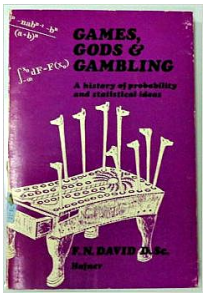
# F. N. David and Probability

**Materials Needed:** two six-sided dice, pencil, and paper

F. N. David earned a bachelor's degree in mathematics in 1931 with the goal of becoming an actuary, but companies at that time would only hire men. Instead she became a research assistant and continued her education. As a student, there was one class in which she had a very famous professor as a teacher, but he wouldn't let her ask any questions because she was a woman. David didn't let that stop her from succeeding: "I would sit next to [other students] and I'd say "Ask him! Ask him!" She earned her PhD in statistics in 1938. Later she worked for the English government during World War II and as a college professor. One mathematical area in which David did a great deal of her work was **probability**, including writing a book called *Games, Gods, and Gambling*.




**Play the dice game**:

Statisticians like F. N. David often study probability using everyday objects like spinners and dice. One idea they are interested in is whether or not certain kinds of games are **fair**, which means that all players have the same chance (probability) of winning. Another way to think about fairness is that if a group of people play a fair game over and over again, they will each win about the same number of times. Try the following game on your own.

1. Roll two dice. If you get at least one 6, give yourself one point. If you do not get at least one 6, give one point to an imaginary friend.
2. Roll the two dice again, using the same scoring rules. Keep rolling until either you or your imaginary friend have a total of five points. That person is the winner!
3. Try the game a few times and keep track of how many times you and your imaginary friend win. There is a table on the next page to help. Do you think this is a fair game? Why or why not?

**Extension:** Invent your own dice-rolling game that would be fair for two players and share it.

(Optional) **For those who have seen tree diagrams or combinations and permutations:** Figure out how many different combinations of numbers you can get when you roll two dice. You could try making a table with two columns, one for each die, or a tree diagram with branches that show the possibilities for the first die and then the second die. How many have at least one 6?

| | Your Point Tally | Friend's Point Tally | Who won the game? |
|---|---|---|---|
| Game 1 | | | |
| Game 2 | | | |
| Game 3 | | | |
| Game 4 | | | |
| Game 5 | | | |
| Game 6 | | | |
| Game 7 | | | |
| Game 8 | | | |
| Game 9 | | | |
| Game 10 | | | |