



**CALIFORNIA STATE SCIENCE FAIR  
2012 PROJECT SUMMARY**

<b>Name(s)</b> <b>Rann A. Rogando</b>	<b>Project Number</b> <b>J0622</b>
<b>Project Title</b> <b>3...2...1... Combust! What Ratio Is Best?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The experiment was conducted to identify the optimum ratio, or the ratio that would cause the most powerful combustion and loudest explosion, of oxygen gas (O <sub>2</sub> ) to hydrogen gas (H <sub>2</sub> ) in a rocket, or more specifically, a micro mole rocket. It was expected that the rockets with a 2:4 ratio of oxygen gas to hydrogen gas would produce the loudest explosion. <b>Methods/Materials</b> Five groups of five, graduated, and congruent pipette bulbs were filled with varied amounts of oxygen gas and hydrogen gas, the ratio of which have been predetermined (1:5, 2:4, 3:3, 4:2, and 5:1). Initially, the gas generators were formed; hydrogen gas was produced by combining hydrochloric acid (HCl) and mossy zinc in a test tube with a one-hole rubber stopper, and oxygen gas was produced by combining hydrogen peroxide (H <sub>2</sub> O <sub>2</sub> ) and freshly-prepared yeast. Water displacement was the method used to identify the amounts of each gas present in the micro mole rocket. The explosions# volumes were measured using a sound level meter. <b>Results</b> The group of micro mole rockets with a 2:4 ratio of oxygen gas and hydrogen gas produced the loudest combustion, averaging at about 94.04 dBA. <b>Conclusions/Discussion</b> As was hypothesized, the micro mole rockets with a 2:4 ratio of oxygen gas to hydrogen gas produced the loudest explosions, therefore the most powerful combustion. The ratio produced the most efficient combustion, because it is similar to the theoretical or stoichiometric combustion ratio of two moles of hydrogen gas per one mole of oxygen gas (Avogrado#s law: volume ratio=mole ratio).	
<b>Summary Statement</b> The project is on the combustion process that happens inside the combustion engines of space shuttles and some automobiles.	
<b>Help Received</b> Parents bought materials; Instructor (Emily Hoffman) ordered materials and assisted in researching and formatting; Siblings helped conduct experiment and take pictures.	