AP Statistics

Course Syllabus

Course Description: AP Statistics introduces students to the major concepts and tools for formulating questions for study, collecting, analyzing, and drawing conclusions from data. The course has the great advantage of being able to look into the backyards of all academic disciplines and all human endeavors. The course uses a diverse set of instruction methodologies including spiral instruction and review, lab work, short projects, simulations involving real world data and ideas, and presentation of material with lecture and physical engagement of students. Students work in groups, teams, pairs and individually using written and verbal communication. Technology is used extensively in the form of graphing calculators and statistical software on computers.

The course covers the four broad conceptual themes of statistical literacy:

1. Exploring Data: Observing patterns and departures from patterns
2. Planning a Study: Deciding what and how to measure
3. Anticipation Patterns: Producing models using probability and simulation
4. Statistical Inference: Confirming models, making decisions, and drawing conclusions.

Probability underlies Planning a Study and Statistical Inference and can also be a topic of pure mathematical study.

The course is an excellent opportunity for any student who has successfully completed Algebra 2 (or above) regardless of intended college major. Although the course does not require math operations beyond the algebra level, it does require a mathematical maturity in quantitative reasoning. Statistics courses are required for business, engineering, social science, and health science degrees. Thus, the course has wide appeal to students with different higher educational interests. In addition, the course develops critical thinking, verbal and writing skills essential to success in all educational and career endeavors.

Textbook:

Starnes, Tabor, Yates, and Moore. The Practice of Statistics, 5th Edition. W.H. Freeman and Company, New York, NY. 2005

Other Resources for use by instructor and students:

1) Graphing Calculators: students encouraged to use TI-84 Silver Edition. Class set available for use in the classroom. Students may check out a calculator for home use.
2) STEW, STatistics Education Web: www.amstat.org/ASA/Education/STEW/home.aspx
3) Against All Odds: Inside Statistics-Annenberg Learner: www.learner.org/resources/series65.html
4) Smith, Sanderson M. Statistical Odyssey of Herkimer and the Stat Pack. Author House. Bloomington, IN. 2009

5) Students encouraged to purchase review book: Princeton, Barron's
6) Various magazine and newspaper articles.
7) Selected AP Free Response and multiple choice problems
8) Scheaffer, Gnanadesikan, Watkins, and Witmer. Activity Based Statistics-Instructor Resources. Springer-Verlag New York, Inc. New York, NY. 1996
9) Albert, Bennett. Curve Ball: Baseball, Statistics, and the Role of Chance in the Game. Copernicus Books, New York, NY. 2001
10) Albert, Jim. Teaching Statistics Using Baseball. Mathematical Association of America. Washington, DC. 2003
11) Tabor, Franklin. Statistical Reasoning in Sports. W.H. Freeman. New York, NY. 2013
12) Watkins, Scheaffer, Cobb. Statistics in Action. Key Curriculum Press. Emeryville, CA. 2008.
13) Rossman, Chance. Workshop Statistics: Discovery with Data. Key College Publishing. CA. 2008
14) Fathom Software with computer lab
15) Assistments: www.assistments.org/
16) Sullivan, Michael, III. Statistics, Informed Decisions Using Data, Prentice Hall, 2004, NJ.
17) Triola, Essentials of Statistics, 5th Edition, Pearson, Boston, MA.
18) Ramsey, Schafer. The Statistical Sleuth. Duxbury. Pacific Grove, CA. 2002.

