



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Daniel Arellano; Desiree Sison</b>	<b>Project Number</b> <b>S0101</b>
<b>Project Title</b> <b>What Is the Relation between the Length of Water Bottle Rockets and Their Resulting Altitude?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The Purpose of this project is to determine if the length of a rocket can affect the altitude it can achieve. According to our hypothesis, if the weight is equalized among all rockets, then the rocket with the longest length will achieve the highest altitude because of its greater control and stability in the air.</p> <p><b>Methods/Materials</b> For the experiment, we constructed our own water bottle rocket launcher from various materials including wood, rubber stoppers, metal plates and various hardware. Rockets of different sizes constructed of 2 liter water bottle rockets, cardboard wings, and a transmission funnel nose were used. To balance the weight of all the rockets, the rocket with the most mass would serve as a control and washers would be added to the remaining rockets to add correct amount of necessary mass to equal the heaviest rocket. To calculate altitude, a stopwatch recording the entire flight time and a gravitational protractor were also used. The time was first divided in two so only the total time to its highest point would be recorded. Then the time is plugged into an equation of kinematics to determine distance up it traveled. The gravitation protractor was used to achieve a second calculated altitude to insure accuracy.</p> <p><b>Results</b> Through data analysis, we have been able to determine and calculate that there is no affect on altitude from the length of the water bottle rockets.</p> <p><b>Conclusions/Discussion</b> From this experiment, we have proved our hypothesis incorrect, in that the longest rocket did not achieve the highest altitude but more or less reached the same height as the smaller rockets. This was determined through the analysis of our data and also through observation. However, if the equation of kinematics are taken into consideration, we would be able to foresee that the equations themselves do not take into account the height or length of an object. The determined results are very conclusive in that further tests would only go to show that our data is further correct.</p>	
<b>Summary Statement</b> Our project is primarily to calculate the effect length has on the altitude of water bottle rockets.	
<b>Help Received</b>	