



# CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

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| <b>Name(s)</b><br><b>Beckett Pfahler</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Project Number</b><br><b>J0119</b> |
| <b>Project Title</b><br><b>Airfoil Shape Effect on Lift</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives</b><br/>The objective of this experiment was to find out which airfoil shape would create the most lift.</p> <p><b>Methods</b><br/>Wind tunnel, three varying airfoil shapes, digital scale, and stand. Tested each airfoil in the wind tunnel for 20 seconds, measuring the lift each created.</p> <p><b>Results</b><br/>Five trials were conducted for each airfoil, measuring the amount of lift created. The airfoil with the most camber, NACA 6713, created the most lift in the majority of the trials.</p> <p><b>Conclusions</b><br/>The airfoil with the most camber created the most lift. The NACA 6713 and 4112 consistently created the most lift. The symmetrical airfoil, NACA 0012, consistently generated the least lift. It is concluded that airfoil shape directly influences the amount of lift generated in a wind tunnel.</p> |                                       |
| <b>Summary Statement</b><br>By testing different airfoils in a wind tunnel, I found that the airfoil with the most camber generated the most lift.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       |
| <b>Help Received</b><br>After finding wind tunnel building plans and dimensions, my father helped me build the wind tunnel. I obtained the airfoils and printed them on the school 3D printer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |