

Course Title

Grade Levels

Month	Unit/Theme (Unit organizing idea)	Content (understandings)	Skills (What students actually do)	Major Assessments (Tests, projects, etc.)
September	What is Statistics Exploring Data	Data Analysis Analyzing Categorical Data Displaying Quantitative Data with Graphs Describing Quantitative Data with Numbers	<ul style="list-style-type: none"> Identify the individuals and variables in a set of data. Classify variables as categorical or quantitative. Display categorical data with a bar graph. Decide if it would be appropriate to make a pie chart. Identify what makes some graphs of categorical data deceptive. Calculate and display the marginal distribution of a categorical variable from a two-way table. Calculate and display the conditional distribution of a categorical variable for a particular value of the other categorical variable in a two-way table. Describe the association between two categorical variables by comparing appropriate conditional distributions. Make and interpret dotplots and stemplots of quantitative data. Describe the overall pattern (shape, center, and spread) of a distribution and identify any major departures from the pattern (outliers). Identify the shape of a distribution from a graph as roughly symmetric or skewed. Compare distributions of quantitative data using dotplots or stemplots. Make and interpret histograms of quantitative data. Compare distributions of quantitative data using histograms. Calculate measures of center (mean, median). Calculate and interpret measures of spread (range, IQR). Choose the most appropriate measure of center and spread in a given setting. Identify outliers using the $1.5 \times \text{IQR}$ rule. Make and interpret boxplots of quantitative data. Calculate and interpret measures of spread (standard deviation). Choose the most appropriate measure of center and spread in a given setting. Use appropriate graphs and numerical summaries to compare distributions of quantitative variables. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!
Sept/Oct	Modeling Distributions of Data	Describing Location in a Distribution Density Curves and Normal Distributions	<ul style="list-style-type: none"> Find and interpret the percentile of an individual value within a distribution of data. Estimate percentiles and individual values using a cumulative relative frequency graph. Find and interpret the standardized score (z-score) of an individual value within a distribution of data. Describe the effect of adding, subtracting, multiplying by, or dividing by a constant on the shape, center, and spread of a distribution of data. Estimate the relative locations of the median and mean on a density curve. Use the 68–95–99.7 rule to estimate areas (proportions of values) in a Normal distribution. Use Table A or technology to find (i) the proportion of z-values in a specified interval, or (ii) a z-score from a percentile in the standard Normal distribution. Use Table A or technology to find (i) the proportion of values in a specified interval, or (ii) the value that corresponds to a given percentile in any Normal distribution. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!

			<ul style="list-style-type: none"> Determine if a distribution of data is approximately Normal from graphical and numerical evidence. 	
October	Describing Relationships	Scatterplots and Correlation Least-Squares Regression	<ul style="list-style-type: none"> Identify explanatory and response variables in situations where one variable helps to explain or influences the other. Make a scatterplot to display the relationship between two quantitative variables. Describe the direction, form, and strength of a relationship displayed in a scatterplot and recognize outliers in a scatterplot. Interpret the correlation. Understand the basic properties of correlation, including how the correlation is influenced by outliers. Use technology to calculate correlation. Explain why association does not imply causation. Interpret the slope and y intercept of a least-squares regression line. Use the least-squares regression line to predict y for a given x. Explain the dangers of extrapolation. Calculate and interpret residuals. Explain the concept of least squares. Determine the equation of a least-squares regression line using technology. Construct and interpret residual plots to assess if a linear model is appropriate. Interpret the standard deviation of the residuals and use these values to assess how well the least-squares regression line models the relationship between two variables. Determine the equation of a least-squares regression line using computer output. Describe how the slope, y intercept, standard deviation of the residuals, and are influenced by outliers. Find the slope and y intercept of the least-squares regression line from the means and standard deviations of x and y and their correlation. 	<p>Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!</p>
Oct/Nov	Designing Studies	Sampling and Surveys Experiments Using Studies Wisely	<ul style="list-style-type: none"> Identify the population and sample in a statistical study. Identify voluntary response samples and convenience samples. Explain how these sampling methods can lead to bias. Describe how to obtain a random sample using slips of paper, technology, or a table of random digits. Distinguish a simple random sample from a stratified random sample or cluster sample. Give the advantages and disadvantages of each sampling method. Explain how undercoverage, nonresponse, question wording, and other aspects of a sample survey can lead to bias. Distinguish between an observational study and an experiment. Explain the concept of confounding and how it limits the ability to make cause-and-effect conclusions. Identify the experimental units, explanatory and response variables, and treatments. Explain the purpose of comparison, random assignment, control, and replication in an experiment. Describe a completely randomized design for an experiment, including how to randomly assign treatments using slips of paper, technology, or a table of random digits. 	<p>Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!</p>

