



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Benjamin S. Martin	Project Number 30594
Project Title Soccer Ball Kick: The Effect of Differing Air Pressures	
Objectives/Goals This project examines the effect of differing air pressures on the distance a soccer ball will travel when kicked. I predicted that a soccer ball with greater air pressure will go farther because there is more of an elastic collision in this kinetic energy transfer. I think the ball with less air will absorb more of the energy from the kick and will not go as far. With a harder more full ball, I think the ball will absorb less energy from the kick and so more energy will transfer through the ball, propelling it farther.	
Abstract Methods/Materials Materials - Custom designed and built spring loaded kicking machine (#Pele#), size 5 soccer ball, blue marking chalk, digital air pressure gauge, ball pump, 100 foot measuring tape Methods- A. Secured kicking machine in street; marked its location; inflated soccer ball to desired per square inch (psi) using pump and gauge; covered ball in blue chalk; placed ball in the ramp of the kicking machine; pulled kicking machine #leg# back to wooden #stop bar# 156 1/2 inch above ground); released kicking leg; observed ball in flight; noted landing location where the ball first hits the ground (evidenced by chalk mark); measured and recorded the distance from the kicking machine. Performed above steps 10 times at each air pressured tested. B. The variable altered to test the hypothesis (independent variable) was the air pressure in the soccer ball. C. Four air pressure levels were tested (2 psi, 5 psi, 8 psi and 11psi) and ten trials were performed at each air pressure level for a total of 40 trials. D. The distance (in inches) between the kicking machine and the initial landing mark for each #kick# were measured and recorded.	
Results The distance of each of the 40 trials were measured (in inches). The mean distance at each psi level was then calculated (2psi=304.39 inches, 5psi=340.18 inches, 8psi=368.76 inches and 11psi 396.60 inches). There were very few outliers in the 40 kicks performed.	
Conclusions/Discussion The hypothesis was supported by the results of my experiment. Overall, the average distanced measured of all my trials resulted in the higher psi filled soccer ball going farther than the lower psi filled ball. Thus, it appears that the fuller soccer ball contributed to a more elastic collision that resulted in greater distance traveled when kicked.	
Summary Statement This projects examines the effect of differing air pressures on the distance a soccer ball will travel when kicked.	
Help Received Father helped build kicking machine; mother helped type report and took photos; younger brothers helped paint and measure distances	