



**CALIFORNIA STATE SCIENCE FAIR  
2008 PROJECT SUMMARY**

<b>Name(s)</b> Nicholas A. Kinsman	<b>Project Number</b> <b>J0912</b>
<b>Project Title</b> <b>Catching Rays: The Importance of Focus</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Objective: Determine whether magnifying (convex) mirrors (MM) intensify more solar radiation than regular (planar) mirrors (RM). Manipulated variable is type of mirrors (RM or MM). Responding variable is temperature(C). Controlled variables are size of can, thermometers, and focal point. Prediction: MM intensify more solar radiation than RM, because MM focus the energy of the sun.	
<b>Methods/Materials</b> Materials: 3 Thermometers (C), 3 Empty soft drink cans, 1 Can black spray paint, 1 Stopwatch, 3 Sticks modeling clay, 3 MM, 3 RM, 6 Mirror supports, 1 Data sheet, Sun Methods: (A) Calibrate thermometers. (B) Paint 3 empty soft drink cans black. (C) Insert thermometer 5 cm into each can and seal in place with modeling clay. (D) Place all 3 cans in full Sun and record time and temperatures. (E) Aim reflection of Sun from a RM at 1 can, and the reflection from a MM at another. The third can is a control. (F) Every 5 minutes, record the temperatures. (G) If the temperature has not increased, add another mirror. (H) Continue until no more mirrors will fit around the cans. (I) Cool cans to room temperature, randomize cans and mirrors, and repeat for a total of 3 trials. (J) Enter data into Excel, obtain means and standard errors, and plot graphs.	
<b>Results</b> The average maximum temperature reached with RM was 1.3C greater than with RM, and 4.3C greater than the control, demonstrating that RM intensify more solar radiation than MM.	
<b>Conclusions/Discussion</b> I want to be an inventor using solar energy to reduce dependence on other energy sources. From this and my previous experiments, I have developed an emergency home desalination/purification unit that people can build from household items. People can use this in case of an emergency when no drinking water is available. This project proved that RM increased heat inside the cans more than did MM, and did not support my hypothesis. Fortunately, RM cost less than MM and people will already have them in the house when disaster strikes. Surrounding a solar water purification device with mirrors makes it more efficient because the mirrors reflect off each other and concentrate energy rather than reflecting energy back into space. Using commonly available materials, such as soft drink cans and plastic water bottles, it is possible to produce drinking water from ocean water or contaminated water for less than a penny a liter, and save lives in a disaster.	
<b>Summary Statement</b> Using common recyclable materials, such as soft drink cans and plastic water bottles, it is possible to produce drinking water from ocean water or contaminated water for less than a penny a liter, and save lives in a disaster.	
<b>Help Received</b> My Aunt purchased materials and took pictures.	