



CALIFORNIA STATE SCIENCE FAIR 2015 PROJECT SUMMARY

Name(s) Clarence Harmon, IV	Project Number J0107
Project Title Perfect Propeller Performance	
Objectives/Goals The objective of this project is to determine how the pitch, length, and number of blades affect propeller efficiency.	
Abstract Methods/Materials The following materials were used to construct two test stands (shoebox and wooden) to determine propeller efficiency. 1. (8) Propeller Blades: (1) 3-Bladed Propeller (30 x 15 cm), (1) 3-Bladed; Propeller (28 x 15 cm), (1) 2-Bladed Propeller (30 x 15 cm), (1) 2-Bladed; Propeller (25 x 20 cm), (1) 2-Bladed Propeller (28 x 15 cm), (1) 2-Bladed; Propeller, (1) 2-Bladed Propeller (25 x 15 cm), and (1) 2-Bladed. 2. (15) Marbles (Mass). 3. (6) Rubber Bands (11 x 8533; cm). 4. (1) Fan (41 x 40 cm). 5. (1) Shoebox: Bottom (29 x 6 x 18 cm), Lid (30 x 3 ½ x 19 cm). 6. (2) Paper Towel Roll: 27 ½ x 3 cm, 27 x 3 ½ cm. 7. (5) Paper Cups: 88 mL each. 8. (1) Piece(s) of String: 45 cm. 9. (1) Pen. 10. (2) Ruler(s). 11. (1) Stopwatch. The testing stands were assembled and propeller were placed onto the front of the shaft and secured. To minimize variability, the fan distance and speed were constant during all tests.	
Results The results obtained from the shoebox test stand revealed that the 3 blade-28 x 15 cm propeller lifted the ballast in the least amount of time. However, it was observed that the results were influenced by friction between the wooden dowel and the paper towel rolls. Therefore, a wooden test stand was built to mitigate the effects of friction. The wooden stand results found that the 3 blade-28 x 15 cm propeller lifted the ballast in less time than the shoebox stand.	
Conclusions/Discussion My conclusion is that individually pitch, length, and number of blades affect propeller performance. The greater the propeller pitch and number of propeller blades does impact efficiency. However, the efficiency of the blade length is determined by weight.	
Summary Statement My project is to find the propeller that performs work in the most efficient manner.	
Help Received My father oversaw my use of power tools during the construction of the wooden test stand.	