

**Richmond Public Schools**  
Curriculum Framework  
*Grade 8*

<b>Strand: Probability and Statistics</b>	
8.11 The student will <ul style="list-style-type: none"> <li>a) compare and contrast the probability of independent and dependent events;</li> <li>b) determine probabilities for independent and dependent events.</li> </ul>	
<b>Suggested Pacing</b>	
Fourth Nine Weeks – 5 Instructional Days (including common assessment)	
<b>Related Standards</b>	
<b>Spiral Down</b> <b>7.8</b> The student will <ul style="list-style-type: none"> <li>a) determine the theoretical and experimental probabilities of an event; and</li> <li>b) investigate and describe the difference between the experimental probability and theoretical probability of an event.</li> </ul>	<b>Spiral Up</b> <i>* No Algebra I Spiral</i>
<b>Essential Questions</b>	<b>Common Misconceptions</b>
<b>How are probabilities of dependent and independent events similar? Different?</b> <i>If events are dependent then the second event is considered only if the first event has already occurred. If events are independent, then the second event occurs regardless of whether or not the first occurs.</i>	<ul style="list-style-type: none"> <li>● Students have difficulty identifying if practical problems are an independent or dependent event.</li> <li>● Students have difficulty remembering that a dependent event requires that one object not be counted.</li> <li>● Students have trouble reducing the resulting fraction in simplest form.</li> </ul>
<b>Understanding the Standard</b>	<b>Essential Knowledge and Skills</b>

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- A simple event is one event (e.g., pulling one sock out of a drawer and examining the probability of getting one color).
- If all outcomes of an event are equally likely, the theoretical probability of an event occurring is equal to the ratio of desired outcomes to the total number of possible outcomes in the sample space.
- The probability of an event occurring can be represented as a ratio or the equivalent fraction, decimal, or percent.
- The probability of an event occurring is a ratio between 0 and 1. A probability of zero means the event will never occur. A probability of one means the event will always occur.
- Two events are either dependent or independent.
- If the outcome of one event does not influence the occurrence of the other event, they are called independent. If two events are independent, then the probability of the second event does not change regardless of whether the first occurs. For example, the first roll of a number cube does not influence the second roll of the number cube. Other examples of independent events are, but not limited to: flipping two coins; spinning a spinner and rolling a number cube; flipping a coin and selecting a card; and choosing a card from a deck, replacing the card and selecting again.
- The probability of two independent events is found by using the following formula:  
 $P(A \text{ and } B) = P(A) \cdot P(B)$ 
  - Example: When rolling a six-sided number cube and flipping a coin, simultaneously, what is the probability of rolling a 3 on the cube and getting a heads on the coin?

$$P(3 \text{ and heads}) = \frac{1}{6} \cdot \frac{1}{2} = \frac{1}{12}$$

#### **The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**

- Determine whether two events are independent or dependent. (a)
- Compare and contrast the probability of independent and dependent events. (a)
- Determine the probability of two independent events. (b)
- Determine the probability of two dependent events. (b)

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- If the outcome of one event has an impact on the outcome of the other event, the events are called dependent. If events are dependent then the second event is considered only if the first event has already occurred. For example, if you choose a blue card from a set of nine different colored cards that has a total of four blue cards and you do not place that blue card back in the set before selecting a second card, the chance of selecting a blue card the second time is diminished because there are now only three blue cards remaining in the set. Other examples of dependent events include, but are not limited to: choosing two marbles from a bag but not replacing the first after selecting it; determining the probability that it will snow and that school will be cancelled.
- The probability of two dependent events is found by using the following formula:  $P(A \text{ and } B) = P(A) \cdot P(B \text{ after } A)$ 
  - Example: You have a bag holding a blue ball, a red ball, and a yellow ball. What is the probability of picking a blue ball out of the bag on the first pick then *without* replacing the blue ball in the bag, picking a red ball on the second pick?
- $P(\text{blue and red}) = P(\text{blue}) \cdot P(\text{red after blue}) = \frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$

Vocabulary	Instructional Activities Organized by Learning Objective
Simple event Event Outcomes Equally Likely Theoretical Probability Desired Outcomes Sample Space Probability	<b>Virginia Department of Education</b> <u>Probability</u> – Lesson Plan  <b>Textbook</b> <i>Virginia Pre-Algebra</i> , ©2012, Glencoe/McGraw-Hill <ul style="list-style-type: none"> <li>● Theoretical and Experimental Probability, page(s) 813 – 818(in part)</li> <li>● Probability of Compound Events, page(s) 840 – 845</li> </ul>

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Independent Event Dependent Event	<b>Notes</b> <ul style="list-style-type: none"> <li>• <a href="#">Probability</a></li> </ul>
<b>Assessment</b>	
RPS PowerSchool Unit Test – RPS 8.11 Common Assessment Test ID#:  <b>Formative Assessments</b> Kahoot.it Plickers Exit Tickets Graphic Organizers	<b>Resources</b> <ul style="list-style-type: none"> <li>• <b>Print</b>  <i>Virginia Coach</i>, NEW SOL Edition, Grade 8, Mathematics            Lesson 15 – page 114 (Probability)</li> <li>• <b>Technology-based</b> <ul style="list-style-type: none"> <li>○ <i>ExploreLearning.com (Gizmos)</i> – <u>Independent and Dependent Events</u>– Interactive Instructional Resource</li> <li>○ <i>TeachingChannel.org</i> – <u>Probability of Dependent and Independent Events</u> – Instructional Teacher Video</li> </ul> </li> </ul> <b>Station Activities</b> <ul style="list-style-type: none"> <li>• <a href="#">Independent vs. Dependent Sort</a> - Have students sort cards with independent and dependent events into their appropriate groups.</li> <li>• Task Cards - Have students complete problems in small groups Think-Pair-Share.</li> <li>• Spinner Activity - Have students choose a spinner, ask students to decide who has the highest/lowest probability based on questions about the spinner.</li> <li>• Marble and Coin Activity - Have students investigate independent and dependent events with a bag of marbles and with two coins.</li> <li>• <a href="#">Quick Note</a></li> </ul>
<b>Cross-Curricular Connections</b>	<b>Differentiations</b>
<b>English</b>	<ul style="list-style-type: none"> <li>• Have students create a foldable for independent and dependent events.</li> </ul>

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Have students write a persuasive essay/paragraph persuading someone about which type of probability (independent or dependent) is in their favor.

#### **Family Consumer Science**

[Monty Hall Problem](#)

#### **Sports**

Discovery Education: [Basketball Free Throw Probability Video](#)

- Have students sort events on cards into groups for independent and dependent events.
- Have students complete experiments and determine whether they were independent or dependent, then discuss why.