



# CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

<b>Name(s)</b> <b>Madeline C. Cowan</b>	<b>Project Number</b> <b>J1010</b>
<b>Project Title</b> <b>Reflecting on Renewable Energy</b>	
<b>Objectives/Goals</b> The goal of this project was to discover if the use of reflective materials would increase the output of a solar panel.	
<b>Abstract</b> In my experiment, I used a variety of reflective materials including: aluminum foil, a small mirror, white ceramic tiles, yellow ceramic tiles, black ceramic tiles, and glass tiles to reflect light onto a 6 volt solar panel. To minimize reflection from other sources, I constructed a box to hold the solar panel and the reflective materials and spray-painted it matte black. I also used a 100 watt light bulb as a light source instead of the sun to eliminate variables in weather conditions. During the experiment, I tested all materials for one minute, three times each and measured the output using a multimeter. Between tests, I would let the bulb and solar module cool for two minutes. For my control group, I measured the output of the solar panel without any reflective materials. I recorded the data in a journal.	
<b>Methods/Materials</b> In my experiment, I used a variety of reflective materials including: aluminum foil, a small mirror, white ceramic tiles, yellow ceramic tiles, black ceramic tiles, and glass tiles to reflect light onto a 6 volt solar panel. To minimize reflection from other sources, I constructed a box to hold the solar panel and the reflective materials and spray-painted it matte black. I also used a 100 watt light bulb as a light source instead of the sun to eliminate variables in weather conditions. During the experiment, I tested all materials for one minute, three times each and measured the output using a multimeter. Between tests, I would let the bulb and solar module cool for two minutes. For my control group, I measured the output of the solar panel without any reflective materials. I recorded the data in a journal.	
<b>Results</b> The reflective material definitely increased the output of the solar panel. The aluminum foil and the mirror produced the greatest output with an average of 4.17 volts followed by the white tiles (4.10 volts), the glass tiles (4.07 volts), the yellow tiles (4.06 volts) and the control group (4.04 volts). The black tiles produced the lowest average voltage with 3.98 volts.	
<b>Conclusions/Discussion</b> My hypothesis stated that by using reflective materials, the output of a solar panel would increase. My hypothesis was proven correct. I was surprised, however, that the average output of the solar panel was the same with both the mirror and the aluminum foil. I had thought that the panel's output would be greater using the mirror since to my eyes it was the most reflective of the materials I tested. The data also suggests that lighter colored materials were better reflectors because they resulted in more output than the darker materials.	
<b>Summary Statement</b> The goal of my project was to determine if the use of reflective materials would increase the output of a solar panel.	
<b>Help Received</b> My parents purchased the materials. Mom helped with my display board. Dad helped with the graphs.	