



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Emily L. Aiken	Project Number J1902
Project Title Testing Gas Laws	
Abstract Objectives/Goals My goal is to determine the effect of pressure and temperature on the volume of air. I hypothesize that higher temperatures and lower pressure increase the volume of air noticeably, even in common, everyday situations. Methods/Materials I used ordinary balloons of several different sizes: small, medium, and large. I experimented with the effect on volume of taking the balloons underwater and to high altitude, as well as heating them in an oven and cooling them in a refrigerator. For each experiment, before, during, and after the test, the circumference of the balloon was measured and used to compute the volume. Every experiment was repeated up to four times for each size balloon. Results I found that balloons increase by 1% in volume per 100 meters of elevation gained, decrease by 6.9% per meter underwater, and decrease by 0.4% per degree Kelvin of cooling. Conclusions/Discussion As expected, the volume of the balloons increased with less pressure or higher temperatures and decreased with more pressure and lower temperatures. The most interesting finding is how large these changes are even under everyday circumstances: small changes in elevation, very shallow water, and typical temperature changes make a significant difference in the volume of balloons.	
Summary Statement My project is about the volume of air at different pressures and temperatures.	
Help Received My brother took the photographs; my parents supervised the underwater and oven experiments, provided transportation, and proofread my write-up; my Dad checked the equations; my science teacher, Mr. Roth, gave me suggestions.	