



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jennifer L. Eggers</b>	<b>Project Number</b>  22676
<b>Project Title</b> <b>What Are the Physical and Chemical Properties of the Soil in Front of Riverside Cement in Oro Grande?</b>	
<b>Objectives/Goals</b> I did this project because I was curious to know how different the soil in front of Riverside Cement Company was and why. My goal was to find the physical and chemical properties of the soil. <b>Abstract</b> <b>Methods/Materials</b> <ol style="list-style-type: none"><li>1. Took 2 samples at two depths at 5 locations, each a quarter of a mile downwind from the plant</li><li>2. Ran each sample through a ASTM #10- 2mm sieve, anything above this size was considered gravel and therefore not a part of the experiment</li><li>3. Took a digital measurement for the pH of each sample</li><li>4. Measured 1/3 of a gram of each sample and set up a test using hydrochloric acid at 10% to check the volume of CO(2) that was released from each sample</li><li>5. Used these numbers to relate the volume of CO(2) and the temperature of the lab to the percentage of CaCO(3) that was in each sample</li><li>6. Mixed 50g of soil, 150ml of distilled H2O, and 100ml of HMP (Sodium Hexametaphosphate) solutit in flasks and placed on a shaker table</li><li>7. Cleaned each solution on a sieve in order to rid the soil of the HMP solution and baked this new group</li><li>8. Took each sample and sent it through 6 sieves in a sieve shaker for one minute and measured amounts of soil at each sieve level</li><li>9. Ran the CaCO(3) tests again this time only using the soil taken off the #18 sieve on each sample</li><li>10. Ran a test on the electrical conductivity of each soil sample.</li><li>11. Came to a conclusion about what was occurring outside the Riverside Cement Company</li></ol> <b>Results</b> <p>The pH levels ranged from 8.33 to 11.08. The CaCO(3) content ranged from 8% to 40%. The electrical conductivity ranged from .4 to 6.7.</p> <b>Conclusions/Discussion</b> <p>I came to the conclusion that there is something unusual happening outside the Riverside Cement Company. The normal soil range is 5-10 and for this area the average soil pH, according to the Ut Department of Agriculture Soil Survey, is 7.4-8.4 which most of my soil samples didn't run under 8.4. It is true that the white film will cause the stomata to get clogged and stunt growth of the plant life of the area. Even from observation I could tell that the topsoil was very thick, hardly breakable, and that water was going to have a hard time seeping into the soil. These are likely related to the fact that there is a high percentage of CaCO(3). It is the CaO(3) that causes the cement properties.</p>	
<b>Summary Statement</b> The project shows a variety of tests that express different properties and I attempt to find distinctions about the soil particularly around the Riverside Cement Company.	
<b>Help Received</b> Father helped with graphs; Carrie Ann Houdeshell and Peter Fahnestock, soil scientists for the US Department of Agriculture, Soil Conservation Service supervised lab work in the Department of Agriculture lab	