



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

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Project Title Boiling Down: The Effects of Pressure on Air	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The experiment measured the effects of pressure, at 1, 2, 4, 6, 8, and 10 meters underwater, on air contained in multiple containers of varying lengths, widths, and volumes. It was expected that, due to the properties of Boyle's Law, the more pressure put on the air, the smaller in volume and greater in density the air would become, regardless the container's shape or size. It was also expected that the tallest, skinniest containers would produce the most accurate results because the change in gas volume would be more visible and thus show more precise results for the experiment.</p> <p>Methods/Materials Four groups of 3 containers each were taken upside down (so as not to spill air) on a scuba dive. The level of air in each container was marked using a file at each depth. Once the experiment was carried out, the volume of each container at each depth was precisely measured based on the weight, in ml, of the water contained.</p> <p>Results The air collapsed steadily when under pressure, with a decreasing volume of 100%, 91%, 81%, 70%, 63%, 56%, and 49%, proportionately. The rate that the air collapsed changed seemingly more rapidly during the first few measurements. At 10 meters, which is almost equal to two atmospheres, the air volume of each container was roughly half (47%) of the volume that it had been in the container at 0 meters.</p> <p>Conclusions/Discussion The conclusion is that the greater pressure placed upon a cylinder of air, the lesser in volume, denser, and more collapsed the air will be. Through this experiment the effects of increased atmospheric and water pressure on amounts of contained air were thoroughly investigated. The hypothesis was supported.</p>	
Summary Statement Air was taken down in different containers and the rate that it collapsed and condensed was calculated at 1, 2, 4, 6, 8, and 10 meters to investigate of the natural phenomenon known as Boyle's Law.	
Help Received Grandfather helped hold apparatus steady during dive, and was dive buddy to ensure safety.	