Content/Skills	Exercises	Materials for Chapter – many of the activities can be spaced into future chapters as Spiral Review	Time Frame Section
Introduction to Course Students can: • Begin to understand the Statistical Process: Formulate a question, gather data, summarize with graphs and numbers, draw conclusions or make a decision, probability in gathering data and drawing conclusion **[SC1-4,9]**.	Participation in group activities	One of the following activities will be chosen for a first day activity. Activities not chosen will be used throughout the year as spiral review or to introduce new topics. These activities are designed with an overview of the course and students are not expected to know all vocabulary and processes. The activities are designed to engage students in the subject they will be studying. 1) STEW: Grouping Categorical (Qualitative) Data. Students will use words to describe themselves and the entire class. 2) Against All Odds: Inside Statistics Video on Creativity and Motivation followed by questionnaire and gathering data and computing basic summary statistics. 3) Graphs to describe the class. Students will prepare a bar chart, scatterplot, two-way table, dot plot of their favorite color, bed-time/wake-up time, and gender and horror movie like or dislike, number of pets. Students will physically graph on the board. 4) Distracted driving-do cells phones distract drivers? Prepare two-way table. Segmented bar chart, proportion and percent computation, simulation using cards, probability **[SC9].** 5) Simpson's Paradox: Airlines and on-time efficiency. Simpson's provides an engaging example of looking deeper into results and has application in regression analysis.	1 day block period
Exploring Data Chapter 1 [SC1] Section 1.1 Analyzing Categorical Data Students can: • Begin using statistical vocabulary using the 5 w's-who, what, when, why, where. Define data and variables, distribution, graphs, inference. • Define a categorical variable. Prepare frequency and relative frequency tables. Prepare bar graphs, segmented bar graphs, pie charts and explain elements and components of graph include titles and labels. • Identify misleading graphs. • Describe "association," and "no association." • Build a two-way table and describe and compute marginal and conditional distributions. • Begin using statistical thinking to answer a question.**[SC6]**	P.6 Textbook 1, 3, 5 P. 20 Textbook 9, 11, 13, 15, 23 17 25 19, 21 Saga of Survival Project	Kiplinger's college rankings to define data and variables. Workshop Statistics variable classification. Nurse scenario. Types and informational character of graphs: Graph of Napoleon's campaign through Russia, Florence Nightingale's graphs: article US News and World Report. STEW: Saga of Survival (Donner Party) preparation of two-way tables of survival based on age and gender with written analysis **[SC6**]. Various data sets gathered by students: who watches horror movies: males or females, walk the football field blindfolded to investigate direction taken by lost hikers, who is wearing blue jeans **[SC6].** Race and Death Penalty Project. Analysis of data using categorical variables with write-up. "Hella" Project. By Whom and where was "Hella" developed. Review of two way tables.	1.5 days block periods
Section 1.2 Displaying Quantitative Data with Graphs Students can: • Prepare dot plot and describe shape in context using SOCS acronym (shape outliers center spread) and compare plots, include labels and title. • Describe the shape of a distribution using approximately symmetric, skewed left/right, uniform,	P.41 37, 39, 43 41	When comparing use of "about the same," "greater than," "less than." Graphing calculator with data sets from Workshop Statistics to prepare histograms **[SC8].** Activity: Saga of Survival (Donner Party), continued from STEW to prepare histograms and write up. Fathom Software. **[SC 10].**	1.5 days block periods

