



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Brian S. Lee</b>	<b>Project Number</b> <b>S1213</b>
<b>Project Title</b> <b>What Makes a Team Win More or Fewer than Pythagorean Expectation?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> The objective of this project is to determine why baseball teams win more or fewer games than they are expected by the Pythagorean expectation, which is based on runs scored and allowed. <b>Methods/Materials</b> I researched the database, stats, and references of the Major League Baseball teams in 2004 and 2005. I also researched the Pythagorean expectation, Pythagorean Theorem, and Bill James who invented the Pythagorean expectation formula. Then the expected winning percentage for each team was calculated and I identified the teams whose actual winning percentages were deviated most from their expected percentages. Next, I gathered more details on those teams and analyzed to find out what they did that resulted in more or fewer wins than predicted. Finally, I tried to determine what the teams had in common. <b>Results</b> 2005 Arizona Diamondbacks (won 13 more games): getting good players (infusion of veteran talents) and good chemistry 2005 Toronto Blue Jays (won 9 fewer games): mismanagement - sent best players without improving the team and chopped payroll (team salaries ranked 25th - difficult to attract quality veteran players) 2004 Cincinnati Reds (won 10 more games): young starting pitching was the biggest reason 2004 Detroit Tigers (won 7 fewer games): poor bullpen and weak team chemistry (lost their motivation and intensity toward the end) <b>Conclusions/Discussion</b> I conclude that my hypothesis was partially correct. Poor bullpen was the main reason why the Tigers won seven fewer games than expected. But it was good players, good veteran players for the Diamondbacks and young starting pitchers for the Reds, that they earned more victories. Also, team chemistry was a critical factor for both the Diamondbacks and the Tigers; it helped the Diamondbacks to win more games while the Tigers saw their team to break apart due to lack of motivation and intensity. I observed that teams that suffered worst records in the MLB came back close to their norm the next year. I also noticed that teams need to invest more money to attract quality players and to win more games. For further research I would like to repeat my project using 1.82 as an ideal exponent instead of 2 that I used and compare the accuracy of the Pythagorean expectation using 1.82 versus 2. Furthermore, I would like to analyze the results to see my hypothesis will be more or less correct than now.	
<b>Summary Statement</b> My project explored what makes a team's winning percentage deviate from the Pythagorean expectation, which is based on runs scored and allowed.	
<b>Help Received</b> My dad helped me searching for numerous baseball related websites to find teams and players stats and any relevant information that I needed. He also showed me how to enter functions to calculate Pythagorean expectation easily using Microsoft Excel.	