



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Landon R. Creighton	Project Number 34747
Project Title Engineering Rocket Science: Can I Make a Small Scale Oxyhydrogen Powered Rocket Launcher?	
Objectives/Goals Design criteria: It needs to launch the rocket. It needs to be safe, not too difficult to build and low cost. It needs to go over twenty feet in the air and be repeatable. Methods/Materials I tested four different prototypes using a two liter soda bottle as the rocket and all used the same fuel cell to generate oxyhydrogen. The first prototype used a traffic cone and a plastic bucket. The second used a pvc pipe. The third used a separate combustion chamber and a one way ball and spring valve. The fourth used a separate ABS combustion chamber. Results Prototype One: When testing, leaks of water and HHO caused a failure to launch the rocket. Analyzed problems and made a new prototype that would not leak. Prototype Two: When testing, tried different amounts of HHO in the rocket (2 l soda bottle). Filled 1/4 full resulted in a flash in the bottle and then a crushing of the bottle from the implosion. Filled 1/2 full resulted in a successful launch. The bottle showed signs of deforming from the heat. The bottle launched repeatedly over 20' high. Filled 3/4 full resulted in the top exploding off the bottle. Analyzed problems of overheating and exploding of the rocket, decided to build a new prototype using a separate combustion chamber. Prototype Three: Tested 10 times that resulted in 5 launches with only one over 20'. Analyzed problems of non launch and low launches. Decided I needed to build a bigger combustion chamber and make the launcher simpler to build. Prototype Four: Tested 10 times that resulted in 10 launches over 20' high. The bottle was inspected after each launch and only had scratches on it from its landings. Conclusions/Discussion After testing my prototypes, analyzing the data, solving the problems and discussing the design with others, brought me to the conclusion that prototype four fit my criteria the best. It always launched safely and always reached heights of over 20'. Although it is the highest cost of the prototypes it is very simple to make. This was a very fun project and I learned a lot about hydrogen and the power of it.	
Summary Statement This engineering project proves from my success that I can make a small scale oxyhydrogen powered rocket launcher.	
Help Received I would like to thank my dad who helped me build the prototypes. I would also like to thank my mom for helping me type, My sister helped to proofread my work.	