



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

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Project Title Some Like It Hot	
Abstract Objectives/Goals The purpose of this project was to compare heating materials that could be used as a backpack warmer in order to keep a person warm in the morning while walking or riding to school without having to put on layers of clothing. Methods/Materials A fabric pouch design was made and three filler materials were chosen: #EZ Heat#, #Grabber Mycoal#, and long grain rice. The EZ heat and Grabber were activated according to the instructions and placed within the pouch. The rice was sealed in the pouch first, and then heated in a microwave for 2 minutes. For each material, a thermocouple was placed on the body side of the pouch and the temperature measured over time, both with and without the backpack in place. The materials were compared for temperature, cost, and weight. Results The rice pouch started at the highest temperature and the Grabber Mycoal was the warmest at the end of the test. The rice pouch was the cheapest material, while the Grabber mycoal was the most expensive. The rice pouch was also the heaviest material, while the Grabber Mycoal was the lightest. Conclusions/Discussion The goal of this experiment was to find the best backpack warmer. Overall, the homemade rice pouch worked best because it could be heated to a higher temperature which held long enough for the walk to school, it molded better to your body making it more comfortable, and it was the cheapest because of a lower cost and you could reuse it. It did have the highest weight, so our next experiments would be to investigate smaller amounts of rice.	
Summary Statement The goal of this experiment was to find the best backpack warmer material	
Help Received Mother taught sewing and helped glue some of the sheets to the board. Father provided thermocouple/multimeter to measure temperature and helped with the graphs.	