



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> <b>Joshua M. Arreola</b>	<b>Project Number</b> <b>J1203</b>
<b>Project Title</b> <b>Let's Heat Things Up! Making the Most Efficient Solar Hot Water Panel</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective was to test various materials in a solar water panel, to see which materials would absorb the most heat to make it the most efficient. Using four different materials and a control variable, I hypothesized that sand would absorb the most heat.</p> <p><b>Methods/Materials</b> Five solar water panels were created using cardboard boxes painted black inside, flexible black tubing, and glass. Soil, fiberglass insulation, heat shield insulation, and sand were placed in four boxes individually, and the fifth box was the control with no material added. A 45° angle frame support was constructed to hold all the panels in place. All panels were then placed in the same location facing the sun. A digital stem thermometer was used to measure the initial temperature of the water, and then the water was measured again after the water had been left in the tubing of each panel for ten minutes. Each panel was tested in the same order, and a total of seven trials were conducted per panel. A run was completed when seven trials were tested for all five panels. To establish validity of my results, a total of three runs were conducted during the same day noting weather conditions and time of day.</p> <p><b>Results</b> The overall results showed that the soil made the water heat up the hottest, followed by the fiberglass insulation, then the control variable, then the heat shield insulation, and finally the sand.</p> <p><b>Conclusions/Discussion</b> My results showed that my hypothesis was incorrect. My background research shows that darker colors make a difference in heat absorption. The sand, which was somewhat dark, absorbed the least amount of heat. For future experiments, I might change the type of tubing and the materials used, place the panels in a different location such as the roof or on cement, and finally, test this experiment at different times of the year. This experiment can help scientists and consumers by creating an energy and cost-efficient way to provide warm water to homes, and can also help reduce the use of fossil fuels in order to create a safer, cleaner environment.</p>	
<b>Summary Statement</b> The purpose of this project was to determine what materials would be the most efficient when placed in a solar water panel.	
<b>Help Received</b> Dad advised on how to pour the water and how to take the measurements. Mom took pictures and took the readings. Mr. Bradford Oliver, an engineer, helped me have a better understanding of my project.	