CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J0119

Project Title
How Does the Chord Length of a Propeller Affect the Amount of Force It Makes?

Abstract

Objectives/Goals
The purpose of this project was to investigate a possible connection between the chord length of propeller blades and the amount of force the propeller produces.

Methods/Materials
I taped extensions onto 4 propellers so that they extended the chord lenght 0.3 cm., 0.6 cm., 0.9 cm., and 1.2 cm. I attached the propellers to a 7.6 cm. long rod and inserted it into a chuck of a cordless drill. I made a jig to keep the drill steady. I pulled the trigger all the way in with the RPMs of the drill set at the lowest setting and in reverse mode. I made sure that the propeller stayed perpendicular to the 0.01 g. accuracy scale. I took six reading for each propeller.

Results
The propeller with the 1.2 cm. extension consistently got the highest reading. The propeller with the 0.3 cm. extension consistently got the second highest reading. The propeller with the 0.6 cm. and 0.9 cm extension consistently got the lowest readings.

Conclusions/Discussion
My results contradicted my hypothesis in the fact that I was expecting a steady increase in the readings as the chord lengths got bigger. I encountered several problems:
The scale reading oscillated too much to get a correct reading. I tried to compensate by counting to 5 and taking down what I saw at that moment.
When I started, the self-ratcheting drill caused the first sample to break. I had to change to a different drill.
The test results were not what was expected and there was no scientific explanation for these results. I believe that the test or propellers were flawed in some way.
Weighing the force does not seem to be the best way to measure the force the propeller creates. Using a car or boat would probably be a better way to prove/disprove my hypothesis.

Summary Statement
My project is about the link between cord length and generated force.

Help Received
Used lab equipment at Bellarmine College Preparatory under the supervision of Dr. Richard Nevle. My mom helped a little with the display board. Mr. Dan Kalcic steered me towards a very helpful website. My science teacher, Mr. Dolan, made sure I was showing progress.