



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> Alex S. Garrison	<b>Project Number</b> <b>J0312</b>
<b>Project Title</b> <b>Brain Freeze: How Do Moderately Cold Temperatures Affect Human Physical and Mental Performance?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> My project was to determine if twenty minutes of exposure to fifty degree temperatures would effect subject's ability to perform basic mental and physical tests. My hypotheses were: My subjects will perform basic mental and physical tests quicker when warm than after twenty minutes of exposure to fifty degree temperatures and children will show a greater difference in times between cold and warm tests. <b>Methods/Materials</b> Informed consent was obtained for eight subjects (3 adults and 5 children). Each subject sat on my patio (in similar clothing) for twenty minutes and then completed five timed tests to measure physical and mental ability. The tests included: adding, measuring, copying a number pattern onto their hands, looking up phone numbers, and screwing nuts and bolts(with a wrench or hands). They did the tests inside (when warm) and outside (when cold). Subjects were warmed using heated blankets and hats and sat by a fire for a minimum of thirty minutes. Each subject's total warm and cold tests times were compared and children's results were compared to adults. <b>Results</b> All subjects overall testing times were markedly slower after exposure to cold and children had a greater difference between cold and warm test times than adults. <b>Conclusions/Discussion</b> My conclusion is that even short exposure to cold can significantly affect a person's ability to perform both mentally and physically. This finding is important because it demonstrates that hypothermia can impact us as we go about our daily activities. Chilren's ability to perform on graded school work and tests after winter recess breaks is a concern.	
<b>Summary Statement</b> My project examines the effects of mild hypothermia on subject's ability to perform basic mental and physical tests.	
<b>Help Received</b> My mother helped me with my display and typing. My father timed the tests for me. Mr. Michael Marotta , a local physical therapist , acted as my qualified scientist.	