



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>David K. Fleming</b>	<b>Project Number</b> <b>J0106</b>
<b>Project Title</b> <b>What a Drag</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of my project was to test and compare the aerodynamic drag of five different shapes to determine which shape produced the least drag and which produced the most drag using two different wind speeds.</p> <p><b>Methods/Materials</b> My method was to test, using a small homemade wind tunnel and an oscillating fan with 2 different speeds, the drag of five different shapes cut from balsa wood. Each shape was attached, individually, to a platform mounted on wheels, which was placed in the wind tunnel. Attached to this platform was a string on a small pulley that held a 2-gram weight which rested on a postal scale, displaying weight in grams. In my data book I recorded how much lift each shape produced as I observed the weight decrease on the scale. The higher the 2-gram weight was lifted off the scale, the greater the drag. I tested each shape 45 times at each of two wind speeds and then averaged the tests to obtain my data.</p> <p><b>Results</b> My results indicated that at medium speed, the round shape created the least drag because it lifted less than 1 gram, while the diamond shape had the most drag because it lifted more than 1.6 grams. At high speed, the sharp teardrop A showed the least drag because it lifted less than 1.3 grams while the diamond shape had the most drag because it lifted the 2-gram weight completely off the scale. The more drag that the particular shape generated, the more the grams decreased on the scale.</p> <p><b>Conclusions/Discussion</b> I discovered that my hypothesis was not accurate as stated because I had thought that sharp teardrop A would be the most aerodynamic at both medium and high speeds. However, this was only true at high speed while the round shape proved to be most aerodynamic at medium speed, displaying the least amount of drag. I had also thought the block shape would be least aerodynamic at both wind speeds. Instead, the diamond shape displayed the highest drag at both speeds. This surprised me until I realized that the diamond shape had a greater frontal area than the other shapes, thus creating more drag.</p>	
<b>Summary Statement</b> My project is the study of drag on various shapes to compare which shape would be the most and least aerodynamic.	
<b>Help Received</b> All of my help came from my family. My dad helped build the wind tunnel and helped to cut the platform and shapes. My older sister and younger brother helped me with the testing. My older brother helped me create the graphs using Excel. My mom helped me edit the writing and cut paper for the display board.	