



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Jacob L. Smith	Project Number S0213
Project Title Comparison of the Distance a Ball Is Thrown from a Catapult Compared to a Formula's Accuracy When Arm Length Is Changed	
Abstract Objectives/Goals To compare the distance a golf ball could be launched compared to the distance predicted by a mathematical equation. Methods/Materials Research began one month ago by researching catapult design as well as existing formulas to compare the catapult projectile distance to. A wooden compound catapult was constructed to determine the distance of a golf ball being launched and provide a comparison for mathematical formula. The variable for the catapult was a changing launching arm length that could be changed to 15, 20, 25, 30, 35, and 40 inches long, measuring from the arms pivot point and the cup at the end of the arm that holds the golf ball. At each arm length the ball was launched 20 times and measured. Results The mathematical formula distance prediction did not match the results that were given by the actual launching of the golf ball until the arm weight was calculated into the formula. The results then became more accurate and closer to the actual projectile range. The outcomes from launching the golf ball became increasingly more accurate as the arm length increased. Conclusions/Discussion The longer arm lengths, 30,35, and 40, were closer to the prediction given by the math equation used. The prediction was less accurate for the 15,20, and 25 inch arms based on the data and did support the hypothesis.	
Summary Statement Comparison of the actual distance of a golf ball launched from a compound catapult compared to a mathematical formula's accuracy when arm length is changed.	
Help Received Science teacher helped with excel and research the project; mother helped to collect data; father helped collect data and photograph project	