



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) Risha R. Bera	Project Number S0802
Project Title A Comparison of Traffic Resulting in Heavy-Duty Diesel Truck Emissions on Highway 91	
Abstract Objectives/Goals This study examined a strategy for increasing the efficiency of trucks and reducing the toxic emissions of acetaldehyde, formaldehyde, 1,3-butadiene, and benzene. The hypothesis stated that most reductions would occur from driving during the afternoon hours. Methods/Materials A five-minute segment of the 91 Freeway Westbound was taped hourly from 7 AM to 9 AM, and 3 PM to 7 PM, for seven days. Truck/trailer units were observed for the seconds seen in the visual frame. An average number of seconds was then determined for each time period, and then classified under three driving modes of cruise, transient, and creep. Results Calculating a distance of 240 feet in the visual frame, the average speeds of the vehicles (miles per hour) were estimated. Congestion rates and amounts of pollution caused were calculated also. Generally, the elimination of truck/trailer units resulted in 1/3 less congestion at both transient and cruise modes. Conclusions/Discussion Going from creep to transient/cruise mode achieved emissions reductions over 90% and progression from transient speed to cruise speed achieved 60% or more reduction. The most reductions that occurred at 7 PM were over 90%. Implementing programs encouraging trucks/trailers to drive during off-peak periods can realistically achieve these reductions not only for commercial vehicles but passenger vehicles also.	
Summary Statement This study examined a strategy for increasing the efficiency of trucks and reducing toxic emissions by studying time periods on the 91 Highway Westbound.	
Help Received Recieved emissions data from Dr. Joseph Norbeck at University of California, Riverside; Borrowed videocamera from Rajesh Bera	