



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Tiffany Lam	Project Number J1418
Project Title Impact of Boyle Heights' Air Quality on Adolescent Children's FEV1% Values	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to find out if the lung capacities of middle school children living in Boyle Heights, Los Angeles have been compromised by air pollution in their residential area. I believed my testing would reveal compromised values because the Boyle Heights Air Quality Study (Air Resources Board, 2002) measured significant quantities of air pollutants that the Childrens Health Study (Gauderman et. al., 2004) found to have an adverse effect on the lung development of children.</p> <p>Methods/Materials In this study, the main indicator of respiratory health was forced expiratory volume in the first second percent (FEV1%). My participants were 13 or 14 year old residents of Boyle Heights for at least 5 years, from non-smoking homes, and considered non-asthmatic. My control group was a similar population from Palos Verdes, CA. For each participant I recorded height, age and ethnicity. This information allowed me to calculate the range of healthy FEV1% values for each participant by using an On-Line Spirometry Calculator (Hankinson et. al., 1999). I then asked each child to perform a series of breathing exercises into a spirometer, after which I analyzed the spirometry curves in order to calculate their experimental FEV1% value. For each participant, a healthy experimental FEV1% value would fall between their LLN (lower limit normal) and their Predicted FEV1% value.</p> <p>Results Eight out of 60 Boyle Heights participants had healthy FEV1% values. Two out of 46 Palos Verdes participants had healthy FEV1% values. Most children had FEV1% values that were less than their LLN (lower limit normal). Most children in both schools were found to have FEV1% values that are lower than they should be.</p> <p>Conclusions/Discussion My findings show that the lung volumes, and therefore the respiratory function, of the children tested were not what they should be as determined by published spirometry reference values. This confirms my hypothesis. I believe the results of my study turned out the way they did because the pollutants measured in Boyle Heights have been known to cause negative effects on the lung development of children. As a continuation of this study, I would like to study the connection between the income levels of Latin American families and the health of their respiratory function, because many low-income families are living in areas that violate federal air quality standards, (Seedling News, Winter 2004.)</p>	
Summary Statement FEV1% was measured to determine if the respiratory functions of children living in Boyle Heights (who attend Hollenbeck Middle School) have been impacted by the air pollution in their neighborhood.	
Help Received My teacher, Mr. Simonsen, helped me with understanding the software programs needed to collect and analyze my data and he also helped me with editing my project. Dr. Davis, from the Statistics Department at UCLA, gave me suggestions for improving my graphs.	