

AP[®] Statistics Course Syllabus

Description of Course:

This course will cover the four main areas of study for AP statistics: Exploring Data, Sampling & Experimentation, Anticipating Patterns, and Statistical Inference. The primary text will provide a basic layout of the course. Students are to read and take personal notes on the text prior to when the topics are presented in class. This allows for more time in class spent on explorations, discussions, activities and labs with minimal time spent on direct lecturing.

Technology

Students will be required to use a graphing calculator in class, on homework and on all assessments. I will be displaying graphing calculator output using the TI-Nspire Teacher software on my tablet PC I will also be displaying computer output using Fathom. I expect students to be able to read and interpret these results. They must also be able to follow along on their calculators. Students will be able to explore statistical software with the use of Stat Crunch and the TI-Nspire App on a class set of I pads. Since Stat Crunch is a web based program, students will also have access to their Stat Crunch accounts on their home computers as well. Students will also have the opportunity to use Fathom. This will allow students to be able to feel comfortable with statistical software and be able to interpret computer output. At the end of each chapter, students are to add the statistical capabilities that they have learned by using their calculator or software, to their student binders.

Objective

Through exploration and discovery, students will gain the confidence and proficiency to communicate statistical concepts. Through labs and activities students will discover and improve their statistical skills with the proper use of technology. Through student driven projects, students will develop their statistical knowledge. Through readings and exposure to real life examples and studies, students will employ statistical analysis. This will be reinforced through their homework, and reading assignments, along with consistent practice of the released free response and multiple choice questions from the AP[®] Statistics Exams.

Primary Text

- Yates, Dan, David S. Moore and Daren Starnes. *The practice of Statistics 5th edition*

Supplementary Text

- Roxy Peck, Chris Olsen, Jay Devore Introduction to Statistics & Data Analysis 3rd edition
- Brase, Brase *Understanding of Basic Statistics, Brief 5th edition*

Statistical software:

- TI-84+, TI-Nspire student personal calculators
- Stat Crunch
- Ti-Nspire App on I pads
- Ti-Nspire Teacher Software
- Fathom Software

Technology & Other resources

- Teacher tablet PC
- Against All Odds (videos)
- Numb3rs Show Clips
- Various applets on the internet

Review Guides

- Jennifer Phan, Jeremy Walker, Divya Balachandran *5 steps to a 5*
- Sternstien, *Barron's AP® Statistics*

Course Projects

Example 1: Midterm Project – Response Bias

Purpose: You will design and conduct an experiment to investigate the effects of response bias in surveys. You may choose the topic for your surveys, but you must design your experiment so that it can answer at least one of the following questions:

- Can the wording of a question create response bias?
- Do the characteristics of the interviewer create response bias?
- Does anonymity change the responses to sensitive questions?
- Does manipulating the answer choices change the response?

Group Size You may work alone or with a partner for this project.

Proposal: In order to meet the requirements for this project, a proposal plan sheet must be submitted and approved. If the proposal isn't approved the first time, you will need to resubmit it for a reduced grade. **You must attach the original proposal to any resubmissions.**

In your proposal, you should:

- Describe your topic and state which type of bias you are investigating
- Describe how you will obtain your subjects in detail including which type of random sampling you will use (you may not earn any extra credit if you use systematic sampling). The minimum sample size is 50. This must be practical!! Note: your population does not need to be from Korea Kent Foreign School.
- Describe what your questions will be and how they will be asked, including how you will incorporate direct control, blocking, and randomization. Convince me that this is a good experiment!

PowerPoint Presentation: The presentation should completely summarize your project. Be sure to include some pictures of your data collection in progress. Things it should include:

- Introduction: What form of response bias were you investigating? Why did you choose the topic you chose for the survey?
- Methodology: Describe how you conducted your experiment and why you think your design was effective. Note: This section should be very similar to your proposal and include the type of random sampling used.
- Results: Present the data in both tables and graphs in such a way that conclusions can be easily made. Make sure to label the graphs/tables clearly and consistently and make sure they are on the same scale. Use Fathom, Stat Crunch or TI-Nspire Student Software for Data.

- **Conclusions:** What conclusions can be drawn from your experiment? Be specific. Did you encounter any problems during your project? Would you do anything different if you were to repeat your experiment? What did you learn from this project?

