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| **Unit Title** | Probability | **Length of Unit** | 12 days |
| **Focusing Lens(es)** | Students will be able to predict the probability an event occurring given specific data as well as use probability practices to solve real-life statistics problems. | **North Carolina State Standards** | ***Cluster:*** *Understand and evaluate random processes underlying statistical experiments* **S.IC.2*****Cluster:*** *Understand independence and conditional probability and use them to interpret data* **S.CP.1, S.CP.3, S.CP.3a, S.CP.3b, S.CP.4, S.CP.5*****Cluster:*** *Use the rules of probability to compute probabilities of compound events in a uniform probability***S.CP.6, S.CP.7, S.CP.8** |
| **Inquiry Questions (Engaging- Debatable):**  | 1. How can a sample represent the variable of interest from a population?2. How can you make and interpret different representations of data for various situations?3. How can you determine whether to use the addition or multiplication rule?4. How are Venn diagrams used to model events? |
| **Unit Strands** | Statistics and Probability |
| **Concepts** | Conditional probability, addition rule, and multiplication rule |

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| **Generalizations****My students will Understand that…** | **Guiding Questions** **Factual Conceptual** |
| Two-way tables and other models help to find and interpret conditional probability.**S-CP.6** | What is a conditional probability? | Compare and contrast two-way tables and tree diagrams. |
| Specific events dictate the use of the addition rule.**S-CP.7** | What conditions are needed to use the addition rule? | How can you interpret the differences in union and intersection for various events? |
| Two events must be independent to apply the general multiplication rule**.****S-CP.8** | How can the multiplication rule help you to justify an event? | What are ways to examine joint and disjoint events? |

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| **Key Knowledge and Skills:****My students will…** | *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.* |
| * Use simulation to determine whether the experimental probability generated by sample data is consistent with the theoretical probability based on known information about the population.
* Describe events as subsets of the outcomes in a sample space using characteristics of the outcomes or as unions, intersections and complements of other events.
* Develop and understand independence and conditional probability
	+ 1. Use a 2-way table to develop understanding of the conditional probability of A given B (written $P(A|B)$) as the likelihood that A will occur given that B has occurred. That is, $P(A|B)$ is the fraction of event B’s outcomes that also belong to event A.
		2. Understand that event A is independent from event B if the probability of event A does not change in response to the occurrence of event B. That is $P(A|B)=P(A)$.
* Represent data on two categorical variables by constructing a two-way frequency table of data. Interpret the two-way table as a sample space to calculate conditional, joint and marginal probabilities. Use the table to decide if events are independent.
* Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
* Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A, and interpret the answer in context. (NOTE:  Understand that when finding the conditional probability of A given B, the sample space is reduced to the possible outcomes for event B. Therefore, the probability of event A happening is the fraction of event B’s outcomes that also belong to A.)
* Apply the General Addition Rule, $P(A or B) = P(A) + P(B) – P(A and B)$, and interpret the answer in context.
* Apply the general Multiplication Rule $P(A and B) = P(A)P(B|A) = P(B)P(A|B)$, and interpret the answer in context. Include the case where A and B are independent: $P(A and B) = P(A) P(B)$.
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| **Critical Language:** 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: *“Mark Twain exposes the hypocrisy of slavery through the use of satire.”* |
| **A student in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can demonstrate the ability to apply and comprehend critical language through the following statement(s):**  | 1. Describe events as subsets of the outcomes in a sample space using various characteristics.
2. Develop and understand independence and conditional probability
3. Apply the addition rule and interpret the answer in context
4. Explain two independent events and how to use them to solve real world problems.
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| **Vocabulary:****T** | categorical variable, Complement, compound events, conditional probability, dependent events, disjoint events, equally likely outcomes, Event, experimental probability, Frequency, General Addition Rule, General Multiplication Rule, Independence, independent events, Intersection, joint probability, marginal probability, multiple events, mutually exclusive, Outcome, Population, random sample, relative frequency, sample (sample data), sample space, Simulation, Subset, theoretical probability, tree diagram, two-way frequency table, union, venn diagram |