

Objective Simulating Probability of Compunds Events

## Warm-Up



1. Explain how to use a six-sided number cube to simulate whether someone prefers gymnastics, soccer, or baseball, given that these outcomes are equally likely.

## GETTING STARTED

### Shoot Out

John is the star player on his basketball team. So far this season, he has made 5 out of 6 free throws.

Use your knowledge of probability to answer each question.

1. Out of the next 6 free throws, how many would you expect him to make?
2. Out of the next 10 free throws, how many would you expect him to make?
3. Predict the likelihood that John will make his next free throw.
4. Predict the likelihood that he will make his next 5 free throws.
5. Suppose John made 5 free throws in a row. Predict what will happen on his next free throw.



John is also the team's top 3-point shooter. Suppose John is fouled while attempting a 3-point shot; he then attempts 3 free throws.

1. What might be a good simulation tool for John attempting the free throws?
2. Explain what constitutes a success, or John making a free throw, and what constitutes a failure, or John missing a free throw, using your tool.
3. John's coach wants to know the probability that John will make all 3 shots. Use a simulation to determine the probability.

a. Describe one trial of the simulation.

b. Conduct 10 trials of the simulation and record your results in the table.

c. Count the number of times that your simulation resulted in John making all 3 free throws.

Trial Number	Number of Free Throws Made
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

d. According to your simulation, what is the probability that John makes all 3 free throws?

e. Calculate the mean of the probabilities from the simulations conducted by your classmates. What does this tell you?

John has been on a "hot streak" lately!

4. Design and conduct a simulation to model the number of times John would shoot before missing a shot. That is, on what shot number would you expect John to miss?

a. Describe one trial of the simulation.

b. Conduct 10 trials of the simulation and record the results in the table.

c. Calculate the mean number of shots it takes for John to miss a shot.

d. Compile your data with your classmates' data. Calculate the mean number of shots John takes before he misses one.

e. How was this simulation different from the first simulation?

Trial Number	Number of Shots For First Miss
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	



## LESSON 11.4a On a Hot Streak



### Objective Simulating Probability of Compound Events

#### Review

1. Alison has a set of alphabet tiles. She puts the tiles representing the six letters of her name into a bag. Suppose Alison draws a tile, puts it back, and then draws a second tile.

a. What is the probability that she draws an A and an N?

b. What is the probability that she draws an A or an N?

2. A local eatery noticed that there were anywhere from zero to four double yolk eggs in each carton. Today the eatery opened and used 12 cartons of eggs.

- 8 cartons contained no double yolk eggs
- 1 carton contained one double yolk egg
- 1 carton contained two double yolk eggs
- 1 carton contained three double yolk eggs
- 1 carton contained four double yolk eggs

Determine the probability that the next carton of eggs the eatery opens will contain four double yolk eggs.

a. Design a probability model by creating a table.

b. What could be a good model for simulating experimental data?

c. Describe 1 trial of the simulation.

d. How many trials do you think you would need to conduct for the experimental probability to approach the theoretical probability?

