



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Diego McDonald	Project Number J0119
Project Title Determining the Relationship between Lift and Wind Speed to Induce Flight in a Sample Aircraft	
Objectives/Goals To determine the relationship between added weight and wind velocity on an airplane.	
Abstract Methods/Materials A wind tunnel was built to simulate the effects of wind. A model airplane was suspended at one end of the wind tunnel, and the fan was installed on the opposite end. The wind speed was calibrated using an anemometer designed for the project. The anemometer consisted of a dial controlling wind speed in degrees, from zero to 360. The minimal amount of counterweight needed to suspend the plane was determined and set. The counterbalance weight was increased in increments of 2.5 grams (one penny dated after 1985), and the wind speed was adjusted using the increments on the anemometer. Tests were performed at 21 different wind speed settings. Materials used included an aerodynamically Correct Model Airplane (has the ability to fly, a Wind Tunnel, Weight Set (I used pennies dated after 1985, each weighs 2.5 grams, Anemometer (I found relative wind speed using circle graph on dimmer switch) and a Counter Weight (Used water to keep airplane suspended).	
Results When the weight of the plane was increased by 2.5 grams, the wind speed would need to be increased by about 50 on the dial. Each time we added weight, we had to increase the wind velocity for the plane to rise. We started at 300 grams of water to emulate the plane hovering in air. We found the minimal wind velocity needed for the plane to fly without added weight, 170 degrees.	
Conclusions/Discussion I discovered the weight added and the amount of wind speed required to lift the plane varied directly with each other. When added weight is increased, the wind velocity must be increased for the plane to rise. Using linear regression, the equation for the relationship between the wind speed and the added weight was determined to be: $y = 2.17x + 172.32$ Where: y = wind speed needed lift the plane, as represented by degrees on the circle (anemometer)	
Summary Statement Testing the relationship between wind velocity and added weight on an airplane.	
Help Received Father helped build wind tunnel; Mother helped paste elements of exhibit board.	