Information for Course Syllabus

Name of Course: Statistics DC/DE

Grade Level: 12

School: ORHS

Major Assignments: Display Project, Hypothesis Project,
Final Exam Project

Field Trips: None

How can parents access instructional materials? Canvas

Statistics DC/DE
2021-2022

Term 1

Collecting Data	**S.ID.A.1** Understand the term 'variable' and differentiate between the data types: measurement, categorical, univariate, and bivariate.
	S.ID.A.2 Understand histograms, parallel box plots, and scatterplots, and use them to display and compare data.
	S.ID.A.3 Summarize distributions of univariate data.
	S.ID.A.4 Compute basic statistics and understand the distinction between a statistic and a parameter.
	S.ID.A.5 For univariate measurement data, be able to display the distribution and describe its shape; select and calculate summary statistics.
	S.ID.A.6 Recognize how linear transformations of univariate data affect shape, center, and spread.
	S.ID.A.7 Analyze the effect of changing units on summary measures.
	S.ID.A.8 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.ID.A.9 Describe individual performances in terms of percentiles, z-scores, and t-scores.
	S.IC.C.13 Develop and evaluate inferences and predictions that are based on data.
	S.IC.C.14 Use properties of point estimators, including biased/unbiased, and variability.

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Term 1

Experimental Design	**S.IC.A.1** Understand the differences among various kinds of studies and which types of inferences can be legitimately drawn from each.
	S.IC.A.2 Compare census, sample survey, experiment, and observational study.
	S.IC.A.3 Describe the role of randomization in surveys and experiments.
	S.IC.A.4 Describe the role of experimental control and its effect on confounding.
	S.IC.A.5 Identify bias in sampling and determine ways to reduce it to improve results.
	S.IC.A.6 Describe the sampling distribution of a statistic and define the standard error of a statistic.
	S.IC.A.7 Demonstrate an understanding of the Central Limit Theorem.
	S.IC.B.8 Select a method to collect data and plan and conduct surveys and experiments.
	S.IC.B.9 Compare and use sampling methods, including simple random sampling, stratified random sampling, and cluster sampling.

Displaying Data	**S.ID.B.10** Represent and analyze categorical data.
	S.ID.B.11 Display and discuss bivariate data where at least one variable is categorical.
	S.ID.B.12 For bivariate measurement data, be able to display a scatterplot and describe its shape; use technological tools to determine regression equations and correlation coefficients.

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Term 1

Probability	**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 Use permutations and combinations to compute probabilities of compound events and solve problems.
	S.CP.A.3 Demonstrate an understanding of the Law of Large Numbers (Strong and Weak).
	S.CP.B.4 Demonstrate an understanding of the addition rule, the multiplication rule, conditional probability, and independence.
	S.CP.B.5 Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.

Probability and Normal Distributions	**S.MD.A.1** Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.
	S.MD.A.2 Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.
	S.MD.A.3 Design a simulation of random behavior and probability distributions (e.g., drawing by lots, using a random number generator and using the results to make fair decisions.)
	S.MD.A.4 Analyze discrete random variables and their probability distributions, including binomial and geometric.
	S.MD.A.5 Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.
	S.MD.A.6 Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.
	S.MD.A.7 Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. a. Find the expected payoff for a game of chance. b. Evaluate and compare strategies on the basis of expected values.
	S.MD.A.8 Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).
	S.MD.B.9 Calculate the mean (expected value) and standard deviation of both a random variable and a linear transformation of a random variable.
	S.MD.B.10 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.

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Year</td></tr>
<tr><td colspan="2" align="center">Term 2</td></tr>
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Confidence Intervals and Hypothesis Testing	**S.IC.D.15** Understand the meaning of confidence level, of confidence intervals, and the properties of confidence intervals.
	S.IC.D.16 Construct and interpret a large sample confidence interval for a proportion and for a difference between two proportions.
	S.IC.D.17 Construct the confidence interval for a mean and for a difference between two means.
	S.IC.B.10 Test hypotheses using appropriate statistics.
	S.IC.B.11 Analyze results and make conclusions from observational studies, experiments, and surveys.
	S.IC.B.12 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

Linear Regressions and Chi Square	**S.ID.B.12** For bivariate measurement data, be able to display a scatterplot and describe its shape; use technological tools to determine regression equations and correlation coefficients.
	S.ID.B.13 Identify trends in bivariate data; find functions that model the data and that transform the data so that they can be modeled.
	S.IC.E.18 Apply the properties of a Chi-square distribution in appropriate situations in order to make inferences about a data set.
	S.IC.E.19 Apply the properties of the normal distribution in appropriate situations in order to make inferences about a data set.
	S.IC.E.20 Interpret the t-distribution and determine the appropriate degrees of freedom.

Final Exam Project