



CALIFORNIA STATE SCIENCE FAIR 2004 PROJECT SUMMARY

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Project Title The Prediction and Variability of Ozone Levels during Episodes of Severe Air Pollution in the Southern San Joaquin Valle	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals As no specific method of ozone prediction previously existed, we wanted to create one for use on high ozone days so it could be determined which hours of the day were safer than others to be outside. Increased public awareness of the hourly variations of ozone could lead to a heightened interest in improving air quality, so an experimental analysis of ozone variations was deemed appropriate, and, moreover, necessary.</p> <p>Methods/Materials We obtained the 2001 ozone readings from the Air Resources Board on CD-ROM format and organized it by date and hour. We color-coded our 2001 ozone readings chart, and used the information derived from it to formulate graphs. We created individual graphs for each of the seven ozone-measuring stations in the southern San Joaquin Valley, our subject of study (its ozone rating is within the top three worst in the country). Based on the images, unique patterns were distinct for each location, so we reasoned that a system of prediction was definitely possible. We generated more graphs with different combinations of the data to try to produce more patterns. After more organization, we obtained equations for our graphs depending on which time of day and year was in question. A second method, a type-curve, was used to obtain another set of graphs based on time of year, time of day, and predicted temperature against ozone concentration.</p> <p>Results The culmination of the project resulted in several notable findings. We discovered that since every station with the confined region of the southern San Joaquin Valley has its own unique trend in ozone variation, it is impossible to designate a generalized time period to the entire nation in which it is #unhealthy to exercise#. The Air Resources Board of America had incorrectly proposed that people not exercise during the hours of 9 a.m. to 6 p.m. during (unidentified) times of high ozone levels. Based on our graphs, we were able to develop specific rules for the curves in two methods.</p> <p>Conclusions/Discussion We determined that in the southern San Joaquin Valley, people should not exercise between the hours of 7 a.m. and 7 p.m. during times of the year up to 120 days before or after the summer solstice. Additionally, we developed two methods (trend-fitting and type-curves) of predicting ozone concentration, which we had been told by representatives of the Air Resources Board and the Air Quality Management Department was impossible to do.</p>	
Summary Statement The project's purpose was to analyze the effectiveness of existing recommendations as to when it is safe to exercise, as well as to develop a predictive method of determining ozone concentration.	
Help Received Dr. Deborah Drechsler of the Air Resources Board helped us interpret and de-code information; Kelli of the Air Quality Management Department (Fresno base) was interviewed about air quality and ozone formation.	