



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Charles Dobbin; Seth Platt</b>	<b>Project Number</b> <b>S0307</b>
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<b>Project Title</b> <b>Lift: An Observation of Different Shaped Conventional Airfoils Creating Lift</b>
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<b>Objectives/Goals</b> The objective is to determine which conventional airfoil will create the most lift over 3 speeds & differing Angles of Attack (AoA), find the stall, which job each may best be suited for & which airfoil performs best at each speed. If Airfoil 2 & 3 produce the most lift, then Airfoil 4 will produce the least.	<b>Abstract</b>
<b>Methods/Materials</b> Wind Tunnel, Fog machine/fluid, Epoxy, Spray & Super Glue, Airfoil Diagrams, Disk & Belt Sander, Wood Filler, Balsa Wood, Scroll Saw, Medium Density Fiber Board, Clamps, Nuts/Nut Driver, Soldering Iron, Base, Plexiglas, Ruler, Electronic Scale, Polyurethane, Acid Brushes, Screw Eyes, Drill Press, Machine Screws, Rods/Clamps and Ruler. Build wind tunnel & airfoils. Open door, place airfoil, close door & perform 3 measurements, minimum 8 seconds. Record the lift in plus or minus ounces. Open door & remove airfoil. Adjust rods to new length for next AoA. Replace in wind tunnel, repeat test, increasing speed to medium. Repeat steps for High speed and additional airfoils until testing completed.	
<b>Results</b> Airfoil 1:Stalled at >30 degrees (deg.) <35 deg. had steady climb to 6.9 oz lift. Airfoil 2:Stalled at >20 deg. <25 deg. had steady climb & jumped to 5.7 oz lift. Airfoil 3:Stalled at >40 deg. <45 deg. had steady climb to 20 deg. & started jumping, reached 14.6 oz lift. Airfoil 4:Stalled at >35 deg. <40 deg. had steady climb & reached 15 oz lift. Airfoil 5:Stalled at >45 deg. <50 deg. had steady climb & jumped once at 15 deg., reached 8.5 oz lift. Airfoil 6:Stalled at >40 deg. <45 deg. had steady climb, reached 9.9 oz lift. Low Speed Comparison: Airfoil 4 performed best; Airfoils 1, 2 & 5 didn't have high climb; Airfoils 3,4 & 6 had steady climb; Airfoil 2 lifted least. Medium Speed Comparison: Airfoil 4 performed best; all Airfoils had steady climb; Airfoil 2 lifted least. High Speed Comparison: Airfoil 4 beat Airfoil 3; both had steep climb, others had lower climb, Airfoil 2 lifted least & Airfoil 5 did not drop off. Average Speed Comparison: Airfoil 4 lifted the most, then 3, 6, 5 1 & 2. Airfoils 1 & 2 did not climb stead; Airfoils 5 & 6 climbed okay and Airfoils 3 & 4 climbed well.	
<b>Conclusions/Discussion</b> The hypothesis was supported 1/3 of the time. Airfoil 3 did well but Airfoil 4 did great & Airfoil 2 did worst.	

<b>Summary Statement</b> The Project is about the measurement of lift generated by various airfoils to stall.
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<b>Help Received</b> Charles father helped build the wind tunnel/wings & explored test parameters. His mom took photos, proofread/helped format documents & helped with display board. The teacher/judges from school Science Fair made comments & suggestions for improvement. Seth's parents transported him to Dobbin house to
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