



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Marshall T. Gifford	Project Number J0909
Project Title Catching the Rays	
Abstract Objectives/Goals The initial impetus for this project was to see if a solar furnace could generate temperatures hot enough to make glass, and to determine how different factors affect the maximum temperature. In the Jamestown Colony in Virginia the early colonists made a business of glassmaking because the materials were available to make it, including vast quantities of firewood needed to generate the necessary heat. I was wondering whether 400 years ago the colonists could have used sunlight to generate enough heat to make glass, thereby saving the Virginia forests.	
Methods/Materials 1. A parabolic mirror was made using a satellite dish with mirrored mylar. 2. This was used to focus sunlight and artificial light on a target under a series of different conditions. 3. Multiple tests were performed to see the effect of the angle of the sun, insulation, and the size of the mirror.	
Results Due to cloudy weather over several weeks, only a small number of tests could be made using sunlight, and an #artificial sun# was created using spotlights indoors. Despite this difficulty, the testing showed that increasing the area of the parabolic reflector increased the temperature of the target. Maximum temperatures were achieved when the sun was closest to directly overhead, near noon. Insulating the target increased the maximum temperature which was achieved. Even in winter, and without insulating the target, temperatures hot enough to melt aluminum (600°C) and steel (1000°C) were achieved.	
Conclusions/Discussion This experiment suggests that on a summer day with much more insulation of the target, it should be possible to melt glass (1,500°C) with a solar furnace like this, even using the materials available 400 years ago.	
Summary Statement This project tested whether a solar furnace could generate the temperatures needed to make glass	
Help Received My father helped with mirroring the parabola, and my mother helped with the layout of my board.	