



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Paul D. McKinney, II</b>	<b>Project Number</b> <b>J0520</b>
<b>Project Title</b> <b>Chillin' Out With Milk: The Effects Fat Has on Freezing Milk</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of my project is to determine if the percent of fat in milk effects the rate at which it reaches zero degrees Celsius. My hypothesis was that the percent of fat in milk does effect the rate at which it reaches zero degrees Celsius. The higher the percent of fat the slower the rate of cooling. <b>Methods/Materials</b> Four common dairy milks were used: Skim Milk(0.02% fat), Homogenized Milk(3.6%), Half and Half(12.25%), Light Cream(20%). A thermometer, a timer, rock salt, ice and 2 containers were also used. A half of a cup of milk was taken and it would sit until it reached ten degrees Celsius. Two and a half cups of rock salt and 12 ice cubes were layered together in one of the containers. Then the cup of milk, with the thermometer in it, was placed into the ice and rock salt. The timer was turned on. When the milk reached zero degrees Celsius, the time was recorded. Three trials were done and the average was taken. Then recorded. This method was done to all four milks. <b>Results</b> My results showed that the least amount of fat in the milk, the least amount of time it took. The Skim Milk(0.2% fat) reached zero degrees Celsius in an average time of 473.3 seconds. The Homogenized Milk(3.6%) took an average time of 583.6 seconds. Half and Half(12.25%) took an average time of 687 seconds and Light Cream took 760.6 seconds on average. <b>Conclusions/Discussion</b> In conclusion, the higher the percent of fat that the milk contained, the more time it took to reach zero degrees Celsius. Therefore, my hypothesis was supported, the percent of fat in milk does effect the rate at which it reaches zero degrees Celsius. The higher the percent of fat, the slower the rate of cooling.	
<b>Summary Statement</b> My project is to find out if the percent of fat in milk effects the rate at which it reaches zero degrees Celsius.	
<b>Help Received</b> Mother helped type Abstract and cut paper. My science teacher, Mrs. McKeown, helped me get my information.	