



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> Mary N. Maillard	<b>Project Number</b> <b>J1314</b>
<b>Project Title</b> <b>The Best Way to Beat Heat</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to learn which type of construction material, among iron, wood, clay, glass and rigid foam, prevents heat transfer from the outside to the inside of the building.</p> <p><b>Methods/Materials</b> Materials used were: Iron/ metal, Wood, Clay, Glass, Rigid foam, Fiber glass bat, Thermometer, Timer, Heater, Insulated box built by myself. To be able to test each material, I built a large box of wood insulated with expanding spray foam from a smaller box placed inside. One side of the two boxes remain open.</p> <p>1. I place a thermometer in the small box and turn the box on its side so that it faces the heater. 2. I place a piece of fiber glass bat with a hole cut in the middle in the front of the smaller box to guarantee a constant insulation for each material that will be tested. 3. I grab a time and remote display. 4. I track a starting degree for my control. 5. At the same time, I start the heater at 1500 watts and the starter set for five minutes. 6. When the timer rings, I track the temperature and reset the timer for another five minutes. 7. I would repeat step 5 until I reach 30 minutes. 8. When I have tracked the last temperature, I stop the heater and place the box outside until it reaches room temperature. 9. I repeat steps 1 to 8 four more times for the control. 10. When the temperature is the same as room temperature, I grab a square of the first material I want to test and duck tape it in front of the smaller box's opening with the thermometer inside. 11. I track the temperature. 12. At the same time, I start the timer set for 5 minutes and the heater at 1500 watts. 13. I track the temperature every 5 minutes. 14. I repeat step 8. 15. I repeat steps 10 to 13 four more times with each material.</p> <p><b>Results</b> Foam was the best insulator, then metal, then wood, then clay and the last was glass.</p> <p><b>Conclusions/Discussion</b> The best type of construction material would be metal. Even though it wasn't as good as rigid foam, it also wasn't as thick. This means that if you have a house made out of metal, the metal will heat up but it will block the heat from actually affecting the inside of the house. I would like to test how standing air affect the materials or how the radiation of the sun affects the insulating material. Some other variables to test are the thickness of the material and how it affects the heat transfer. To see if metal is as effective with cold air as it is with hot air would also be interesting.</p>	
<b>Summary Statement</b> Comparing different thermal insulation materials.	
<b>Help Received</b> Father helped to build the box.	