



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Daniel E. Brown</b>	<b>Project Number</b> <b>J0203</b>
<b>Project Title</b> <b>Pumped Up! Determining the Optimum Air Pressure for a Soccer Ball</b>	
<b>Objectives/Goals</b> I wanted to determine how the amount of air pressure in a soccer ball affects the distance the soccer ball travels in the air when kicked and what is the optimum pressure for best performance.	
<b>Abstract</b> To get the coefficient of restitution, inflate the soccer ball to 2 psi. Someone stands on a chair and drops the ball from an 80 inch height. Measure the height of the bounce. This was repeated 3 times at each air pressure (2,4,6,8,10 and 12 psi). Calculate the coefficient of restitution by dividing the height of the bounce by the height of the drop.	
<b>Methods/Materials</b> Assemble slingshot. Launch the soccer ball with 2 pounds of pressure and measure the distance it travels. Repeat twice more at this air pressure. Next repeat 3 times each with the ball at 4, 6, 8, 10 and 12 pounds of pressure. Materials: Size 3 soccer ball, air pump, low-pressure air pressure gauge, 25 foot measuring tape, air inflation needle. For Soccer Ball Launching Slingshot: One of the following:4ft. X 4in. plywood 1/2 in. thick, 4in. X 4in. wood 18in. long, 4in.X4in. wood 20in. long, 1 1/2in. O hook, 1in. wood drill bit, 1/2in. X 4in. wood 36in. long, pad of heavy duty felt, gate latch, 1in. dowel 13in. long, box of wood screws 1 3/4 in. long, round door stop 2in. diameter. Two of the following:4in. X 4in. wood 9 1/2in. long, 2in. X 4in. wood 41 1/2 in. long, 1in. I hook, 1 1/4in. I hook. Three: Bunge cords 24in. long.	
<b>Results</b> The distance increased from 2 to 8 psi then began to decrease. My data showed that the manufacturer recommendation, 6-8 psi is actually the air pressure that will give you the best performance of the ball.	
<b>Conclusions/Discussion</b> The optimum pressure is 6-8 psi. If you put more air, the ball becomes harder but doesn't perform better.	
<b>Summary Statement</b> My experiment was designed to determine the optimum air pressure of a soccer ball using the scientific method and launching the ball at incrementally higher pressures.	
<b>Help Received</b> My older brother came up with design for ball launcher; Dad took me to buy lumber, helped me build launcher and took pictures; Mom helped cut all the paper for backboard.	