AP STATISTICS SYLLABUS

Text:

Bock, Velleman and De Veaux. *Stats: Modeling the World* 2nd ed. Software Bundle (ActivStats). Boston: Pearson, 2007

Supplements:

Daren S. Starnes, Yates, Dan, and David S. Moore. *The Practice of Statistics*, 4th Edition. New York: W.H. Freeman.

Peck, Roxy, Chris Olsen, and Jay Devore. *Introduction to Statistics & Data Analysis*. Belmont, CA: Thomson Brooks/Cole.

Technology:

All students required to have TI-83 or higher. Students will be required to each provide either a TI-83+ or TI-84+ graphing calculator. This calculator is necessary to better the learning experience in the classroom as well as a requirement for the AP Exam. It is important that the students become very knowledgeable of the capabilities of the TI. These calculators will be used on homework, quizzes, and exams for the entire AP Statistics course.

All students use the ActivStats software provided with the text bundle. The activities include many using Data Desk

PEDAGOGY:

As students prepare to enter college, they need to assume the responsibility of their education. A major goal in my classroom is for the students to gain independence in their studies. To prepare students and to move them towards this goal, students are required to read the textbook and take quizzes before we discuss the topic in class. In each chapter there are "step-by-step" problems and also problems entitled "just checking." With both of these types of problems the book gives full solutions. The students are asked to try the problems and work through them until they understand the process, and can answer the problem without the aid of the book.

The quiz may consist of any 2 to 4 of the following: broad general questions from the reading, an identical just checking question with changed values or an identical step by step problem with changed values. The students know these are coming. Just after these quizzes, the solutions are given and discussion begins first, usually with any questions from the students, and then with a brief lecture of the assigned reading and further discussion. In this approach the students learn to use the textbook as a tool. When students do this, they are not only learning from me, but also from David Bock, Paul Velleman and Richard De Veaux.

Some classes start with a pop question. This question may or may not count as a quiz. The students are given 10 minutes to answer when it is a quiz. If it is not a quiz, the students do not know until 5 minutes into the quiz when they are told to group up and work it out. Students like it better when they can work together. These weigh between 20 and 40 points each.

More formal assessments are the chapter quizzes, unit tests, and Investigative Tasks that come with the text, whose values may be from 100 to 250 points each.

Grading Policy

Grades are decided by a point system. Each assignment is given a number of points. The student's grade is simply the percentage of earned points out of the total possible. When students are absent on a quiz day they are not required to make up the quiz, as they have many opportunities to demonstrate proficiency. Students must make up missed unit tests and investigative tasks(explained below). Students usually have 20-30 quantitative assessments per quarter.

Other Assessments

The students are assessed frequently (at least twice a week) to keep them up to date with their work. Here are more ways that students may show proficiency

HOMEWORK: Students are graded on a points system. Homework acts as a bonus only. It is randomly collected to keep the students on the ball.. While all homework is not collected, homework that is collected, at random, adds points to the student's semester points. A student who does all of his/her homework could gain up to 6 points on their quarter average.

TEXT PROBLEMS- Students are assigned between 3-6 problems at a time.

READING- Reading only homework is always followed with a quiz.

ACTIVSTATS- Students are assigned most of the ActivStats activities and asked to write a "What Did You Think (WDYT)" paper. WDYT papers are quick one-paragraph papers describing how the student felt about an ActivStats Video, simulation, tutorial, or assignment.

INVESTIGATIVE TASKS: The text comes with an investigative task for most chapters. Many of these involve experimental design. The students are given three days to complete tasks. They are allowed to ask for advice. Once corrected, these are returned with a rubric with a grade from 0-4. The students are asked to use the rubric to make the task a 4. Students who do this get partial credit on the task.

GROUP PROJECTS- Students are assigned 2 experimental design projects. They must work together to answer a question. They may use surveys or tests. Before beginning they must have their methodology approved, and submit any permission slips. Upon completion the students must give a presentation to the class on their question, method, and discovery. They must provide the class with the collected data and a visual display.

CLASS CLARIFICATIONS: When the entire class struggles with a topic, extra credit is given to students who want to present to the class with a clarification. In order to get the credit the student must present the topic using PowerPoint or Overhead, or even the board (as long as something tangible is given to the teacher) to present to the entire class the topic, and then answer questions from the class and the teacher.

