AP Statistics Syllabus for AP Audit

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Brief Description of Course

AP Statistics is a year-long introductory course to statistics designed for students who have successfully completed Algebra II. The purpose of this AP course is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students will explore and analyze data using graphical and numerical techniques. Students will also use probability and statistical inferences to develop an appropriate model for data collected. AP Statistics can be taken alone or in conjunction with another math course.

Primary Textbook

Bock, David E., Paul F. Velleman and Richard D. DeVeaux. *Stats: Modeling the World.* 1st edition; Boston: Pearson/Addison-Wesley, 2004.

Technology

Students are expected to have at least a TI84 to use for all homework and assessments throughout the course. In the classroom, a TI-SmartView with a SMART Interactive White Board are used on a daily basis. A variety of online Java applets, Powerpoint demonstrations, and websites are used to illustrate course content. Students are also exposed to computer output from JMP and Fathom when applicable.

Homework

Students will be given an assignment sheet for each unit. Some of the problems on the assignment sheet, typically odd-numbered exercises, will be completed in class with a partner. The purpose of these exercises will be to give students the opportunity to discuss statistics with other students as well as provide examples for that chapter. These exercises comprise the most representative problems for that chapter and must show all required work and be written in complete sentences.

Problem of the Day (PODs)

Each day, when students arrive to class, they get their Warmup of the Day. When students arrive to class, they are to sit down and start working on that day's Warmup questions. In addition to answering the questions, students must explain/justify their answer.

Reading Guides (RGs)

Students are expected to read and take notes over the material in the textbook. These readings will be assessed using the Reading Guides. Reading Guides are included with each unit assignment sheet. Reading Guides are discussed in class during each chapter.

AP Questions (APQs)
Students will be given AP Question Packets during the school year containing released AP Statistics free response questions. They will be collected and graded using the AP rubrics.

Quizzes
Both chapter and cumulative quizzes are given regularly throughout the course. Quizzes may be made up of multiple choice and/or free response style questions.

Tests
Tests will be given after each unit of material covered and contain both multiple choice and free response questions. All tests will contain both current material as well as information from previous chapters/units. Unit tests are designed to emulate the AP Exam given in May.

Projects
Throughout the year, students will be required to complete and present several projects and investigative tasks involving topics discussed in class. Course projects are in the form of extended writing assignments and will be assessed based on the clarity of communication in addition to the mathematics presented. Some projects will require the use of computer software.

Unit 1 – Exploring and Understanding Data (25 Days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
1 day	*Chapter 1 – Stats Starts Here* Topics covered: • Introduction to Statistics, Data, and Variation. Assignments: ☐ Read: Read Chapter 1 pgs 2-5 ☐ Complete Chapter 1 Reading Guide	
2 days	*Chapter 2 – Data* Topics covered: • Analyzing Data – Who, What, When, Where, Why, How • Categorical vs. Quantitative Variables • TI: Entering data and working with data lists Assignments: ☐ Read Chapter 2 pgs 6-12 ☐ Complete Chapter 2 Reading Guide ☐ Pg 13-14 #5, 7, 8, 9, **12**, **16**	
3 days	*Chapter 3 – Displaying and Describing Categorical Data* Topics covered: • Frequency and Relative Frequency Tables • Distributions of Categorical Variables • Importance of the Area Principle • Bar and Pie Charts • Contingency Tables • Marginal and Conditional Distributions • Independence of Categorical Variables • Segmented Bar Charts • Simpson's Paradox Project: • Analyzing Bad Graphs - Find a graph in a newspaper, magazine, or on the internet that is an example of a violation of the area principle. Explain how the graph is misleading and what should be changed to improve it. Assignments: ☐ Read Chapter 3 pgs 15-28 ☐ Complete Chapter 3 Reading Guide	I. Exploring Data E. Exploring categorical data 1. Frequency tables and bar charts 2. Marginal and joint frequencies for two-way tables 3. Conditional relative frequencies and association 4. Comparing distributions using bar charts

