



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Neeka A. Mashouf	Project Number S0908
Project Title The Effect of Fresnel Lens Magnification on Solar Cell Energy Output, Cell Temperature, and LED Light Brightness	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to determine if a type of solar concentrator, known as a Fresnel lens, could optimize the energy produced by a solar cell and it's energy application on an LED light, while keeping the consequential temperature endurable for the cell.</p> <p>Methods/Materials I tested 2x, 3x, and 4x magnifying lenses, as well as no magnification as a control on a solar cell by measuring the electric power produced (watts), cell temperature (F), and brightness of the LED light. To use the LED brightness as a qualitative measure of output power, I made a simple circuit that included the solar cell, 3 resistors, and the LED. The power data was calculated by multiplying the appropriate voltage and current values read by a voltmeter and an ammeter to measure the watts produced. Cell temperature was measured with an accurate laser-sight temperature gun aimed 2 inches away from the center of the cell.</p> <p>Results I hypothesized that the 3x lens would produce the optimal energy output and temperature, as well as yield the brightest light. My data supported this by showing that the 3x lens provided the highest power production of .495w (four times the control!) and brightest light at a tolerable temperature of 171.5 degrees Fahrenheit.</p> <p>Conclusions/Discussion My experiment proves that by using the right magnification of Fresnel lenses, energy production can be amplified and light can be focused on a smaller active cell area, making solar technology more cost-effective and productive.</p>	
Summary Statement My project tests the effect of Fresnel lens magnification on a solar cell's energy production and consequent temperature from light concentration in order to find an optimum point between high power production and tolerable cell temperature	
Help Received Father taught me electrical circuit basics for breadboard construction; teachers answered all questions I had and provided guidance	