



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> Claire E. Gorder	<b>Project Number</b> <b>J1812</b>
<b>Project Title</b> <b>Your Fries Give Me Gas! The Viscosity of Various Bio-diesel Blends in Cold Temperatures</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of my project is to find out whether or not temperature affects the viscosity of bio-diesel fuel blended with different bio-fuel/diesel fuel ratios. <b>Methods/Materials</b> Eleven samples were prepared using pure B100 bio-diesel fuel and pure Diesel #2 fuel. A graduated cylinder was used to prepare various blends with the ratio of bio-diesel to diesel varied in ten percent increments. The blended samples were poured into test tubes and placed in a temperature-controlled chamber. Viscosity of each blend was measured at various temperatures ranging from +25 to -20 degrees Celsius using a viscosimeter with a 2.0 millimeter orifice and a stopwatch. Temperatures were measured with a thermocouple. <b>Results</b> The results show that temperature affects the viscosity of the mixtures, depending on the blend ratios. Pure bio-diesel (B100) gelled at -4 degrees Celsius, while pure Diesel #2 gelled at -19 degrees Celsius. Significantly, the viscosity of all blends remained relatively constant until the gel-point was reached. *Note: Gel point is the temperature at which the fuels did not flow. <b>Conclusions/Discussion</b> All of the bio-diesel blends tested would be suitable for the Southern California marketplace. However, higher bio-diesel ratios could be problematic in colder climates such as in the Upper Midwest during the winter season. Bio-diesel appears to be a very viable alternative fuel to reduce dependence on imported oil and air pollution.	
<b>Summary Statement</b> I wanted to find out if temperature had an affect on the viscosity of bio-fuel blended with different bio-fuel/diesel fuel ratios.	
<b>Help Received</b> My mom helped me use the paper cutter and with the spray adhesive for my display. My dad proofread my report and drove me to his lab to use the equipment there. Mr. Ronald Tirado let me interview him, and Mrs. Kelly Silva lent me test tube equipment.	