Stats Thursdays are extra help sessions with 3-10 students. The students are asked to bring questions about current or past topics. Extra help sessions usually last from 60 to 100 minutes.

Classes meet M, T, and W for 45 minutes and on F for 90 minutes. Students are expected to spend between 3 and 5 hours per week studying outside of class.

TOPICS & COURSE OUTLINE

Intro to Statistics CH 1

- How to use the text and what to expect

Data CH 2

Topics:

- The who, what, when, where, why and who of data
- Categorical vs. Quantitative Variables
- TI- How to enter lists

SWBAT

- Identify the W's
- Differentiate between categorical and Quantitative
- Be able to identify cases and variables in any given data set
- Be able to identify units

Displaying and Describing Categorical Data CH 3

Topics:

- Frequency Tables- Contingency Tables- Bar Charts (segmented)
- Conditional and Marginal Distributions
- Simpson's Paradox

SWBAT

- Choose appropriate displays for the data (pie, bar)

- Compare Marginal vs. Conditional percentages
- Summarize the distribution of a Categorical Variable with a frequency table
- Display the distribution with a bar, segmented bar, or a pie chart
- Make and examine a contingency table
- Make and examine displays of the conditional distributions of one variable for two or more groups
- Describe distributions with relative frequencies
- Describe extraordinary variables revealed by the display of a variable
- Describe and Discuss patterns found in a contingency table and associated displays of conditional distributions

Displaying and Describing Quantitative Data CH 4

Topics

- Histogram (relative frequency), Stem-Leaf, Dot Plots
- SHAPE, CENTER, SPREAD
- Comparing Distributions
- Line Plots
- Re-Expressing Skewed Data

SWBAT

- Identify appropriate display for a quantitative variable
- Guess the shape of the distribution by examining the context
- Display the distribution of a quantitative variable with a stem and leaf, boxplot, dot plot, and histogram
- Compare data visually with the above displays (paired or more box, back to back stem-leaf)
- Make a time plot
- Describe the distribution using proper vocabulary for SHAPE, CENTER and SPREAD
- Describe extraordinary features revealed by the displays
- Compare two or more distributions SHAPES, CENTERS and SPREADS
- Describe patterns over time
- Discuss outliers in context

Describing Distributions Numerically CH 5

Topics

- The Median, Range and IQR
- The 5-number Summary
- Making Box Plots (side by side)
- Outliers
- TI-How to make histograms & Box Plots
- Mean vs. Median
- TI-5 number summary, mean and SD
- Standard Deviation (spread)
- Variance

SWBAT

- Select appropriate measures of center and spread based on the distribution
- Compute the Median, Range and IQR
- Compute the Mean and Standard Deviation
- Create the five number summary
- Construct box plot from 5 number summary
- Construct box plots on the TI
- Explain why the median and IQR resists outliers
- Explain why the mean follows the tail and outliers
- Explain shape center and spread in context with proper units, noting any unusual features
- Use the 1.5 IQR rule to identify a possible outlier
- Interpret outliers in box plots from computer outputs
- Interpret information from computer outputs

The Standard Deviation as a Ruler and the Normal Model CH 6

Topics

- The Standard Deviation as a Ruler
- Standardizing with Z scores (watch units)
- SHIFTS and SCALING: The effects of adding and multiplying
- Z SCORES!
- Using the Z table
- 68-95-99.7 Rule and how to use it

- Make a picture-Make a picture – Make a picture
- Finding Normal Percentiles By Hand
- TI- Using TI functions for Z scores
- Checking for Normality
- TI- Making a Normal Probability Plot

SWBAT

- Explain the effects of adding or multiplying by a constant on the center and spread of a distribution
- Recognize when standardizing can be used to compare values
- Use the standard deviation as a ruler
- Recognize when a normal model is appropriate and when it is not
- Calculate the z-score of an observation by hand
- Explain what a Z score is
- Compare different Z scores and explain this in context
- Use the 68,95,99.7 rule to estimate percentages
- Draw and appropriately label a normal model
- Use the Z table in two ways
- Use TI functions for Z table operations
- Check whether a variable satisfies the Nearly Normal Condition
- Make a histogram and a normal probability plot on the TI
- Describe how extraordinary a certain value may be by using the normal model

