conclusions/Discussion</p> <p>In conclusion, I found that the Artemia are sensitive to shorter wavelengths such as those found in blue and UV light, but become less sensitive as the wavelength increases. They also become less sensitive to green light as they mature. This could point to a behavior such as a shift in the water column as they mature, and I would like to pursue this idea in a future project. If anything, I would like to find a more precise way to measure the phototaxis and distribution of the Artemia. All in all, I look forward to finding out more about this fascinating topic.</p>	
Summary Statement	
<p>This project is about the effect of the wavelength of light emitted from a Light Emitting Diode on the phototaxis, or movement in regards to a light source, of brine shrimp of the species Artemia.</p>	
Help Received	
<p>Used lab at UCSB under the supervision of David Plachetzki</p>	