bimodal, unimodal. • Prepare a stem plot in various forms: regular, split, back-to-back and describe using SOCS and compare plots. • Prepare a histogram using a frequency table and technology and describe using SOCS and compare plots. • Begin to use statistical thinking process to analyze a question.	45, 47, 49 51, 53, 59, 63 Race and Death Penalty Project, Saga of Survival (LAB)	Short quizzes on homework using even problems from textbook. Various data sets from multiple sources. Technology with graphing calculator to prepare box plots and compute mean, median, quartiles, variance and standard deviation **[SC8].** STEW activity: Are Female Hurricanes Deadlier than Male Hurricanes? Box plots and number summaries and analysis of results. Prepared on Fathom Software with written explanations in context **[SC6], [SC7], [SC10].** Released AP Free Response and Multiple Choice as appropriate to learned content.	
Section 1.3 Describing Quantitative Data with Numbers Students can: • Compute mean and median and choose the most appropriate measure of center with explanation in context. Describe concept of resistance. • Measure spread with the IQR and range and use the 1.5 x IQR rule for outliers. • Compute the 5-Number Summary and prepare a boxplot, compare boxplots. • Measure spread with the variance the standard deviation and interprets. • Choose how to group mean and standard deviation and median and IQR. • Begin to use a statistical thinking process to analyze a question.	P.69 79, 81, 83, 85, 87 89 91, 93 97 99, 101 105, Hurricanes (LAB)	Data sets for boxplots from various sources. Standard Deviation Hand-Span activity by group. Activity: Why are there two standard deviations? Computations. Short quizzes on homework using even problems from textbook. Review. Unit Test on Chapter 1: Exploring Data with Multiple Choice and Free Response problems.	1.5 days block periods
Modeling Distributions of Data Chapter 2 Section 2.1 Describing Location in a Distribution Students can: • Measure position using percentiles. • Prepare an ogive (cumulative relative frequency graph) with interpretations. • Measure position with a z-score • Transform data using adding, subtracting, multiplying and dividing **[SC4].**	P.99 Textbook 1, 3 7, 9 11, 15 17, 19, 21	Temperature of cities in the world and transformation from Fahrenheit to Celsius. Spiral review: matching boxplots, dot plots and histograms. Short quizzes on homework using even problems from textbook. Activity: Tennis Ball measurement to see normal model in action. Students use a method to measure diameter of tennis ball. Human measurement should form a normal distribution. Students work in pairs. Class graph. STEW activity: What Does a Normal Model Sound Like? Students listen for popcorn pop in time intervals to sense a normal distribution in a different way. Students work in teams.	1 day block period
Section 2.2 Density Curves and Normal Distributions **[SC1]** Students can: • Define a density curve and its characteristics and locate important measures. • Describe, draw, and label a normal distribution and normal curve. Use the 68-95-99.7 phone number rule (689-5997) i.e., empirical rule to estimate	P.128 Textbook 33, 35, 37, 39, 41 43, 45, 47, 51, 53, 61, 63	Released AP Free Response and Multiple Choice relevant to topics studied to date. Graphing calculator to draw normal curves and find percentages. Short quizzes on homework using even problems from textbook. AP Practice Test covering material to date. (Textbook) Review. Unit Test on Chapter 2: Modeling Distributions of Data	2 days block periods

normal curve percentages, use z-scores to find percentages under normal curve. • Use a normal probability plot to assess normality. • Spiral Review-Dot Plots, SOCS, boxplots.	65 P.103 31 P.133 75	Multiple Choice and Free Response problems. Assistments: Students log on website for review problems	
			Fall Break
Describing Relationships Chapter 3 Section 3.1 Scatterplots and correlation **[SC1]** Students can: • Distinguish between categorical and quantitative variables and determine when scatterplot can be prepared. Determine explanatory and response variables. • Use DSFO (Direction, Strength, Form, and Outliers) to describe a scatterplot and sketch by hand. Use calculator with labels. • Describe and understand the computation of r (coefficient of correlation) and compute with technology. Explain the facts about r. Interpret in context. • Spiral Review-Histograms.	P.159 Textbook 1 3, 5, 7, 9, 11 15, 17, 19, 21, 23, 25 P.163 33	Graphing Calculator to find correlation, LSRL, residuals, graph. Activity: Tootsie Pop Hand Span. Is there an association between hand span and number of tootsie pops a student can grab from bin? Students generate data and prepare scatterplot. Kentucky Derby scatterplot. What changed? CSI Galena Activity: Someone has stolen second base, a footprint is a clue. Use regression analysis to explain who the perpetrator may be **[SC7].** Challenger Disaster data set. An unusual scatterplot, describe what it may or may not say. Simulation of baseball statistics regarding correlation **[SC4].** Short Project: Mortality and Smoking. Students use technology to prepare regression and write analysis. Vietnam Draft Lottery and correlation activity. Use of Fathom. Extra Credit.	2 days block periods
Section 3.2 Least Squares Regression **[SC1]** Students can: • Describe a regression line from word description, interpret slope and intercept in context using template language, make predications using regression line, explain extrapolation, compute residuals including making a residual plot, use graphing calculator, use context and appropriate symbols. • What are the conditions required for regression. Use statistical thinking process to analyze regression scenario including r-squared and s. Explain regression to the mean. • Explain outliers and influential points in a regression. • Spiral Review-Normal Curve	P.193 Textbook 35, 39, 47, 49, 51 55, 59, 61, 65, NFL Quarterbacks LAB 69 P.199 79	Florida and Bush/Gore Presidential election scatterplot activity. Use of Fathom. Was there an outlier, what were the consequences? STEW: Quarterbacks in the NFL. Students compute various regression analysis on Fathom regarding quarterback salary and football performance measurements **[SC7].** Correlation and graph matching. Short quizzes on homework using even problems from textbook. Home Plate method using a combination of technology and formulas to develop regression equation: X-bar Y-bar Sx Sy r Released AP Free Response and Multiple Choice relevant to topics studied to date. Worksheet on the computation and meaning of r-squared. AP Practice Test covering material to date (Textbook). Review. Unit Test on Chapter 3: Modeling Distributions Multiple Choice and Free Response problems. Was Leonardo Da Vinci Right? Regression and body proportions. Group Activity and Fathom Lab.	3 days block periods

