



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Daniel C. Moyer</b>	<b>Project Number</b> <b>J0121</b>
<b>Project Title</b> <b>Winging It: A Study of Wind-Powered Nautical Propulsion Systems</b>	
<b>Abstract</b> <b>Objectives/Goals</b> This research paper, experiment and analysis is on the efficiency of an airfoil being employed to push a boat using lift compared to that of a lateen sail. It#s purpose is to prove whether or not a wing employed as a way of propelling a boat across the wind is more efficient than using a traditional lateen sail. The researcher's hypothesis is that the wing will be at least 10% better than the lateen sail. <b>Methods/Materials</b> Basic construction materials were obtained and a 10x1x1-foot trough capable of holding upwards of 500 pounds of water was built. A 1-foot long balsa wood boat was constructed and also from those same materials was built a wing and a sail to test on the model boat that was built. After 20 trials each it was determined that another wing and sail set would have to be built and the boat given a larger keel and rudder to keep it on course. 20 more trials were made for all four wings and sails at a higher wind speed using the modified boat. <b>Results</b> The second wing was proven more effective by 11% over the second sail and by 20% over the first sail. The first wing was within the standard deviation for the second sail but was more effective than the first sail at the higher windspeed. <b>Conclusions/Discussion</b> The researcher's hypothesis was proven correct with a wide margin for the 2nd wing and, to a lesser extent, because of standard deviation, the original wing.	
<b>Summary Statement</b> This is a comparison between the efficiency of an air foil and a traditional lateen sail while sailing across the wind.	
<b>Help Received</b> Former Science Teacher taught how to make model boats in his class and loaned his laser timer. Father helped build the trough.	