



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> <b>Jo Grode; Megan Larratt</b>	<b>Project Number</b> <b>J1308</b>
<b>Project Title</b> <b>Fuels of the Future: A Comparison between the Molecular Mass of a Fuel and the Amount of Energy It Produces</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> In our experiment, we tested the relationship between the molecular mass of a fuel and the amount of energy it produces. The whole idea of this experiment was to see if current fuels we are using are our best energy source option. In other words, why we use the fuels we use. We decided to include molecular mass because we were interested to see if there was a chemical reason why some fuels produced more energy than others. We believe that if the molecular mass of a fuel is small, then it will produce more energy because the smaller groups will oxidize more easily.</p> <p><b>Methods/Materials</b> Tested 8 fuels; biodiesel, ethanol, soybean oil, peanut oil, diesel, motor oil, gasoline, &amp; canola oil. First, we figured out each fuel's molecular mass. Then, we placed 2.4 mL of the fuel on a regular size cotton ball. From there, we burned the fuel and the cotton ball under a can of 100 mL of water and recorded the change in temperature every 10 seconds. The amount of time each fuel burned was also recorded in our data. In our testing, the independent variable was the molecular mass of the fuel and the dependent was the amount of energy that was produced. Equipment: Metal Cup, Cotton balls, Metric Ruler, Soda Can, Liquid Measuring Cup, Immersion Alcohol Thermometer, Dropper, Tape, Water, Lighter, Paper Towels, Metal Clamp, Baking Soda, Ring stand with 3 inch ring.</p> <p><b>Results</b> Our hypothesis, if the molecular mass of the fuel is small, then more energy will be produced because the smaller groups will oxidize more easily, was proven inconclusive. As we looked over our fourth graph, we discovered that there is virtually no relationship between the molecular mass of the fuel and the amount of energy the fuel produces. We are lead to believe that there is a possibility of a relationship between the molecular mass of a fuel and the time it takes to burn.</p> <p><b>Conclusions/Discussion</b> Our hypothesis was not supported by the data we collected. We did determine that different fuel types produced different amounts of energy. However, with the data we collected, we did not find any relationship between the molecular mass and the amount of energy a fuel produced. If we were to repeat our experiment, we would do all of the trials on the same day. Also, we would test to see if there is a relationship between a fuel's molecular mass and its burn time and we would further examine the burn characteristics to see which fuels are better for the environment.</p>	
<b>Summary Statement</b> Our project tested to see if there is a fuel characteristic (their molecular mass) that explains why some fuels produce more energy than others.	
<b>Help Received</b> We borrowed some equipment from La Reina High School for our experiment (i.e. ring stand, dropper, immersion alcohol thermometer). My Dad helped us build the apparatus and he oversaw the first two trials to make sure we were burning the materials safely.	