

**GLENCOE ALGEBRA 2**  
**CHAPTER 12-4 “INDEPENDENT AND DEPENDANT EVENTS”**  
**Multiplying Probabilities**

1. Website: [www.selectmath.com](http://www.selectmath.com) and [www.explorelarning.com](http://www.explorelarning.com)
2. Choose Advanced Algebra → Chapter 12: **Probability and Statistics**
3. Choose 12.4 Independent and Dependent Events  
[www.Explorelarning.com](http://www.Explorelarning.com)

**OBJECTIVE:** To simulate and analyze independence and dependence of mutually exclusive as well as inclusive events. Students will find the theoretical probability and will estimate the experimental probabilities of the given events. They will also solve multiple word problems using Virtual Manipulatives

**PART A**

1. Conduct a Physical demo using bags and marbles with the students to find theoretical as well as Experimental probabilities.

2. What do you think are independent as well as dependant events? Think about some everyday examples.

3. Is a single draw marble event an independent or dependant event? Why?

4. Does the nature of events change for “With Replacement” or “Without replacement” events?

5. Lets change number of draws to 2 and analyze the outcomes of the events for “with replacement” as well as “without replacement” options. Make a table of your outcome (Example is given below). Which is Independent event and which is Dependant event? Why?

With Replacement (**Still Independent Events**)

Outcome	Calculation	Probability
BB	$\frac{6}{9} \cdot \frac{6}{9}$	$\frac{36}{81} \approx 44\%$
BG	$\frac{6}{9} \cdot \frac{3}{9}$	$\frac{18}{81} \approx 22\%$
GB	$\frac{3}{9} \cdot \frac{6}{9}$	$\frac{18}{81} \approx 22\%$
GG	$\frac{3}{9} \cdot \frac{3}{9}$	$\frac{9}{81} \approx 11\%$

Without Replacement (**Dependant Events**)

Outcome	Calculation	Probability
BB	$\frac{6}{9} \cdot \frac{5}{8}$	$\frac{30}{72} \approx 42\%$
BG	$\frac{6}{9} \cdot \frac{3}{8}$	$\frac{18}{72} = 25\%$
GB	$\frac{3}{9} \cdot \frac{6}{8}$	$\frac{18}{72} = 25\%$
GG	$\frac{3}{9} \cdot \frac{2}{8}$	$\frac{6}{72} \approx 8\%$

6. Please discuss the probability differences that you see in both cases

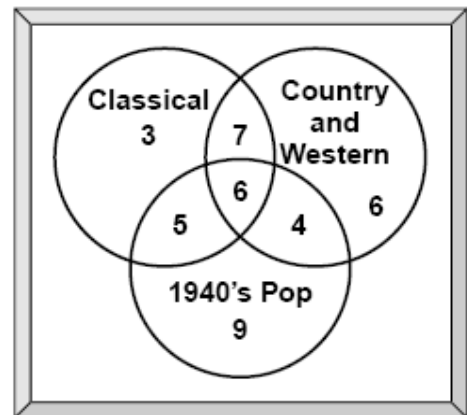
THEORETICAL		
Outcome	Calculation	Probability
BB	$\frac{6}{9} \cdot \frac{6}{9}$	$\frac{36}{81} \approx 44\%$
BG	$\frac{6}{9} \cdot \frac{3}{9}$	$\frac{18}{81} \approx 22\%$
GB	$\frac{3}{9} \cdot \frac{6}{9}$	$\frac{18}{81} \approx 22\%$
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THEORETICAL		
Outcome	Calculation	Probability
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BG	$\frac{6}{9} \cdot \frac{3}{8}$	$\frac{18}{72} = 25\%$
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**PART B** (Some Practice Problems)

We are now going to use our understanding of dependant and independent probability in solving the Addition and Multiplication of Probability Problems.

- MUSIC** Forty senior citizens were surveyed about their music preferences. The results are displayed in the Venn diagram. If a senior citizen from the survey group is selected at random, what is the probability that he or she likes only country and western music? What is the probability that he or she likes classical and/or country, but not 1940's pop?



- A department store employs 28 high school students, all juniors and seniors. Six of the 12 seniors are females and 12 of the juniors are males. One student employee is chosen at random. What is the probability of selecting a senior or a female?
- A restaurant has 5 pieces of apple pie, 4 pieces of chocolate cream pie, and 3 pieces of blueberry pie. If Janine selects a piece of pie at random for dessert, what is the probability that she selects either apple or chocolate cream?
- There are 3 nickels, 2 dimes, and 5 quarters in a purse. Three coins are selected in succession at random. Find the probability.**
  - $P(\text{nickel, then dime, then quarter})$ , if no replacement occurs
  - $P(2 \text{ nickels, then } 1 \text{ quarter})$ , if no replacement occurs
  - $P(3 \text{ dimes})$ , if replacement occurs