Scatter Plots, Association and Correlation CH 7

Topics

- Looking at Scatter Plots
- Positive and Negative Associations
- Outliers
- TI- Scatter Plots and Trace
- Correlation
- Correlation Coefficient
- Checking Conditions
- TI- Finding Correlation
- Correlation Properties and Strength
- Correlation Tables
- Straightening Scatter Plots using the TI
- Don't Confuse Correlation with Causation
- Lurking Variables

SWBAT

- Recognize when it is appropriate to make a scatter plot
- Correctly place the variables on the prober axis by knowing the roles of the response and predictor variables
- Check the conditions for correlation
- Identify impossible correlations (outside of the -1 to +1) or correlations with units
- Explain how the magnitude of the correlation reflects the strength of a linear association as viewed in a scatter plot
- See that a correlation coefficient is not changed by changing the center or scale of either variable
- Call out bogus claims such as causation and misinterpretations of correlation
- Compute the correlation of two variables by hand and with the TI
- Interpret correlation data from the output of a statistics program
- Describe DIRECTION, FORM, and STRENGTH of a scatter plot
- Identify and describe extraordinary points in context
- Use the correlation as part of the description of the data
- Create and correctly label a scatter plot by hand and with the TI

Linear Regression CH 8

Topics

- Linear Model
- Residuals
- Best Fit Means Least Squares
- Correlation and the Line

- Regression to the Mean
- Slope Intercept Formula
- Assumptions and Conditions
- Calculating the Regression Equation
- R^2 the Variation Accounted For
- How Big Should R^2 Be?
- A Tale of 2 Regressions
- Is the Regression Reasonable?
- TI- Making Residual Plots
- Extrapolation

SWBAT

- Identify response (y) and explanatory (x) variables in context
- Summarize the relationship between two variables with a linear equation
- Explain the slope of the equation in context
- Recognize when a regression should be used to summarize a linear relationship between two quantitative variables
- Explain residuals and their plots, and differentiate this from the scatterplot
- Examine data for violations of the Straight Enough Condition and check with residuals plot
- Explain the possible effects of an extreme value on the slope
- Explain the "LEAST" in least squares
- Create a regression equation from the summary statistics for each variable and the correlation between them
- Find a regression equation using the TI
- Use and interpret computer output tables on regression
- Use the regression equation to make predictions
- Calculate residuals for any data point and display them
- Discuss, in context, the residual of a data point
- Write a sentence describing the relationship by explaining the slope in context
- Write a sentence about the meaning of the Y Intercept
- Explain what the correlation coefficient says about the relationship, that the variation in y is accounted for by its linear relationship with x.
- Describe a prediction
- Resist the urge to extrapolate

Regression Wisdom CH 9

Topics

- Sifting Residuals for Groups
- Sub Sets
- Checking for Linearity
- Extrapolation Again
- Outliers, Leverage and Influence
- Lurking Variables and Causation
- Working with Summary Values
- Unusual Points

SWBAT

- Identify when a linear model is appropriate
- Look for subgroups in data and analyze separately
- Know the dangers of extrapolating beyond the range of X
- Identify points with high leverage and high influence
- Write how a certain point may change the slope, intercept and correlation
- Be conscious of lurking variables whenever considering an association.
- Find bogus claims of causation
- Create regression lines with and without outliers and compare
- Include diagnostic information in a report of regression such as residual plots, scatter plots, descriptions of unusual points, and the distribution of the x variable
- Report high leverage points and outliers
- Explain appropriate cautions such as unusual points, correlation, extrapolation or lurking variables.

