Probability

JUST BECAUSE YOU GUESSED A HUNDRED COIN FLIPS IN A ROW DOESN'T MEAN YOU'RE PSYCHIC. COINCIDENCES DO HAPPEN.

I CALL SEVEN ROTATIONS FOLLOWED BY INEXPLICABLE HOVERING AND HEN NOISES.

THAT IS LUCK ... LUCK, LUCK, LUCK, LUCK, LUCK!

ARE WE DONE NOW?
http://youtube.com/watch?v=31e2tBg8b8k

http://youtube.com/watch?v=xFAWR6hzZek
The study of probability dates back to the mid 17th century through correspondence between two mathematicians, Pierre de Fermat and Blaise Pascal.

“A gambler's dispute in 1654 led to the creation of a mathematical theory of probability by two famous French mathematicians, Blaise Pascal and Pierre de Fermat.”
Antoine Gombaud, Chevalier de Méré, a French nobleman with an interest in gaming and gambling questions, called Pascal's attention to an apparent contradiction concerning a popular dice game. The game consisted in throwing a pair of dice 24 times; the problem was to decide whether or not to bet even money on the occurrence of at least one double six during the 24 throws.
A seemingly well-established gambling rule led de Méré to believe that betting on a double six in 24 throws would be profitable, but his own calculations indicated just the opposite.
This problem and others posed by de Méré led to an exchange of letters between Pascal and Fermat in which the fundamental principles of probability theory were formulated for the first time. Although a few special problems on games of chance had been solved by some Italian mathematicians in the 15th and 16th centuries, no general theory was developed before this famous correspondence.”
Take two dice and roll them 24 times. Record whether or not you win or lose, where you win if you roll double six at least once.

We will determine what percentage of the class wins.
It is easier to calculate the probability of losing in this game. Losing requires you to not roll a double six on each of the 24 rolls. It turns out that the probability of losing is

\[(\frac{35}{36})^{24}\]

which is approximately .51, or about 51%. 
Then the probability of winning is approximately .49, or slightly less than half. Thus, de Méré was right that it is a little less than even money to bet on getting a double six in 24 rolls.

Later on we will see how to come up with this calculation.
We will explore some of the ideas that are used in this calculation. We will focus on getting a better understanding of what is the meaning of probability.
For a rough idea of the meaning of probability, saying that the probability (or chance) of flipping a coin and getting heads is 50%, or .5, then on average, if you flip a coin many times, you will have 50% of the flips being heads. However, what happens in a given set of flips can be nearly anything.
Flip a coin 20 times and record the number of heads you get. Then record the number of heads. We will tabulate the data for the entire class.

What does the data indicate to you about the probability of getting a heads on a flip of a coin?
Roll a die 20 times and record the number of times you got each number. Record your data. We will tabulate the class data.

What do you think is the probability of rolling a die and getting a 3?