	☐ Pg 28-35 #**6**, 7, 12, 14, **16**, **22**, 23, 29, **30**	
3 days	*Chapter 4 – Displaying Quantitative Data* Topics covered: • Distributions of Quantitative Variables • Frequency and Relative Frequency Histograms • Stem-and-Leaf Displays • Dotplots • Describing a Distribution in terms of shape, outliers, center, and spread (SOCS) • Shape: Modality, Uniformity, Symmetry, Skewness, Unusual Observations, Gaps, and Clusters • Center and Spread in General Terms • Comparing Distributions • Timeplots • TI: Creating a Histogram Applets: • Effects of Bin Width on Histograms http://quarknet.fnal.gov/cosmics/histo.shtml Assignments: ☐ Read Chapter 4 pgs 36-49 ☐ Complete Chapter 4 Reading Guide ☐ Pg 50-56 #4, 6, 7, **10**, **12**, 14, 17, 28, **30**, **32**	I. Exploring Data A. Constructing and interpreting graphical displays of distributions of univariate data (boxplot, stemplot, histogram, cumulative frequency plot) 1.Center and spread 2.Clusters and gaps 3.Outliers and other unusual features 4.Shape C. Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots) 1.Comparing center and spread within group, between group variation 2.Comparing clusters and gaps 3.Comparing outliers and other unusual features 4.Comparing shapes
5 days	*Chapter 5 – Summary Statistics* Topics covered: • Measures of Central Tendency (Mean, Median, Mode, and Midrange) • Measures of Spread (Range, IQR, Variance, Standard Deviation) • Five Number Summary • Quartiles/Percentiles • Calculating Outlier "Fences" • Boxplots • Comparing Multiple Datasets • Resistance vs. Non-resistance to Extreme Values • Cumulative Frequency Graphs • TI: Creating a Boxplot, Finding the Five Number Summary, Calculating the Mean and Standard Deviation Lab Activity: • The Game of Greed Lab – Students gather data by playing the "Game	I. Exploring Data A. Constructing and interpreting graphical displays of distributions of univariate data (boxplot, stemplot, histogram, cumulative frequency plot) 1.Center and spread 2.Clusters and gaps 3.Outliers and other unusual features 4.Shape B. Summarizing distributions of univariate data 1.Measuring center: median and mean 2.Measuring spread: range, interquartile range,

	of Greed", then analyze the data using back-to-back stemplots, modified boxplots, and summary statistics to compare male and female scores. Project: • Auto Safety Investigative Task – Students analyze and compare auto safety records among small, mid-size, and large vehicles using graphical and numerical measures in order to draw a conclusion concerning insurance policies. Assignments: ☐ Read Chapter 5 pgs 57-72 ☐ Complete Chapter 5 Reading Guide ☐ Pg 73-82 #5, 7, 8, 11, **12**, 15, **16**, 19, 20, 21, **24**, 26, 29, 31, **32**, 35	standard deviation 3.Measuring position: quartiles, percentiles, standardized scores (z-scores) 4.Using boxplots C. Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots) 1.Comparing center and spread within group, between group variation 2.Comparing clusters and gaps 3.Comparing outliers and other unusual features 4.Comparing shapes
6 days	*Chapter 6 – The Standard Deviation as a Ruler and the Normal Model* Topics covered: • Introduction to Standardized Scores (z-scores) • Shifting Data by Adding or Subtracting a Constant Value • Rescaling Data by Multiplying or Dividing by a Constant Value • Normal Models • Parameters vs. Statistics • Standard Normal Model • Empirical Rule (68-95-99.7 Rule) • Tables of Normal percentiles to calculate probabilities for a Normal Model and to find z-scores for a given percentile. • Assessing Normality • Normal Probability Plots • TI: Finding Normal Probabilities, Finding z-scores for a given percentile, Creating a Normal Probability Plot Assignments: ☐ Read Chapter 6 pgs 83-99 ☐ Complete Chapter 6 Reading Guide ☐ Pg 100-103 #**2**, 3, 7, **12**, 13, 15, **16**, **20**, **22**, **24**, 26, 27, **28**, 29, 31	I. Exploring Data B. Summarizing distributions of univariate data 3.Measuring position: quartiles, percentiles, standardized scores (z-scores) 5.The effect of changing units on summary measures III. Anticipating Patterns C. The normal distribution 1.Properties of the normal distribution 2.Using tables of the normal distribution 3.The normal distribution as a model for measurements
5 days	*Unit Assessments*	

	• Quiz – Chapter 2/3 • Quiz – Chapter 4/5 • Unit 1 Review • Unit 1 Multiple Choice Test • Unit 1 Free Response Test	

Unit 2A – Exploring Relationships Between Variables (11 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
2 days	*Chapter 7 – Scatterplots, Association, and Correlation* Topics covered: • Introduction to Bivariate Data • Creating a Scatterplot • Describing a Scatterplot in terms of Direction, Form, Strength, and Unusual Observations • Explanatory vs. Response Variables • Calculating Correlation • Conditions Required for Correlation • Properties for Correlation • Correlation Tables • Correlation vs. Association • Lurking Variables and Causation • TI: Creating a Scatterplot, Calculating Correlation Applets: • Visulazing Strength and Direction with Correlation http://noppa5.pc.helsinki.fi/koe/corr/cor7.html • Guess the Correlation Game http://www.stat.uiuc.edu/courses/stat100/java/GCApplet/GCAppletFrame.html Assignments: ☐ Read Chapter 7 pgs 115-131 ☐ Complete Chapter 7 Reading Guide ☐ Pg 131-136 #1, 5, **6**, **10**, 11, **12**, 14, **18**, **20**, 23	I. Exploring Data D. Exploring bivariate data 1.Analyzing patterns in scatterplots 2.Correlation and linearity
5 days	*Chapter 8 – Linear Regression* Topics covered: • Linear Models	I. Exploring Data D. Exploring bivariate data 1.Analyzing patterns in scatterplots

