



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Chloe C. Ding	Project Number J1307
Project Title Cost-efficient Fire Fuels	
Abstract Objectives/Goals The objective is to find out the most cost efficient fire fuel. Methods/Materials Five burning materials (pine, oak, charcoal briquettes, lump charcoal, fire logs) were split into separate groups of \$1.25 for each trial. A thermometer probe was hanging over the fire with the main unit on a chair nearby. Another thermometer was placed 10 meters away from the fire. The material was burned in a fire pit and the temperatures from the thermometers were recorded every five minutes to see how much the temperature changed. The length of time that the material burned was also recorded. Results The average burning time of charcoal briquettes, fire logs, lump charcoal, pine, and oak were 168.33, 166.67, 136.67, 131.67, and 120.00 minutes, respectively. The average temperature increase of pine, oak, charcoal briquettes, fire logs, and lump charcoal were 10.22, 9.52, 9.47, 8.96, and 6.79 degrees Celsius, respectively. For this experiment, the sum of the temperature increases of all the time points was used to represent the total heat each material gave out. The total amount of heat produced by the charcoal briquettes, fire logs, pine, oak, and lump charcoal were 359.85, 322.57, 286.07, 266.65, and 190.23, respectively. Conclusions/Discussion jk.\\The hypothesis of this project was that oak would give at least 8% more heat than any of the other options, but pine had the highest average temperature increase which was 7.35% more than the next highest average. The charcoal briquettes had the highest total heat and produced 11.56% more heat than the second highest, the fire logs. Though charcoal briquettes did have the longest average burning time, it was only 1% longer than the fire logs, as opposed to the predicted 5% in the second half of the hypothesis. Based on these results, charcoal briquettes are the most efficient choice. They have the longest burning time and the highest total heat output and their average temperature increase is only 0.75°C lower than the average temperature increase of pine.	
Summary Statement This experiment was conducted in order to find the most cost-efficient fire fuel based on the burning time and temperature.	
Help Received My mom saw me through the entire project and gave me plenty of good advice	