



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Paulina M. Hlavacek	Project Number S0213
Project Title Simulating the Optimal Golf Swing	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I strive to determine the effect of adjusting gravitational potential energy and effort force on a golf swing and the resulting ball flight. I hypothesize that the maximum gravitational potential energy, in conjunction with the maximum effort force, will produce the most desirable resulting ball flight.</p> <p>Methods/Materials I constructed one catapult-styled testing mechanism, using a 9-iron golf club as the lever and placing the fulcrum on the grip where the player's hands are used. I could adjust the weight (input force) used by adding ankle weights to the shaft above the club head and the height (potential energy) by measuring the distance from the club head to the ground.</p> <p>Results The results of the experiment were drawn using a swing-simulator at a golf shop. The simulator is a wall designed to interpret ball speed, total distance (including curved roll), carry distance (the actual linear distance), and the loft of the shot using the impact of the ball.</p> <p>Conclusions/Discussion Full swing trials were successful in achieving the maximum distance records; however, they were also inconsistent. The half-swing trials produced considerable distance with regularity, although the greatest distance never matched that of the full swing. Adding mass to the club did increase distance in some cases, but more frequently decreased swing accuracy and detracted from distance. In fact, the greatest distance was achieved in a trial with no weight added to the club.</p>	
Summary Statement Using experimental data to understand the relationship between output distance, flight trajectory, and ball speed, and gravitational potential energy and input force.	
Help Received Used golf swing simulator at The Golf Mart Superstore (2040 Fremont Blvd, Seaside, CA, 93955); assisted by Jeffree, a sales associate; Father helped construct machine	