



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Connor M. Lynch</b>	<b>Project Number</b> <b>J0218</b>
<b>Project Title</b> <b>Hydrogen Fuel: Clean and Powerful!</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this project was to demonstrate that by replacing the fuel source of a gasoline combustion engine with hydrogen gas would produce fewer detrimental emissions while still maintaining a practical level of performance. <b>Methods/Materials</b> In order to fully evaluate both aspects of my hypothesis, I developed four separate testing experiments. First, I converted a 5 hp Briggs & Stratton gasoline engine to burn hydrogen gas as its fuel source. Then I took the converted engine to Fast Lane Auto for an emissions test while running on gasoline and while running on hydrogen. The next experiment, speed, was measured in RPM (revolutions per minute) using a tachometer which measure the revolutions of the axel while running on gasoline and while running on hydrogen. For my final test, power, I constructed a differential strap brake which measures the differential pressure required to stop the engine at idle speed. This test was also done while gasoline was burning and while hydrogen was burning. I then plugged these measurements into a horsepower conversion formula which gave me the horsepower that was exerted when each different type of fuel was burned. <b>Results</b> The results from the emissions test showed the engine running on hydrogen demonstrated an 84% reduction in carbon monoxide, 60% reduction in carbon dioxide and a 272 ppm increase in hydrocarbon emissions when compared to the engine running on gasoline. While burning gasoline in the engine the axle had an overall average of 1740 rpm. Where as the same engine burning hydrogen had an overall average of 1725 rpm. After putting the weight differences into the horsepower conversion formula the horsepower that the gasoline powered engine exerted was 2.81. While the horsepower from the hydrogen powered engine was 2.21. <b>Conclusions/Discussion</b> This experiment demonstrated that an engine running on hydrogen would have an overall positive impact, and would be practical to implement in society.	
<b>Summary Statement</b> I converted a gasoline powered engine to run on hydrogen to prove that a hydrogen powered engine would produce fewer emissions while still maintaining an equal power performance when compared to a gasoline powered engine.	
<b>Help Received</b> UCSB Graduate Student	