



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Alex J. McFarlin	Project Number S0210
Project Title Gasoline vs. Ethanol	
Objectives/Goals To determine whether ethanol is a more efficient fuel than gasoline. Hypothesis- I think that ethanol is a more efficient fuel than gasoline because it is an oxygenate, which means it has a cleaner and more complete burn.	
Abstract Methods/Materials single cylinder gasoline engine,dynamometer,2-2 liter gas cans,2 liters regular,unleaded gasoline,2 liters 200 proof auto grade ethanol/ethyl alcohol,500 ml. brake fluid,complete wrench and screwdriver set,pyrex widemouth measure beaker (200 ml.),calculator,shop table, large, heavy-duty C-clamps,notebook and pencil I ran the engine on gasoline at 4000 rpm's and then added a load on the dynamometer to determine horsepower output. The dynamometer indicates pounds of torque, which is converted to engine horsepower. The experiment was repeat numerous times to get the average horsepower with gasoline. I then did a burn test to check efficiency. I ran the engine on 50 ml of gasoline while timing to see how long it ran. This test was also repeated to obtain an average run time. I had to change the engine timing to account for the different speed of burn for the ethanol and then repeated the same tests with this fuel.	
Results On my first series of tests the average horsepower for the gasoline was 1.3 hp. When I tested ethanol the average horsepower was 3.1. The results of the second series of tests/burn tests were exactly the same for gasoline and ethanol- 1 minute 58 seconds.	
Conclusions/Discussion Ethanol has more than double the power of gasoline. This is because ethanol is an oxygenate (a compound containing oxygen), which means it has a more complete burn than gasoline. Since oxygen is required for fire, having more oxygen during a burn insures all the fuel being used. Also, ethanol is a much slower burning fuel; it has an octane rating of 110, where as regular unleaded gasoline has a rating of 87. The results of the burn tests, or the rate at which the engine consumed the fuel were exactly the same because I never altered the carburator. Since the carburator meters or controls fuel flow the results would have to be the same. From the results I learned that ethanol has double the power of gasoline and that oxygen is a big factor in engine performance. Through my experiments I proved my hypothesis correct because ethanol has a more powerful burn, so that means half the amount of fuel can be used to substitute gasoline and have no loss of power.	
Summary Statement The project was to determine which fuel was more efficient- gasoline or ethanol.	
Help Received My father, who teaches shop classes at Carmel High, provided me with the engine, the workspace, dynamometer,tools, and his expertise. Information was aquired from Dotseth Specialty auto parts in Salinas, CA.	