



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Daron S. Yacoubian	Project Number J0337
Project Title PorSHA H(2)O (Portable Solar Heating Apparatus)	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to design a solar powered floating apparatus that can effectively heat swimming pools. This system eliminates the need for traditional swimming pool water heaters in order to save energy, preserve natural resources, and protect the environment from pollution.</p> <p>Methods/Materials The materials needed to build the apparatus are 2 foam kickboards, 2 solar pumps, flat mirrors, 100 feet of black tubing, and 2 identical temperature gauges to measure input and output temperature of the water. With the assembled apparatus, the first step is to determine the rate of water flow through the apparatus. This is done by measuring the amount of water that can flow through the apparatus in 1 hour. The rate is averaged by performing the test 4 times, 1 hour each, to calculate average flow rate and volume per hour. The second step is to determine the change in water temperature as the water travels through the apparatus. This is done over the course of 1 hour daily for 5 days, and the temperature change is recorded at 5 minute intervals. This data is compared to a control to determine the temperature change of the water with the sun alone without the apparatus.</p> <p>Results The results show that the apparatus increases the temperature of 7 liters of water an average of 38.4° F in 1 hour. The control has an average increase of 1.1° F for 7 liters of water in 1 hour. Also, it took approximately 5 minutes for the average water temperature output to increase by 38.4° F</p> <p>Conclusions/Discussion The results suggest that this project has the potential to revolutionize the swimming pool industry and is a successful proof of concept. The apparatus was successful in increasing the water temperature an average of 38.4° F. This is a significant increase compared to the control of 1.1° F. This project is exciting for future prospects of energy conservation and production of clean energy. The apparatus has the advantages of being portable, cheap, reusable, safe, and environmentally responsible. More importantly, when this concept is increased in scale and efficiency, it will eliminate the need for existing bulky pool systems that are expensive, polluting, and wasteful. The next phases of the project involve adding an effective water filter to the system and a solar powered water mixer to more evenly distribute treated water. I look forward to presenting those results in the future.</p>	
Summary Statement This project introduces a novel floating solar powered device that will eliminate the need for a traditional swimming pool heater.	
Help Received I designed, built, and tested the apparatus myself. My parents helped with purchasing the materials necessary for building the apparatus. My science teacher helped me with the background research.	