



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Nicholas Fung	Project Number S1505
Project Title Direct Solar Pool Heater	
Objectives/Goals My objective is to demonstrate the feasibility of heating a pool using a new invention called Direct Solar Pool Heater (DSPH). It is my first hypothesis that a pool of water with the DSPH in place will warm up to a higher temperature than the same without the DSPH because the black fabric of the DSPH absorbs more and reflects less solar energy than the light colored pool walls or bottom. It is my second hypothesis that by suspending the DSPH closer to the surface of the water (where swimmers stay most of the time), the DSPH will heat up the surface water more than the deep water.	
Abstract Methods/Materials A bathtub was used to simulate the pool. Six 1300-lumen floodlights were used to simulate the sun. Three small DSPH disks were made. Each was made of black nylon fabric stretched over a steel ring and then fitted with 3 buoy sticks to allow the disk to be suspended at the desired water depth. Two temperature probes were connected to a Vernier LabPro and a TI-83 calculator to collect temperature data at 2 different depths. Four experiments were conducted under controlled room and water temperatures. Each experiment lasted 12 hours and temperatures were recorded at 30-minute intervals. The 4 experiments were: 1)light and DSPH, 2)light but no DSPH, 3)no light but DSPH, and 4)no light and no DSPH.	
Results Experiment #1(with light on and with DSPH) yielded the biggest temperature increase (+1.071C). This confirmed my first hypothesis that a pool of water with the DSPH in place will warm up to a higher temperature than the same without the DSPH. By comparing the data of experiments #1 and #2(with light on), it was noted that the surface water temperature was higher by 0.221C on average and the deep water temperature was higher by 0.169C on average when the DSPH was used. This confirmed my second hypothesis that the DSPH heats up the surface water more than the deep water.	
Conclusions/Discussion My project demonstrated the feasibility of DSPH. I believe DSPH has many advantages over conventional solar or natural gas pool heating systems. DSPH is cheap to make, install, and maintain. It does not require electricity or natural gas to operate. It is also highly efficient with no heat loss due to pipes or heat exchangers. If DSPH is widely used, I believe it can reduce our energy consumption and lessen the chance of another energy crisis in our future.	
Summary Statement The Direct Solar Pool Heater is a new invention designed to absorb solar energy using submerged black fabric disks and to transfer the absorbed energy directly to the pool water.	
Help Received My teacher provided useful suggestions throughout the project, kept me on schedule, and lent me the Vernier LabPro. My parents critiqued my write-ups and helped me to set up experiments and assemble the display board.	