



# CALIFORNIA STATE SCIENCE FAIR 2002 PROJECT SUMMARY

<b>Name(s)</b> Alan T. Vickery	<b>Project Number</b>  22890
<b>Project Title</b> <b>The Amount of Heat Energy Given Off by Various Species of Nuts When Burned</b>	
<b>Objectives/Goals</b> The objective was to test various types of natural nuts for the amount of heat energy each type gave off when burned and to determine which specie burned hottest. <b>Abstract</b> <b>Methods/Materials</b> A calorimeter was constructed so that the amount of heat energy each nut gave off when burned could be measured. The calorimeter was constructed of homemade materials. It consisted of a large coffee can with a series of small holes punched at its base to allow it to function as a chimney, containing heat and ventilating smoke. Two holes were punched at the top of a soup can, and a barbeque skewer was placed through them. A needle was inserted into the middle of a cork. The soup can was hung above the larger can by utilizing the skewer, and one-half cup of water was placed into the soup can. The water temperature was taken with a Fahrenheit thermometer. A nut was placed on the needle inserted in the cork, lit on fire with a match, and placed under the soup can filled with water. It was allowed to burn until burning out or after five minutes, whichever came first. Water temperature was taken promptly and recorded. The water was disposed of, and the soup can was permitted time to cool. The process was repeated for each type of nut until each specie was tested twice to ensure no irregularities occurred. Water was kept at a room temperature of seventy degrees Fahrenheit to ensure that no irregularities resulted as well. The average rise in temperature and amount of Btu each type of nut gave off when burned was able to be calculated from the data collected. <b>Results</b> The results varied during the experiment. Most nuts measured a very small increase in temperature ranging from four to eight degrees Fahrenheit; however, the walnut raised the water temperature an average of twenty-five degrees Fahrenheit and the pecan raised it an average forty-four degrees Fahrenheit. They were also the only two species that were extinguished for safety purposes after the five-minute time limit after each trial. <b>Conclusions/Discussion</b> In conclusion, most nuts tested gave off minimal heat energy when burned except the walnut and pecan. Attempts were made to measure mass during the experiment. At the time it was performed, materials to register the mass of the miniscule nuts were not available. Mass measurements and inclusion of data relating to calories per gram of each specie of nut are additions that will be made to enhance the project.	
<b>Summary Statement</b> The project is about testing the amount of heat energy various species of nuts give when burned and determining which type of nut burns the hottest.	
<b>Help Received</b> Mother helped type project and with board; Grandfather helped by supplying cans, metal hole punch, and such materials; Chemistry teacher Mrs. Poquette helped draft abstract and gave suggestions for improvement.	