



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Jarrison Ball; Matthew Harris	Project Number S0302
Project Title The Effect of Frost on an Aircraft Wing	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Our objective is to learn if sandpaper (simulating frost) on the upper surface of a wing will produce significantly less lift than a clean wing without sandpaper.</p> <p>Methods/Materials We constructed three control wings and three dirty wings with sandpaper attached to the upper surface. Each group had three wings so different angles of attack could be tested including 0, 5, and 10 degree angle of attack. After one round of tests we added 4oz of weight to each wing and retested all wings. Finally for the last round we added 10 oz of additional weight. This should simulate flights of empty, partially full, and full aircraft. A wind tunnel made by Aerolab was used.</p> <p>Results All light wings with no additional weight produced lift that exceeded the top of the scale with the exception of the dirty wing at zero angle of attack which produced .8 lbs. Wings with 4 oz of additional weight added showed a reduction in lift for all wings. Zero degree - clean .6 lbs dirty .4 lbs 5 degree - clean 1.1 lbs dirty .4 lbs 10 degree - clean .85 dirty .8 Wings with 10oz additional weight added: Zero degree - clean .3 lbs dirty .05 lbs 5 degree - clean .5 lbs dirty .1 lbs 10 degree - clean .4 lbs dirty .35 lbs</p> <p>Conclusions/Discussion The data confirmed our hypothesis as tests showed a reduction in lift between the clean and dirty wings. The heavy wings appeared to have the most critical results because there was almost no lift created for the zero and five degree angle of attack dirty wings.</p>	
Summary Statement We wanted to prove that even a slightly rough surface can reduce lift created by a wing.	
Help Received Mentor and father helped assemble the wind tunnel.	