Designing Studies Chapter 4 Section 4.1 Sampling and surveys **[SC2]** Students can: • Identify population and sample. Define population, census, and sample. • Identify bias or poor sampling methods in the form of under coverage, voluntary, nonresponse, wording, convenience. • Define SRS and use table of random digits or calculator or other methods of choosing an SRS. • Identify scenarios where a different sampling method such as stratified, systematic, cluster should be used and carry out plan. Understand terms homogenous and heterogeneous. • Spiral Review-Regression slope	P.229 Textbook 1 5, 7, 9, 29, 31, 33, 35 11, 13, 15, 23 17, 19, 21, 25, 27 P.234 43	Activity: Random Rectangles for drawing a random sample and showing the accuracy of results compared to non-random selection. Also shows size bias of human eye when selecting **[SC2].** Activity: Rolling Down the River for showing convenience sampling, simple random sampling and stratified sampling **[SC2].** Focus on homogeneity. Key AP Free Response problems on experimental design: dentists and apples, fish tanks and temperature of room, butterflies, and others. Activity: Memory Game as an experimental design with results **[SC3].** Activity: Music and Maze experiment involving class with results.**[SC3]** Activity: Matched pairs, completely randomized, and individual block design pulse rates.**[SC6]** The Salk Vaccine Field Trials: An experiment for Polio Vaccine-- lecture notes. LAB: Spiral review with observational study on hot dogs. Lab will review two-way tables, scatter plots, box plots and analysis using an observational study. Fathom software **[SC7], [SC10].**	2 days block periods
Section 4.2 Experiments **[SC3]** Students can: • Define observational study and experiment and distinguish between the two. Explain explanatory and response variable. Explain cause and effect. • Use the vocabulary of studies: confounding variable, treatment, experimental unit. • Describe and use random assignment and the principles of Experimental Design: Comparison, Random Assignment, Control, and Replication. • Describe placebo, blind, double blind. • What is the meaning of "statistically significant?" • Describe and use a randomized block design, a completely randomized design, and a matched pairs design. Draw diagrams of designs. • Spiral Review-Normal Curve.	P.259 Textbook 45, 47 49, 51, 53, 61, 67a 57, 59, 63, 65, 67b 69, 71 73 75, 77, 79, 81, 83, 85, LAB Hot Dogs P.265 95	Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. AP Practice Test covering material to date (Textbook). Review. Unit Test on Chapter 4: Designing Studies. Multiple Choice and Free Response problems. Blocking Activity: Planting Trees: new and old tree varieties planted in different zones.	2 days block periods
Section 4.3 Using Studies Wisely Students can: • Elaborate on cause and effect in an experiment vs observational study. • Spiral Review-Categorical data with segmented bar chart.	P.273 97, 99, 101, 103 P.275 113		1 day block period

