



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Lindsay R. Kipnis	Project Number 22763
Project Title Spin to Win: A Dreidel Discussion	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals My objective was to discover if I could alter the laws of probability by weighting one side of my dreidel before spinning it. I believed that when I weighted one side of my dreidel, the probability of the dreidel landing with that side up would increase because the weight would force the dreidel to stop spinning with the weighted side up. Also, the more weights I put on one side, the more the dreidel would land with that side up.</p> <p>Methods/Materials I spun different dreidels until I found one that was well balanced. I then added weights, one at a time (up to three), to get my results. I spun my dreidel two hundred times at each weight level making sure to follow the reliability factors discussed in my journal. I glued the washers to the Gimmel side of the dreidel because that is the side that I wanted to come up.</p> <p>Results I discovered that I could alter the laws of probability, but not in the way I expected. I thought adding the weights to Gimmel would increase the amount of times Gimmel would land up because the weight would force the dreidel to land with the Gimmel side up. As I added weight, I discovered that these predictions were incorrect. Instead, Hey, the side to the left of the weighted side, landed up most often and adding weight only exaggerated the results.</p> <p>Conclusions/Discussion I tried to think about why Hey landed up most often and decided it had to be due to the spinning motion. Adding weight to one side must have changed the outside shape of the dreidel, which changed the momentum as the dreidel slowed. When I spun the dreidel, the motion seemed to throw the weighted side past landing down. The Gimmel side landed on the right and therefore the Hey side landed up.</p> <p>My goal was to figure out how to weight a dreidel so the Gimmel side landed up most often. When I weighted Gimmel, Hey landed up the most often and Hey is to the left of Gimmel. Therefore, I now predict that if I want Gimmel to come up most often, I would need to weight Nun because Gimmel is one side to the left of Nun. To continue my experiment in the future, I would like to weight Nun and see if I am correct.</p>	
Summary Statement My project is to determine if, by adding weights to one side of a dreidel, I can affect the probability that the dreidel will land with that side up.	
Help Received My mother helped me by letting me discuss the stages of my project with her, my dad supervised me while gluing the washers onto my dreidel, and I discussed my results in a telephone conversation with my dad's friend, Dr. Larry Wilen.	