



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Nikhil Sundrani</b>  | <b>Project Number</b><br><b>J1223</b> |
| <b>Project Title</b><br><b>The Effects of Air Pollution on Lung Capacity in Adolescents</b>   |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>The objective of my project is to explain the correlation and connection between air quality index, or AQI, and lung capacity in adolescents, or their FEV1 (forced expiratory volume in one second) and FVC (forced vital capacity). According to my research, there is a definite link between the two values.</p> <p><b>Methods/Materials</b><br/>In order to test my experiment, informed consent forms had to be collected from around 30 subjects. First, the AQI of each testing location was obtained. Testing required each subject to inhale and exhale through a spirometer three times from which the FEV1 and FVC of the subjects were obtained. This data was then compared to the AQI of each test site in order to determine the success of the experiment. All subjects were tested in the afternoon for consistency in data.</p> <p><b>Results</b><br/>Subjects from the test site with the worst AQI generally performed worse in the spirometry tests, with significantly lower FEV1 and FVC values. These numbers were then compared to the location with the best AQI of 20, with by far the largest lung capacity values out of any of the tests performed. All four of the sites had subjects aged 10-16; height, weight, and gender typically had similar, more generic values. Results and tests were strictly controlled, with minimal subjects failing to perform the tests correctly.</p> <p><b>Conclusions/Discussion</b><br/>My hypothesis was supported, however my tests proved that a significant difference is needed in the AQI to have a significant difference in the lung capacity function of the adolescents tested. When this difference was achieved, tests proved that the AQI seriously affected the lung capacity. This project can have an important effect on the community. As everyday citizens know that California's Central Valley (where tests were held) has unhealthy air quality, they may not know how it affects their overall lung function. Also, there is a correlation between air quality and lung function and how it affects obesity rates; it is proven that the epidemic in the Central Valley is worse than most other places in California.</p> |                                       |
| <b>Summary Statement</b><br>My project is about the air quality of a specific testing location and its effects and relations to the lung capacities of adolescents in the area.   |                                       |
| <b>Help Received</b><br>My expert, Dr. Kuldeep Gill, educated me on the procedure of spirometry and gave me clearance to do so, and my parent was a designated supervisor.  |                                       |