

Algebra II: Probability & Statistics

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Students will demonstrate the ability to apply probability concepts and the rules of probability to determine the likelihood of a given outcome, make inferences and justify or critique conclusions. - Students will demonstrate the ability to apply statistical methods by summarizing, representing and interpreting data on categorical and quantitative data. - Students will demonstrate ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> - S.ID.A.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. - S.IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. - S.IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. - S.IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. - S.IC.B.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. - S.IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. - S.IC.B.6 Evaluate reports based on data. - S.CP.A.1 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"). - S.CP.A.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their	Transfer	
	Students will be able to independently use their learning to construct and defend a well thought out prediction.	
	Meaning	
	ENDURING UNDERSTANDINGS Students will understand that... - the probability of an event's occurrence can be predicted with varying degrees of confidence. - statistical representations are beneficial for either studying certain characteristics or influencing certain interpretations of the data.	ESSENTIAL QUESTIONS How confident can you be that a given outcome will occur?
	Acquisition	
	Students will know... - the Fundamental Counting principle. - the difference between dependent and independent events. - the Binomial Theorem. - the formula for binomial probability. - the conditional probability formula. - the formulas for finding the number of combinations and permutations. - the characteristics and graph of normal distribution. - the various sampling types and study methods. - that the more times you repeat an experiment, the closer the experimental probability gets to the theoretical probability. <u>vocabulary:</u> combination, conditional probability, experimental probability, measure of central tendency, mean, median, mode, bimodal, outlier, quartile, interquartile range, percentile, box-and-whisker plot, mutually exclusive events, normal distribution, permutation, simulation, theoretical probability, n factorial, sample space, equally likely outcomes,	Students will be skilled at... - using the Fundamental Counting principle. - calculating combinations and permutations of data sets using formulas. - comparing experimental and theoretical probability. - calculating theoretical probability. - calculating geometric probability. - classifying events as dependent, independent or mutually exclusive. - finding the probability of independent, dependent and mutually exclusive events. - designing a probability distribution . - calculating conditional probability and creating a conditional probability table . - calculating experimental and theoretical probability of events using formulas and from simulations of modeling. - constructing a probability model. - finding the measures of central tendency (mean, median, mode). - identifying an outlier in a data set. - calculating percentiles.

probabilities, and use this characterization to determine if they are independent. • S.CP.A.3 Understand the conditional probability of A given B as $P(A \text{ and } B)/P(B)$, and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B. • S.CP.A.4 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. • S.CP.A.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. • S.CP.B.6 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 terms of the model. • S.CP.B.7 Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model. • MP2 Reason abstractly and quantitatively. • MP3 Construct viable arguments and critique the reasoning of others. • MP7 Look for and make use of structure. • MP8 Look for and express regularity in repeated reasoning.	<i>dependent events, independent events, contingency table, probability model, measure of variation, standard deviation, binomial probability, binomial experiment, Binomial Theorem, population, sample, convenience sample, self-selected sample, systematic sample, random sample, bias, observational study, controlled experiment, survey, discrete probability distribution, continuous probability distribution, normal distribution</i>	• <i>finding the variance and standard deviation (with and without a calculator).</i> • <i>using standard deviation to describe data.</i> • <i>analyzing sample methods.</i> • <i>analyzing study methods.</i> • <i>designing a survey.</i> • <i>using a formula to find probabilities.</i> • <i>expanding binomials.</i> • <i>applying the Binomial theorem.</i> • <i>analyzing normally distributed data.</i> • <i>sketching a Normal curve.</i>
Content Area Literacy Standards		21st Century Skills
• RST.11-12.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. • RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11-12 texts and topics</i>. • RST.11-12.6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. • RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. • RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. • RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.		• <i>reason effectively</i> • <i>make judgments and decisions</i> • <i>access and evaluate information</i> • <i>use and manage information</i>

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence

	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan <i>Summary of Key Learning Events and Instruction</i>	
<i>Language Arts Integration</i>	<i>Mathematics Integration</i>
1.OA.1 Use	1.OA.1 Use
<i>Technology Integration</i>	<i>District Materials</i>
1.OA.1 Use	