Probability: What are the Chances Chapter5 Section 5.1 Randomness, Probability and Simulation **[SC9], [SC4]** Students can: • Define probability as chance and a long-run relative frequency concept, a number between 0 and 1. Describe misconceptions about randomness in terms of the law of large numbers, law of averages, runs. • Gather data by building a simulation through components, trials, modeling outcomes and trials, stating response variables, collect data and conclude. • Spiral Review-Bias.	P.300 1, 3, 7, 9, 11 13, 15, 19, 25 P. 304 37	Coin tossing and dice rolling for long-run relative frequency. College Board Curriculum Module: Simulations. Statistics in Action: Lengths of Hospital Stays for correct way to simulate In class simulation examples: superhero trading cards in cereal boxes, World Series , Birthday problem-how likely for at least 2 people in group of 30 to have same birthday. Random Babies (The Beatles) simulation regarding mothers and their babies and confirmation of simulation with theoretical probability using combinations. Adapted from Workshop Statistics. Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 5: Probability: What are the Chances? Multiple Choice and Free Response problems.	2 days block periods
Section 5.2 Probability Rules Students can: • Define probability vocabulary: sample space, event, and model. • Use basic probability rules including the addition rule for mutually exclusive (disjoint) events, and complements. • Compute probabilities using the general addition rule, two-way tables, and Venn diagrams. • Spiral review-Regression analysis	P.314 39, 41, 43 45, 47 49, 51, 53, 55 P.317 61	AP Practice Test covering material to date (Textbook).	1 day block period
Section 5.3 Conditional Probability and Independence Students can: • Define conditional probability and calculate using formula, from bar chart, Venn diagram, two-way tables. • Use the general multiplication rule and tree diagram. • Determine if events are independent using formula. Find probability of "at least one." • Spiral Review-Two-way table and association.	P.333 63, 65, 67, 71 73, 75, 77, 79, 81 85, 89, 91, 93 P. 337 102		1 day block periods
Random Variables Chapter 6 [SC4] Section 6.1 Discrete and Continuous Random Variables Students can: • Define the most important concept in statistics: the random variable and create a probability distribution and compute the expected value	P.359 1, 3, 5, 7, 9, 13, 15, 17, 19	Students use proper work setup using formula's and use calculator to compute mean and standard deviation. TI-84 one-variable stats L_1 and L_2. **[SC7],[SC8]** Graph histograms of probability distributions with calculator. Casino Lab to compute expected values and probabilities of winning at basic parts of Craps, Roulette, Blackjack.	2 days block periods

and standard deviation. • Define and find probabilities for continuous random variables. Define density curve. • Spiral Review-Cause and effect, Regression.	21, 23, 25 P.363 32, 33	Master formula sheet for transforming and combining random variables. Distinguish the difference between combining independent random variables and scaling a random variable. Lecture material on lottery and diversification of investments.	
Section 6.2 Transforming and Combining Random Variables Students can: • Make computations of mean and standard deviation when adding, subtracting, multiplying, or dividing by a constant. Understand the impact of a transformation on various statistical measures. • Combine random variables and find mean and standard deviation. • Find probability of events resulting from the combining of two independent random variables. • Spiral Review-Regression, Probability, Expected Value.	P.382 35, 37, 39, 37, 43, 45 47, 49, 51, 53, 55, 57 61, 63 P.386 67, 68	Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 6: Random Variables. Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	2 days block periods
Section 6.3 Binomial and Geometric Random Variables Students can: • Recognize the setting for Bernoulli Trials and use the acronym BINS (Bi-tow outcomes, independence, number of trials is fixed or first occurrence, success is constant probability). • Use binomial formula to show work for computing probabilities and use calculator to make computations. • Find and interpret the mean and standard deviation of binomial. • Use the normal approximation to the binomial. • Determine whether a setting is geometric using BINS. Calculate basic probabilities using formula. Use calculator. • Spiral Review-Probability Tree Diagram.	P.410 69, 71, 73, 87 75, 77, 79 81, 83, 85 91, 93 95, 97, 99 P.414 107	**Final Exam: Chapters 1-6. Winter Break: Assistments-students log on to website for review problems.**	2 days block periods **End 1sr Semester**
Sampling Distributions Chapter 7 Section 7.1 What is a Sampling Distribution Students can: • Identify population parameters and sample statistics and use appropriate notation (means and proportions). • From a small data set prepare a list of all possible samples of size n=2, graph and describe. • Describe a sampling	P.436 1, 3, 5 7 9, 11, 13	Gettysburg Address sampling words activity demonstrates sampling distributions, parameters, statistics, bias, Central Limit Theorem, graphs. **[SC7]** German Tank Problem and estimation methods. Lecture material on the difference between the distribution of a sample and a sampling distribution. Reese's Pieces Applet Demonstration from Workshop Statistics. Draw normal curves, label, compute z scores, use calculator to find probabilities.	2 days block periods

