



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Brian VanDerhoff	Project Number J1539
Project Title Caloric Energy Output from Concentrating Solar Arrays	
Abstract Objectives/Goals The project objective was to determine whether the average number of calories produced by each 1.25 inch mirror tile in a concentrating solar array would remain constant as the size of the array was changed. In my hypothesis, I state that the average calories produced by a single mirror would remain constant as the number of mirrors in the array is increased and/or decreased. Methods/Materials In order to test my hypothesis, I built a solar array with 225 1.25 inch adjustable mirror tiles which could all be focused on a single spot. I then filled a test tube with 30 milliliters of water and focused the mirrors so that they were all reflecting onto the test tube. I recorded the temperature and repeated the process after covering up 25 mirrors every ten minutes. I then used the formula: the quantity of heat = the mass times the specific heat times the change in temperature. This formula told me how many calories the array was emitting. Results The experiment showed a range of calories per mirror from 15.6 calories to 9.6 calories. There was an average of about 11.8 calories per mirror when all of the tests had been completed. Conclusions/Discussion The hypothesis of the experiment was not supported. There was an expectation of a constant proportion of calories per mirror; however, the tests showed no recognizable mode of the number of calories per mirror.	
Summary Statement I built a concentrating solar array of 225 adjustable mirrors and used it to determine whether the average caloric energy output per mirror tile remained constant as the number of tiles in the array was increased and/or decreased.	
Help Received Friend/science teacher supplied me with books and feedback; Dad taught me how to use tools and assisted me during testing; Mom helped type report; Advisors gave feedback and suggestions.	