



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Josh A. Van Doren	Project Number 36596
Project Title Wild for Wildfire Safety	
Objectives/Goals The objective of this study is to test various new materials for the use as a more effective means of protecting our firefighters in case of emergency situations during a wildfire. Abstract Methods/Materials Tested the fire resistance of lightweight but strong materials as an alternative to the current method of protecting firefighters in an emergency situation. Samples of the current thin fire shelter were tested against samples of 1/2" plywood coated with intumescent paint and as well as samples of a composite panel made of polystyrene sandwiched between two layers of fiberglass and coated with intumescent paint. Multiple samples of each were tested with a propane torch flame while recording the surface temperature on the cool side of the panel for up to one hour or until the flame burned through. Results The samples of the current fire shelter tent used by firefighters during an emergency situation burned through within seconds. The samples of the plywood coated with the intumescent paint, although measuring a lower surface temperature during the period of 373.3 degrees Fahrenheit, burned through within an average of just over 17 minutes. The samples of the composite panel, on the other hand, withstood the flame for the full one hour without burn through at an average high temperature of just under 500 degrees Fahrenheit. The composite panel was also 1/3 the weight of the plywood panel at 192.6 grams per square foot. Conclusions/Discussion After repeated trials with the three samples, the results were very similar. The current fire shelter did not last more than a few seconds against the flame set at a temperature similar to that found in a wildfire. Though the plywood panel lasted longer, the weight and ultimate failing of the panel did not meet the objectives. The composite panel met and exceeded the one hour trial and, though the surface temperature reached the 500 degree range by the end of each trial, the temperature found at 2" and further from the cool side of the panel was bearable to the human hand. The composite panel being extremely light also makes it an ideal candidate for small transportable protective pods that could be placed at a near distance from the firefighters. The strength of the composite panel could also provide protection from falling debris that is not provided with the current system.	
Summary Statement I have determined that the composite panel design with an intumescent paint coating could provide an excellent alternative to the current means of protecting our firefighters during an emergency situation while fighting a wildfire.	
Help Received I had the pleasure of meeting and interviewing a firefighter, Captain Jeff Isaacs, of Cal Fire, Department of Forestry and Fire Protection, Southern Region Headquarters who was instrumental in directing my experiment.	