Unit 8a: Probability & Statistics (Compound Events & Expected Values)	
Probabilistic Reasoning (PR) **G.PR.10:** Solve problems involving the probability of compound events to make informed decisions; interpret expected value and measures of variability to analyze probability distributions.	
STANDARD & Expectations	**LT & SC** **Lesson Activities & Resources**
G.PR.10.1 Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events. Apply the Addition Rule conceptually, P(A or B) = P(A) + P(B) -P(A and B), and interpret the answers in context.	**LT**: o I am learning to describe categories of events as subsets of a sample space using unions, intersections, or complements of other events. **SC**: o I can communicate informed decisions by applying the Addition Rule to a problem involving the probability of compound events. o I can use Venn Diagrams and two-way tables to help visualize events. o I can use two-way tables to reveal the sample space. o I can use Venn Diagrams to show intersections of two or more events. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.2 Apply and interpret the general Multiplication Rule conceptually to independent events of a sample space, P(A	**LT**: o I am learning to apply and interpret the general Multiplication Rule conceptually to independent events of a sample space using contingency tables or tree diagrams. **SC**:

and B) = $[P(A)] \times [P(B\|A)] = [P(B)] \times [P(A\|B)]$ using contingency tables or tree diagrams.	o I can relate the conditional probability back to the conceptual interpretation of probability studied in previous courses. o I understand the Multiplication Rule conceptually with limited emphasis on the manipulation of the equation. o I can use a tree diagram to help me visualize events and probabilities of those events. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.3 Use conditional probability to interpret risk in terms of decision-making and investigate questions such as those involving false positives or false negatives from screening tests.	**LT**: o I am learning to use conditional probability to interpret risk in terms of decision-making. o I am learning to investigate questions such as those involving false positives or false negatives from screening tests. **SC**: o I can answer relevant questions based on the appropriate risk measures. o I can explain how studies and/or models are used to determine risk measures. o I can recognize the chances of a false positive or a false negative is not the same as the chances of having the condition or not having the condition given the test result. o I can interpret and communicate the consequences of making the false positive or false negative errors. o I can interpret the notation for conditional probability in context. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.4 Define permutations and combinations and apply this	**LT**: o I am learning to define permutations and combinations. o I am learning to compute probabilities of compound events using permutations and combinations.

understanding to compute probabilities of compound events and solve meaningful problems.	o I am learning to solve meaningful problems. **SC**: o I understand the terms permutation and combination. o I can solve simple problems involving selection and arrangement of objects in a line, including those involving repetition and restriction. o I understand and can apply permutations and combinations. o I can interpret formal notation to communicate about combinations and permutations **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.5 Interpret the probability distribution for a given random variable and interpret the expected value.	**LT**: o I am learning to interpret the probability distribution for a given random variable. o I am learning to interpret the expected value. **SC**: o I understand that the probabilities in a distribution are between 0 and 1, and that they should sum to 1. o I can define a random variable and understand that the sample space consists of all the values the random variable can take. o I can explore and develop an understanding that the expected value is the mean of the probability distribution. o I can solve real-life problems given the expected value and interpret its meaning within context. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.6	**LT**:

Develop a probability distribution for variables of interest using theoretical and empirical (observed) probabilities and calculate and interpret the expected value.	o I am learning to develop a probability distribution for variables of interest using theoretical and empirical (observed) probabilities. o I am learning to calculate and interpret the expected value. **SC**: o I can calculate the probability of all possible outcomes of a given event and display the probability of each graphically. o I understand the sum of all probabilities within one distribution will be 1 (100%). o I can find the probability of a certain quantity. o I can find the probability of a range of quantities. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.7 Calculate the expected value of a random variable and interpret it as the mean of a given probability distribution.	**LT**: o I am learning to calculate the expected value of a random variable. o I am learning to interpret expected value as the mean of a given probability distribution. **SC**: o I can use the expected value of a random variable to make informed decisions. o I can calculate the expected value of a random variable as the sum of each $X_n * P(X_n)$. o I understand the sum is a weighted average of the outcomes (weighted by the probability). **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.PR.10.8	**LT**:

Compare the payoff values associated with the probability distribution for a random variable and make informed decisions based on expected value and measures of variability.	o I am learning to compare the payoff values associated with the probability distribution for a random variable. o I am learning to make informed decisions based on expected value and measures of variability. **SC**: o I can make decisions about real-life problems considering net value or payoff. o I can understand that two probability distributions can have the same expected value, but one may vary more than the other, and this should be considered in decision-making. o I can compute and interpret expected values for games of chance, insurance policies, and other real-life situations. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.

Unit 8b: Categorical Data in two-way frequency tables; conditional probability

Data & Statistical Reasoning (DSR); Probabilistic Reasoning (PR)
G.DSR.11: Examine real-life situations presented in two-way frequency tables to calculate probabilities, to model categorical data, and to explain real-life phenomena.

STANDARD & Expectations	LT & SC Lesson Activities & Resources
G.DSR.11.1 Construct and summarize categorical data for two categories in two-way frequency tables.	**LT**: o I am learning to construct and summarize categorical data for two categories in two-way frequency tables. **SC**: o I can identify, calculate, and interpret joint, marginal, and conditional relative frequencies in context of the data. o I can analyze meaningful, real-life data and recognize possible associations and trends in the data.

	o I can understand and apply concepts of sample space to describe categorical data. **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.
G.DSR.11.2 Use categorical data in two-way frequency tables to calculate and interpret probabilities based on the investigation.	**LT**: o I am learning to use categorical data in two-way frequency tables to calculate and interpret probabilities based on the investigation. **SC**: o I can use two-way frequency tables to find probabilities for unions and intersections. o I can use two-way frequency tables to compute conditional probabilities **LA&R:** o Desmos and 3-Act Tasks; GeoGebra; Quizlet vocabulary & word wall; See the AP Stat teacher for activities & resources.