



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) John A. Kaufman	Project Number J0511
Project Title Heatin' It Up! A Study of the Greenhouse Effect	
Abstract Objectives/Goals The objective of my experiment was to determine how different amounts of carbon dioxide in air affect the temperature of the air when exposed to light. My hypothesis was that more carbon dioxide would result in higher air temperatures. Methods/Materials To run my experiments I designed a test chamber. I used vinegar and baking soda to make the carbon dioxide in a coffee can. I stuck three thermometers through the side of the coffee can to read the temperatures at different heights of the can. I positioned a lamp above the can to simulate the sun by providing heat and light. I read the thermometers at different time intervals with the light on until the temperatures stopped rising, then turned the light off and read the temperatures until they reached room temperature. I compared the readings of these thermometers at different time intervals with those of a fourth thermometer that measured the room temperature at the same time intervals. I ran six experiments: no vinegar or baking soda, 35 ml. vinegar with no baking soda, 35 ml. vinegar with .4g baking soda, 35 ml. vinegar with .8g baking soda, 35 ml. vinegar with 1.6g baking soda, and 35 ml. vinegar with 4g baking soda. Results The maximum temperatures ranged from 8.1°C to 9.2°C above room temperature, however, there was no clear relationship between the amounts of baking soda (CO ₂) and the maximum temperatures. The time it took for the air in the can to cool down ranged from 60 minutes to 110 minutes and increased in relation to the amount of baking soda (CO ₂). Conclusions/Discussion My hypothesis was not correct. This is surprising, since it is known that carbon dioxide in the atmosphere causes the greenhouse effect. My conclusion is that more carbon dioxide in the air caused the air to retain more heat and take longer to cool down. When this is applied to the Earth's atmosphere, my hypothesis is true because as the amount of carbon dioxide in Earth's atmosphere increases, the atmosphere will hold more heat, causing the temperature to rise eventually.	
Summary Statement I investigated the relationship between the amount of carbon dioxide in air and the temperature of that air when it was exposed to light.	
Help Received My father gave me some advice on the design of the test chamber and both of my parents gave me advice on organizing the poster.	