



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> Casey J. Mansfield	<b>Project Number</b> <b>J1523</b>
<b>Project Title</b> <b>The Best Hot Water Heater Insulation</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my project was to determine which of four commercially available insulating materials will keep hot water warm the longest. My dad wanted to insulate an older hot water heater, and I wanted to do an experiment to help him decide which type of insulation to use. <b>Methods/Materials</b> I used quart glass jars to simulate hot water heaters. The four insulators I used were Great Stuff Insulating Foam Sealant, Wrap-On Vinyl Backed Fiberglass, Rigid Foam sheathing, and Reflectix, a reflective bubble wrap insulation. Around each of my jars I put 2 inches of a different insulating material, except for the control jar which had nothing wrapped around it. I poured boiling water into each of the five jars, covered each jar with a metal lid, and checked the temperature of each jar and recorded the results every 20 minutes until the water cooled to below 90 degrees. I then repeated the experiment insulating the tops of the jars and wrapping aluminum foil around the insulators that did not have a reflective backing. <b>Results</b> Using the average heat loss per 20 minute interval from the 2 experiments, Reflectix came in first with 7.37 degrees, Great Stuff came in 2nd with 7.41 degrees, Rigid foam came in 3rd with 7.44 degrees, and Fiberglass came in last with 7.82 degrees, as compared with the control which lost 8.96 degrees. Reflectix, Great Stuff, and Rigid Foam were very close, and all three did better than the fiberglass in both experiments. All four insulators kept water significantly warmer than the unwrapped control. <b>Conclusions/Discussion</b> Based on my results, there wasn't a large difference between the insulating qualities of the four insulators I tested. It appears that all four insulators, each in a slightly different way, had the most important quality of an insulating material: the capacity to contain air and thus become a poor conductor of heat. Reflectix did slightly better than the others when using average heat loss as the determining measure. Which insulator did my dad use? Based on my research, he's going to try Reflectix to insulate his hot water heater.	
<b>Summary Statement</b> My project is about determining which of four commercially available insulating materials will keep hot water warm the longest.	
<b>Help Received</b> My mom drove me to the hardware stores to buy my materials.	