



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Lucas D. Unruh	Project Number J0126
Project Title Shake, Rattle, and Roll: The Effect of Shock Absorber Piston Orifice Area on Piston Travel Time (Damping Rate)	
Objectives/Goals To learn about shock absorbers and evaluate how changing a shock absorber's piston orifice area affects piston travel time (damping rate).	
Abstract Methods/Materials A plant duster was used to simulate a shock absorber. A hole was drilled in the piston, the duster was filled with water, a weight was placed on the plunger, and the time it took the piston to travel four inches was measured. Piston orifice area was increased by drilling additional holes in the piston. Piston travel time was measured three times as the orifice area was increased to demonstrate the consistency of the results.	
Results With no holes in the piston (zero orifice area), the piston did not move (infinite damping). As orifice area initially increased, piston travel time decreased quickly. After a quick decrease, orifice area did not appear to affect piston travel time as much. Piston travel time appeared to level off as orifice area continued to increase.	
Conclusions/Discussion As piston orifice area increased, the piston travel time (damping rate) decreased, but never reached zero.	
Summary Statement The focus of this project was to evaluate how shock absorber piston travel time (damping rate) was affected by changing the piston orifice area.	
Help Received Grandfather helped develop project idea and assisted with experiment; mother and father helped with layout of backboard; teacher/project advisor provided guidance and schedule milestones.	