PowerPoint Report: This should be a print out of the actual presentation for the teacher. You should include write-ups for each slide.

Presentation: Both members need to participate equally. Your PowerPoint should be used as a visual aid and reference. No less than 5 minutes so don't just read from the slides of the PowerPoint bring some interesting info to share. Be prepared for questions.

Optional Poster for Extra Credit: Create a poster that encompasses all the components in your PowerPoint. This will be used as a visual aid during your presentation, and also to be hung up! Make sure they are not too heavy and can easily be read by our student population.

Rubric for Midterm Project

Midterm Project	4 = Complete	3 = Substantial	2 = Developing	1 = Minimal
Introduction	<ul style="list-style-type: none"> • Describes the context of the research • Has a clearly stated question of interest • Provides a hypothesis about the answer to the question of interest • Question of interest is of appropriate difficulty 	<ul style="list-style-type: none"> • Introduces the context of the research and has a specific question of interest • Suggests hypothesis OR has appropriate difficulty 	<ul style="list-style-type: none"> • Introduces the context of the research and has a specific question of interest OR has question of interest and hypothesis 	<ul style="list-style-type: none"> • Briefly describes the context of the research
Data Collection	<ul style="list-style-type: none"> • Method of data collection is clearly described • Includes appropriate randomization • Describes efforts to reduce bias, variability, confounding • Quantity of data collected is appropriate 	<ul style="list-style-type: none"> • Method of data collection is clearly described • Some effort is made to incorporate principles of good data collection • Quantity of data is appropriate 	<ul style="list-style-type: none"> • Method of data collection is described • Some effort is made to incorporate principles of good data collection 	<ul style="list-style-type: none"> • Some evidence of data collection
Graphs and Summary Statistics	<ul style="list-style-type: none"> • Appropriate graphs are included (To help answer the question of interest) • Graphs are neat, clearly labeled, and easy to compare • Appropriate summary statistics are included • Summary statistics are discussed and correctly interpreted 	<ul style="list-style-type: none"> • Appropriate graphs are included (To help answer the question of interest) • Graphs are neat, clearly labeled, and easy to compare • Appropriate summary statistics are included 	<ul style="list-style-type: none"> • Graphs and summary statistics are included 	<ul style="list-style-type: none"> • Graphs or summary statistics are included
Conclusions	<ul style="list-style-type: none"> • Uses the results of the study to correctly answer question of interest • Discusses what inferences are appropriate based on study design • Shows good evidence of critical reflection (discusses possible errors, limitations, alternate explanations, etc.) 	<ul style="list-style-type: none"> • Makes a correct conclusion • Discusses what inferences are appropriate • Shows some evidence of critical reflection 	<ul style="list-style-type: none"> • Makes a partially correct conclusion (such as accepting null). • Shows some evidence of critical reflection 	<ul style="list-style-type: none"> • Makes a conclusion
Overall Presentation/ Communication	<ul style="list-style-type: none"> • Clear, holistic understanding of the project • PowerPoint is well organized, neat and easy to read • Statistical vocabulary is used correctly • Poster is visually appealing 	<ul style="list-style-type: none"> • Clear, holistic understanding of the project • Statistical vocabulary is used correctly • PowerPoint is unorganized or isn't visually appealing, 	<ul style="list-style-type: none"> • PowerPoint is not well done or communication is poor 	<ul style="list-style-type: none"> • Communication and organization are very poor

Example 2: Final Project - Adapted from Jared Derson @Mrmathman.com

Purpose: The purpose of this project is for you to actually do statistics. You are to formulate a statistical question, design a study to answer the question, conduct the study, collect the data, analyze the data, and use statistical inference to answer the question. You are going to do it all!!

Topics: You may do your study on any topic, but you must be able to include all 6 steps listed above. Make it interesting and note that degree of difficulty is part of the grade.

Group Size: You may work alone or with a partner for this project.

Proposal: To get your project approved, you must be able to demonstrate how your study will meet the requirements of the project. In other words, you need to clearly and completely communicate your statistical question, your explanatory and response variables, the test/interval you will use to analyze the results, and how you will collect the data so the conditions for inference will be satisfied. You must also make sure that your study will be safe and ethical if you are using human subjects. The proposal should be typed. If your proposal isn't approved, you must resubmit the proposal for partial credit until it is approved.