distribution from a graph using SOCS. Make conclusions about results using a sampling distribution. • Describe unbiased estimators, sample sizes and variability, bias and variability. • Spiral Review-Regression Residuals. Section 7.2 What is a Sampling Distribution **[SC4]** Students can: • Find the mean and standard deviation of the sampling distribution of sample proportion. Use the 10% condition, determine if the sampling distribution of p is approximately normal. Explain results from samples using sampling distributions. • Use SOCS to describe sampling distributions. Explain the relationship between sample size and spread. Use the normal approximation when sample size is large enough. • Spiral Review-Venn Diagram, sample selection. Section 7.3 Sample Means Students can: • Find the mean and standard deviation of $\bar{x}$ in various sample size scenarios. • Use normal curve to find probabilities involving the mean. • Define the Central Limit Theorem and use it to solve problems. • Spiral Review—Two-way table probabilities and independence.	15, 17, 19 P.439 26 P. 447 27, 29, 31, 35 37, 39, 41 P.449 47, 48 P.461 49, 51, 53 55 57, 59, 61, 63 P.464 69-72	Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 7: Sampling Distributions. Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	1 day block periods 2 days block periods
Estimating with Confidence Chapter 8 Section 8.1 Confidence Intervals: The Basics **[SC5]** Students can: • Define a point estimator and compute a point estimate from a sample. • Check basic conditions for use of a confidence interval; use the 68-95-99.7 empirical rule to refer to intervals. • Define a confidence interval, the margin of error, interpret the confidence interval in context verbally and in writing. Use a calculator to compute interval.	P.489 1, 3 5, 7, 9, 11 13, 15, 17, 19	Graphing Calculator. Conditions for using a statistical model: College Board resource. Revisit Against All Odds video on Motivation. Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 8: Estimating with Confidence.	2 days block periods

• Spiral Review-Observational study vs experiment, regression	P.492 25, 26	Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	
Section 8.2 Estimating a Population Proportion **[SC5]** Students can:	P.504		2 days block periods
• Check the conditions for estimating p ; what to do if a condition is violated.	27, 29		
• Find z^* using a table and using a calculator for various confidence levels. Use inverse normal on calculator.	31		
• Use the statistical thinking process to check conditions, compute a confidence interval for a proportion and conclude in context. Use a calculator to compute interval and properly label procedure**.[SC8]**	33, 35, 39		
• Determine the sample size. Describe the connection between confidence level and precision and between sample sizes.	43, 45		
• Spiral Review-Describing Quantitative data with numbers and graphs.	P.507 53, 54		
Section 8.3 Estimating a Population Mean Students can:	P.527		2 days block periods
• Understand the issue of the unknown σ . Compute $t*$ critical values, draw t curves, understand the difference between the normal curve and a t curve with degrees of freedom.	55, 57		
• Check conditions for estimating μ .	59		
• Compute and interpret the standard error of the mean.	61, 63		
• Use the statistical thinking process to check conditions, compute a confidence interval for a mean and conclude in context. Use a calculator to compute interval and properly label procedure**.[SC8]**	65, 67		
• Analyze the difference between two means with a confidence interval.	71		
• Spiral Review-Probability model, sampling distribution for mean, experimental design.	P.530 79, 80		
Testing a Claim Chapter 9 [SC5] Section 9.1 Significance Tests: The Basics Students can:	P.551	Four Square analysis of Type I and Type II errors in the context of American justice system, other types of scenarios. How to read output from statistical software packages.	1 day block period
• State the Null and Alternative Hypothesis in a Test of Significance.	1, 3, 5, 7, 9		
• Understand the reasoning of a	11, 13, 15, 17, 19	How to calculate power example.	

