



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Karl J. Lowood	Project Number 22330
Project Title What're the Odds? A Lesson in Probability	
Abstract Objectives/Goals My objective was to figure out and test the probabilities of rolling certain combinations of dice in role-playing games. My hypothesis was that 10 three-sided dice were more likely to roll a sum of at least 18 on the total of the dice than 3 ten-sided dice or 5 six-sided dice. Methods/Materials I used 10 three-sided dice, 3 ten-sided dice, and 5 six-sided dice to perform this experiment. Since there is no way to make an actual three-sided die, I rolled a six-sided die and rounded fractions up. I rolled each combination of dice 100 times and recorded my results. Then, I determined the probability of rolling a sum of at least 18 on each combination of dice. For 3 ten-sided dice, I made a chart to determine probability. For the other two combinations, I went online and found charts that helped me calculate the probability distributions. Finally, I checked to see if my results matched these probabilities. Results For 10 three-sided dice, I calculated a probability of 4 in 5. For 3 ten-sided dice, I calculated a probability of 2 in 5. For 5 six-sided dice, I calculated a probability of 1 in 2. For the most part, the experiment results matched the probabilities I calculated for rolling a sum of at least 18. For 3 ten-sided dice, I rolled at least 18 thirty-nine times, and for 5 six-sided dice rolled at least 18 fifty-one times. Ten three-sided dice was slightly off -- I rolled at least 18 seventy-four times. Conclusions/Discussion The experiment proved my hypothesis, that 10 three-sided dice are the best way to roll a sum of at least 18. It also showed that though probability is a reliable and effective way to determine your chances of rolling a certain sum, your actual experience will not always match the calculated probability.	
Summary Statement I calculated and verified probabilities for rolling dice.	
Help Received Mother proofread, Father checked for math errors	