



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Talia Gnessin	Project Number J1018
Project Title The Effect of Simulated Winter and Summer Sunlight Intensities on a Solar Panel's Performance	
Abstract Objectives/Goals The objective of the experiment was to investigate and test how sunlight intensity effects solar panel performance. The hypothesis was that during the summer, the solar panel would receive more energy from the sun's rays than in the winter, because the light intensity is affected by the sun's rays angle. Methods/Materials The tests consisted of recording the electrical current that is generated by the solar panel each hour of the day during winter and summer, making sure the angle of the light was simulating the angle of the sun's rays. The angle of the sun's rays is defined by two angles. The latitude angle determines how high the sun is in the sky, while the azimuth angle is the direction of the sun east to west, as it moves in the sky between morning and evening. Materials: I used a lightbulb to simulate the sun's rays, and a circular rail to simulate the sun's position in the sky throughout the day. I purchased a small photovoltaic type solar panel that is used to charge batteries. I also used a current meter and electrical wires. Results When repeating the experiment in three different trials, the results were generally the same. The solar panel produced more electric current in the summer compared to the winter, however during the "early morning" and "sundown" hours, the solar panel produced more current in the winter compared to the summer. Conclusions/Discussion In general, the results supported the hypothesis because the solar panel generated more current in the summer compared to the winter. However, I expected to get consistent results along the course of a day, and that did not occur in the experiment. In the early morning hours and at sundown, the winter current was higher than the summer current. I believe that this was caused by the fact that the rail did not simulate accurately the movement of the sun in the sky. The hinges that were used for tilting the rail were fixed, therefore the height of the sun was the same in winter and summer. I know that the latitude and azimuth were very accurate around noon time (Zenith point), but the results towards the ends of the rail were not accurate. If I had to repeat the experiment, I would make the hinge height adjustable.	
Summary Statement The Effect of Simulated Winter and Summer Sunlight Intensities on a Solar Panel's Performance.	
Help Received Dad helped with the sawing of plywood and purchasing of materials; Science teacher Mr. Hueyopa helped with report and preparations.	