



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Carlisle A. Williams	Project Number 22540
Project Title How Does Acid Rain Affect the Cell Structure of Spirogyra and Plant Life within Our Ecosystem?	
Objectives/Goals My objective was to determine whether water that contains a measurable amount of acid with a pH level below 7 (to simulate acid rain) will negatively affect the cellular structure of Spirogyra and if so, to determine which is more harmful, sulfuric or nitric acid. The sulfuric and nitric acid are administered to simulate acid rain in six fishbowls containing two liters of distilled water and Spirogyra cultures. Two fishbowls will have no acid and neutral pH. Two fishbowls will have 3cc of acid and a 6.0 pH. Two fishbowls will have 12cc of acid and a 3.0 pH. Abstract Methods/Materials The materials used in the experiment were six Spirogyra algae cultures, six one-gallon (3.79 liter) fishbowls, 12 liters of distilled water, two quarts soil/water mixture (5mg soil and one liter tap water.) Also, six lamps (each with a 40-watt bulb, thermometer, dropper cc-calibrated), a 200x microscope, microscope slides, a pH indicator, and 15cc of 90% water and 10% sulfuric acid (3cc for the second bowl, 12cc for the third bowl), and 15cc of 90% water and 10% nitric acid (3cc for the second bowl, 12cc for the third bowl.) I let the algae cultures grow for ten days. I added the correct amounts of acid to the bowls. I took samples from all bowls 24 hours and 48 hours after the "acid rain" was administered. Results After careful observation and processing of the experiment's data, I accepted my hypothesis as correct. My hypothesis is correct because both concentrations of the sulfuric acid rain simulation damaged the Spirogyra cell structure to a greater degree than the nitric acid. Though the nitric acid rain simulation had similar damaging effects to cell structure and color, in both concentrations and pH levels, the sulfuric acid seemed to create greater cell damage and therefore would be considered more harmful to plant life. Conclusions/Discussion My results supported my hypothesis and proved that sulfuric acid is more harmful to the cellular structure of Spirogyra than nitric acid. These findings are important because among other things, they show that acid rain negatively affects our ecosystem because it damages the most basic levels of the food chain and thus jeopardizes the higher forms of life. Acid rain also causes changes to the atmosphere, more pollution, and damages trees, which absorb carbon dioxide and produce oxygen.	
Summary Statement How does acid rain affect the cell structure of Spirogyra and plant life within our ecosystem?	
Help Received Father purchased sulfuric and nitric acid from Tri-ess Sciences Inc.	