

Wyoming Department of Education Required Virtual Education Course Syllabus

BIG HORN COUNTY SCHOOL DISTRICT #1

Program Name	WYCA	Content Area	Mathematics
Course ID	CAMA77893	Grade Level	9, 10, 11, 12
Course Name	AP Statistics B	# of Credits	0.5
SCED Code	02203E0.5022	Curriculum Type	Connections Academy

COURSE DESCRIPTION

In the second half of AP Statistics, students continue to become familiar with the vocabulary, methods, and meaning in the statistics that exist in the world. This is an applied course in which the student will actively construct his or her own understanding of the methods, interpretation, communication, and application of statistics. Each unit is framed by enduring understandings and essential questions designed to allow the student a deep understanding of the concepts at hand rather than by memorization and emulation. The student will also complete several performance tasks throughout the year consisting of relevant, open-ended tasks requiring the student to connect multiple statistical topics together. The TI-83+/84 OR 89 calculator and computers will be used to explore the world of data and the patterns that can be found by analyzing this information as well as statistical relationships. General topics of study include exploring data, planning and design of a study, anticipating patterns, and statistical inference.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK
N.Q.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*
N.Q.2	Define appropriate quantities for the purpose of descriptive modeling.*
N.Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.*
A.SSE.2	Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.
A.CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*
A.CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
F.IF.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*
F.BF.1	Write a function that describes a relationship between two quantities.*
F.BF.1b	Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.
S.ID.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).*
S.ID.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.ID.6a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.*
S.ID.6b	Informally assess the fit of a function by plotting and analyzing residuals.*
S.IC.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.*
S.IC.6	Evaluate reports based on data.*
S.CP.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 compliments of other events ("or," "and," "not").
S.CP.5	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

S.MD.3	(+)Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.*
S.MD.4	(+)Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?*
S.MD.5	(+)Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.*
S.MD.5b	(+)Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.*
S.MD.6	(+)Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).*
S.MD.7	(+)Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).*

SCOPE AND SEQUENCE

UNIT OUTLINE	STANDARD#	OUTCOMES
<p>Unit 1: Introduction to Inference</p> <p>In this unit, you will see that the notion and behavior of a random variable is foundational to understanding probability distributions and that the central limit theorem and normal distribution are essential to analyzing samples of data.</p>	<p>N.Q.1; N.Q.2; N.Q.3; A.SSE.2; A.CED.2; A.CED.3; F.IF.4; F.BF.1; F.BF.1a; S.ID.3; S.ID.4; S.ID.6a; S.ID.6b; S.IC.1; S.IC.6; S.CP.1; S.CP.5; S.MD.3; S.MD.4; S.MD.5; S.MD.6; S.MD.7</p>	<ul style="list-style-type: none"> •Recognize the relationship between sample size, confidence level, and confidence intervals •Learn how sample sizes are determined •Demonstrate how the size of a confidence interval may increase or decrease •effectively use your calculator to construct confidence intervals •understand the structure and logic of the significance test •understand the meaning of statistical significance, level of significance, and the •understand the connection between a two-sided significance test and the confidence interval •understand how significance tests are utilized to make decisions and understand the risk of such decisions •describe both Type I and Type II errors in context as well as finding the probability of a Type I error

<p>Unit 2: Inference for Means and Proportions</p> <p>This unit focuses on inference, the mean of a population with a sample, the significance test, and confidence intervals. You will answer questions about how these topics apply to real life questions, as well as investigate data.</p>	<p>N.Q.1; N.Q.2; N.Q.3; A.SSE.2; A.CED.2; A.CED.3; F.IF.4; F.IF.7; F.BF.1; F.BF.1a; S.ID.3; S.ID.4; S.ID.6a; S.ID.6b; S.IC.6; S.CP.5; S.MD.3; S.MD.4; S.MD.6; S.MD.7</p>	<ul style="list-style-type: none"> •Carry out significance tests for unknown populations •Apply significance testing for the matched pairs experimental design •Conduct complete t-tests for one sample data and matched pairs data •understand the conditions that must be met prior to conducting any testing or constructing any intervals. •how to use the calculator to construct t intervals and carry out t tests. •Recognize how the procedures of constructing t intervals changes when comparing two means from two populations •Demonstrate the new t distribution and two sample statistics •how to carry out significant tests for comparing two means. •Understand the conditions for two sample estimating and testing •Understand the calculator's role with two means •Properly construct confidence intervals for proportions •Recognize the conditions under which confidence intervals may be created •Conduct complete significance tests for a proportion •Determine the conditions under which such tests are carried out <hr/> <ul style="list-style-type: none"> •Determine a sample size to obtain a given margin of error •Construct intervals and conduct significance tests proficiently using your calculator •Construct two proportion confidence intervals in order to compare proportions •Use your calculator to construct these intervals •conduct two proportion significance tests.
<p>Unit 3: Inference for Goodness of Fit</p> <p>This unit teaches you how confidence intervals are effective tools for estimating the mean of a population, and how significance tests determine the likelihood of a sample.</p>	<p>N.Q.3; S.MD.5b; S.MD.7</p>	<ul style="list-style-type: none"> •conduct a chi-squared Goodness of Fit Test to test a group of proportions. discover the conditions or assumptions under which we may perform the Goodness of Fit test •use chi-square to determine if there is an association or independence between two categorical variables.