



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Henry W. Downs	Project Number J0107
Project Title Making the Perfect Paper Air Plane	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My experiment is to make a paper airplane that can rival some of the best paper airplanes. To accomplish this, I will first gain an understanding of how real planes work, and observe the principals of flight in action by testing a few different kinds of paper airplanes. My data showed that the design elements, such as placement of weight, and wing structure are the key to designing a good paper airplane. Unfortunately, I learned that designing a paper airplane is not child#s play, and is more difficult than it appears.</p> <p>Methods/Materials Material- Paper; stop watch; tape measure; chalk; a starting point;a second person to start and stop the time;notebook Procedure- Test different kinds of paper airplanes, using standard data points, and learn from comparing the data to create the best paper air plane that I can.</p> <p>Results My data showed that the plane needs to be small enough to be able to survive a hard throw, yet it needs to be large enough to take full advantage of gravity's pull, and use it to create lift. The plane also needs to be balanced, so that its angle of attack does not change so drastically that the plane can't stabilize itself. Positioning of the weight affected the angle at which the plane would turn down when gravity took over. If the angle was perfect, the wings could catch the wind, and swoop up. If the plane turned too far down, it would fly into the ground. If the plane had most of its weight on its nose, it would probably create too steep of an angle for the wings to catch the air and create forward thrust to move the plane forward. If the plane had most of its weight in its middle, the weight wouldn't pull its nose down at as sharp of an angle, and therefore would be able to use the gravity to its advantage, speeding up, as well as generating more lift, because the wings were able to catch the airflow at the right angle of attack.</p> <p>Conclusions/Discussion The structure of a plane is important because as soon as the initial thrust provided by the throw decreases, gravity takes over and helps provide thrust. If the weight is in the right position, the plane will be able to go down at an angle gentle enough for the plane's wings to easily catch the airflow and use it to create lift and forward thrust. If the weight is not in the correct position, the plane goes down at an angle too steep for the plane's wings to catch the airflow and generate lift, resulting in a crash.</p>	
Summary Statement Designing the perfect paper air plane is more difficult than it may seem because you must balance The Principals of Flight, know to us as lift, thrust, gravity, and drag.	
Help Received Step Dad helped to type up the project, put together the display board, and guide me.	