

Name _____ Period _____

With Replacement vs. Without Replacement

When we are drawing a card from a deck or picking marbles out of a bag or drawing names from a hat we have to distinguish whether we return an item or keep it out of the batch. This decision affects the resulting probabilities.

Example: We have a bag with 3 blue marbles and three red marbles. If 2 marbles are drawn one after the other, calculate the probability with replacement and without replacement.

Event	With Replacement	Without Replacement
2 red marbles, one after the other		
A blue marble followed by a red marble		

Example: We have a bag with 1 red, 2 blue, 2 green, 1 yellow, and 2 purple marbles. If 2 marbles are drawn one after the other, calculate the probability with replacement and without replacement.

Event	With Replacement	Without Replacement
A green marble and a yellow marble		
A blue marble and a purple marble		

Example: You have the numbers one through nine on individual slips of paper in a hat. You draw a few numbers from the hat.

Event	With Replacement	Without Replacement
3 numbers are drawn, a 3, a 6, and a 9		
4 numbers are drawn, a 1, a 3, a 5, an 8		

Example: You are drawing cards from a standard deck. Here are a few events that occur with the cards.

Event	With Replacement	Without Replacement
A seven is drawn followed by a king		
A face card is drawn followed by an ace		
A 2, 3 or 4 is drawn followed by a jack		
An ace is drawn followed by another ace		