



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Katherine Y. Sham</b>	<b>Project Number</b> <b>J1520</b>
<b>Project Title</b> <b>SODIS: Solar Water Disinfection</b>	
<b>Objectives/Goals</b> The objective is to test whether or not the opacity of PET bottles affects the solar disinfection of pathogenic-infested water.	
<b>Abstract</b> <b>Methods/Materials</b> Fourteen PET bottles, fourteen petri dishes, nutrient agar, and an Escherichia coli slant culture are prepared in order to begin the experiment. Six of the bottles are scratched to varying opacities of 25%, 50%, and 75%. Four of the bottles are scratched to 100% opacity, and the other four are left unscratched. Approximately 0.25 milliliters of Escherichia coli are pipetted into each bottle. Seven bottles are placed in the sunlight for six hours, and the rest are placed in a box covered with a UV light bar for six hours. A sample of each bottle is spread on separate petri dishes, and then after twenty four hours of incubation, the colonies are counted and observed.	
<b>Results</b> In the sun trials, there was no growth of bacteria in any of the agar plates. The shade agar plates had varying amounts of bacterial growth that seemed to be slightly affected by opacity. However, in the trial with the UV bar, all agar plates had some degree of growth, and the opacity affected the amount of bacterial growth to a slight degree. Shade was simulated by covering two of the bottles (0% scratched and 100% scratched) with a cloth, thereby creating indirect UV light exposure. Interestingly enough, the bottles with indirect exposure had agar plates where the bacteria appeared in approximately 12 hours, while the bottles with direct UV exposure had agar plates where the bacteria appeared 24 hours later.	
<b>Conclusions/Discussion</b> The opacity of the bottle did not appear to affect the amount of bacteria neutralized by the sun's rays. The shade agar plates had varying amounts of bacterial growth that seemed to be slightly affected by opacity. However, in the UV bar trial, all agar plates had some degree of growth, and the opacity affected the amount of bacterial growth to a slight degree. The results were not as expected, because the sun was strong enough to deactivate all bacteria, regardless of opacity.	
<b>Summary Statement</b> The purpose of this project is to determine if the degree of opacity of PET bottles affects the solar disinfection of pathogenic-infested water.	
<b>Help Received</b> Parents helped to acquire materials and supervise the inoculation, observation, and disposal of the Escherichia coli	