	• Predicted Values • Line of Best Fit • Regression to the Mean • Least Squares Regression Line (LSRL) • Finding the Slope and Y-intercept of the LSRL using Summary Statistics • Interpreting the Slope and Y-Intercept of the LSRL • Calculating and Interpreting Residual Values • Creating and Interpreting a Residual Plot • Understanding and Interpreting the Coefficient of Determination • Assumptions and Conditions for the Linear Regression Model • Reading Computer Output for Regression • TI: Finding the LSRL, Adding a Line to a Graph of Datapoints, Creating a Residual Plot Lab Activities: • Pinching Pages Lab – Students will gather data on number of pages vs. thickness by "pinching" the pages of their textbook in order to develop the idea behind finding a line of best fit (LSRL), and interpreting the slope and intercept of a bivariate dataset. • Height vs. Hand Width Lab – Students will gather data about the class heights and hand widths in order to analyze and interpret the data as a review of the chapter's content. • Importance of Graphing Data – Students will explore 'Anscombe Data Sets' to see why you should never trust summary data without a graph. Applets: • Meaning of "Least Squares" http://standards.nctm.org/document/eexamples/chap7/7.4/standalone1.htm • Understanding the Slope of the LSRL http://www.bbn-school.org/us/math/ap_stats/investigations_folder/powerpoint_folder/understanding_rSySx.pps • Understanding r-squared http://www.bbn-school.org/us/math/ap_stats/investigations_folder/powerpoint_folder/understanding_r-sq_.pps Assignments: ☐ Read Chapter 8 pgs 137-154 ☐ Complete Chapter 8 Reading Guide	2.Correlation and linearity 3.Least-squares regression lines 4.Residual plots, outliers, and influential points

	☐ Pg 154-161 #**2**, 3, 7, **8**, 9, **10**, 17, **18**, 22, 25, **26**, 31, **32**, 35	
4 days	*Unit Assessments* • Quiz – Chapter 7 • Unit 2A Review • Unit 2A Multiple Choice Test • Unit 2A Free Response Test	

Unit 2B – Exploring Relationships Between Variables (8 Days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
2 days	*Chapter 9 – Regression Wisdom* Topics covered: • Abuses of Regression • Exploring Subsets of Data • Non-linear datasets • Dangers of Extrapolation • Examining Outliers in Regression Models • Lurking Variables and Causation • Working with Summary Values Articles: • Women may outsprint men by 2156 – Article illustrating extrapolation in the news http://news.bbc.co.uk/1/hi/uk/3702650.stm Applet: • Exploring Linear Regression http://bcs.whfreeman.com/yates/cat_020/applets/CorrelationRegression.html Assignments: ☐ Read Chapter 9 pgs 162-175 ☐ Complete Chapter 9 Reading Guide ☐ Pg 175-180 #**2**, 9, **10**, **12**, 13, 19, **20**	I. Exploring Data D. Exploring bivariate data 3.Least-squares regression lines 4.Residual plots, outliers, and influential points
4 days	*Chapter 10 – Re-expressing Data: It's Easier Than You Think* Topics covered: • Linear vs. Non-linear growth • Re-expressing data sets • Using the Ladder of Powers	I. Exploring Data D. Exploring bivariate data 3.Least-squares regression lines 4.Residual plots, outliers, and influential points 5.Transformations to

	• Using logarithms to straighten scatterplots, including the Exponential, Logarithmic, and Power models. • TI: Using logarithms to re-express data, Creating residual plots Lab Activity: • Growth and Decay of M&Ms – Students will gather data for the exponential growth and decay of M&Ms candies, then analyze the data using logarithms to re-express the data in linear form. Project: • Save Fluffy! Investigative Task – Students will analyze non-linear bivariate data regarding the length and weights of alligators in order to make the best prediction of weight for an alligator of 96 inches in length. Students must also weigh the pros and cons of possible influential outliers. Assignments: ☐ Read Chapter 10 pgs 181-198 ☐ Complete Chapter 10 Reading Guide ☐ Pg 198-202 #1, **2**, **4**, **6**, 7, **8**, 27	achieve linearity: logarithmic and power transformations
2 days	*Unit Assessments* • Unit 2B Review • Unit 2B Test	

