



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Maximizing Solar Cell Performance	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective was to see which among five different methods of sunlight exposure would maximize the output of voltage and current in a solar cell. We hypothesized that a solar cell in combined direct and reflective sunlight would put out the most voltage and current.</p> <p>Methods/Materials Four 7-volt solar cells were placed in direct sunlight, reflective sunlight using a hand mirror, shade (under a porch roof), magnified sunlight using a magnifying glass, and combined direct and reflective sunlight. At each position, a digital multi-meter was used to measure the voltage and current that each solar cell gave out. Data was collected over four trials and analyzed to determine which configuration produced the most voltage and current on average.</p> <p>Results The average voltages in direct sunlight, reflected sunlight, magnified sunlight, shade, and combined direct and reflected sunlight were 7.7 V, 7.5 V, 7.9 V, 6.2 V, and 7.8 V, respectively. The corresponding average current values were 32.7 mA, 21.6 mA, 43.8 mA, 2.5 mA, and 43.9 mA, respectively.</p> <p>Conclusions/Discussion We generally got the most voltage from the combined direct and reflective sunlight. However, the current was generally largest in the case of magnified sunlight. We believe this occurred because the magnifying glass gathered light from a larger collection area than the mirror used to reflect the sunlight. These overall results partially support our hypothesis, but further indicate a potentially better method to improve solar panel performance than our original hypothesized result. This could be useful in everyday life if one wanted to maximize their solar panel efficiency and save money.</p>	
Summary Statement We wanted to determine whether there was a simple technique that could be used to improve solar cell performance.	
Help Received Our parents purchased the materials, provided transportation and advice on project format, and help with using computer software.	