



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Natalie Gallagher; Connor Lydon	<b>Project Number</b>  34125
<b>Project Title</b> Secret of San Lorenzo Valley's Atmosphere: Vertical Meteorological Measurements Part 2	
<b>Abstract</b> <b>Objectives/Goals</b> To determine the affect of atmospheric inversions on ground particulate matter 2.5 (PM 2.5) levels. To compare San Lorenzo Valley's particulate matter 2.5 levels to neighboring areas. To take into account vapor pressure by using the standard of Virtual Potential Temperature and to determine if this has an effect upon on the atmospheric inversions of PM 2.5 levels. We hypothesize that fluctuations in vapor pressure will have little effect upon atmospheric inversions and ultimately PM 2.5 levels. <b>Methods/Materials</b> We used: radiosondes, 200g balloons, helium, parachutes, dereelers, an iMet 3050 Sounding System, and data from EBAMs. In the 2012/13 season we collected atmospheric data over a period of three months, launching weather balloons three times a week, twice a day to obtain atmospheric inversion data. This year, we launch weather balloons when inversions are forecasted to be present or if other drastic changes in weather patterns are seen. We collect our data by weather balloon, compile, then analyze it. <b>Results</b> Particulate matter 2.5 clearly was affected by atmospheric inversions, and increased greatly on inversion days. In some cases, PM 2.5 levels were "unhealthy" on inversion days and "healthy" on non-inversion days (determined by our Modified Air Quality Index table). San Lorenzo Valley's topography had an evident affect on PM 2.5 levels. Vapor pressure fluctuation did not have a major effect on the inversions (as determined by temperature recordings) and as a result little effect on PM 2.5 levels. <b>Conclusions/Discussion</b> Inversions do affect levels of particulate matter 2.5, and due to this San Lorenzo Valley experienced many unhealthy days for particulate matter 2.5. San Lorenzo Valley experiences much higher particulate matter 2.5 levels due to its topography. Differing vapor pressure does not affect atmospheric inversions and as a result does not effect PM 2.5 levels in San Lorenzo Valley. Our data has supported our hypothesis.	
<b>Summary Statement</b> We analyzed the effect of atmospheric inversions on particulate matter 2.5 levels in San Lorenzo Valley with weather balloons and EBAMs; also, vapor pressure has little effect upon atmospheric inversions and PM 2.5.	
<b>Help Received</b> Scott Norton trained us for data collection; Bob Nunes and Mike Gilroy helped us interpret data; and the Monterey Bay Unified Air Pollution Control District donated money and data; internet donated money and equipment.	