Unit 3 – Gathering Data (18 Days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
3 days	*Chapter 11 – Understanding Randomness* Topics covered: • Understanding the Concept of Randomness • How the Mind is Not Random • Pseudorandom Numbers • Tables of Random Digits • Conducting a Simulation • Components of a Simulation (outcomes, trials, response variables) • TI: Seeding the Random Number Generator, Generating Random Numbers Lab Activity: • Streaky Behavior Lab – Students will explore real randomness vs. perceived randomness by examining coin flips to determine the	III. Anticipating Patterns A. Probability 5. Simulation of random behavior and probability distributions

	length of a "streak" of heads in a real coin flip sequence. Video: • Numb3rs Episode 101 video clip – Charlie discusses how the human mind tries to simulate randomness and instead creates a pattern by being too evenly spaced. Project: • Simulation Project – Students will create their own scenario that can be modeled by a probability simulation and present their problem and solution in poster format. Assignments: ☐ Read Chapter 11 pgs 215-223 ☐ Complete Chapter 1 Reading Guide ☐ Pg 223-225 #9, **10**, **11**, **12**, 13, 14, **15**, **16**, 18	
4 days	*Chapter 12 –Sample Surveys* Topics covered: • Sample Statistics vs. Population Parameters • The Good and the Bad of Polling • Why Randomization is Important in Sampling • How Sample Size Plays a Role in Sampling • Taking a Census • Sampling Frame • Sampling Variability • Statistical Sampling Methods: Simple Random Sampling, Stratified Random Sampling, Cluster Sampling, Multistage Sampling, Systematic Sampling • Nonstatistical Sampling Methods – Voluntary Response Sampling, Convenience Sampling • Bias in Sampling – Voluntary Response Bias, Sampling from a Bad Sampling Frame, Undercoverage, Overcoverage, Nonresponse Bias, Response Bias, Poorly Worded Questions Lab Activity: • How Many G's – Students will explore the accuracy of the census by counting the number of G's in a short story in a specified time limit. Students will then recount the number of G's using a statistical sampling method in order to compare the results. • JellyBlubbers – Students will attempt to estimate the average length of the JellyBlubber colony using a variety of sampling methods in	II. Sampling and Experimentation: Planning and conducting a study A. Overview of methods of data collection 1.Census 2.Sample survey B. Planning and conducting surveys 1.Characteristics of a well-designed and well-conducted survey 2.Populations, samples, and random selection 3.Sources of bias in sampling and surveys 4.Sampling methods, including simple random sampling, stratified random sampling, and cluster sampling. D. Generalizability of results and types of conclusions that can be drawn from observational studies, experiments and surveys

	order to compare the accuracy of the methods. Article: • How Polls are Conducted by Gallup http://media.gallup.com/PDF/FAQ/HowArePolls.pdf Assignments: ☐ Read Chapter 12 pgs 226-242 ☐ Complete Chapter 12 Reading Guide ☐ Pg 243-245 #1, 3, **8**, 11, **12**, 13, **14**, **18**, **20**, 23, **24**	
6 days	*Chapter 13 – Experiments* Topics covered: • Observational Studies vs. Experiments • Types of Observational Studies – Retrospective vs. Prospective • Elements of an Experiment • Experimental Units, Subjects, and Participants • Explanatory Variables, Factors, Levels, and Treatments • Response Variables • Principles of Experimental Design (Control, Randomization, Replication, and Blocking) • Completely Randomized Experimental Designs • Idea of Statistical Significance • Control Treatments and Control Groups • Blinding (Single and Double Blind) • Placebo and Placebo Effect • Randomized Block Experimental Designs • Matched Pairs Designs • Idea of Confounded Variables Project: • Experimental Design Task – Students will locate an article describing an experimental study, then answer several questions concerning the study. Assignments: ☐ Read Chapter 13 pgs 246-262 ☐ Complete Chapter 13 Reading Guide ☐ Pg 262-266 #**6**, 7, 8, **10**, 21, **22**, **23**, 24, **26**, 30, **32**	II. Sampling and Experimentation: Planning and conducting a study A. Overview of methods of data collection 3.Experiment 4.Observational study C. Planning and conducting experiments 1.Characteristics of a well-designed and well-conducted experiment 2.Treatments, control groups, experimental units, random assignments and replication 3.Sources of bias and confounding, including placebo effect and blinding 4.Completely randomized design 5.Randomized block design, including matched pairs design D. Generalizability of results and types of conclusions that can be drawn from observational studies, experiments and surveys
5 days	*Unit Assessments* • Quiz – Chapter 11 • Quiz – Chapter 12	