			<ul style="list-style-type: none"> Describe the placebo effect and the purpose of blinding in an experiment. Interpret the meaning of statistically significant in the context of an experiment. Explain the purpose of blocking in an experiment. Describe a randomized block design or a matched pairs design for an experiment. Describe the scope of inference that is appropriate in a statistical study. Evaluate whether a statistical study has been carried out in an ethical manner. 	
November	Probability: What are the Chances	Randomness, Probability, and Simulation Probability Rules Conditional Probability and Independence	<ul style="list-style-type: none"> Interpret probability as a long-run relative frequency. Use simulation to model chance behavior. Determine a probability model for a chance process. Use basic probability rules, including the complement rule and the addition rule for mutually exclusive events. Use a two-way table or Venn diagram to model a chance process and calculate probabilities involving two events. Use the general addition rule to calculate probabilities. Calculate and interpret conditional probabilities. Use the general multiplication rule to calculate probabilities. Use tree diagrams to model a chance process and calculate probabilities involving two or more events. Determine whether two events are independent. When appropriate, use the multiplication rule for independent events to compute probabilities. 	P Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!
December	Random Variables	Discrete and Continuous Random Variables Transforming and Combining Random Variables Binomial and Geometric Random Variables	<ul style="list-style-type: none"> Compute probabilities using the probability distribution of a discrete random variable. Calculate and interpret the mean (expected value) of a discrete random variable. Calculate and interpret the standard deviation of a discrete random variable. Compute probabilities using the probability distribution of a continuous random variable. Describe the effects of transforming a random variable by adding or subtracting a constant and multiplying or dividing by a constant. Find the mean and standard deviation of the sum or difference of independent random variables. Find probabilities involving the sum or difference of independent Normal random variables. Determine whether the conditions for using a binomial random variable are met. Compute and interpret probabilities involving binomial distributions. Calculate the mean and standard deviation of a binomial random variable. Interpret these values in context. Find probabilities involving geometric random variables. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY! Casino Lab
January	Sampling Distributions	What is a sampling distribution Sample Proportions Sample Means	<ul style="list-style-type: none"> Distinguish between a parameter and a statistic. Distinguish among the distribution of a population, the distribution of a sample, and the sampling distribution of a statistic. Use the sampling distribution of a statistic to evaluate a claim about a parameter. Determine whether or not a statistic is an unbiased estimator of a population parameter. Describe the relationship between sample size and the variability of a statistic. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY! AP Stat Midterm

			<ul style="list-style-type: none"> Find the mean and standard deviation of the sampling distribution of a sample proportion \hat{p}. Check the 10% condition before calculating $\sigma_{\hat{p}}$. Determine if the sampling distribution of \hat{p} is approximately Normal. If appropriate, use a Normal distribution to calculate probabilities involving \hat{p}. <ul style="list-style-type: none"> Find the mean and standard deviation of the sampling distribution of a sample mean \bar{x}. Check the 10% condition before calculating $\sigma_{\bar{x}}$. If appropriate, use a Normal distribution to calculate probabilities involving \bar{x}. <ul style="list-style-type: none"> Explain how the shape of the sampling distribution of \bar{x} is affected by the shape of the population distribution and the sample size. If appropriate, use a Normal distribution to calculate probabilities involving \bar{x}. 	
February	Estimating with Confidence	Confidence Intervals: The Basics Estimating a Population Proportion Estimating a Population Mean	<ul style="list-style-type: none"> Interpret a confidence interval in context. Interpret a confidence level in context. Determine the point estimate and margin of error from a confidence interval. Describe how the sample size and confidence level affect the length of a confidence interval. Explain how practical issues like nonresponse, undercoverage, and response bias can affect the interpretation of a confidence interval. State and check the Random, 10%, and Large Counts conditions for constructing a confidence interval for a population proportion. Determine critical values for calculating a C% confidence interval for a population proportion using a table or technology. Construct and interpret a confidence interval for a population proportion. Determine the sample size required to obtain a C% confidence interval for a population proportion with a specified margin of error. Explain how the t distributions are different from the standard Normal distribution and why it is necessary to use a t distribution when calculating a confidence interval for a population mean. Determine critical values for calculating a C% confidence interval for a population mean using a table or technology. State and check the Random, 10%, and Normal/Large Sample conditions for constructing a confidence interval for a population mean. Construct and interpret a confidence interval for a population mean. Determine the sample size required to obtain a C% confidence interval for a population mean with a specified margin of error. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!
February	Testing a Claim	Significance Tests: The Basics Tests about a Population Proportion Tests about a Population Mean	<ul style="list-style-type: none"> State the null and alternative hypotheses for a significance test about a population parameter. Interpret a P-value in context. Determine if the results of a study are statistically significant and draw an appropriate conclusion using a significance level. Interpret a Type I and a Type II error in context, and give a consequence of each. State and check the Random, 10%, and Large Counts conditions for performing a significance test about a population proportion. Perform a significance test about a population proportion. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!

