



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Zoe S. Reifel	Project Number J0217
Project Title Solar Tracking Robot	
Abstract Objectives/Goals Solar panels collect the most energy when pointed directly at the sun. Most solar panels are mounted in a fixed position. My project tests if a panel that tracks the sun generates more power than a typical panel with its fixed position. I predicted that by tracking the sun, more energy will be collected. Methods/Materials To make this comparison, a small solar panel was connected to multimeters to measure its output. Measurements were recorded throughout several days. Some with the panel in a typical fixed position, and others with the panel pointed directly at the sun. My control was a fixed position solar panel, and my variable was one that tracks the sun. My approach was to build a small dual axis solar tracker. It uses a computer and two motors to orient the panel towards the sun. Results I ran my experiment three times, each time collecting a full set of data. On January 21st, a bright and sunny day, I collected 12.5 watt-hours of energy with my fixed solar panel, and 16 watt-hours by using my solar tracker. This resulted in 27% more energy collected by tracking the sun. Conclusions/Discussion My data supported my hypothesis that tracking the sun is beneficial. My experiment showed conclusively that more energy can be generated by continually pointing the solar panel directly at the sun. To expand on this experiment, I would like to do more research on whether the increased energy generated justifies the additional installation expense. I would also be interested in collecting data throughout a year to understand the seasonal factors of tracking the sun. Another area of exploration would be to determine the optimum way to track the sun. Some trackers use sensors, and some use mathematical calculations, like I did, to predict the sun's position.	
Summary Statement Do solar panels that track the sun generate more energy than those with a fixed position?	
Help Received My father helped with the design concepts, and advised on construction and computer programming.	