



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

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Project Title The Role of Soil Minerals in Mitigating the Effects of Acid Rain	
Abstract	
Objectives/Goals The objective of this experiment is to determine if sand, soil, and lime can lessen the acidity of simulated acid rain.	
Methods/Materials Glass column was filled with sand (the control), lime and sand, or soil and sand. Then a 0.005 M sulfuric acid was poured into the column, and collected after passing through. The molarity of the solution after passing through the soil was determined using an acid base titration, with sodium hydroxide or sulfuric acid. The pH of the solution after passage was measured using pH paper. Stoichiometry was then used to determine the initial and final amounts of hydrogen ions. From these values the percent by which the number of hydrogen ions decreased was found.	
Results The lime decreased the number of hydrogen ions by about 24%, the soil by about 4%, and the control by about 1%. The pH level was 2 at the start of the experiment and passage through lime raised that number to about 10.5, the soil to about 5.3, and the control to about 5. The lime so drastically changed the pH of the solution because it is basic.	
Conclusions/Discussion Since regular rain has a pH of about 5.6 and the soil minerals decreased the pH of acid rain from about 2 to 5.6, these results align with existing data. Current research indicates acid rain does not affect greatly effect ground water supplies because its acidity is negated by the rocks through which the rain flows. This information should encourage conservationists to focus on the acidity of bodies of water and areas covered with thin layers of soil.	
Summary Statement This experiment aimed to find the effect of sand, lime, and soil, on the molarity of a sulfuric acid solution, which simulates acid rain. Passage through the minerals did revert the acid rain to the acidity expected in regular rain.	
Help Received Worked Ms.O'Neill my chemistry teacher's lab, Dr.Yoder at Franklin and Marshall College sent me a lab setup, My classmates helped me clean equipment	