



**CALIFORNIA STATE SCIENCE FAIR  
2010 PROJECT SUMMARY**

<b>Name(s)</b> <b>Ronja M. Johnson</b>	<b>Project Number</b> <b>J1909</b>
<b>Project Title</b> <b>Boiling Water: Keep Your Lid On!</b>	
<b>Abstract</b>	
<b>Objectives/Goals</b> The goal of this project is to determine whether water boils faster in a closed container than one which is open. In addition, is there a related difference in the amount of energy used and is this a method for reducing energy usage?	
<b>Methods/Materials</b> Using pre-measured bottled water, and one stainless steel pot, taking temperature readings at regular intervals, and noting the time at which boiling took place. The pot was brought back to original temperature with an ice water bath. Stainless Steel pot w/ handle and Lid 20 x 16.9 fl oz water bottles Thermometer (degrees F) Gas Stove (High Heat setting 8) Timer Digital Camera	
<b>Results</b> The project gave results as expected. The maximum temperature reached with no lid was 212°F. With the lid on, a temperature of 213°F was the high. According to the data, it took an average of 407 seconds or 6 minutes and 47 seconds to reach the boiling point without a lid. The average time with a lid was only 346 seconds or 5 minutes and 46 seconds. This is a 25% decrease in the time to boil the water. This reduction in time also reduced the amount of energy needed to reach the boiling point.	
<b>Conclusions/Discussion</b> The data from these experiments demonstrated my hypothesis to be accurate. Since we are almost at sea level, the pressure from the lid would force a higher boiling temperature. The boiling temperature was 212°F, regardless of the pressure due to the lid. The maximum temperature of the water exceeded the boiling point when the lid was used. The trapped water vapor and heat caused the temperature in the water to exceed the boiling temperature. The time to reach the boiling point with a lid on the pot was reduced by an average of 25% or 1 minute and 1 second. In order to cut down boiling time and energy usage, keep your lid on#	
<b>Summary Statement</b> Does the use of a lid help reduce the time to boil water in a pot? This project looks at a simple way to reduce energy usage in everyday life.	
<b>Help Received</b> My mother helped me with the the organization of my display, and my Dad helped me with graphing the data and helped with the tests themselves.	