



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Katie P. Gruenhagen	Project Number 31135
Project Title Aerodynamics of Pickup Trucks	
Abstract Objectives/Goals What changes, if any, to the shape of a pickup truck, will change the aerodynamics? I hypothesized that even a small change would affect the aerodynamics, therefore drag, of the pickup truck. Methods/Materials I used modeling clay, two toy pickup trucks, machined brass rods, a camera, and a lab at CSU, Fresno to conduct my experiment about the drag of differently modeled pickup trucks. At CSUF, I used their first wind tunnel (smoke tunnel) to visualize the wind flowing over the trucks. Then I calibrated their second wind tunnel (drag coefficient tunnel) and took readings from the manometer and the digital strain gage. My experiment started with readings from the digital microstrain gage and I continued for 5 trials at each RPM. I calculated the drag force and then the drag coefficient for each of the different pickup trucks and compared the drag coefficients among the trials. Results I found that the drag coefficients for the control at both 400 RPMs and 600 RPM were consistently the highest drag coefficients for all of the different trucks. In addition, the hood and bed cover and bed cover drag coefficients were not significantly different from each other at 400 RPM; the extended cab and the hood cover also were not significantly different at 600 RPM. Finally, the lowest drag coefficient at 400 RPM was the hood and bed cover and at 600 RPM, the lowest was the bed cover. Conclusions/Discussion I found that my hypothesis was supported. I hypothesized that any modification would change the drag. According to my results, the drag coefficients for the modified trucks were significantly different than the control at both 400 RPM and 600 RPM.	
Summary Statement Aerodynamics of Pickup Trucks	
Help Received Used lab equipment at CSUF under the supervision of Dr. Maria Sanchez and Dr. Walter Mizuno; Dr. Elaine Backus helped perform the statistical analysis; Derick Gangbin helped machine the plexiglas roadway; Dr. Ned Gruenhagen helped epoxy the model trucks.	