



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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Project Title Cold to Caliente: A Study of Materials' Ability to Absorb and Retain Heat	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals We are studying several material's (sand,air,gravel,air and ash) ability to absorb and retain heat. We think soil will absorb and retain the most heat based on our observations of flowerbeds and pathways when they have been in the sun.</p> <p>Methods/Materials We used five identical bottles, all painted black, to hold the five materials studied: sand, air, soil, gravel, and ash. We put a thermometer into each bottle and got them all to the same starting temperature. Using heat lamps, we monitored their temperature every five minutes for thirty minutes. After turning off the lamps, we monitored the temperatures for another thirty minutes. We had to do this multiple times.</p> <p>Results The ash had the highest net gain in heat, 11.1 degrees. The sand had the second highest net gain in heat, 9.6 degrees. The soil came in third with a net gain of 8.1 degrees. Interestingly, although the air absorbed the most heat it also lost the most, so it ended with a net loss of .4 degrees.</p> <p>Conclusions/Discussion Our original hypothesis was wrong. We understand that these results reflect the density of the materials and their ability to absorb and give off heat. The less dense materials will absorb heat faster, but they also give it off quickly. Air is an example of this. Although gravel should be more dense than ash or soil, we think the gravel did not do as well because of the air spaces between. There was the least amount of air in the ash, which probably caused it to retain heat the best even though gravel, sand and maybe even soil are more dense.</p>	
Summary Statement We are studying several materials ability to absorb and retain heat.	
Help Received Our teacher helped us think through the project and the results.	