



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Lindsey Lewis; Kaitlin Wright	Project Number S1709
Project Title The Burning Bush: A Flammability Study of 30 Shrub Species Native to the Mojave Desert	
Objectives/Goals If 30 native Mojave Desert shrub species are collected, then a relative flammability rating system can be developed based on the variables of combustibility, sustainability, ignitability, and consumability.	
Abstract Methods/Materials 30 native Mojave Desert shrub species were collected in Dec. & dehydrated. One sample of each shrub species was transported to Edwards AFB Fire Station #2 where testing was conducted using a propane torch, a gallows-like hanging apparatus, moisture meter, triple beam balance, thermocouple, & thermal imager. Each shrub was weighed, tested for moisture %, & photographed against a grid. Each shrub was hung upside-down while a propane torch was swept under the lowest, most dense part. Independent ignition, total burn times, & ignition temp. were recorded. While burning, a picture was taken of the thermal imager screen. After burning, shrub remains were collected, photographed, & weighed. Data was analyzed based on combustibility, measured by max. flame height; sustainability, by independent ignition & total burn times; consumability, the amount of shrub consumed while flaming; & ignitability, time to independent ignition & ignition temp.	
Results An ordinal rating system was established after the testing. Each shrub was assigned a 1,2,or 3 to indicate low, moderate, or high flammability for ignitability, sustainability, combustibility, & consumability. Ratings were averaged to produce an overall flammability rating. Shrubs with the highest flammability rating were Chrysothamnus teretifolius (Needle-leaved Rabbitbrush) and Tetradymia axillaris var. longispina (Longspined Cottonthorn) with overall ratings of 3. Eight other shrubs earned high flammability ratings of >2-3. The shrub with the lowest flammability rating was Lycium cooperi (Peachthorn) with an overall rating of 0.63. Two other shrubs earned low flammability ratings of 0-1; while 17 shrubs were classified as moderately flammable with ratings >1- 2.	
Conclusions/Discussion The data did support the hypothesis. The results show that it is possible to establish a flammability rating system by determining each shrub's ignitability, consumability, combustibility, & sustainability. Although there are other flammability variables such as chemical composition, wind speed, season of collection & etc., this relative rating system is helpful when determining the potential flammability of these 30 native Mojave Desert shrubs.	
Summary Statement 30 different species of shrubs native to the Mojave Desert were collected, and a relative flammability rating system was developed based on the variables of combustibility, sustainability, ignitability, and consumability.	
Help Received Mr. David Charlton/Botanist/ helped with shrub collection; Edwards AFB Fire Station #2/supplied engine bay for testing and thermal imager; Parents/helped with testing.	