



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Callista E. Schoettmer	Project Number J0623
Project Title Does the Viscosity or Density of Gasoline Correlate to Its Energy?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project's purpose is to determine if the energy content of gasoline has a connection to its density, grams per volume of an object, or its viscosity, the resistance for a fluid to flow against itself.</p> <p>Methods/Materials I tested the energy content, viscosity, and density of gasoline. I measured the energy content with a bomb calorimeter. First the gasoline is placed in a sample cup being suspended in the bomb, or a tightly closed container, the bomb is filled with pure oxygen so that way all of the gasoline will burn cleanly. Inside of the bomb there are fuse wires that hang above the gasoline. The bomb is then placed in a bucket of water (2000g=M), inside of the machine. Protruding from the machine are lead wires, these lead wires are plugged into the bomb, and they send an electric charge through the fuse wires to ignite the gasoline. The gasoline burns creating a change in temperature in the water. I then calculated the calories using the equation, $Q=MC\Delta T$, Q being the calories, M being the mass of water which in my case was 2000 grams, C being the heat capacity of water which is 1° Celsius per one gram of water, and ΔT being the change in temperature.</p> <p>For the density, a small amount of gasoline is injected into a U-shaped tube in a density meter. The U-shaped tube bounces up and down; the more it bounces the less dense the gas is, the less it bounces the more dense it is.</p> <p>To test the viscosity I used a kinematic viscometer. How this mechanism works is by placing gasoline in a tube, this tube is placed into the viscometer which is basically an Anti-freeze bath that controls the temperature. Little suction cups are placed on the tube, it draws up the gasoline to a certain point then times how long it takes for the fluid to go from one point to another. When the fluid passes one point, an optical sensor sends a signal for the time to start and once the liquid reaches the second point, the sensor signals the time to stop. The time in seconds is then multiplied by the tube constant to get the viscosity.</p> <p>Results There appears to be a correlation between gasoline's energy content and its density and viscosity.</p> <p>Conclusions/Discussion My conclusion is that the density and viscosity correlate to the energy content of gasoline. I would like to do further research about how gas companies perform their gasoline blends and test other characteristics of gasoline to look for correlations.</p>	
Summary Statement This project's purpose is to determine if there is a correlation between the density and viscosity of gasoline and its energy content.	
Help Received I used laboratory equipment at the Air Force Research Laboratory, Edwards AFB, CA under the supervision of Jo ann La Rue and my mother, Amanda Wheaton. My mother helped me make my board.	