



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Zachary R. Zuniga	Project Number J0128
Project Title Cylinder vs. Blade: An Experiment Using Rotating Cylinders and Stationary Blades to Generate Lift	
Abstract Objectives/Goals The objective of my project is to determine how much lift a rotating cylinder generates when compared to an airplane propeller and a helicopter blade. I predict that the rotating cylinder will generate as much lift as the blade and the propeller, but do better at low wind speeds. Methods/Materials To test this, I built an apparatus that rotated a cylinder in an air stream. The amount of lift was measured with a load cell, the angular velocity of the cylinder was measured with a tachometer and the wind speed was measured with an anemometer. The wind was generated by a leaf blower. For comparison, I tested a toy helicopter blade and radio-controlled airplane propeller using the same apparatus, except they were stationary. Results I found that the cylinder generated significantly more lift than the propeller or blade per unit length. Despite this, the cylinder did not generate as much lift as predicted by the Magnus Effect equations. Conclusions/Discussion In conclusion, a rotating cylinder is a potential mechanism for generating lift, and future projects could look into making wind turbines with cylindrical blades.	
Summary Statement My project tests the lift generated by a rotating cylinder in an air flow when compared to a stationary blade and a stationary propeller.	
Help Received Mother helped edit my report; Father helped edit report, obtain parts and troubleshoot apparatus; Thomas Zimmerman helped think of ideas; Lisé Whitfield helped edit report and format project	