Re-Expressing Data: Get it Straight CH 10

Topics

- Straightening Relationships, Everybody Does It
- Goals of Re-Expression
- The Ladder of Power
- TI- Re-Expressing Data
- Attack of the Logarithms
- Using Curves
- TI- Logarithmic, Exponential and Power Models

SWBAT

- Re-Express Data using the ladder of exponents and logs on the TI
- Check Residuals for the appropriate re-expression
- Recognize when no re-expressions are useful
- Reverse a re-expression to get the information back to its original units
- Explain the re-expressed unit
- Summarize a re-expression by describing the process
- Use TI functions to look for linear, power, logarithmic, quadratic and cubic regression models

Understanding Randomness CH 11

- Practical Randomness
- Simulations
- Planning a Simulation
- Random Number Table
- TI- Simulations

SWBAT:

- Recognize random outcomes in a real world situation
- Recognize when a simulation might be useful in modeling random behavior in the real world
- Perform a simulation using a random number table, TI, dice, cards, spinners, etc.
- Describe a simulation such that others can repeat it
- Discuss and draw conclusions from a simulation

Sample Surveys CH 12

Topics

- Examining Part of a Whole
- Bias
- Randomizing
- Sample Size
- Sensibility of a Census
- Populations and Parameters
- Simple Random Samples
- Sampling Variability
- Stratified Sampling
- Cluster and Multistage Sampling
- Systematic Sampling
- Voluntary Convenience and Under coverage

SWBAT

- Use the basic concepts and terminology of sampling
- Recognize population parameters in descriptions of populations and samples
- Understand the value of randomization as a defense against bias
- Explain the value of sampling for making inferences about a population parameter.
- Explain why it is the sample size, and not the size of the population that determines the precision of an estimate
- Draw a simple random sample from a master list of a population by using a random number table or a computer generated list (TI)
- Make a statistical analysis of the sample and report it properly.
- Report possible sources of bias.
- Recognize voluntary response and nonresponse and how they might affect the outcome of surveys.

Experiments and Observational Studies Ch 13

Topics

- Observational Studies
- Retrospective and Prospective
- The Four Principals of Experimental Design
- Control, Randomize, Replicate, Block

- Designing an Experiment
- Statistically Significant
- Experiments and Samples
- Controls, Blinding and Placebos
- Adding More Factors
- Confounding VS Lurking

SWBAT

- Recognize when an observational study would be appropriate
- Identify observational studies as retrospective or prospective
- Explain strengths/weaknesses of retrospective and prospective studies
- List the four basic principles of sound experimental design: CONTROL, RANDOMIZE, REPLICATE, and BLOCK
- Explain each of the four principles and why they are each important.
- Recognize the factors, treatments and the response variable in a description of a designed experiment
- Use placebos and controls properly
- Determine whether single or double blinding was used in the description of an experiment.
- Explain the importance of blinding and placebos
- Designe a completely randomized experiment to test the effect of a single factor
- Design an experiment in which blocking is used to reduce variation
- Use graphical displays to compare responses for different treatment groups.
- Check graphical displays and conditions before making any analysis
- Properly report the results of the experiment in context using appropriate statistical language.
- Identify the subject, how the data was gathered, possible flaws or bias and any other factors affecting the outcome.
- Compare the responses in different treatment groups to assess if it could have been due to sampling variability.
- Report the design using appropriate displays describing the randomization , treatments and blocking.
- Report how the response variable was measured using proper units
- Check to ensure that the design could be used by another experimenter
- Report on the statistical significance of the result

Randomness and Probability CH 14

Topics

- Dealing with Random Phenomena
- Probability
- Trials, outcomes and events
- The Law of Large Numbers
- The Law of Averages (bogus)
- Equally likely outcomes
- Personal and Formal Probability
- Venn Diagrams – unions, intersections and disjoint
- Disjoint vs. Independent

SWBAT

- Explain the Law of Large Numbers (IN THE LONG RUN...)
- Recognize random outcomes in real world situations
- Explain how the Law of Large Numbers effects the relative frequency of an outcome over time
- Use the basic definitions of probability to solve problems
- Identify disjoint and independent events and differentiate between them knowing that DISJOINT EVENTS CAN NEVER BE INDEPENDENT.
- Use probability facts to determine proper use of them.
- Write the probability with a number between 0 and 1
- Apply the addition and multiplication rules properly

- Use the complement rule to make calculating simpler (AT LEAST...)
- Use probability to describe random phenomenon.
- Use the terms of probability properly

