



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Paul Rendon; Alisa Smith</b>	<b>Project Number</b> <b>S0830</b>
<b>Project Title</b> <b>Carbon Monoxide Emissions from Common Consumer Items</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Our goal was to test and see if common consumer items could produce unhealthy levels of carbon monoxide in an enclosed room. The items we tested were candles, incense, kerosine lanterns, a gas camping stove, a generator, a hibachi, and a propane heater. We defined 'unhealthy' as exceeding 35 ppm. <b>Methods/Materials</b> We set up our experiment in an enclosed storage room the size of a small bedroom where a video recorder captured the experiment for an hour. We observed the experiment on a computer in an external room where we could make sure the CO limit did not exceed 35 ppm. For the items that did exceed this limit, we stopped the experiment.  Materials used: CO detector, video cameras, Final Cut Pro, thermometer, timer, MacBook Pro, hibachi, incense, propane heater, candles, generator, kerosine lanterns, gas camping stove, storage room, metal table, fans, matches, lighters, lamp oil, tripod, charcoal, and fiberglass. <b>Results</b> We discovered that the generator, hibachi, and incense produced unhealthy levels of CO. The heater produced some, but not up to an unhealthy limit. The candles, kerosine lanterns, and gas camping stove produced no detectable CO. <b>Conclusions/Discussion</b> We were surprised by some of the outcomes of our experiment, while other outcomes did not surprise us. It surprised us that incense, a seemingly innocent item, produced so much CO. It also surprised us that the gas stove produced no detectable CO, especially since it had warning labels that said it did. We figured the generator would be a heavy producer of CO, but we did not think the CO levels would rise so fast. We thought the heater would produce more CO than it did. The results from the hibachi, kerosine lanterns, and candles were not surprising.	
<b>Summary Statement</b> For our project, we tested common consumer items for unhealthy amounts of carbon monoxide emissions.	
<b>Help Received</b> Jeff helped set up the technical equipment and supervised us to ensure safety, Parents helped with graphs and board assembly.	