



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Alden D. Deran	Project Number J1606
Project Title Is Human-Generated Carbon Dioxide Escalating the Greenhouse Effect?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Although it is known that CO₂ absorption of infrared radiation emitted from the Earth's surface traps heat inside the atmosphere, and that this greenhouse effect has been keeping the Earth at a livable temperature for millions of years, the great debate about human generated CO₂ goes on. Has the tremendous increase in CO₂ caused by humans escalated the greenhouse effect? Is CO₂ the most significant greenhouse gas that humans are creating? My experiment attempts to determine if increased CO₂ increases infrared absorption, and therefore increases global temperatures.</p> <p>Methods/Materials I sealed the ends of a PVC pipe with plexiglass windows, and drilled holes near the ends of the pipe in order to attach two hoses. One of the hoses delivered CO₂ from a CO₂ canister with a pressure release valve, and the other connected to a pressure gauge. I sealed all joints with epoxy glue or hose clamps.</p> <p>I pointed a heat lamp, which has a variable transformer to regulate intensity, through one end of the pipe, and a wide-range infrared detector with amplified signal, through the other end. First, I measured the voltage output when the heat lamp and detector were turned on, to determine the steady baseline voltage. Then, I opened the valve on the CO₂ canister, noted the increased pressure in the pipe, and then noted the change in the baseline voltage.</p> <p>Results For an increased pressure of about 15 pounds, I detected an average drop in the voltmeter reading of about 0.1 millivolts. The effect of adding CO₂ was greatest when I ran the experiment for the first time after airing out the pipe. Then, as I added more CO₂, there continued to be decreased voltage, but the drops were not as significant. I repeated the airing out and repressurizing sequence several times and noted the same results.</p> <p>Conclusions/Discussion My calculations determined the percent extra absorption to be approximately 0.12%, per pound, per square inch increase in the amount of CO₂. Since this figure is based on a 0.1 millivolt change, I think it would be beneficial to improve the signal-to-noise ratio of my experimental apparatus. This will be the focus of continued research on this topic.</p>	
Summary Statement The purpose is to determine if human-generated Carbon Dioxide absorbs infrared enough to significantly escalate the greenhouse effect.	
Help Received Father acted as a laboratory assistant when I needed extra help monitoring equipment.	