



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

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| <b>Name(s)</b><br><b>Julie Baker; Karen Nichols</b>  | <b>Project Number</b><br><b>S1001</b> |
| <b>Project Title</b><br><b>Circumference of Thigh vs. Force of Kick</b>  |                                       |
| <p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b><br/>This project will test whether or not the circumference of each person's thigh, will affect the amount of force that each participant applies to the ball. The larger the circumference of the thigh, the higher the ball in rotations will be, thighs that contain large circumferences will have a larger force, and have a larger number of degrees. Male participants will apply a larger force to the ball opposed to women.</p> <p><b>Methods/Materials</b><br/>Materials: A mini soccer goal, a chain, a new soccer ball, sand bags, measuring tape, an enlarged protractor, and data tables to record the information. Before testing each participant, they had to get a signed consent form informing each participant about the project. Once the participant was cleared to go, their dominant leg was measured. Their leg was then measured four inches above the knee cap. After measuring the four inches up their circumference of their thigh was measured. After recording the circumference, each participant would stand at the tip of the pole that goes across the bottom of the soccer contraption. Each participant got a trial run, to make sure they knew how it worked. Standing at the tip of the pole, each participant would strike the ball. The numbers of rotations were counted as the ball went around the contraption. As the ball slowed down, and could not make it around another full rotation, the excess angles were measured with the enlarged protractor. The protractor's flat bottom was vertical and right against the contraption, as the semi circle of the protractor measured the excess angle. Then the data was recorded. When doing the calculations for the kick results, each full rotation was three hundred and sixty degrees, and then multiplied by how many full rotations, and then the excess angle we sited from our protractor to the other numbers was added. One hundred participants were tested.</p> <p><b>Results</b><br/>As predicted, results showed that as the circumference of the thigh increased, so did the rotations of the ball. For the most part the male adults dominated for the highest amount of force. Both female and male children had a lower force on the ball, and the youth that tested were wide spread. The female adults as well, were in the higher end of the graphs.</p> <p><b>Conclusions/Discussion</b><br/>In the conducted experiment, the results supported that the circumference of someone's thigh does affect the force that each individual has when kicking a soccer ball.</p> |                                       |
| <b>Summary Statement</b><br>The project was simply to support the prediction that the larger the circumference of someone's thigh, the larger the force that they can apply to a soccer ball.  |                                       |
| <b>Help Received</b><br>Help that was received during the project would include the hundred participants, parents, and the teachers Mrs. Lewis, and Mr. Grubb for their input to improve the project, and Mr. Holmes for ideas on suspending the soccer ball from the mini goal, and using a new soccer ball. Thank you!   |                                       |