



CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

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Project Title Breathing Exercises and Lung Capacity	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of my project was to find out how different breathing exercises affect lung capacity. I got interested in this project because one of my family members had asthma and used a peak flow meter to measure his expiratory flow. This motivated me to learn more about the lungs and conduct this experiment. I hypothesized that Abdominal Breathing would increase lung capacity the most by strengthening the diaphragm to expand the lungs more.</p> <p>Methods/Materials To do this experiment, I identified five breathing exercises, gathered ten subjects, and measured their initial vital capacity, using a spirometer and the logger pro software. The exercises were done three times a day for five weeks. Twice a week I analyzed their change in vital capacity.</p> <p>Results The hypothesis was not supported. Pushing Out increased vital capacity the most, by 58.62%, because the subject deeply exhales and inhales, strengthening the lungs. Holding the breath in this exercise allows more time for the fresh inhaled air to mix in the air sacs and push out the stagnant air. Chair Breathing increased vital capacity by 30.74%. It includes chanting on the exhale, which slows down the breath, allowing the release of as much stagnant air as possible. In Chinese Breathing, which improved vital capacity by 26.8%, one inhales three times without exhaling, increasing the maximum amount of air inhaled. Abdominal Breathing increased vital capacity by 19.89% and inspiratory volume the most, by 103%, since the subject utilizes the diaphragm to take bigger inhales. Rib Stretch improved vital capacity by 12.92%.</p> <p>Conclusions/Discussion The results show that Pushing Out increased the lung capacity the most, Chair Breathing was second, Chinese Breathing was third, Abdominal Breathing was fourth, and Rib Stretch improved it the least. One can use these results to do a certain breathing exercise for improving specific lung volumes. It is important to have a high lung capacity. With a low lung capacity, the body will have less oxygen to function, less stamina, and a higher risk of a heart attack. This experiment is also useful for asthma patients who can do these exercises to efficiently take in more oxygen. If I were to do this project again, I would have more subjects doing more breathing exercises. I would also make the duration of the project much longer for more results and test other factors such as age, gender, and health conditions on lung capacity.</p>	
Summary Statement Using a spirometer, ten test subjects, and the logger pro software, I discovered how different breathing exercises improve vital capacity.	
Help Received My father bought the spirometer and the software, and the test subjects sincerely performed the breathing exercises.	