



# CALIFORNIA STATE SCIENCE FAIR 2005 PROJECT SUMMARY

<b>Name(s)</b> <b>Haruna Asakawa</b>	<b>Project Number</b> <b>J0502</b>
<b>Project Title</b> <b>Nutty Calories</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my experiment was to determine from a selection of different types of nuts which one contained the highest caloric content. My research indicated that the almond would exhibit the highest calorie release, thus, I hypothesized that the almond would release the most heat and raise the temperature of the water the greatest.</p> <p><b>Methods/Materials</b> This experiment began by obtaining the weights of the different nuts involved using a three beam scale. The nuts used were pistachios, almonds, walnuts, pecans, and peanuts. I then weighed a certain volume of water that would be used to measure the heat released. The container for the water was an aluminum coke can, modified by removing the top portion to accommodate the 200mls of water. The nut holder that was used during the burning process was fashioned from a wire paper clip. Finally, I used a wrought iron vase holder to hold the aluminum water container over the burning nut. I measured the temperature change of the water by using a Celsius thermometer and calculated the amount of energy in calories used to raise the temperature of the water. This was done by multiplying the temperature difference by the mass of the water and the specific heat factor for water.</p> <p><b>Results</b> The pecan released the most heat and raised the temperature of the water the most. The amount of heat released in order of decreasing magnitude is: pecan, almond, walnut, peanut, and pistachio.</p> <p><b>Conclusions/Discussion</b> My hypothesis was proven incorrect as the pecan released the most heat. However, this result can be explained by the fact that the initial weights of the pecan were more than the almond. The pecan burned longer and had time to raise the temperature of the water the most. The calculated calories per gram in decreasing order are: almond, pecan/pistachio (tie), walnut, and peanut. I would have gotten better results if the heat that was lost to the air and absorbed by the can could have been captured in the experiment.</p> <p>The applications of nuts to one's health and to bio-technology are very interesting. Nuts are a compact source of calories that also have health benefits like fighting heart disease and cancer. A very exciting area where nuts' highly compact caloric content can be used is in the area of alternative fuels. The oils from the nuts could be extracted and used as an automotive fuel alternative.</p>	
<b>Summary Statement</b> The purpose of this experiment was to examine the caloric content of almonds, pecans, pistachios, peanuts, and walnuts.	
<b>Help Received</b> Mr. Snell, my advisor, gave me helpful suggestions and guidelines to complete this project. My parents supported and guided me throughout this experiment.	