test of significance, and interpret a p -value in context, use an ∂ -value, make a conclusion in context. • Describe a Type I and Type II error in context and explain the consequences of each type of error. • Spiral Review-Probability, Confidence Levels. Section 9.2 Tests about a Population Proportion **[SC5]** Students can: • Conduct a one-**sample** z - test for a proportion by stating hypothesis, checking conditions, using proper mechanics with diagrams, compute the test statistic, use calculator to determine probability and check result, and conclude in context. • Use a confidence interval to obtain more information such as how big the difference is if a statistically significant result is obtained. • Read output from statistical software package to test a claim. • Define the Power of a Test and the connection to a Type II error, and how to increase power. • Spiral Review-Combining Two Random Variables, Experimental Design. Section 9.3 Tests about a Population Mean **[SC8]** Students can: • Conduct a one-sample t -test for a proportion by stating hypothesis, checking conditions, using proper mechanics with diagrams, compute the test statistic, use calculator to determine probability and check result, and conclude in context. • Continue to determine Type I and Type II errors and describe consequences in context. • Read output from statistical software package to test a claim**. [SC10]** • Use a confidence interval to obtain more information such as how big the difference is if a statistically significant result is obtained. • Use a test of significance when there is paired data.	21, 23 P.554 29, 30 31, 33, 35, 39, 41, 43, 45 47, 49 51 55, 57 P. 574 63, 64 P.595 65, 67, 71, 77 73 75 79, 81, 83 85, 87	Graphing calculators. AP Central: On Power Workshop Statistics complete examples with step by step process and written conclusions. Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 9: Testing a Claim. Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	2 days block periods 2 days block periods

• Define the Power of a Test and the connection to a Type II error, and how to increase power. • Spiral Review-Margin of Error, Probability.	89, 91 P.601 103, 104		
Comparing Two Populations or Groups Chapter 10 [SC5] Section 10.1 Comparing Two Proportions Students can:	P.629	Computer chips oven problem for working with paired data. Return to Teresa Amabile's Motivation and Creativity experiment.	2 days block periods
• Describe parameters and statistics in two-proportion situations and compute the mean and standard deviation of the sampling distribution of $p_1 - p_2$, and describe the shape of the sampling distribution. • State the conditions for the samplings distribution for the difference between two proportions. • Compute standard error and build a confidence interval for the difference between two proportions. Use calculator. State conditions, conclude in context. • Compute standard error and conduct a test of significance for the difference between two proportions. Use calculator. State conditions, conclude in context. • Continue to describe Type I and Type II errors. • Use inference procedures in experiments. • Spiral Review-Regression.	1, 3 5, 7 9, 11 13, 15, 17, 19 21 23 P.633 29,30	Graphing calculator. Computer software output including using Fathom software to enter data and conduct inference procedures with write-up **[SC10].** Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 10: Comparing Two Population s or Groups. Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	
Section 10.2 Comparing Two Means Students can: • Describe the sampling distribution of $\overline{x_1} - \overline{x_2}$; compute the test statistic, standard error, appropriate degrees of freedom (calculator), check conditions and conduct a test of significance for the difference between two means. • Conduct a paired t -test using the statistical thinking process. • Conduct inference for experiments. • Spiral Review-Probability, Confidence Intervals, Bias.	P.654 31, 33, 35, 37, 39, 41 53 51 P.661 63, 64, 65	Assistments-Students log on to website for review problems.	2 days block periods **Spring Break**
Inferences for Distributions of Categorical	P. 693	Benford's Law Problem from Workshop Statistics. Article from Wall Street	1 day block