PowerPoint:

The key to a good statistical presentation is communication and organization. Make sure all components of the presentation are focused on answering the question of interest and that statistical vocabulary is used correctly. The presentation should include:

- Title (in the form of a question).
- Introduction. In the introduction you should discuss what question you are trying to answer, why you chose this topic, what your hypotheses are, and how you will analyze your data.
- Data Collection. In this section you will describe how you obtained your data. Be specific.
- Graphs, Summary Statistics and the Raw Data (if numerical). Make sure the graphs are well labeled, easy to compare, and *help answer the question of interest*. You should include a brief discussion of the graphs and interpretations of the summary statistics. Use Fathom, TI-Nspire Student Software, or Stat crunch.
- Analysis. In this section, identify the inference procedure you used along with the test statistic and P -value and/or confidence interval. Also, discuss how you know that your inference procedure is valid.
- Conclusion. In this section, you will state your conclusion. You should also discuss any possible errors or limitations to your conclusion, what you could do to improve the study next time, and any other critical reflections.
- Live action pictures of your data collection in progress.

PowerPoint Report: This should be a print out of the actual presentation for the teacher. You should include write-ups for each slide.

Oral Presentation: You will be required to give a 10-15 minute oral presentation to the class using your PowerPoint Presentation.

Optional Poster Extra Credit: Visual Poster aid to hang on the classroom wall – This should contain majority of the items of the PowerPoint presentation. Do not make them heavy! I want to hang them up.

Rubric for Final Project

Final Project	4 = Complete	3 = Substantial	2 = Developing	1 = Minimal
Introduction	<ul style="list-style-type: none"> Describes the context of the research Has a clearly stated question of interest Clearly defines the parameter of interest and states correct hypotheses (for tests) Question of interest is of appropriate difficulty 	<ul style="list-style-type: none"> Introduces the context of the research and has a specific question of interest Has correct parameter/hypotheses OR has appropriate difficulty 	<ul style="list-style-type: none"> Introduces the context of the research and has a specific question of interest OR has question of interest and parameter/hypotheses 	<ul style="list-style-type: none"> Briefly describes the context of the research
Data Collection	<ul style="list-style-type: none"> Method of data collection is clearly described Includes appropriate randomization Describes efforts to reduce bias, variability, confounding Quantity of data collected is appropriate 	<ul style="list-style-type: none"> Method of data collection is clearly described Some effort is made to incorporate principles of good data collection Quantity of data is appropriate 	<ul style="list-style-type: none"> Method of data collection is described Some effort is made to incorporate principles of good data collection 	<ul style="list-style-type: none"> Some evidence of data collection
Graphs and Summary Statistics	<ul style="list-style-type: none"> Appropriate graphs are included Graphs are neat, clearly labeled, and easy to compare Appropriate summary statistics are included Summary statistics are discussed and correctly interpreted 	<ul style="list-style-type: none"> Appropriate graphs are included Graphs are neat, clearly labeled, and easy to compare Appropriate summary statistics are included 	<ul style="list-style-type: none"> Graphs and summary statistics are included 	<ul style="list-style-type: none"> Graphs or summary statistics are included
Analysis	<ul style="list-style-type: none"> Correct inference procedure is chosen Use of inference procedure is justified Test statistic/P-value or confidence interval is calculated correctly P-value or confidence interval is interpreted correctly 	<ul style="list-style-type: none"> Correct inference procedure is chosen Lacks justification, lacks interpretation, or makes a calculation error 	<ul style="list-style-type: none"> Correct inference procedure is chosen Test statistic/P-value or confidence interval is calculated correctly 	<ul style="list-style-type: none"> Inference procedure is attempted
Conclusions	<ul style="list-style-type: none"> Uses P-value/confidence interval to correctly answer question of interest Discusses what inferences are appropriate based on study design Shows good evidence of critical reflection (discusses possible errors, limitations, alternate explanations, etc.) 	<ul style="list-style-type: none"> Makes a correct conclusion Discusses what inferences are appropriate Shows some evidence of critical reflection 	<ul style="list-style-type: none"> Makes a partially correct conclusion (such as accepting null). Shows some evidence of critical reflection 	<ul style="list-style-type: none"> Makes a conclusion
Overall Presentation/Communication	<ul style="list-style-type: none"> Clear, holistic understanding of the project PowerPoint is well organized, neat and easy to read Statistical vocabulary is used correctly Poster is visually appealing 	<ul style="list-style-type: none"> Clear, holistic understanding of the project Statistical vocabulary is used correctly PowerPoint is unorganized or isn't visually appealing, 	<ul style="list-style-type: none"> PowerPoint is not well done or communication is poor 	<ul style="list-style-type: none"> Communication and organization are very poor

