



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Alex D. Provda	Project Number 22149
Project Title Optimal Windmill Blades for Power Generation	
Abstract Objectives/Goals The goal of the experiment was to determine the most effective shape, and its relative angle to the direction of the wind for power generation. In the experiment another goal was to examine the merits of lift, and drag and two determine which one is more important for windmills. Methods/Materials The miniature windmill stand was created out of a tool set, consisting of interlocking metal bars. The windmill blades were each cut from balsa wood, by a power saw and then sanded with a power sander until they reached their desired shape. The blades were then hooked on to a motor, that had been turned to spin backwards, and then connected by wire to a milliamper reader. The source of the wind was a hair dryer bolted down to a stand approximately four feet away. To conduct the tests all you have to do is turn the blades to the desired angle, turn the hair dryer on high and wait till the milliamper readers needle is steady. Results The results showed the the most effective blade shape was a rectangular blade with curved edges this side forward turned to an angle of 30 degrees. In general the results showed that winged shaped blades were general less effective for power generation than rectangular shaped blades. Conclusions/Discussion It can be concluded from the results that having curved edges on a rectangular shaped blade will always increase the amount of power generated. It can also be concluded that rectangular shaped blades are better for power generation. While looking at the performances by all of the different blades, it can be seen that the blades that combine lift and drag are the most effective for power generation.	
Summary Statement My project is all about testing different shapes of windmill blades turned to different angles for maximum power generation.	
Help Received My father helped me come up with the idea for the project, and the crafting of the windmill blades.	