



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> <b>Kimy Alexi Buere; Sierra Franco; Kavish Loomba</b>	<b>Project Number</b> <b>S1108</b>
<b>Project Title</b> <b>Decontamination of Polluted H2O by Photocatalysis for Undeveloped Countries</b>	
<b>Objectives/Goals</b> The goal of our research was to develop a sustainable and economically viable device for water purification. Our innovative methodology integrates filtration with an enhanced photocatalytic process. We created spheres that helps purify the polluted water using Zinc Oxide, Portland cement, titanium dioxide (TiO <sub>2</sub> ) and 3m glass bubbles . The ratio of ZnO:TiO <sub>2</sub> :3m glass bubbles: cement: was 1: 4: 25:100 by weight.	
<b>Abstract</b> <b>Methods/Materials</b> First build the frame by drilling the 23 and 24 inch SPF common BRD together to form a rectangle. Then take the 17 and 15 inch 1X3 white wood and create a stand by drilling the 17 inch piece vertically to the top right of the frame and the 15 piece horizontally connecting the bottom to the bottom corner of the frame. Repeat for other side. Drill the 4 reflectors 2.75 inches away from each other starting from the end of the top of the wooden frame. Attach the 4 inch PVC pipes into the corner PVC pieces (two corner pieces should not have a 4 inch pipe in them). Insert the corner pieces into the braided vinyl, putting the one corner pieces into the first and last braided vinyl. Put the first braided vinyl in the middle of the first reflector and drill the washers over it on the side of the frame. Repeat this 4 times on each side. Attach the shut off valve to the last corner PVC piece.	
<b>Results</b> The results collected in Experiment #1 indicated that.. 1.) Reduced the amount of E.coli colonies below EPA limits. 2.) Prevented the regrowth of bacteria unlike current SODIS methods. 3.) Did not wash off after several uses. 4.) The hypothesis was supported	
<b>Conclusions/Discussion</b> In conclusion, we have successfully introduced a design for a portable water purification unit that only relies on (photocatalysis) to achieve its goals. In the future we would like to investigate the inactivation of different types of pathogens (including protozoa and viruses); ii) study the feasibility of degrading different types of organics and pesticides; ii) study the feasibility of removing heavy metals and other inorganic water pollutants; and iv) characterize the size and its distribution; and v) evaluate the safety and performance of the composite filters over time.	
<b>Summary Statement</b> Decontaminating polluted water using photocatalysis for undeveloped countries.	
<b>Help Received</b> My parents helped us design the device but over all my group mates and I did the whole project.	