



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Christopher W. Weddington	Project Number J1937
Project Title Effects of Motor Oils and an Additive on Friction	
Abstract Objectives/Goals My project was to determine the effects of 4 different types of motor oils and 2 rates of an anti-friction additive on the level of friction measured between a moving and a stationary part. I hypothesize that the additive will decrease the level of friction measured between a moving and a stationary part in the 4 motor oils tested. Methods/Materials A drill press was used to generate friction between a flat aluminum drill pad and a flat-bottomed stainless steel cup, simulating the moving metal parts of an engine. Four treatments (friction levels 1 to 4) were produced by hanging a 5 pound weight at 4 positions along an extension arm mounted to the drill press handle. An amp meter was clamped on one wire of the electrical cord to measure amps, reflecting the level of work done by the motor and the amount of friction between the pad and the cup. Four different motor oils and 2 rates of anti-friction additive were tested. One third cup of oil was poured into the cup, the pad was lowered into the cup, the 4 friction treatments were conducted, amps were recorded for each treatment. The test was repeated with 1/2 rate and full rate of additive for each of the 4 motor oils. Results All motor oils performed best at lowest friction and worst at highest friction level. The 4 oils showed differences from each other except at friction level 1 (lowest). Three oils had a benefit from the 1/2 rate of additive at friction levels 2 though 4. All 4 oils had a benefit from the full rate of additive at friction levels 2 through 4. At the highest friction level and full additive, the reduction in friction was 12% (regular), 10.6% (synthetic), 3.3% (low emission), and 2.8% (non-detergent). Conclusions/Discussion The results supported my hypothesis that the additive would decrease the level of friction measured between a moving and a stationary part in the 4 motor oils tested. The additive shows potential in improving motor efficiency and may help to reduce air pollution and resource consumption. The benefits of using the additive depend on the type of motor oil used, and there may not be an economical benefit in low friction applications. The additive and motor oils should be further tested under other conditions such as higher temperatures.	
Summary Statement My project is about the effects of 4 types of motor oils and 2 rates of anti-friction additive on the friction produced between a moving and a stationary part.	
Help Received CW Industries made the drill pad. Mr. Harris loaned the amp meter. Father loaned shop equipment and supervised data collection. Mother guided calculations and reviewed report. UCCE personnel advised on statistics.	