



CALIFORNIA STATE SCIENCE FAIR 2005 PROJECT SUMMARY

Name(s) Lauren E. Markgraf	Project Number S0612
Project Title What Petroleum Waste Products Affect the Formation of Clouds?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project was to determine which petroleum waste products commonly introduced into our environment by means of combustion, container leakage and improper disposal had the greatest impact on cloud formation.</p> <p>Methods/Materials A cloud chamber was created by taking a 32 oz. glass container and filling it with 1 cup of water heated to 120 degrees F. This heated water acted as a warm front. The opening of the container was covered by a stainless steel bowl containing ice cubes with a temperature of 8 degrees F. The chilled bowl acted as a cold front. The temperature of the room in which the experiment was conducted was 73 degrees F. The reaction was created in a control state with outcomes recorded for comparison. The reaction was recreated with five different petroleum waste products injected into the heated water of five separate cloud chambers. The petroleum waste products used were unused motor oil, unused diesel oil, gasoline, used motor oil and used brake fluid. Each waste product was tested using three different ratios; 5 drops: 1cup, 15 drops: 1cup and 30 drops: 1cup. During each trial the reaction was timed and the cloud size measured after 45 seconds with a standard inch ruler. Each group was recreated three times for a total of 45 repetitions.</p> <p>Results Based on the data collected from these trials I found that the cloud that formed the fastest compared to the control group, which formed at an average speed of 2.7 seconds was the unused motor oil timed at 1.5 seconds using a ratio of 30 drops: 1 cup. The variable that produced the slowest time to form a cloud was used motor oil timed at 6.3 seconds with a ratio of 30 drops: 1 cup. The pollutant that created the smallest cloud was used brake fluid, which measured 1.8# and used a ratio of 30 drops: 1 cup. As expected, it was the control group that created the largest cloud measuring 5.5# with the used motor oil following closely behind with a cloud of 5.2# high and a variable ratio of 5 drops: 1 cup.</p> <p>Conclusions/Discussion I have concluded from the results of this experiment that the unused motor oil (30drps/1c), generated a cloud in the least amount of time. Therefore, the unused motor oil in large quantities acts as an accelerant in the formation of clouds. Also, I have concluded that used motor oil in small concentrations (5drps/1c) creates a measurably larger cloud than the other pollutants used in these trials.</p>	
Summary Statement I have determined that the petroleum pollutants that had the greatest impact on cloud formation were unused motor oil, used motor oil and used brake fluid.	
Help Received All hazardous materials used for this experiment were provided and disposed of by Mr. Warren Valenson, owner and operator of Top Dawg Auto Repair, Riverside, CA. Additionally, the transport and handling of hazardous materials was conducted under the direct supervision of Lauretta Logue.	