



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Mark P. Stainer	Project Number J0231
Project Title The Need For Speed: A Comparison of Solar Cells vs. Fuel Cells for Powering a Model Car	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine the speed of a model car powered by a solar cell vs. a car powered by a hybrid cell (solar cell plus fuel cell) with the solar panel attached at 55 degrees and 0 degrees and traveling in 4 directions (North, South, East, West). My hypothesis was that the hybrid cell with the solar panel attached at 0 degrees would travel faster than the other cells in all directions.</p> <p>Methods/Materials I built a model car to race with an engine that could be powered by either a solar cell or hybrid cell (a combination of a solar cell and fuel cell). Both required a solar panel attached to the car. I marked out a track on a straight, flat stretch of asphalt. I allowed the car to accelerate over a 3.66 meter track and then measured its speed in seconds over a 15.25 meter straight track in all four directions (north, south, east, west). I angled the solar panel at either 0 degrees or 55 degrees and repeated the experiment. The cars were each tested 12 times in each direction. Measurements were obtained with a stopwatch. Temperature and wind direction were recorded. The tests began at 12 noon so the sun's position would be as directly overhead as possible.</p> <p>Results Results showed that the hybrid cell with the 55 degree solar panel was faster than the hybrid cell at 0 degrees as well as the solar cell with the panel attached at 0 degrees and 55 degrees. In fact, the 55 degree hybrid cell was the only car that ran in every direction. The solar cell car had a faster time when it ran, but was very dependent on the direction it was traveling and the position of the sun.</p> <p>Conclusions/Discussion The results do not support my hypothesis. The only car to run in every direction was the hybrid cell with the 55 degree panel. The results show that not only is the angle of the solar panel critical, but also the direction the car is traveling in relation to the sun's position at the time it was tested. The fact that the solar cell alone only worked when receiving direct sunlight on the panel is very important to future studies. Air pollution is a huge concern for our environment and we must find an alternative to the polluting fossil fuels. The hybrid cell might be a more reliable source of energy to power a car since it appears to be less dependent on the sun's position.</p>	
Summary Statement My project is about the speed of a model car that is powered by a solar cell vs. a car powered by a hybrid cell (solar cell and fuel cell combination).	
Help Received My father helped me build the model car and test it. He also helped me understand how the hybrid cell worked. My mother helped me assemble my board.	