



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

Name(s) John B. Glaser	Project Number J0212
Project Title The Physics of Cheating in Baseball	
Abstract Objectives/Goals I tried to determine whether cork, sawdust, or rubber balls, when used as fillers in hallowed out wooden baseball bats, will cause a baseball to travel farther in distance upon contact compared to a solid wooden bat (the control bat). Methods/Materials My father helped me hallow out three standard bats. I filled each to capacity with one of three substances: cork, sawdust, and rubber balls. I also made a batting device, which held the bat stationary and was attached with a spring to cock the bat back 90 degrees and then release it to hit the ball at the same velocity and position each time. Measuring tape was placed on the ground to mark the spot each ball first hit the ground. There were 25 trials for each of the four bats. Results The solid wooden bat hit the ball the farthest with an average of 206 inches after 25 trials. The cork bat hit the ball an average of 205 inches with the rubber ball and sawdust bats hitting the ball the same average of 202 inches. Conclusions/Discussion I determined that, given all variables constant except the bat filler, a wooden bat hits a ball farther than the other fillers. I considered the weight of each bat, since the filler changed the weight, but the results did not indicate that weight was a factor. More importantly, the density of the bat was consistent with the results. The sawdust and the rubber ball bats are the least dense and therefore hit the ball shortest in distance. A wooden bat is more dense than a cork, but not by a significant amount.	
Summary Statement The density of the bat is related to the distance a ball will travel, but not to a significant level to allow cheating in baseball.	
Help Received My dad helped me hallow and fill each of the three experimental bats and supervised me making the device to hold the bat. He also helped to determine the distance each ball projected. My teacher helped me organize the board and made sure I properly submitted the paperwork.	