



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Erin E. Gudger	Project Number J1304
Project Title Shuffle Scuffle	
Abstract Objectives/Goals The purpose of this project is to find out how many shuffles you need to do to play a card game fairly. My question is #How many times do you have to shuffle to have a random deck of cards?# My hypothesis is I think that after seven shuffles I won't be able to detect any difference in randomness. Methods/Materials a deck of playing cards, my notebook, a pencil and a computer. I shuffled various amounts of cards 10 times and recorded their order. I then used the computer to analyze the data for randomness. Results I found out that the results depended on the number of cards shuffled. For a smaller sized deck of cards it seemed like I needed fewer shuffles than a full sized deck of cards. For both cases, after 5 shuffles, the cards did not get much more random. Conclusions/Discussion It is true that after seven shuffles you will not be able to detect any difference in randomness. However, I found that for a standard deck of playing cards I could not detect any increase in randomness after five shuffles.	
Summary Statement The purpose of this project is to find out how many shuffles you need to do to play a card game fairly.	
Help Received My father helped me with the project and wrote the shuffling computer program I used.	