Probability Rules CH 15

Topics

- Events
- Make a picture, Make a Picture, Make a Picture
- The General Addition Rule
- Conditional Probability
- Venn Again
- The General Multiplication Rule
- Independence
- Independence and Disjoint revisited
- Tables and Conditional Probability
- Drawing without Replacement
- Tree Diagrams
- Reversing the Conditioning
- Bayes's Rule

SWBAT

- Understand that probability is the proportion of successes over many repetitions
- Explain simply, that probability is (successes/total outcomes)
- Use what is GIVEN for finding conditional probabilities
- Calculate conditional probabilities algebraically and by using Venn Diagrams
- Identify independent events
- Properly use the General Addition, General Multiplication and Bayes's rules
- Find probabilities of compound events
- Make and use a table to find probabilities
- Make a tree diagram to understand and explain conditional probabilities and reverse conditioning
- Clearly explain how a condition affects the probability
- Avoid assuming independence when it is no clear evidence.

Random Variables CH 16

Topics

- Expected Value : CENTER
- Probability Models
- SPREAD
- Expected Values and Standard Deviations for Discrete Random Variables
- Means and Variances
- TI- Expected values and Standard Deviations
- The Pythagorean Theorem of Statistics (adding variances)

SWBAT

- Recognize random variables.
- Identify independence before adding variances
- Find the probability model for a discrete random variable
- Find the expected value and the variance of a random variable by hand and with TI
- Use the proper notation for these population parameters
- Determine the new mean and SD after adding a constant, multiplying by a constant, or adding or subtracting two independent random variables.
- Interpret the meaning of the expected value and the standard deviation in the proper context.

Probability Models CH 17

- Bernoulli Trials
- The Geometric Model
- Independence
- The 10% Condition
- TI-Geometric Probability Density Function
- The Binomial Model
- TI-Binomial Probability Density Function
- The Normal Model to the Rescue

- Success/Failure Condition
- Continuous Random Variables

SWBAT

- Tell if a situation involves Bernoulli trials
- Choose whether to use a Geometric or a Binomial model for a random variable involving Bernoulli trials.
- Check the appropriate conditions
- Use TI for calculating probabilities
- Find the mean and SD of a Binomial model
- Calculate Binomial probabilities, or maybe estimating with a normal model
- Interpret means, SDs and probabilities in context

Sampling Distribution Models CH 18

Topics

- Modeling the Distribution of Sample Proportions
- The Sampling Distribution Model of a Proportion
- Sampling Error and Variability
- How good is the Normal Model?
- Assumptions and Conditions
- Quantitative Data and Sample Means
- Simulating the Sampling Distribution of a Mean
- The Fundamental Theorem of Statistics- THE CENTRAL LIMIT THEOREM
- The Real World and the Model World
- Choosing a Normal Model
- Assumptions and Conditions
- Diminishing Returns
- Standard Error
- Sampling Distribution Models

SWBAT

- Relate variability with sample size
- Interpret the Central Limit Theorem
- Demonstrate a sampling distribution by simulation
- Use a sampling distribution model to make statements about the distribution of the proportions or means of repeated samples
- Check assumptions and conditions
- Interpret a sampling distribution model as describing infinite samples from a population.

Confidence Intervals for Proportions CH 19

Topics

- A Confidence Interval
- Capturing p
- "What does 95% Confidence" Really Mean?
- TI-One Proportion Z Intervals
- Margin of Error: Certainty vs. Precision
- Critical Values
- Assumptions and Conditions
- Plausible Independence-Randomization-10%-Success/Failure
- Still look for bias

SWBAT

- Explain confidence intervals as a balance between precision and certainty of a model parameter
- Explain how sample size and Confidence effects margin of error, and vice versa
- Examine data for violations of conditions
- Construct a one proportion z-int by hand and with TI
- Interpret a one-proportion z-interval in a sentence or two, not suggesting that the population parameter varies, but the bounds of the interval are what vary.