	• Unit 3 Review • Unit 3 Multiple Choice Test • Unit 3 Free Response Test	

Unit 4A – Randomness and Probability (12 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
3 days	*Chapter 14 – From Randomness to Probability* Topics covered: • Difference between randomness and chaos • Probability as a Long Run Relative Frequency • Language of Probability – Trials, Outcomes, and Events, Sample Space • Fundamental Counting Rule • General Idea of Independence • Law of Large Numbers • Basic Rules of Probability • Complement Rule • Addition Rule for Disjoint Events • Multiplication Rule for Independent Events • Union and Intersection of Two Events • Introduction to Venn Diagrams Assignments: ☐ Read Chapter 14 pgs 274-285 ☐ Complete Chapter 14 Reading Guide ☐ Pg 285-288 #**8**, 9, **10**, 11, **12**, 13, **14**, 15, **16**, **18**, 21	III. Anticipating Patterns A. Probability 1.Interpreting probability, including long-run relative frequency interpretations. 2."Law of Large Numbers" concept 3.Addition rule, multiplication rule, conditional probability, and independence
5 days	*Chapter 15 – Probability Rules* Topics covered: • Probability for Equally Likely Events • General Addition Rule • Conditional Probability • General Multiplication Rule • Formal Idea of Independence • Independent Events vs. Disjoint Events (Revisited) • Drawing with and without Replacement • Making a Picture – Venn Diagrams, Probability Tables, and Tree Diagrams	III. Anticipating Patterns A. Probability 1.Interpreting probability, including long-run relative frequency interpretations. 2."Law of Large Numbers" concept 3.Addition rule, multiplication rule, conditional probability, and independence

	• Introduction to Bayes' Rule Assignments: ☐ Read Chapter 15 pgs 289-305 ☐ Complete Chapter 15 Reading Guide ☐ Pg 305-308 #1, **2**, 3, **6**, 7, **8**, **10**, 15, **16**, 17, **18**, 23, **24**, 26, 28, **30**, **32**, 33, **34**, 35	
4 days	*Unit Assessments* • Quiz – Chapter 14 • Quiz – Chapter 15 • Unit 4A Review • Unit 4A Test	
3 days	*Semester Review and Exam*	

Unit 4B –Randomness and Probability (13 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
4 days	*Chapter 16 – Random Variables* Topics covered: • Random Variables • Discrete and Continuous Random Variables • Creating a Probability Model for Discrete Variables • Expected Values of Random Variables • Variance and Standard Deviation of Random Variables • Linear Transformations of Random Variables • Combining Independent Random Variables • Combining Normal Random Variables • TI: Calculating Mean and Standard Deviation for Probability Models Assignments: ☐ Read Chapter 16 pgs 309-320 ☐ Complete Chapter 16 Reading Guide ☐ Pg 321-324 #1, **2**, 3, **4**, 5, **6**, 15, **16**, **18**, 19, 21, **22**, **24**, 25, 27, **28**, 33, **34**, 37, **38**	III. Anticipating Patterns A. Probability 4.Discrete random variables and their probability distribution, including binomial and geometric 6.Mean (expected value) and standard deviation of a random variable, and linear transformation of a random variable B. Combining independent random variables 1.Notion of independence versus dependence 2.Mean and standard deviation for sums and differences of independent random variables.

5 days	*Chapter 17 – Probability Models* Topics covered: • Properties of Bernoulli Trials • Properties of the Geometric Model • Calculating Geometric Probabilities • Calculating the Expected Value and Standard Deviation for a Geometric Model • Properties of the Binomial Model • Calculating Binomial Probabilities • Calculating the Expected Value and Standard Deviation for a Binomial Model • Simulating Binomial and Geometric Probability Models • Normal Approximation to the Binomial Model • TI: Calculating Geometric Probabilities, Calculating Binomial Probabilities Assignments: ☐ Read Chapter 17 pgs 325-336 ☐ Complete Chapter 17 Reading Guide ☐ Pg 336-339 #3, **4**, 5, 7, **8**, 11, **12**, 13, **14**, 15, **16**, **18**, 19, **20**, 29, **30**	III. Anticipating Patterns A. Probability 4.Discrete random variables and their probability distribution, including binomial and geometric 5.Simulation of random behavior and probability distributions 6.Mean (expected value) and standard deviation of a random variable, and linear transformation of a random variable B. Combining independent random variables 1.Notion of independence versus dependence 2.Mean and standard deviation for sums and differences of independent random variables.
4 days	*Unit Assessments* • Quiz – Chapter 16 • Unit 4B Review Activity – Probability Around the World • Unit 4B Test	