Course Outline:

The following outline describes this course's content by chapter of study in the primary textbook. It also includes learning objectives as well as activities, labs, assignments and projects. Each row corresponds to one 50 minute class period. The schedule is subject to change based on student needs, class interruptions, teacher absences, etc.

Key: BN- book notes BW- book work

Chapter 1 (1st Quarter: 10 days)

Day	Topics	AP Topic	Learning Objectives/Activities	Assignment
1	Course overview, Policies & Expectations		<ul style="list-style-type: none"> Have a clear understanding of what is expected of them. Be prepared for the rigor involved in this course. 	BN 1-8 Download Fathom, Sign up for wiki-space, Sign Syllabus
2	Chapter 1 Introduction		<ul style="list-style-type: none"> Activity – Distracted Driver Identify the individuals and variables in a set of data. Classify variables as categorical or quantitative. 	BW 1, 3, 5, 7, 8 BN 9-11
3	1.1 Bar Graphs and Pie Charts, Graphs: Good and Bad	I.E.1, I.E.4	<ul style="list-style-type: none"> Display categorical data with a bar graph. Decide if it would be appropriate to make a pie chart. Identify what makes some graphs of categorical data deceptive. 	BW 11, 13, 15, 17 BN 12-13
4	1.1 Two-Way Tables	I.E.2, I.E.3	<ul style="list-style-type: none"> Calculate and display the marginal distribution of a categorical variable from a two-way table. Calculate and display the conditional distribution of a categorical variable for a particular value of the other categorical variable in a two-way table. Describe the association between two categorical variables by comparing appropriate conditional distributions. 	BW 19, 21, 23, 25, 27–32 BN: 27-33
5	1.2 Dot plots, Describing Shape, Comparing Distributions, Stem plots	I.A.2-4 II.C.1-4	<ul style="list-style-type: none"> Make and interpret dot plots and stem plots of quantitative data. Describe the overall pattern (shape, center, and spread) of a distribution and identify any major departures from the pattern (outliers). Identify the shape of a distribution from a graph as roughly symmetric or skewed. Compare distributions of quantitative data using dot plots or stem plots. 	BW 37, 39, 41, 43, 45, 47 BN: p.35- 41
6	1.2 Histograms, Using Histograms Wisely *Stat Crunch/Fathom Demo		<ul style="list-style-type: none"> Make and interpret histograms of quantitative data*. Compare distributions of quantitative data using histograms. 	BW 53, 55, 59, 60, 65, 69–74 BN: 50-54
7	1.3 Measuring Center TI-family 1Vars-Stat*	I.A.1, I.A.4	<ul style="list-style-type: none"> Calculate measures of center (mean, median)* Calculate and interpret measures of spread (range, <i>IQR</i>). Choose the most appropriate measure of center and spread in a given setting. Identify outliers using the $1.5 \times IQR$ rule. Make and interpret box plots of quantitative data. 	Calculator -1VarsStat BW 79, 81, 83, 87, 89, 91, 93 BN: 55-66
8	1.3 Measuring Spread:		<ul style="list-style-type: none"> Calculate and interpret measures of spread (standard deviation). Choose the most appropriate measure of center and spread in a given setting. Use appropriate graphs and numerical summaries to compare distributions of quantitative variables. 	95, 97, 99, 103, 105, 107–110 Prepare Unit 1 Packet
9	Chapter 1 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 1 	Chapter 1 Review Exercises from text
10	Chapter 1 Test			

Chapter 2 (1st Quarter: 8 days)