			<ul style="list-style-type: none"> • Use a confidence interval to draw a conclusion for a two-sided test about a population parameter. • Interpret the power of a test and describe what factors affect the power of a test. • Describe the relationship among the probability of a Type I error (significance level), the probability of a Type II error, and the power of a test. • State and check the Random, 10%, and Normal/Large Sample conditions for performing a significance test about a population mean. • Perform a significance test about a population mean. • Use a confidence interval to draw a conclusion for a two-sided test about a population parameter. • Perform a significance test about a mean difference using paired data. 	
March	Comparing Two Populations or Groups	Comparing Two Proportions Comparing Two Means	<ul style="list-style-type: none"> • Describe the shape, center, and spread of the sampling distribution of • Determine whether the conditions are met for doing inference about • Construct and interpret a confidence interval to compare two proportions. • Perform a significance test to compare two proportions. • Describe the shape, center, and spread of the sampling distribution of • Determine whether the conditions are met for doing inference about • Construct and interpret a confidence interval to compare two means. • Perform a significance test to compare two means. • Determine when it is appropriate to use two-sample t procedures versus paired t procedures. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!
April	Inference for Distribution of Categorical Data	Chi-Square tests for Goodness-of-fit Inference for Two-way Tables	<ul style="list-style-type: none"> • State appropriate hypotheses and compute expected counts for a chi-square test for goodness of fit. • Calculate the chi-square statistic, degrees of freedom, and P-value for a chi-square test for goodness of fit. • Perform a chi-square test for goodness of fit. • Conduct a follow-up analysis when the results of a chi-square test are statistically significant. • Compare conditional distributions for data in a two-way table. • State appropriate hypotheses and compute expected counts for a chi-square test based on data in a two-way table. • Calculate the chi-square statistic, degrees of freedom, and P-value for a chi-square test based on data in a two-way table. • Perform a chi-square test for homogeneity. • Perform a chi-square test for independence. • Choose the appropriate chi-square test. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!
April	More about Regression	Inference for Linear Regression Transforming to Achieve Linearity	<ul style="list-style-type: none"> • Check the conditions for performing inference about the slope of the population (true) regression line. • Interpret the values of a, b, s, and r in context, and determine these values from computer output. • Construct and interpret a confidence interval for the slope of the population (true) regression line. • Perform a significance test about the slope of the population (true) regression line. 	Problem of Day – Do Now Teacher Prepared Quiz Teacher Prepared Test Homework Board Presentation Case Closed FRAPPY!

			<ul style="list-style-type: none"> • Use transformations involving powers and roots to find a power model that describes the relationship between two variables, and use the model to make predictions. • Use transformations involving logarithms to find a power model or an exponential model that describes the relationship between two variables, and use the model to make predictions. • Determine which of several transformations does a better job of producing a linear relationship. 	
May	Review for AP Exam	Review for AP Exam	AP Exam this month Final exam taken shortly after AP exam Begin final project	AP EXAM REVIEW <ul style="list-style-type: none"> • Practice AP Free Response Questions • Choosing the Correct Inference Procedure • Flash cards • Mock Grading Sessions • Rubric development by student teams • Practice Multiple Choice Questions Final Exam Final Project Progress Checkpoints
June	Final Project	Reinforces all concepts learned throughout the year.	Final project Final project presentation	Final Project Progress Checkpoints Final Project Paper Final Project Presentation