Testing Hypotheses About Proportions CH 20

Topics

- Hypotheses- Null and Alternative
- P-Value
- Testing Hypotheses
- Trials and Innocent Defendants
- The Reasoning of Hypothesis Testing
- Hypothesis-Model-Mechanics-Conclusion
- Two-Sided and One-Sided Alternatives
- One Proportion Z-Test

- TI-One proportion z-test
- P-Values and Decision Making
- Tests and Intervals
- A Better Confidence Interval for Proportions
- DON'T ACCEPT THE NULL

SWBAT

- Symbolically and contextually state the null and alternative hypotheses
- Check proper conditions for a one-proportion z-test and examine data for violations
- Identify and use the proper alternative hypothesis by understanding one and two-sided alternatives and be able to explain their choice.
- Perform a one-proportion z-test by hand and with the TI
- Write a sentence interpreting the results of the test
- Interpret the p-value in non-technical language, making clear that this probability comes from the assumption that the null hypothesis is true.

More About Tests CH 21

Topics

- Zero In on the Null
- Another One-Proportion Z-Test
- How to Think About P-Values
- Alpha Levels (significance levels) and Statistical Significance
- What Not to Say About Significance
- Critical Values Again
- Confidence Intervals for Hypothesis Tests
- Making Errors- TYPE I & TYPE II
- Power, Beta, and Effect Size
- Reducing Both Types of Error (bigger samples)

SWBAT

- Recognize when others misinterpret statistical significance
- Explain the relationships between hypothesis tests and confidence intervals (one and 2 tailed)
- Identify and use the alternative hypothesis when testing hypotheses.
- Defend the choice of a one-sided alternative
- Use alpha levels to find critical values
- Explain what the Power of a test is and how it relates to beta, alpha, and error types.
- Explain that power increases with larger sample size.
- Complete a hypothesis test for a population proportion
- Interpret the meaning of a p-value in non-technical language
- Understand that the P-VALUE DOES NOT GIVE THE PROBABILITY THAT THE NULL HYPOTHESIS IS CORRECT
- Explain why we never accept a null hypothesis, only fail to reject it.

Comparing Two Proportions CH 22

Topics

- Another Ruler
- The Standard Deviation of the Difference Between Two Proportions
- Assumptions and Conditions
- The Sampling Distribution
- A Two-Proportion z-Interval
- TI- Two proportion z-interval
- Everyone into the Pool
- Two Proportion z-Test
- A MEAN OF ZERO!
- TI-Two proportion z-test

SWBAT

- State the null and alternative hypotheses for testing the difference between two population proportions symbolically and in context and choose the appropriate alternative.
- Examine the data from violations of the conditions that would make the inference invalid.

- Explain where the formula for the standard error of the difference comes from (Pythagorean theorem of statistics)
- Find a confident interval for the difference between two proportions
- Perform a significance test of the natural null hypothesis that the proportions are equal
- Explain why one would pool when hypothesis testing, but not with a confidence interval for a difference of proportions.
- Write a sentence explaining the confidence interval.
- Write a sentence or two explaining the results of the hypothesis test
- Interpret the meaning of a p-value in non-technical language, understanding it is a probability under the assumption that there is no difference in proportions.
- Never accept the null

Inferences About Means CH 23

Topics

- The Central Limit Theorem
- Gosset's t (student's t)
- Degrees of Freedom
- T vs. Z
- Finding t-Values by Hand
- TI- normal cumulative density function
- TI- t-cumulative density function
- TI-inverse norm and inverse t
- Finding Critical Values
- Assumptions and Conditions
- Random-10%-Nearly Normal Again
- One Sample t-Interval for the Mean
- TI- One Sample t-Interval for the Mean
- More Cautions About Interpreting Confidence Intervals
- Make a Picture-Make a Picture- Make a Picture
- Normal Probability Plots
- One Sample t-Test for the Mean
- TI- One Sample t-Test for the Mean
- Significance and Importance
- Intervals and Tests
- Finding a Sample Size
- Degrees of Freedom

SWBAT

- Explain the differences and similarities between t and z
- Know when to use the t versus the z
- Check the conditions and assumptions
- Examine data for violations of conditions
- Explain the relationships between hypothesis tests and confidence intervals being sure to correctly use the alpha
- Compute and interpret a t-test using a statistics package, or working from summary statistics
- Compute and interpret a t-based confidence interval using a statistics package or working from the output summary statistics
- Explain the meaning of a confidence interval for a mean in context.
- Interpret the result of a teest of a hypotheses about a population mean
- Never accept a null hypothesis
- Say that the p-value does not give the probability that the null is true

Comparing Means CH 24

Topics

- Plot the Data
- Comparing Two Means
- Two Sample t-Interval
- Assumptions and Conditions
- Independence-Normal-Independent Groups
- TI-Two sample t-interval
- Testing the Difference Between Two Means
- Two-Sample t-test
- TI-Two Sample t-Test

- Back Into the Pool (not often)
- Is There Ever a Time When Assuming Equal Variances Makes Sense?

