



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> <b>Christopher P. Leyva</b>	<b>Project Number</b> <b>S0213</b>
<b>Project Title</b> <b>Launching into Physics: A Study of Projectile Motion</b>	
<b>Objectives/Goals</b> My objective in this experiment was to find which angle of trajectory will fire a projectile the farthest?	
<b>Abstract</b> <b>Methods/Materials</b> Materials: Tennis Ball Cannon, Pen and Paper, Orange Cones, Tennis Balls, W-D40 Lubricant, Tape Measure, Tennis Ball Cannon Stand, Prestone Starting Fluid (fuel) Procedure: A. Load the cannon B. Fire the cannon at each of the following degrees: 80, 70, 60, 55, 50, 45, 40, 35, 30, 20, 10 C. Measure and record the distance traveled from the point of impact of the tennis ball D. Repeat steps 1-3 until you have fired the cannon at all of the angles E. Compare your measurements	
<b>Results</b> The tennis ball traveled the farthest when fired at a 45 degree angle.	
<b>Conclusions/Discussion</b> I have learned that firing a tennis ball at a 45 <sup>o</sup> angle achieved the greatest distance. I noted that the tennis ball would occasionally deviate from the expected path and land off to the right of its intended straight path. I noticed that the higher the projectile was fired, the farther off to the right it landed. I believe that the infrequent occasions that this happened are due to wind. I chose to do the experiment on a day that had very little wind. However, intermittent breeze would pass by and alter the path of the tennis balls. It is not practical to expect that there was no wind at all during the experiment. This explains why the projectiles that were fired at a higher altitude had a shorter overall distance. Due to being in the air for a longer amount of time, the wind had a greater effect on these tennis balls. If wind could be completely factored out of this experiment, the averages of 10 <sup>o</sup> and 80 <sup>o</sup> , for example, would have been very close to the same. Yet my results show that tennis balls fired at lower altitudes (10 <sup>o</sup> ), achieved a greater distance than those of higher altitudes (80 <sup>o</sup> ). I think that fuel is another important factor in this experiment. The starting fluid must be sprayed directly into the chamber. If one is not careful, the aerosol stream can be sprayed onto the inside wall of the chamber. When this occurs, the fuel moves from a aerosol to liquid state. This in turn causes a misfire because the fuel does not mix with the air in the combustion chamber. In addition, as little as possible starting fluid needs to be sprayed. If too much fuel is sprayed into the cannon, the fuel-air ratio becomes too rich to ignite.	
<b>Summary Statement</b> This experiment involves the study of projectile motion by launching a tennis ball at different angles.	
<b>Help Received</b> My father gave me advice as I performed the experiment. He also helped record measurements as I fired the cannon.	