



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Ava M. Killoran	<b>Project Number</b> <b>J1019</b>
<b>Project Title</b> Fresh Water from the Sea by Desalination	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> California has been through many severe droughts such as the recent drought of 1987-1992, where Santa Barbara turned to desalination, installing a temporary emergency desalination plant. 2013 was the driest year in recorded history in many California areas. The need for freshwater is critical during drought conditions. Since coastal California has access to plenty of sea water, my goal was to build an environmentally friendly solar desalination device and test how temperature and surface area affect its efficiency of freshwater production.</p> <p><b>Methods/Materials</b> I built two solar desalination devices using plastic boxes of different sizes to test the effect of surface area on freshwater yield. I tested the effect of temperature at 80 degrees and 90 degrees Fahrenheit. I was not measuring the temperature of the water, but the temperature of the environment. Each test duration was three hours. I used an artificial heat source to maintain the same temperature for each test but theoretically it could be done with the sun.</p> <p><b>Results</b> A surface area of 330 square inches produced four times as much freshwater as a surface area of 96 square inches at 80 degrees. At 90 degrees Fahrenheit the device produced three times as much freshwater as the same device did at 80 degrees Fahrenheit.</p> <p><b>Conclusions/Discussion</b> My hypothesis predicted that higher temperatures would produce a higher yield because it would increase evaporation and condensation. A higher surface area would create a higher yield because there is a larger surface for droplets to form. My results supported my hypothesis. Surface area had a greater effect on the freshwater yield but temperature is still very significant.</p>	
<b>Summary Statement</b> I built a solar desalination device and tested how temperature and surface area effect its efficiency.	
<b>Help Received</b> My Mom helped revise drafts, helped with cutting and pasting, and photographed.	