



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

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Project Title Up, Up, and Away! Model Rocket Aerodynamics and Parachute Recovery Systems	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This project on rocket aerodynamics had two goals. The first goal was to determine which fin shape and location would yield the greatest stability and thus the highest maximum altitude during flight. The second goal was to determine which parachute style would yield the slowest rate of descent and reduce the distance a rocket traveled away from the launch site.</p> <p>Methods/Materials Flight stability was tested by constructing four different rockets. Two rockets had downward-facing fins: on one rocket they were located near the base and on the other near the center of the rocket. Two additional rockets had upward-facing fins, again located near the base or near the center of the rocket.</p> <p>At another time, the efficiency of four different styles of parachutes was analyzed. A drop test was used instead of an actual flight as parachutes used during flights may not properly deploy. Two large parachutes of equal area but different shapes were compared to two small parachutes, one with a spill hole and one without.</p> <p>Results The rockets with downward facing fins consistently reached higher altitudes than those with upward facing fins.</p> <p>The larger parachutes took the most time during descent and traveled the greatest distances, while the smaller chutes dropped faster and traveled less distance.</p> <p>Conclusions/Discussion The downward-facing fins created much more stability than the upward-facing fins, and the greatest stability was achieved when the fins were located closest to the engine mount.</p> <p>Large parachutes descend slowly and travel great distances while small chutes fall rapidly and do not drift far from the drop point.</p> <p>Future tests would examine the effect of greater thrust on both models of the rockets with downward-facing fins to see if either design would prove to be less stable if more force were added.</p>	
Summary Statement Fin shape and location directly affects flight stability and maximum altitude attained. Parachute size and shape affects recovery time and distance traveled.	
Help Received My mother helped me type the report; my neighbor advised me on designing and launching the rockets.	