



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

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| <b>Name(s)</b><br>Alyssa N. Pronovost   | <b>Project Number</b><br><b>S0323</b> |
| <b>Project Title</b><br><b>The Wind Beneath My Wings: The Study of Lift on Airfoils</b>   |                                       |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>The goal of my project was to determine which airfoil would produce the most amount of lift based on airfoil design. I believe that the airfoil that is most commonly seen on aircraft would produce the most lift.<br><b>Methods/Materials</b><br>I constructed six airfoil models from foam blocks for testing. Four of which are known airfoil designs, one is a modified airfoil design, and one I designed myself. All airfoils were tested in a home built wind tunnel five times at three different wind speeds and three different angles of attack. Data was collected and tabulated; the lift results were then averaged across tests. Drag approximations were calculated for each airfoil based on the drag equation and known drag coefficient.<br><b>Results</b><br>The airfoil designated as "B" produced the most lift of the six tested. This airfoil has a large upper camber with a long trailing edge and flat lower camber. Airfoil "A" which is commonly seen on aircraft came fourth in the results. Surprisingly, the airfoil I designed, "F," produced results that placed it second to airfoil "B".<br><b>Conclusions/Discussion</b><br>Airfoil designs play a crucial role in providing lift for aircraft. However, other factors like purpose and overall design of aircraft come in to play when deciding which design to use. My hypothesis that airfoil "A" would produce the most lift was incorrect, but other factors make it a suitable choice for aircraft, where airfoil "B" produced the most lift, but it may not be practical for use because of other factors and design considerations. |                                       |
| <b>Summary Statement</b><br>My project was to determine which airfoil design of both common and experimental produced the greatest amount of lift.  |                                       |
| <b>Help Received</b><br>My father assisted in construction of the wind tunnel and use of Excel. My mother assisted with the design of the board.  |                                       |