Day	Topics	AP Topics	Learning Objectives/Activities	assignment
1	Introduction to Chapter2		<ul style="list-style-type: none"> Review Test scores from Chapter 1 test Activity: Where do I stand? 	BN p. 85-89
2	2.1 Measuring Position: Percentiles; Cumulative Relative Frequency Graphs; Measuring Position: z-scores	I.B.3	<ul style="list-style-type: none"> Find and interpret the percentile of an individual value within a distribution of data. Estimate percentiles and individual values using a cumulative relative frequency graph. Find and interpret the standardized score (z-score) of an individual value within a distribution of data. 	BW 1, 3, 5, 9, 11, 13, 15 BN p. 92-98
3	2.1 Transforming Data TI-Family*	I.B.5	<ul style="list-style-type: none"> Activity – Global Warming Changes in Temp* Describe the effect of adding, subtracting, Multiplying by, or dividing by a constant on the shape, center, and spread of a distribution of data. 	BW 17, 19, 21, 23, 25–30 BN p. 99-103
4	2.2 Density Curves, The 68–95–99.7 Rule; The Standard Normal Distribution	III.C.1-3	<ul style="list-style-type: none"> Estimate the relative locations of the median and mean on a density curve. Use the 68–95–99.7 rule to estimate areas (proportions of values) in a Normal distribution. Use Table A or technology to find (i) the proportion of z-values in a specified interval, or (ii) a z-score from a percentile in the standard Normal distribution. 	BW 33, 35, 39, 41, 43, 45, 47, 49, 51 BN p. 110-123
5	2.2 Normal Distribution Calculations TI-Family*		<ul style="list-style-type: none"> Use Table A or technology* to find (i) the proportion of values in a specified interval, or (ii) the value that corresponds to a given percentile in any Normal distribution. 	BW 53, 55, 57, 59 BN 124-129
6	2.2 Assessing Normality		<ul style="list-style-type: none"> Determine if a distribution of data is approximately Normal from graphical and numerical evidence. 	BW 54, 63, 65, 66, 67, 69–74 Prepare chapter 2 packet
7	Chapter 2 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 2 	Chapter 2 Review Exercises
8	Chapter 2 Test			

Chapter 3 (1st Quarter: 9 days)

Day	Topics	AP Topics	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 3		<ul style="list-style-type: none"> Review Test scores from Chapter 2 test Activity: The Case of the missing cookie 	BN p. 143-150
2	Chapter 3 Introduction 3.1 Explanatory and response variables, displaying relationships: scatter plots, describing scatter plots	I.D.1	<ul style="list-style-type: none"> Identify explanatory and response variables in situations where one variable helps to explain or influences the other. Make a scatter plot to display the relationship between two quantitative variables. (TI- family) Describe the direction, form, and strength of a relationship displayed in a scatter plot and recognize outliers in a scatter plot. 	BW 1, 5, 7, 11, 13 BN p. 150-156
3	3.1 Measuring linear association: correlation, facts about correlation TI-Family Calculators*	I.D.2	<ul style="list-style-type: none"> Interpret the correlation. Understand the basic properties of correlation, including how the correlation is influenced by outliers. Use technology* to calculate correlation. Explain why association does not imply causation. Correlation applet practice Reading: Why Correlation does not imply causation 	BW 14–18, 21 BN p. 164-171
4	3.2 Least-squares regression, interpreting a regression line, prediction, residuals	I.D.3	<ul style="list-style-type: none"> Interpret the slope and y intercept of a least-squares regression line. Use the least-squares regression line to predict y for a given x. Explain the dangers of extrapolation. Calculate and interpret residuals. 	BW 27–32, 35, 37, 39, 41, 45 BN p. 172-178
5	3.2 Calculating the equation of the least-squares regression line, determining whether a linear model is appropriate: residual plots	I.D.4	<ul style="list-style-type: none"> Explain the concept of least squares. Determine the equation of a least-squares regression line using technology. Construct and interpret residual plots to assess if a linear model is appropriate. 	BW 43, 47, 49, 51 BN p. 176-180
6	3.2 How well the line fits the data: the role of s and r^2 in regression		<ul style="list-style-type: none"> Interpret the standard deviation of the residuals and r^2 and use these values to assess how well the least-squares regression line models the relationship between two variables. 	BW 48, 50, 55, 58 BN p. 181-189 Bring in laptops!
7	3.2 Interpreting computer regression output, regression to the mean, correlation and regression wisdom *Use fathom or Stat Crunch		<ul style="list-style-type: none"> Determine the equation of a least-squares regression line using computer output*. Describe how the slope, y intercept, standard deviation of the residuals, and r^2 are influenced by outliers. Find the slope and y intercept of the least-squares regression line from the means and standard deviations of x and y and their correlation. 	BW 59, 61, 63, 65, 69, 71–78* Prepare chapter 3 packet Computer lab available for afterschool support with fathom*
8	Chapter 3 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 3 	Chapter Review Exercises
9	Chapter 3 Test			

