



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Mary R. Data	Project Number J0106
Project Title Serve It Up: The Effects of Spin on the Volleyball	
Abstract Objectives/Goals The purpose of this science fair project was to determine which volleyball serve is the hardest for the opponent to return based on the effects of the spin on volleyball. Methods/Materials The experimental method I used was to videotape a live volleyball match. I drew a diagram from the measurements of the court showing the lines on the court and walls of the gym to use as reference points to determine the trajectory and speed of the volleyball for each serve. I analyzed 59 overhead serves and 45 float serves. A total of 112 serves were analyzed frame-by-frame and recorded on an Excel spreadsheet. Each serve was analyzed for the type of serve (determined by the rotation of the ball), the maximum height, the launch angle of trajectory, the distance the volleyball traveled, the time it took from the initial impact (serve) to when the ball lands, the travel speed of the volleyball and the level of difficulty to return the volleyball. I also designed and built a wind tunnel to confirm the Bernoulli Effect on a spinning volleyball. Results The float serve is the hardest serve to return because 58% of the aces in the volleyball match were the result of a float serve. The average level of difficulty to return a float serve on a scale of 0 to 4 was 2.8 as compared to 2.4 for an overhead serve. In an overhead serve the ball with a backspin has lift in an upward motion and tends to curve upward as it reaches the end of its path. The float serve is when the ball has no spin and the pressure around the ball is constantly changing. This causes the ball to swerve erratically through the air making it harder for the opponent to predict the ball's trajectory. Conclusions/Discussion My hypothesis was correct and proves that the float serve is the most difficult serve to return over the net or to set a pass to the setter because it is harder for the player to judge the ball's erratic trajectory keeping the opposition off guard. As a volleyball player, physics has given me a competitive advantage; I can change the spin on my serve to keep the other team off guard.	
Summary Statement My project demonstrates which volleyball serve is the most difficult for the opponent to return based on the spin of the volleyball.	
Help Received My dad videotaped the volleyball match and cut out the plywood for the smoke machine box on the table saw. My parents talked with me about my design concepts. My brother helped me with one of my spread sheets. My mom proof-read my report and display board.	