Unit 5 – From the Data at Hand to the World at Large (32 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
6 days	*Chapter 18 – Sampling Distribution Models* Topics covered: • Simulating a Sampling Distribution Model • Sampling Variability • Describing the Sampling Distribution Models for Sample Proportions in terms of Center, Spread, and Shape • Assumptions and Conditions for the Sampling Distribution Model of Sample Proportions	III. Anticipating Patterns. . D. Sampling distributions 1.Sampling distribution of a sample proportion 2.Sampling distribution of a sample mean 3.Central Limit Theorem 6.Simulation of sampling distributions

	• Calculating Probabilities Based on the Sampling Distribution Model of Sample Proportions • Describing the Sampling Distribution Models for Sample Means in terms of Center, Spread, and Shape • Central Limit Theorem • Assumptions and Conditions for the Sampling Distribution Model of Sample Means • Calculating Probabilities Based on the Sampling Distribution Model of Sample Means • Law of Diminishing Returns • Standard Error of the Sampling Distribution Model Lab Activity: • Flipping Coins Lab – Using a penny, students will flip the coin 25 times, recording the proportion of heads and repeat this several times. By combining the data, the class will explore the sampling distribution for sample proportions. Applets: • Convergence of the Sum of Dice to Normality http://www.stat.sc.edu/~west/javahtml/CLT.html • Central Limit Theorem for Means http://www.ruf.rice.edu/~lane/stat_sim/sampling_dist/ Projects: • Simulated Coins Investigative Task – Students will explore and describe the sampling distribution for sample proportions using a random number generator to simulate the flipping of a fair coin. Assignments: ☐ Read Chapter 18 pgs 347-362 ☐ Complete Chapter 18 Reading Guide ☐ Pg 362-365 #1, **2**, 3, **4**, 5, **6**, 9, 11, **12**, 13, **14**, 15, **16**, 17, **18**, 19, **20**, 21, **22**, **24**, **28**, 29, **30**, **33**	
5 days	*Chapter 19 – Confidence Intervals for Proportions* Topics covered: • Sampling Variability • Estimating Population Parameters • Point Estimates • Margin of Error • Interpreting Confidence Levels	IV. Statistical Inference A. Estimation (point estimators and confidence intervals) 1. Estimating population parameters and margins of error 2. Properties of point

	• Critical Values of z* • Creating a One-Proportion Z-Interval • Interpreting Confidence Intervals • Assumptions and Conditions for a One-Proportion Z-Interval • Calculating Minimum Sample Size for a given Margin of Error • TI: Calculating a One-Proportion Z-Interval Lab Activities: • Skittles Lab – Using a bag of Skittles, students will sample with replacement, recording the proportion of red skittles in 30 draws, and create a confidence interval to estimate the proportion of red skittles. Students will graph their CI on the chart paper on the board to illustrate the concepts of sampling variability and confidence level. Applets: • Understanding Confidence http://bcs.whfreeman.com/ips4e/cat_010/applets/confidenceinterval.html Assignments: ☐ Read Chapter 19 pgs 366-377 ☐ Complete Chapter 19 Reading Guide ☐ Pg 378-381 #1, 3, **4**, 5, **6**, **7**, **8**, 9, **10**, 11, **12**, 13, **14**, 15, **18**, **20**, 21, **22**, 23, **24**, 25, **26**, **30**	estimators, including unbiasedness and variability 3. Logic of confidence intervals, meaning of confidence level and confidence intervals, and properties of confidence intervals. 4. Large sample confidence interval for a proportion
5 days	*Chapter 20 – Testing Hypotheses About Proportions* Topics covered: • Logic of a Hypothesis Test • Null vs. Alternate Hypotheses • Idea of Rejecting vs. Retaining the Null Hypothesis • Conducting a One-Proportion Z-Test • Calculating a Probability Value (P-Value) • Assumptions and Conditions for a One-Proportion Z-Test • One-sided vs. Two-sided Hypothesis Tests • Drawing Conclusions from our Data • How Hypothesis Tests and Confidence Intervals are Related • TI: Calculating a One-Proportion Z-Test Applets: • The Basics of Hypothesis Testing http://bcs.whfreeman.com/sta/content/chapterall/spt/significance/testsignificance.html Assignments:	IV. Statistical Inference B. Test of significance 1. Logic of significance testing, null and alternative hypotheses; p-values; one- and two-sided tests 3. Large sample test for a proportion

