CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
Carmon D. Brown

Project Number
34060

Project Title
Fire Starters

Abstract

Objectives/Goals
The purpose of my project was to test if wood hardness affects the time it takes to start a fire when using a bow drill. My hypothesis was that if I use harder woods to start a fire, then the harder woods would burn faster because it takes more energy to turn the bow drill which would create more heat.

Methods/Materials
I checked my hypothesis by measuring the temperature change of a piece of wood after I rubbed it with a bow drill for 1 minute. I used six woods with different hardness for my experiment. The woods had Janka Hardness measurements from 450 to 1450. I made 4, 3/8 inch holes in each wood sample to help hold the bow drill. My bow drill was a 5/8 inch dowel. I used an IR thermometer to measure the temperature of each hole before and after my experiment.

Results
My hypothesis was wrong. The softer woods had a greater temperature change after rubbing them for 1 minute with the bow drill. These woods were rougher and created more friction with the bow drill, which made more heat. The softer woods came closest to 450F, which is the temperature that wood burns.

Conclusions/Discussion
Wood hardness does effect the time it takes to start a fire when using a bow drill. I also learned that the size and shape of the hole in the wood samples changed the results of my experiment. If I did my experiment again I would use a stronger bow and test more holes with longer drill times.

Summary Statement
My project showed how friction works by testing the effect of wood hardness on the time it takes to start a fire when using a bow drill.

Help Received
Dad helped prepare wood and do experiment; mom helped prepare parts of project display

Preliminary