



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Vivian R. Chiang	Project Number J0804
Project Title The Greenhouse Effect and the Warming of the Surface	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment is to emulate greenhouse effect and to test how different gases affected the thermal equilibrium temperature. The hypothesis was that carbon dioxide has a stronger greenhouse effect than normal and dry air and that normal air has a stronger greenhouse effect than dry air.</p> <p>Methods/Materials Three tests were designed in this experiment: normal air test, dry air test, and carbon dioxide test. In an aquarium tank, a box of sand was placed, along with a container thermometer and humidity sensor, a box of desiccant, and a glass of vinegar. Also, a surface thermometer was placed outside of the tank, with a thermocouple leading into the tank and ending right below the surface of the sand. A tight glass cover was placed on top and a set of lights shone directly above the tank. During the experiment, the surface temperature, container temperature and the humidity were recorded every 5 minutes until the thermal equilibrium was reached. In the normal air test, the tank was filled with normal air and the lids of the desiccant and vinegar glass were closed. In the dry air test, the desiccant lid was opened; in the carbon dioxide test, 8 grams of baking soda was added to the glass of vinegar and the desiccant lid was closed.</p> <p>Results In the carbon dioxide test, the thermal equilibrium temperature was about two degrees higher than the ones in the normal and dry air test. The thermal equilibrium temperatures of the normal and dry air tests were very similar.</p> <p>Conclusions/Discussion In conclusion, carbon dioxide is a stronger greenhouse gas than normal and dry air. However, the comparison between normal and dry air was inconclusive because the humidity and the room temperature were not controlled very well during the experiment.</p>	
Summary Statement My project is about testing different greenhouse gases and it was found that carbon dioxide was a stronger greenhouse gas than normal and dry air.	
Help Received Parents helped record some of the data	