Chapter 4 (1st Quarter: 13 days)

Day	Topics	AP Topic	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 4		<ul style="list-style-type: none"> Review Test scores from Chapter 3 test Activity: Random Rectangles Activity 	BN p. 207-214
2	4.1 Introduction, The Idea of a Sample Survey, How to Sample Badly, How to Sample Well: Simple Random Sampling	II.A.2 II.B.1-4	<ul style="list-style-type: none"> Identify the population and sample in a statistical study. Identify voluntary response samples and convenience samples. Explain how these sampling methods can lead to bias. Describe how to obtain a random sample using slips of paper, technology, or a table of random digits. 	BW 1, 3, 5, 7, 9, 11 BN p. 215-219
3	4.1 Other Random Sampling Methods	II.B.4	<ul style="list-style-type: none"> Activity – Rolling down the River Distinguish a simple random sample from a stratified random sample or cluster sample. Give the advantages and disadvantages of each sampling method. 	BW 13, 17, 19, 21, 23, 25 BN p.220-221
4	4.1 Inference for Sampling, Sample Surveys: What Can Go Wrong?	II.A.2, II.B.2	<ul style="list-style-type: none"> Video – Against all odds: Sample & Surveys Explain how under-coverage, non-response, question wording, and other aspects of a sample survey can lead to bias. 	BW 27, 29, 31, 33, 35 BN p. 231-234
5	4.2 Observational Study versus Experiment, The Language of Experiments	II.A.3, II.A.4	<ul style="list-style-type: none"> Distinguish between an observational study and an experiment. Explain the concept of confounding and how it limits the ability to make cause-and-effect conclusions. 	BW 37–42, 45, 47, 49, 51, 53, 55 BN p.235-241
6	4.2 How to Experiment Badly, How to Experiment Well, Completely Randomized Designs	II.C.1-4	<ul style="list-style-type: none"> Identify the experimental units, explanatory and response variables, and treatments. Explain the purpose of comparison, random assignment, control, and replication in an experiment. Describe a completely randomized design for an experiment, including how to randomly assign treatments using slips of paper, technology, or a table of random digits. 	BW 57, 59, 61, 63, 65 BN p. 242-245
7	4.2 Experiments: What Can Go Wrong? Inference for Experiments	II.C.3	<ul style="list-style-type: none"> Describe the placebo effect and the purpose of blinding in an experiment. Interpret the meaning of statistically significant in the context of an experiment. 	BW 67, 69, 71, 73 BN p. 246-251
8	4.2 Blocking	II.C.5	<ul style="list-style-type: none"> Activity: Tire Blocking Explain the purpose of blocking in an experiment. Describe a randomized block design or a matched pairs design for an experiment. 	BW 75, 77, 79, 81, 85 BN p. 261-264
9	4.3 Scope of Inference, The Challenges of Establishing Causation	II.D	<ul style="list-style-type: none"> Describe the scope of inference that is appropriate in a statistical study. 	BW 83, 87–94, 97–104
10	4.3 Data Ethics (optional topic)		<ul style="list-style-type: none"> Evaluate whether a statistical study has been carried out in an ethical manner. Activity: Response Bias 	Prepare Chapter 4 packet
11	Chapter 4 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 4 	Chapter Review Exercises
12	Chapter 4 Test			Barron's Guide – Practice sections covered
13	Cumulative AP Practice Test 1		<ul style="list-style-type: none"> MC from Chapters 1-4 Practice FR from Chapters 1-4 	