	☐ Read Chapter 20 pgs 382-398 ☐ Complete Chapter 20 Reading Guide ☐ Pg 398-400 #1, **2**, **4**, 5, **6**, 7, **8**, 9, **10**, 11, **12**, 13, **14**, 15, **16**, 17, **18**, **20**, **21**, **22**, 23, **24**	
4 days	*Chapter 21 – More About Tests* Topics covered: • P-values as a Conditional Probability • Making a Decision based on an Alpha Level • Critical Values for a Hypothesis Test • Comparing a Hypothesis Test to a Confidence Interval • Type I and Type II Errors • Power of the Test • The Relationship between Alpha, Beta, and Power • Effect Size Applets: • Relationship Between Type I Errors, Type II Errors, and the Power of the Test http://www.intuitor.com/statistics/T1T2Errors.html Project: • Making a Decision Project – Students will create an original scenario, identifying the null and alternate hypotheses and then describing the Type I error, Type II error and Power of the test in the context of their scenario. Assignments: ☐ Read Chapter 21 pgs 401-417 ☐ Complete Chapter 21 Reading Guide ☐ Pg 418-420 #1, **2**, 3, **4**, 7, **8**, **9**, 10, 11, **12**, **13**, **14**	IV. Statistical Inference B. Test of significance 1.Logic of significance testing, null and alternative hypotheses; p-values; one- and two-sided tests 2.Concepts of Type I and Type II errors and concept of power
4 days	*Chapter 22 – Comparing Two Proportions* Topics covered: • Sampling Distribution Model for the Difference Between Two Independent Proportions • Assumptions and Conditions for Two-Proportion Inference • Creating a Two-Proportion Z-Interval • Idea of Pooling • Conducting a Two-Proportion Z-Test • Relationship between an Interval and a Test • TI: Calculating a Two-Proportion Z-Interval, Calculating a Two-	III. Anticipating Patterns. . D. Sampling distributions 4.Sampling distribution of a difference between two independent sample proportions IV. Statistical Inference A. Estimation (point estimators and confidence intervals) 5.Large sample confidence

	Proportion Z-Test Assignments: ☐ Read Chapter 22 pgs 421-432 ☐ Complete Chapter 22 Reading Guide ☐ Pg 433-435 #1, **2**, 3, **4**, 5, **6**, 7, **8**, 9, **10**, 11, **12**, 13, **14**, **16**, **18**, 19, 21, **22**	interval for a difference between two proportions B. Test of significance 4.Large sample test for a difference between two proportions
8 days	*Unit Assessments* • Quiz – Chapter 18 • Quiz – Chapter 19 • Quiz – Chapter 20 • Quiz – Chapter 22 • Unit 5 Lab Activity – Pass the Pigs Lab – Students will gather data using the game "Pass the Pigs", then analyze the data, using all of the inference techniques from Unit 5. • Unit 5 Review • Unit 5 Multiple Choice Test • Unit 5 Free Response Test	

Unit 6 –Learning About the World (10 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
3 days	*Chapter 23 – Inferences About Means* Topics covered: • Standard Error of the Sample Mean • T-distribution • Degrees of Freedom • When to Use the Z-distribution vs. the T-distribution • Assumptions and Conditions for Inference for Means • Calculating a One-Sample T-Interval for Means • Interpreting a Confidence Interval for Means • Normal Probability Plots Revisited • Conducting a One-Sample T-Test for Means • Drawing a Conclusion Based on a Test for Means • Relationships between Intervals and Tests • Calculating a Minimum Sample Size for a Given Margin of Error • TI: Calculating probabilities for the T-distribution, Calculating a One-	III. Anticipating Patterns. . D. Sampling distributions 7.t-distribution IV. Statistical Inference A. Estimation (point estimators and confidence intervals) 1.Estimating population parameters and margins of error 2.Properties of point estimators, including unbiasedness and variability 6.Confidence interval for a mean B. Test of significance