Data Chapter 11 [SC5] Section 11.1 Chi-Square Tests for Goodness of Fit Students can: • State the hypothesis for a χ^2 Goodness of fit test and compute the χ^2 statistic, sketch a graph and compute the p-value using a calculator. • Conduct a Chi-Square Goodness of Fit test by stating hypothesis, checking conditions, computing the test statistic, drawing a picture, computing p-value and concluding in context. • Conduct a follow-up analysis to determine the components that contribute most to the Chi-Square statistic. Section 11.2 Chi-Square Tests for Goodness of Fit Students can: • Distinguish between tests for homogeneity and for independence and conduct a complete Chi-Square test. • Review categorical variable two-way tables, prepare bar chart and discuss association. • Compute the Chi-Square statistic for two-way tables using the $\frac{Row * Column}{Total}$ procedure for each cell, and know its meaning. • Check conditions for Chi-Square Homogeneity/Independence situations. • Use output from statistical software to prepare a Chi-Square analysis for homogeneity/Independence scenarios.**[SC9]** • Compare Chi-Square tests and two-proportion z-tests. • Spiral Review-Inference procedure identification	1, 3, 5 7, 11 15 41, 45 27 29 31 47 49 P.729 57	Journal on lack of 4's in earnings per share. M&M's to determine if sampled colors conform to Mars Co. model. Moose AP Exam problem: Goodness of Fit. Graphing calculator. Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 11: Inferences for Distributions of Categorical Data. Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	period 2 days block periods
More About Regression Chapter 12 [SC5] Section 12.1 Inferences for Linear Regression Students can: • State the conditions for performing inference on the slope of the population regression line. • Use regression software output to find the equation of the regression line. Interpret slope and intercept in context.	P.759 1, 3 5, 7, 9, 11, 13	Fathom Lab to recap regression. Supplemental material for significance test for r (Essentials of Statistics, Triola) Graphing calculator. Procedure to back into S_b on calculator Simpson's Paradox connection by identifying categories in scatterplot.	2 days block periods

Explain s and s_b in context. Find a confidence interval for slope. Predict values using regression line. • Conduct a linear regression t-test to determine statistical significance of the slope. Check conditions, show test statistic, p-value and conclusion. • Spiral Review-Probability, Chi-Square.	15, 17 P.764 29, 30	Short homework quizzes using even problems from textbook. Released AP Free Response and Multiple Choice relevant to topics studied to date. Review. Unit Test on Chapter 12: More About Regression. Multiple Choice and Free Response problems. AP Practice Test covering material to date (Textbook).	
Section 12.2 Transformations to Achieve Linearity Students can: • Recognize scatterplots that are curved and may be transformable to linear. Perform basic transformations such as square root and logarithm. • Spiral Review-Confidence Interval, Hypothesis Test, Sampling Method.	P.785 31, 33, 39 P.792 54		1 day block period
REVIEW FOR AP EXAM		Released free response and multiple choice questions. Emphasis on: Graphs Regression Confidence Intervals Hypothesis Tests Probability and Expected Value Investigative Task Flow chart for selecting proper inference procedure. Larry Green's website to practice choosing appropriate inference procedure. Comprehensive library of inference procedures with conclusions. Comprehensive list of conditions required to be checked. Review of formulas and probability tables to be provided on exam. We Solved the Crime—group review activity. Tips for students on AP Exam. Strategy discussion of Investigative task and practice. Assistments: students log on website for review problems. Students encouraged to work problems from purchased review book.	Mid-April 4-6 days block periods
AFTER AP EXAM TOPICS ANOVA RUNS TEST FOR RANDOMNESS SIGN TEST		Various problems to compute one-way ANOVA with multiple comparisons. Introduction to Non-Parametric Statistics with various problems on Runs Test and Sign Test. Final Exam on these topics.	Mid May-June 5 days block periods