



CALIFORNIA STATE SCIENCE FAIR

2010 PROJECT SUMMARY

Name(s) Joanie M. Kalmbach	Project Number J1014
Project Title Solar Angle?	
Objectives/Goals I wanted to test whether the power solar panels produce is affected by the angle at which they are mounted. I thought the angle that the solar panels are mounted play a significant role in the amount of power they produce, because the solar panels produce the most power when they are perpendicular to the sun. As the earth rotates, the path of sunlight constantly changes, therefore, causing the solar panels to produce different amounts of power at various times.	Abstract The abstract section is currently empty.
Methods/Materials I had three different types of panels: monocrystalline, polycrystalline, and monocrystalline-hybrid. I chose four different angles to mount the panels at, and then used a volt meter to record the amount of power each panel produced at the different angles. To find the angle at which the panel would be perpendicular to the sun, I subtracted the sun's altitude angle obtained from the U.S. Naval Observatory website from 90 degrees. On the first set of tests, this angle was 58.3 degrees (90 degrees-31.7 degrees). On the second set of tests, this angle was 59.7 degrees (90 degrees-30.3 degrees). The first set of tests took place at 1:45 p.m. The azimuth angle at this time was 206 degrees. The four angles I used on all of the panels, during the first set of tests, were 70 degrees, 58.3 degrees (this angle placed the panel perpendicular to the sun), 42 degrees, and 28 degrees. The second group of tests took place at 2:00 p.m. The azimuth angle at this time was 210 degrees. The four angles I used on all of the panels, during the second set of tests, were 70 degrees, 59.7 degrees (this angle placed the panel perpendicular to the sun), 42 degrees, and 28 degrees.	
Results According to the test averages, the monocrystalline-hybrid solar panel was least affected by the change in angle, and the polycrystalline was the most affected by the change in angle. This leads me to believe that the monocrystalline-hybrid would be the most productive because the earth's rotation causes the sun angle to change constantly throughout the day.	
Conclusions/Discussion My hypothesis was supported because I thought that the angle the solar panel was mounted would affect the amount of power the panels produce. My data shows that all of the panels were affected by the change in angle; however, the monocrystalline-hybrid was the least affected, which means it would be the most productive throughout the day.	
Summary Statement My project determined how solar panels power production is affected by the angle at which they are mounted.	
Help Received performed experiments at home; dad helped set up solar panels	