	Sample T-Interval, Calculating a One-Sample T-Test Lab Activity: • JellyBlubber Lab – Students will gather data by taking an SRS of JellyBlubbers in order to estimate the true mean length of the colony by creating a confidence interval for the mean. Students will then chart the intervals on a class graph to illustrate the meaning of 95% confidence. Assignments: ☐ Read Chapter 23 pgs 443-461 ☐ Complete Chapter 23 Reading Guide ☐ Pg 461-465 #1, **2**, 7, **8**, 9, **10**, 11, **12**, 17, **18**, 19, **20**, 23, **24**, 25, **26**, 27, **28**	5.Test for a mean
2 days	*Chapter 24 – Comparing Means* Topics covered: • Sampling Distribution Model for the Difference Between Two Independent Means • When to Use the Z-distribution vs. the T-distribution • Assumptions and Conditions for Two-Sample Inference for Unpaired Means • Creating a Two-Sample T-Interval for Unpaired Means • Idea of Pooling • Conducting a Two-Sample T-Test for Unpaired Means • Relationship between an Interval and a Test • TI: Calculating a Two-Sample T-Interval for Unpaired Means, Calculating a Two-Sample T-Test for Unpaired Means Assignments: ☐ Read Chapter 24 pgs 466-484 ☐ Complete Chapter 24 Reading Guide ☐ Pg 485-490 #1, **2**, 3, 5, **6**, **7**, 9, **10**, **26**, **27**	III. Anticipating Patterns. . D. Sampling distributions 5.Sampling distribution of a difference between two independent sample means IV. Statistical Inference A. Estimation (point estimators and confidence intervals) 7.Confidence interval for a difference between two means (unpaired and paired) B. Test of significance 6.Test for a difference between two means (unpaired and paired)
3 days	*Chapter 25 – Paired Samples and Blocks* Topics covered: • Paired Data vs. Independent Samples • Assumptions and Conditions for Inference for Paired Means • Creating a Matched-Pairs T-Interval for Means • Conducting a Matched-Pairs T-Test for Means • TI: Creating a Matched-Pairs T-Interval for Means, Conducting a Matched-Pairs T-Test for Means	IV. Statistical Inference A. Estimation (point estimators and confidence intervals) 7.Confidence interval for a difference between two means (unpaired and paired) B. Test of significance

	Lab Activities: • Timing Your Reaction Lab – Students will gather data using a Reaction Timer for their dominant and non-dominant hands and analyze the data using 2-sample inference methods for independent samples (males vs. females) and dependent samples (dominant vs. non-dominant) Assignments: ☐ Read Chapter 25 pgs 491-502 ☐ Complete Chapter 25 Reading Guide ☐ Pg 503-507 #1, **2**, 3, **5**, 7, **8**, 11, **12**, **14**, 15, **20**, 21	6.Test for a difference between two means (unpaired and paired)
2 days	*Unit Assessments* • Unit 6 Review • Unit 6 Test	

Unit 7 –Inference When Variables Are Related (10 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
5 days	*Chapter 26 – Comparing Counts* Topics covered: • Chi-Square Distribution • Chi-Square Test of Goodness of Fit • Assumptions and Conditions for Chi-Square Tests • Expected Counts vs. Observed Counts • Chi-Square Test of Homogeneity • Chi-Square Test of Independence • TI: Calculating a Chi-Square Test for Goodness of Fit, Calculating a Chi-Square Test for a Table Lab Activities: • Chi Square M&Ms Lab – Students will gather data on Plain and Peanut Butter M&Ms in order to illustrate the difference between Chi Square Tests for Goodness of Fit, Independence, and Homogeneity Assignments: ☐ Read Chapter 26 pgs 518-537 ☐ Complete Chapter 26 Reading Guide ☐ Pg 537-542 #1, **2**, 3, 5, **6**, 9, **10**, **12**, 13, **14**, 15, 17, **18**, 19, **20**	III. Anticipating Patterns. . D. Sampling distributions 8.Chi-square distribution IV. Statistical Inference B. Test of significance 7.Chi-square test for goodness of fit, homogeneity of proportions and independence (one- and two-way tables)

3 days	*Chapter 27 – Inferences for Regression* Topics covered: • Idealized Regression Model • Assumptions and Conditions for Inference for Regression • Sampling Distribution Model for the Slope of the Regression Line • Constructing a T-Interval for the Slope of the LSRL • Conducting a T-Test for the Slope of the LSRL • Reading Computer Output • TI: Calculating a T-Interval for the Slope, Calculating a T-Test for the Slope Assignments: ☐ Read Chapter 27 pgs 542-563 ☐ Complete Chapter 27 Reading Guide ☐ Pg 563-571 #1, **2**, 3, **4**, 7, **8**, 9, **10**, 13, **14**, 15, **21**	IV. Statistical Inference A. Estimation (point estimators and confidence intervals) 8.Confidence interval for the slope of a least-squares regression line B. Test of significance 8.Test for the slope of a least-squares regression line
2 days	*Unit Assessments* • Unit 7 Review • Unit 7 Test	

Unit 8 –AP Exam Review (12 days)

Number of Days	Chapter/Topic/Activity/Assignments	AP Statistics Course Topic Outline
11 days	*Review for AP Exam* Topics covered: • Mock AP Exam using 2002 Released Multiple Choice and most recently released Free Response • Practice Multiple Choice Questions from AP Review Books • Practice Multiple Choice Questions from Acorn Book • Item Analysis of Practice Exams • Practice Investigative Tasks from previously released Free Response • Review sessions after school for each unit of material covered • Topic Outline with detailed review	
1 day	AP Exam!!	