SWBAT

- Recognize situations in which we want to do inference on the difference between the means of two independent groups.
- Examine data for violations of the conditions.
- Recognize the slim chance that pooling might be appropriate
- Perform a two sample t test using the TI
- Interpret a test of the null hypothesis in context.
- Interpret a two sample t-interval in context.
- Interpret the p value in non-technical terms

Paired Samples and Blocks CH 25

Topics

- Paired Data
- Assumptions and Conditions
- Paired-Independence-Nearly normal
- A Paired t-Test
- TI- Paired t-test
- Confidence Intervals for Matched Pairs
- TI-Confidence intervals for matched pairs
- Blocking

SWBAT

- Examine data for violations of assumptions
- Recognize whether or not pairing is appropriate
- Find a paired confidence interval
- Perform a paired t-test
- Interpret and report the results of a paired t-test
- Interpret and report the confidence interval in context
- Explain the p-value in non-technical terms
- Never accept the null

Comparing Counts CH 26

Topics

- Goodness of Fit
- Assumptions and Conditions
- Counted Data-Independence-Random-Sample Size-Expected Cell Frequency
- Calculations
- Chi-Square Models
- One or Two Sided
- A Chi-Squared Test for Goodness of Fit
- The Chi Squared Calculation
- TI-Chi-Squared
- Degrees of Freedom
- Comparing Observed Distributions
- Chi-Squared Test for Homogeneity
- Assumptions and Conditions
- Examining the Residuals
- Independence and Contingency Tables
- Chi-Squared Test for Independence
- Assumptions and Conditions
- Examining the Residuals
- TI-Chi for homogeneity or independence
- NO CAUSATION

SWBAT

- Examine data for violations of assumptions
- Recognize when a goodness of fit, a test of homogeneity, or a test of independence would be appropriate for a table of counts
- Explain how the degrees of freedom relates to the table and not the sample size
- Explain that increasing sample size increases the ability of the chi-squared test to reject the null
- Examine the standardized residuals to explain the nature of the deviations from the null hypotheses
- Interpret, in a few sentences, the chi-square as a test of goodness of fit, homogeneity, and independence.
- Use the chi-square table

Inferences for Regression CH 27

Topics

- The Population and the Sample
- Assumptions and Conditions
- Linearity-Independence-Equal Variance-Normal
- Which Comes First: the Conditions or the Residuals?
- Regression Inference
- Intuition About Regression Inference
- Spread around the line
- Spread of the x's
- Sample Size
- Standard Error for the Slope
- A Sampling Distribution for Regression Slopes
- What About the Intercept?
- A Regression Slope t-Test
- Confidence Interval for the Slope
- TI- Linear Regression-Confidence intervals
- Standard Errors for Predicted Values
- Confidence Intervals For Predicted Values

SWBAT

- Understand that the "true" regression line does not fit the population data perfectly, but is rather an idealized summary of that data
- Examine your data and scatter plots for violations of assumptions and conditions
- Judge Normality from a histogram and Normal probability plot
- Carefully check for failures of the independence assumption when working with data recorded over time by checking scatter plots of z against time and of the residuals against time
- Test the standard hypotheses that the true regression slope is zero.
- State the null and alternative hypotheses
- Find relevant numbers in standard computer regression output
- Find a confidence interval for the slope of a regression based on the values reported in a standard regression output table
- Summarize a regression in words, stating the meaning of the true regression slope, the standard error of the slope, and the standard deviation of the errors
- Interpret the P-value of the t-statistic for the slope to test the standard null hypothesis
- Interpret a confidence interval for the slope of regressions