



**CALIFORNIA SCIENCE & ENGINEERING FAIR  
2018 PROJECT SUMMARY**

<b>Name(s)</b> <b>Eric Larson; Jacob Mansbach</b>	<b>Project Number</b> <b>J0613</b>
<b>Project Title</b> <b>Optimum Thrust in Homemade Rocket Fuels</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this study is to test different types and ratios of homemade rocket fuel. <b>Methods/Materials</b> Stump Remover (KNO <sub>3</sub> ), Sugar, Hot Plate, Various additives, protection equipment, mixing devices, recoding device, laptop, pan, rocket casings, fuses We tested multiple types of fuels multiple times to get an average burn rate for each fuel. We then recored the data and compared our results to figure out which fuel we made was the most powerful. <b>Results</b> Five rocket motors of identical dimensions were made, each containing a different compound. Each compound was tested three times, and the average burn rates were observed. The best fuel was observed to be the one that included rust powder and normal sugar. It burned the fastest of any of the fuels made with an average of 9.6 grams per second. This fuel mixture yielded the greatest performance and significantly outperformed three of the five fuels tested. <b>Conclusions/Discussion</b> After reviewing the data, we accept the hypothesis. Looking back over this project, we see that we successfully proved our hypothesis. Compared to a commercially available Estes E motor, we could make 12 complete equivalent motors for the same cost. We also successfully made a fuel that is fast-burning and that provides enough thrust to launch a model rocket. Our best performing fuel had an average burn rate of 9.6 grams per second which is comparable to an Estes motor. This average supports our hypothesis and proves that it is both easy and inexpensive to produce our own solid rocket fuel.	
<b>Summary Statement</b> We created a simple, efficient, and inexpensive rocket fuel at home.	
<b>Help Received</b> We designed, tested, and organized our experiment alone. We received help from Mr. Mark Morey in the chemical aspect of our project.	