



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Ian N. Zell	Project Number J0127
Project Title Egg Survival: Optimizing the Blade Camber of a Free-Falling Rotor	
Abstract Objectives/Goals My objective for this project was to see if I could slow a free-falling object safely to the ground using only drag, by optimizing the blade camber of propellor wings. I believe that there is a blade camber that will maximize the descent time and number of propellor spins. Methods/Materials I dropped a 4-bladed rotor device from two different heights, multiple times. This device had blades that could be folded at different angles. The diameter of the propellor wings, the weight, the number of blades, the dropping method, the air humidity and wind were all kept constant. I took data on how blade fold angle changes the descent time and the number of spins. The descent time was measured with a stopwatch and the number of spins was measured by slow motion playback of video. Results The blade fold angle of 45 degrees always maximized the descent time and the number of spins. All of the other angles resulted in faster descents and less spins. Conclusions/Discussion My conclusion is that the blade camber can change the descent time and number of spins of a carefully constructed device. My hypothesis of an optimum blade camber was supported by the data.	
Summary Statement My project is about optimizing the blade camber of a free-falling rotor.	
Help Received Dad helped me gather materials and conduct the drop test. I also received information from interviews of two NASA engineers.	