



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Phillip Chau	Project Number J0103
Project Title The Effect of Increasing the Chord Length of a Propeller on Its Efficiency	
Abstract Objectives/Goals The purpose of my project was to observe the effect of increasing the chord length, or the width, of a propeller on its efficiency. My hypothesis was that if the chord length of a propeller increases, then the efficiency of a propeller will increase as well. Methods/Materials First, a thrust meter was built in order to measure the thrust produced by each propeller at a given watt input. These two variables were used to find the propeller's efficiency. Then, 3 different propellers were trimmed to chord lengths of 24 mm, 21 mm, and 18 mm while keeping other parameters such as the pitch angle and diameter constant. A propeller with 27 mm chord length served as the control of the set. The propellers were then tested on the thrust meter with watt inputs of 10, 20, and 30 watts. A RPM meter was used to find the rotations per minute of each propeller. Finally, the efficiency of each propeller was found by multiplying the thrust, the pitch, and RPM of each propeller and dividing that by the watt input Results The results for the propellers tested at a 30 watt input were that the propeller with chord length of 18 mm had an average efficiency of 29%. The 21 mm chord length propeller had an average efficiency of 34%, while the 24 mm chord length propeller had an average efficiency of 36%. Finally, being the most efficient of the group, the 27 mm chord length propeller had an average efficiency of 38%. The same trend of greater efficiency with greater chord length was found when the propellers were tested at 10 and 20 watts as well. Conclusions/Discussion The data collected clearly proved my hypothesis that as the chord length of a propeller is increased, then the efficiency will increase as well. This is due to the fact that a propeller with a greater width would have more surface area. As a result, it could push back more air particles in a single revolution, and thus, cause a greater reaction force that'll push it forward according to Newton's 3rd Law of Motion.	
Summary Statement My project investigates the correlation between increasing the width of a propeller and its efficiency.	
Help Received My parents helped me get the materials necessary to conduct the experiment.	