



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Sean S. Haas	Project Number J1020
Project Title Solar Powered Water Purification and Distillation through Evaporation	
Abstract Objectives/Goals Not all areas of the world have access to a source of clean water. In some countries people have to drink contaminated water and risk their health to stay hydrated. In nature water is constantly being recycled by evaporation, so I thought of a way to use this process on a smaller scale to purify water. As a second year study this project improves upon previous attempts to purify water with a solar still by observing the effects of different backing materials on overall distillation efficiency. I believed that a still with a reflective backing would produce more water than one with a black or clear backing because it would reflect any light and heat that was not originally absorbed by the water tray back into the water. This causing a double trough parabola effect, which would make the water hotter and cause more evaporation.	
Methods/Materials A glass cylinder was used for a condenser unit. Inside was a black metal tray used to hold the dirty water. This was placed on a frame which held a trough parabola underneath it. The parabola would collect the light and bounce it back onto the tray full of water. This was then placed under heat lamps for 12 hours. The heat lamps were then turned off for another 12 hours. This alternating cycle represented a day of solar radiation. This was repeated a total of 12 times, 4 trials for each variable. I had two variables, a black background and a reflective Mylar background. My control was a clear still with no background.	
Results In each trial the reflective-backed still proved to be far more efficient in heating and distilling the water. Both my control and the black-backed still were incapable of creating as much water as my reflective-backed trials. Changing my parabola to a more reflective material substantially increased the energy density of my focal point causing an increase in temperature resulting in a higher clean water yield.	
Conclusions/Discussion My hypothesis was proven correct: the reflective-backed still produced more water than my black-backed or clear control still. I believe this has proven to be a viable means of water purification for Third World countries or for clean water anywhere. I plan on this being an ongoing study, I would like to perfect this still so it could be easily and effectively used to help create clean water that is vital to all life.	
Summary Statement To create a simple and efficient means of solar water purification this could benefit people the world over.	
Help Received My mother helped as inspiration and as my trusty assistant. My father helped proof read papers. John Davis was my solar adviser.	