



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> Nelson F. Liu	<b>Project Number</b> <b>J1513</b>
<b>Project Title</b> <b>The Effect of UV-A Light on the Amount of Bacteria in Lake Water</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Is UV-A light powerful enough to kill bacteria in normal lake water? If so, is the UV-A killing the bacteria, or is some other source?</p> <p><b>Methods/Materials</b> I used agar to measure the growth of the bacteria. I used a UV-A emitting light to give off UV-A. I used droppers to assist in growing bacteria. I used water bottles to hold the water I was purifying.</p> <p><b>Results</b> Test 1: I tested bottled lake water under UV light from 0-10 in 2 hour intervals and boiled water. Test results seemed to be not significantly affected by hours the under UV light. How effective is the UV light from the 100 watt Daylight Blue Bulb compared to the Sun? Test 2: I tested bottled lake water under UV light from 0-14 in intervals of 2, and under the Sun. Again, test results were not significantly affected by hours under UV light among the dishes. The bottle under the sun was exposed to a UV index of 3; it was nearly completely clean of bacteria, meaning that my bulbs are VERY weak in comparison to the Sun. Should I extend my test hours to find the comparable hours under UV light to under the Sun? Test 3: I tested from 0-48 hours, in 6 hour intervals and also included an water under the sun test. The water stayed in the sun for 7 hours, and the weather was partly cloudy, with a UV index of 2. After growing them, I was surprised at the results. The 48 hour was about as sterile as the water under the sun. Both had very little bacteria, which supports my case that UV-A does have some sterilization power. However, the thermometer in the box read 39 degrees Celsius, which is about 102 degrees Fahrenheit. Was the UV-A, or the heat, killing the pathogens? Test 4: In this test, I wanted to determine what was killing the bacteria: the heat, or the light. I tested from 0-48 with intervals of 12. For each interval, we set in a normal bottle, and a bottle encased with aluminum foil. The foil will repel the UV-A waves, but will allow heat to pass through. After my testing, I found that the agars with UV-A exposure had less bacteria colonies.</p> <p><b>Conclusions/Discussion</b> In my testing, I deduced several things about the ability of UV-A to kill bacteria. First, UV-A does clean water by killing pathogens, although the amount of time necessary depends on the environment. Also, there was a correlation between the number of hours under the UV-A light and the amount of bacteria</p>	
<b>Summary Statement</b> Determining whether UV-A can kill bacteria in water.	
<b>Help Received</b> Mother helped to get water.	