



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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| Name(s) Robert C. Hollar | Project Number S0819 |
| Project Title Maximizing Solar Energy | |
| Abstract Objectives/Goals The purpose of the project is to use a parabolic mirror to maximize solar energy. Another goal of the project is to use the heat absorbing properties of black paint to further potential solar thermal energy output Methods/Materials The project will be conducted as follows: a parabolic mirror will be built using the formula of a parabola and an aluminum sheet. The aluminum will be chemically treated in order to increase its reflective properties. Four 5in long 1in diameter cylinders will be cut out of PVC two of which will be painted black and two of which will be painted white. These cylinders will then be filled with water and placed along the focus of the mirror. One cylinder of each color will be placed directly above the mirror and one of each color will be placed off the reflective surface. The vertex of the mirror will then be pointed towards the sun and the temperatures of the water in each cylinder will be recorded. Results Up until this point, the tests have been conducted with a mirror that has not been chemically treated. However, when the mirror is treated to increase reflectiveness, it should affect all the cylinders equally thus, not affecting the basic results. In these tests, the hypothesis has been proven true with the black mirrored cylinder absorbing the most heat followed by the white mirrored, black off mirror, and white off mirror respectively. Conclusions/Discussion The parabolic mirror was correctly constructed as shown by the fact that all light reflected back to a relatively thin focus. This light increased the amount of heat energy available to the two cylinders above the mirror. This explains why both of the cylinders above the mirror absorbed more heat than those to the side. Furthermore, the theory on black paint was also correct. Something appears black when it absorbs all or almost all light. Because it absorbed all light, the black cylinder also absorbed almost all heat. On the other hand, something appears white when it reflects almost all light. This caused the white cylinder to reject the vast majority of heat energy. | |
| Summary Statement this project focuses on utilizing both the reflective properties of parabolic mirrors and the absorbing properties of black paint to maximize solar energy. | |
| Help Received worked in school engineering lab | |