



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Drake J. Lasley</b>	<b>Project Number</b> <b>S1408</b>
<b>Project Title</b> <b>Can You Take the Pressure?</b>	
<b>Objectives/Goals</b> Is it possible to breathe with an extended snorkel at a depth of 396.24 cm (13 feet). If not, what depth and pressure will restrict the ability to breathe?	
<b>Abstract</b> <b>Methods/Materials</b> 1 snorkel, length 396.24 cm (13'), diameter 1.27 cm (1/2"); 1 snorkel, 396.24 length (13'), diameter 2.54 cm (1"); Pressure meter; Weight belt; Meter stick; Calculator; Camera; Glass jar; Pool, with a depth of 396.24 cm, (13') 1. Starting at the top of the pool, get a pressure reading, record the number. 2. Continue down the pool in 30.5 cm (1') intervals, attempting to breathe at each interval. 3. Return to the surface, record results. 4. After recording all data, take the pressure readings and calculate barrier depth. 5. Repeat steps 1-4 with the larger diameter snorkel. 6. To calculate the effect of pressure on a fixed amount of gas, I will fill a glass bottle with air and move down the pool in the same intervals, observing the changes in the amount of water in the bottle.	
<b>Results</b> 1. 30.5 cm (1')-Pressure 782.4 mmHg (15.12 PSI). There was no difficulty breathing. 2. 61 cm (2')-Pressure 804.8 mmHg (15.56 PSI). Breathing was possible, but it was difficult. 3. 91.4 cm (3')-Pressure 827.3 mmHg (16 PSI), resulting in extreme difficulty breathing. 4. 121.9 cm (4')-Pressure 849.7 mmHg (16.4 PSI), and it was no longer possible to breathe. 5. 109.22 cm (3' 7") Pressure 840.3 mmHg (16.24 PSI). I was able to get an 1/8 of a breath. 6. While at these depths, I had a pain in my diaphragm, which was trying to initiate Boyle's Law. 7. I did not feel any difference in the two different diameters. 8. While experimenting with the glass jar and the fixed volume of air, I saw that even at the 30.5-cm (1 foot) level, the air was already being compressed	
<b>Conclusions/Discussion</b> After finishing, I learned that the depth a person can no longer breathe is 109.2 cm (3' 7"). The pressure at this depth was only 840.3 mmHg, or only 16.24 PSI. The difference between the surface pressure and depth pressure was 80.3 mmHg, or 1.55 PSI. When experimenting to see what effects pressure had on a fixed volume of gas, I learned that even at 30.5 cm (1') level the amount of air was already starting to be compressed. When the bottle of air was at the 304.8 cm (10') level, the volume of air was almost reduced by half!	
<b>Summary Statement</b> This experiment will seek to examine if water depth will inhibit the ability to breathe with an extended snorkel.	
<b>Help Received</b> Former Physiology teacher helped provide accurate depth measurement.	