



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> M. Peter Kedzierski	<b>Project Number</b> <b>J1211</b>
<b>Project Title</b> <b>Keep the Heat</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Objective: The objective of the experiment was to figure out which insulator will keep bottles of water the hottest the longest and coldest the longest. Hypothesis: It was predicted that the best two for keeping the water hot would be cotton and aluminum foil and the worst two would be plastic and the Styrofoam sheets. Also, it was hypothesized that cotton and aluminum foil would be the best for cold and the worst two would be plastic and newspaper.</p> <p><b>Methods/Materials</b> Materials: The seven insulators used were cotton, aluminum foil, newspaper, bubble wrap, plastic, Styrofoam sheets, and fleece. Procedures: The cold test was performed by putting the bottles that were filled with water in the refrigerator for at least 12 hours then taking them out and wrapping them in the insulator. The bottles were then placed back in the refrigerator for five minutes to stabilize the thermometers. The bottles were then taken out and the temperature was recorded every five minutes for five hours or until the temperature was constant for three consecutive readings. With the hot water testing bottles were wrapped with the insulation first and then the hot water from an electric coffee maker was poured into the bottles. The same procedures of measuring the temperature of the water that was used for the cold water testing were used for the hot water testing.</p> <p><b>Results</b> Results: It was found that the aluminum foil and cotton were the best insulators for keeping the water cold while the Styrofoam sheets and the bubble wrap were the worst two insulators for keeping the water cold. The best insulators for keeping the water hot were cotton and plastic while the worst two insulators for keeping the water hot were the aluminum foil and the bubble wrap. Overall, it was found that the best insulator was cotton while the worst insulator was the bubble wrap.</p> <p><b>Conclusions/Discussion</b> Conclusions: The reason why cotton worked the best is because there wasn't as big of air pockets. This made is so that there is not as much convection, which is the movement of molecules to move heat and that is why bubble wrap is a terrible insulator. If the project was done again, the bottoms of each of the bottles would be wrapped so it could be determined if it made a difference in the results.</p>	
<b>Summary Statement</b> The purpose was of this project was to determine which insulator would work the best at keeping water in bottles hot and which would work best at keeping the water cold.	
<b>Help Received</b> Father helped gathering materials and mother helped in preparing board	