



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) D. Ziva Shulaker	Project Number J0122
Project Title Sail Away: Air, What a Drag!	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To see what effect the surface area of an object, such as a vehicle, has on the amount of air resistance produced as it travels down a slope.</p> <p>Methods/Materials MATERIALS: 1 wooden ramp (set at a constant angle); 1 toy car; 2 wooden dowels; rectangular 'sails' of different sizes cut from posterboard; stop watch; marking tape to show "Start" and "Finish" lines on the ramp. METHOD: A sloped ramp was set up at a 12 degree angle - a Start line was marked at the top of the ramp, and a Finish line at the bottom. A toy truck was fitted with two wooden dowels, and cardboard sails of various sizes were threaded onto the dowels. The toy vehicle was timed going down the ramp, using a stop watch. Five trials for each sail were recorded. The highest and lowest scores for each sail were discarded, and the average of the remaining three was calculated. The results were plotted on a graph - Sail Area vs Time for Vehicle to travel down ramp.</p> <p>Results The results showed that the larger the area of the 'sail' attached to the car, the slower the car traveled down the ramp.</p> <p>Conclusions/Discussion The vehicle speed plotted against the area of the sail gave a straight line graph. I concluded that the larger the area of the sail, the greater the air resistance produced, and so the slower the vehicle went. However, the results also showed that with sails of the same area, but of different shapes, the vehicle speed was a little different, so I also conclude that air resistance is affected by the shape of the object travelling through the air, as well as by the surface area.</p> <p>From my research, I learned that air resistance is important in the 'real world'. For example, in the design of automobiles, the less air resistance, or drag, that a vehicle produces, the less energy is wasted as it goes through the air, and so, the more fuel efficient it is.</p>	
Summary Statement This project is about air resistance - the larger the area of an object, the greater the air resistance	
Help Received None.	