



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Alex J. Keimach	Project Number S1506
Project Title The Effect of Reduced Pressure on the Yield Volume of Popcorn	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective was to determine the effect of cooking corn kernels at reduced pressure on the volume of popcorn they would yield.</p> <p>Methods/Materials An apparatus was built for reducing the pressure at which popcorn was popped using a wok and vacuum cleaner. Two different levels of pressure, 101.35 kPa and 59.98 kPa, were used at which to pop the kernels. For each trial, 47.5 g of kernels were cooked at 176°C with 30 mL of corn oil. Excess corn oil was removed and the wok was allowed to cool to room temperature between each trial. At the completion of popping, when 3 seconds were heard between pops, the heat and vacuum were turned off and the yield of popcorn was measured using a beaker. Kernels that did not pop completely were removed and counted for each trial. Five trials were performed at each level of pressure.</p> <p>Results The experimental results showed an average 40% increase in the average volume of popcorn cooked at reduced pressure to that cooked at normal pressure. The average yield of popcorn popped at normal pressure was 1152 cm³, while the average yield popped at reduced pressure was 1614 cm³, a difference of 462 cm³. The popcorn cooked at reduced pressure also showed an average decrease in the number of unpopped kernels. A visible difference in the shape of popcorn was not observed, however the popcorn popped at reduced pressure looked lighter and fluffier when examined as a whole.</p> <p>Conclusions/Discussion The outcome of this experiment supported the original hypothesis, which stated that popcorn cooked at reduced pressure would have greater volume. This project has introduced a practical and more efficient method for popping popcorn which can be adapted for commercial or domestic use. It has also shown that reducing the external pressure of an explosion increases the size to which the explosion can expand.</p>	
Summary Statement My project is about how reducing external pressure affects the expansion of starch in the process of a popcorn kernel popping.	
Help Received Father helped build cooking apparatus; Mother helped operate vacuum cleaner.	