



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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<b>Project Title</b>  <b>Boiling under Pressure</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b> The objective of this project is to determine if the boiling point of water can be lowered by lowering the surrounding pressure.</p> <p><b>Methods</b> Filtration flask, hand vacuum pump, rubber stopper, propane burner, and water. First, the pressure in the flask was lowered to the pressures at which I planned to record the boiling points. Next, I heated the water until I saw boiling occurred. Then I recorded the temperature at which the water boiled.</p> <p><b>Results</b> The temperature at which the water boiled was recorded after reaching the desired pressure. The water's boiling point decreased when the surrounding pressure was lowered. Three sets of trials were conducted, each under the same conditions, excluding pressure. Each set had three different tests and each test was conducted three times each.</p> <p><b>Conclusions</b> The boiling point of the water was lower when the pressure surrounding it was lower. My results supported my hypothesis that the boiling point of water is directly connected to atmospheric pressure. When graphed, the relationship between pressure and boiling point resembled a logarithmic curve. In future experiments, I plan to test different liquids as well to find out if this relationship is purely unique to water. I also plan to use a more capable vacuum pump in order to reach lower pressures. This concept can be applied in oil and natural gas drilling to prevent overheating of parts and save money.</p>	
<b>Summary Statement</b>  I showed that the boiling point of water can be decreased if the pressure surrounding the liquid is lowered.	
<b>Help Received</b>  I designed and assembled the apparatus by myself. I performed my experiments and operated the propane burner with the supervision of my father.	