



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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| Name(s) Anthony J. Neuberger | Project Number 22177 |
| Project Title Will Greenhouse Gas Accumulation Help Feed the World? | |
| Abstract Objectives/Goals Conversion of fuels to energy is known to increase the concentration of carbon dioxide in our atmosphere and this, in turn, can have profound effects on our environment and the quality of our lives. We hypothesized that a small increase in the atmospheric carbon dioxide concentration would increase the temperature within our experimental chambers and result in accelerated germination rates of 3 common vegetables: cucumbers, squash and beans. Methods/Materials To test our hypothesis we planted cucumber, squash and bean seeds into 3.78 liter jars containing plant soil. Using a calibrated instrument, carbon dioxide was added to yield 5%, 20% or 100% carbon dioxide. The control jar contained atmospheric levels of carbon dioxide. Jars were maintained in shade or sunlight for 14 days after which the temperature of the soil was determined, the pH of the water was measured and the seeds were inspected for germination. Results When jars were maintained in sunlight, the addition of carbon dioxide resulted in elevated soil temperature and decreased pH. Seed germination was noted only in jars that did not receive extra carbon dioxide. In contrast, jars that were maintained in the shade did not show a difference in soil temperature or pH. The germination rate was similar in all jars; however, more germination was noted in the control jars and the resulting plants grew faster compared to jars that were supplemented with carbon dioxide. Conclusions/Discussion The results of this study proved that my hypothesis was incorrect. Even increases in the atmospheric carbon dioxide concentration as small as 5% was sufficient to have important negative effects on the environment. As carbon dioxide levels in the atmosphere increase, we expect to see both higher global temperatures and more acidic rain. As I demonstrated in this project, one or both of these changes can result in lower germination rates of food plant seeds and that could lead to less food being produced for the world. | |
| Summary Statement This project was designed to determine what effect in any, increased atmospheric carbon dioxide levels will have on seed germination and plant growth rates. | |
| Help Received Mother and father proof read report, father added carbon dioxide to containers | |