



# CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

<b>Name(s)</b> <b>Shawn P. Cogan</b>	<b>Project Number</b> <b>S0602</b>
<b>Project Title</b> <b>The Effect of Rocket Fuel Ratios on Burn Rate</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this experiment is to analyze the combustion rates of several ratios of procket fuel and oxidizer, to see which one had the fastest burn rate. <b>Methods/Materials</b> Basic homemade rocket casings, potassium nitrate and sugar, and an ignition switch was used to burn five different ratios of fuel. While volumes differed slightly, density of the different rockets were kept constant. The burn time in cm <sup>3</sup> per second was determined for each ratio, and analyzed on a graph. <b>Results</b> The mixture with the most rapid burn rate was determined to be about 35% sugar and 65% potassium nitrate. However, the burn rate did not decrease equally in both directions of this median. The ratios with excess oxidizer burned faster in comparison to the ratios with excess fuel. <b>Conclusions/Discussion</b> This ratio, although found with Potassium Nitrate as the oxidizer and sugar as the fuel, can be applied to many other concepts, because the same rough ratios applies to similar fuels, including the one used in the solid boosters of the space shuttle. Furthermore, by knowing the correct ratio, the temperature, pressure, and length of the reaction can be found, and used to calculate the most efficient rocket nozzle design for that fuel.	
<b>Summary Statement</b> This project in its present form analyzes the combustion of five different rocket fuels to determine the most rapid burn rate.	
<b>Help Received</b> N/A	