



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Emily J. Carrera	Project Number S2003
Project Title Growing Vitamins: The Environmental Effects on Plant Nutrition	
Objectives/Goals The goal of my project is to see how different environmental factors effect the nutrients in plants by growing tomato and egg plants with magnets and acid rain.	
Abstract Methods/Materials I created the 6 different greenhouse environments out of individual plastic containers. Then I created the acid rain by boiling water from a beaker, collecting the vapors through a plastic tube, to a cooling system (a box made out of foil mounted on a block of wood) and into the plastic greenhouse. I coated the inside of the cooling system with vinegar to create the "acid". I did this twice in 5 days. For the magnetic environment I added the magnets to 2 of the greenhouses for 10 days. To test the amount of nutrients extracted I cultured bacteria in Petri Dishes with agar gel. Then I extracted plant nutrients by drying out leaves under a heat lamp, pulverizing it with acetone and collecting the green solution. The solutions were added to the cultures to be observed. Plant nutrients were extracted once again after the testing period to be used for comparison and added to new bacterial cultures. I observed these cultures with a light microscope to monitor bacterial behavior.	
Results The bacterial cultures proved that the magnetic environment helps to concentrate nutrients in the leaves of the plant because this culture lasted the longest (meaning that there were more nutrients present to sustain its life). These leaves also came out to be very dark. The bacterial cultures that had the nutrients extracted from the acid rain plants proved to be nutrient deficient because this bacteria died the quickest. These leaves had turned light green.	
Conclusions/Discussion Growing plants with magnets helps to concentrate the nutrients in the leaves because some of the nutrients in plants such as magnesium, sulfur and iron are magnetic. They are attracted to the magnetic field and concentrate in the leaves which are in direct contact of that field. Growing the plants with acid rain kills the plant because the acid kills the nutrients which are used by the plant to survive. By doing this experiment, we can see that the way to gain the most nutrients in a plant is to place the magnets around the plant. We can also see how harsh chemicals effect plant nutrition. If plants are nutrient deficient, then we as humans (and consumers of the plants) are not receiving the nutrition we need for our bodies to properly function.	
Summary Statement The goal of my project is to show how different environments can effect the nutritional quality of plants.	
Help Received My teacher (Mrs, Flagan) provided most supplies and workspace.	