



What Are My Chances?



A lesson plan designed to teach students about **conditional** and **independent** probability



It can be really confusing learning how to apply conditional and independent probability to real-life situations. This lesson focuses on several examples and practice problems to help you learn how to find conditional probability. In this lesson, we will discuss the differences in the two kinds of probability.



COMMON CORE STANDARDS

CCSS.MATH.CONTENT.HSS.CP.A.2

Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.


CCSS.MATH.CONTENT.HSS.CP.A.3

Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.

CONDITIONAL VS INDEPENDENT PROBABILITY

Independent Probability is when events A and B, do not effect each other. For example, attempting to pull an ace of spades out of a deck is an independent probability. There is no effect on the event.

Conditional Probability is the probability that an event “A” will occur, given that another event “B” has already occurred. For example, suppose you are attempting to pull the Ace of Spades out of a deck of cards. Your first pull fails; and you DO NOT PUT THE CARD BACK. Your odds of pulling the Ace of Spades are now 1/51. Event A affected the odds of Event B.



Exercise: With a partner, brainstorm 3 examples of independent and conditional probability. Make sure to include the probability of each event occurring.

Should students want to watch an introduction of the lesson, please enter the following link: <https://www.youtube.com/watch?v=AQ66NSVZKXk>

PROBABILITY OF TWO EVENTS HAPPENING

Suppose we want to find the probability of pulling a pair of aces from our deck of cards. We can use the following formula to determine the probability of A (pulling an ace) and B (then pulling a second ace):

$$P(A \text{ and } B) = P(A) \times P(B)$$

The probability that both A and B will occur = (The probability that event A will occur) x (The probability that event B will occur, given that event A has already occurred)

The probability that event A will occur (pulling an ace from the deck) = $4 / 52$

The probability event B will occur = $3 / 51$.

So the probability that both events occur =

$$P(A \text{ and } B) = (4 / 52) \times (3 / 51)$$

$$P(A \text{ and } B) = 12 / 2652, \text{ which we reduce to } 1 / 221$$

EXERCISE

Work with a partner to brainstorm 3 scenarios in which you might need to find the probability that two dependent events will occur. Write and solve the equations for each of your scenarios. Students are encouraged to use cards, dice, coins, and other materials to create problems.

