

**Curriculum Development Overview**  
**Unit Planning for High School Mathematics**

<b>Unit Title</b>	Independently Lucky		<b>Length of Unit</b>	3 Weeks
<b>Focusing Lens(es)</b>	Decision-making Classification	<b>Standards and Grade Level Expectations Addressed in this Unit</b>	MA10-GR.HS-S.3-GLE.3	
<b>Inquiry Questions (Engaging-Debatable):</b>	<ul style="list-style-type: none"> <li>• How does probability relate to obtaining car insurance? (MA10-GR.HS-S.3-GLE.3-IQ.3)</li> <li>• Why is it hard for humans to determine if a set of numbers was created randomly?</li> </ul>			
<b>Unit Strands</b>	Statistics and Probability: Conditional Probability and the Rules of Probability			
<b>Concepts</b>	two-way frequency tables, associations, conclusions, categorical variables, unions, intersections, complements, events, subsets, sample space, independence, probabilities, products, conditional probability, given			

<b>Generalizations</b> My students will <b>Understand</b> that...	<b>Guiding Questions</b>	
	Factual	Conceptual
Two-way frequency tables provide the necessary structure to make conclusions about the association of categorical variables. (MA10-GR.HS-S.3-GLE.3-EO.a.iv)	<p>How is conditional probability represented in a two-way frequency table?</p> <p>How do you determine the conditional probability of A given B from a frequency table?</p> <p>How do you determine if two events are independent from a frequency table?</p>	Why are two-way frequency tables useful in probability?
Unions, intersections and complements of events describe subsets of a sample space. (MA10-GR.HS-S.3-GLE.3-EO.a.i)	<p>How do the word “and” and “or” relate to unions and intersections?</p> <p>How are intersections and complements related?</p> <p>When is it appropriate to use unions, intersections, or complements in determining probability?</p>	Why is the addition rule related to unions, intersections and complements?
Mathematicians determine the independence of events A and B by examining if the product of the probabilities of A and B equals the probability of A and B occurring together. (MA10-GR.HS-S.3-GLE.3-EO.a.iii)	How can you determine if two events are independent?	Why are events independent if the product of the probabilities of A and B equals the probability of A and B occurring together?
Mathematicians find the probability of an event given the occurrence of another event through conditional probability. (MA10-GR.HS-S.3-GLE.3-EO.a.iii)	When do we use conditional probability?	How are independence and conditional probability related?

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<b>Key Knowledge and Skills:</b> <b>My students will...</b>	<i>What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.</i>
<ul style="list-style-type: none"> <li>• Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”). (MA10-GR.HS-S.3-GLE.3-EO.a.i)</li> <li>• Understand two events <math>A</math> and <math>B</math> are independent if the probability of <math>A</math> and <math>B</math> occurring together is the product of their probabilities, and use this characterization to determine if they are independent. (MA10-GR.HS-S.3-GLE.3-EO.a.i)</li> <li>• Understand the conditional probability of <math>A</math> given <math>B</math> as <math>P(A \text{ and } B)/P(B)</math>, and interpret independence of <math>A</math> and <math>B</math> as saying that the conditional probability of <math>A</math> given <math>B</math> is the same as the probability of <math>A</math>, and the conditional probability of <math>B</math> given <math>A</math> is the same as the probability of <math>B</math>. (MA10-GR.HS-S.3-GLE.3-EO.a.ii)</li> <li>• Determine if two events are independent by showing that if two events <math>A</math> and <math>B</math> are independent then the probability of <math>A</math> and <math>B</math> occurring together is the product of their probabilities. (MA10-GR.HS-S.3-GLE.3-EO.a.ii)</li> <li>• Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. (MA10-GR.HS-S.3-GLE.3-EO.a.iv)</li> <li>• Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. (MA10-GR.HS-S.3-GLE.3-EO.a.v)</li> <li>• Find the conditional probability of <math>A</math> given <math>B</math> as the fraction of <math>B</math>'s outcomes that also belong to <math>A</math>, and interpret the answer in terms of the model. (MA10-GR.HS-S.3-GLE.3-EO.b.i)</li> <li>• Apply the Addition Rule, <math>P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)</math>, and interpret the answer in terms of the model. (MA10-GR.HS-S.3-GLE.3-EO.b.ii)</li> <li>• Analyze the cost of insurance as a method to offset the risk of a situation. (MA10-GR.HS-S.3-GLE.3-EO.c) *</li> </ul>	

<b>Critical Language:</b> includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i>	
<b>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</b>	<i>I can determine if two events <math>A</math> and <math>B</math> are independent by determining if conditional probability of <math>A</math> given <math>B</math> is the same as the probability of <math>A</math>.</i>
<b>Academic Vocabulary:</b>	outcomes, describe, determine, construct, interpret, recognize, explain, find, apply, model, classified, categories
<b>Technical Vocabulary:</b>	Addition Rule, two-way frequency tables, associations, conclusions, categorical variables, unions, intersections, complements, events, subsets, sample space, independence, probabilities, products, conditional probability, given, random, event

\* Denotes a connection to Personal Financial Literacy (PFL)