End of First Quarter

Chapter 5 (2nd Quarter: 9 days)

Day	Topics	AP Topic	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 5		<ul style="list-style-type: none"> Review Test scores from Chapter 4 test Video- Against all odds: Intro to probability 	BN p. 283-289
2	5.1 The Idea of Probability, Myths about Randomness	III.A.1, III.A.2	<ul style="list-style-type: none"> Interpret probability as a long-run relative frequency. Activity: Probability Applet 	BW 1, 3, 7, 9, 11 BN p. 289-292
3	5.1 Simulation	III.A.5	<ul style="list-style-type: none"> Use simulation to model chance behavior. Activity- Let's make a Deal Simulation Video- Numb3rs – Explanation 	BW 15, 17, 19, 23, 25 BN p. 299-302
4	5.2 Probability Models, Basic Rules of Probability	III.A.3	<ul style="list-style-type: none"> Determine a probability model for a chance process. Use basic probability rules, including the complement rule and the addition rule for mutually exclusive events. 	BW 27, 31, 32, 39, 41, 43, 45, 47 BN p.303-307
5	5.2 Two-Way Tables, Probability, and the General Addition Rule, Venn Diagrams and Probability		<ul style="list-style-type: none"> Use a two-way table or Venn diagram to model a chance process and calculate probabilities involving two events. Use the general addition rule to calculate probabilities. 	BW 29, 33–36, 49, 51, 53, 55 BN p. 312-320
6	5.3 What Is Conditional Probability?, The General Multiplication Rule and Tree Diagrams		<ul style="list-style-type: none"> Calculate and interpret conditional probabilities. Use the general multiplication rule to calculate probabilities. Use tree diagrams to model a chance process and calculate probabilities involving two or more events. 	BW 57–60, 63, 65, 67, 71, 73, 77, 79 BN p.321-327
7	5.3 Conditional Probability and Independence: A Special Multiplication Rule	III.B.1	<ul style="list-style-type: none"> Determine whether two events are independent. When appropriate, use the multiplication rule for independent events to compute probabilities. 	BW 81, 83, 85, 89, 91, 93, 95, 97–99 Prepare Chapter 5 packet
8	Chapter 5 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 5 	Chapter 5 Review Exercises
9	Chapter 5 Test			

Chapter 6 (2nd Quarter: 10 days)

Day	Topics	AP Topic	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 6		<ul style="list-style-type: none"> Review Test Scores from Chapter 5 Activity- Pepsi Vs. Coke (or bottled water vs. tap) Video- Against all odds: Random Variables 	BN p.341-345
2	Chapter 6 Introduction, 6.1 Discrete Random Variables, Mean (Expected Value) of a Discrete Random Variable	III.A.4	<ul style="list-style-type: none"> Compute probabilities using the probability distribution of a discrete random variable. Calculate and interpret the mean (expected value) of a discrete random variable. 	BW 1, 3, 5, 7, 9, 11, 13 BN p. 346-351
3	6.1 Standard Deviation (and Variance) of a Discrete Random Variable, Continuous Random Variables		<ul style="list-style-type: none"> Calculate and interpret the standard deviation of a discrete random variable. Compute probabilities using the probability distribution of a continuous random variable. 	BW 14, 15, 17, 18, 21, 23, 25 BN p.358-363
4	6.2 Linear Transformations	III.A.6	<ul style="list-style-type: none"> Describe the effects of transforming a random variable by adding or subtracting a constant and multiplying or dividing by a constant. 	BW 27–30, 35, 37, 39–41, 43, 45 BN p. 364-376
5	6.2 Combining Random Variables, Combining Normal Random Variables	III.B.2	<ul style="list-style-type: none"> Find the mean and standard deviation of the sum or difference of independent random variables. Find probabilities involving the sum or difference of independent Normal random variables. 	BW 47, 49, 51, 53, 55, 57–59, 61 BN p. 382-390
6	6.3 Binomial Settings and Binomial Random Variables, Binomial Probabilities	III.A.4	<ul style="list-style-type: none"> Determine whether the conditions for using a binomial random variable are met. Compute and interpret probabilities involving binomial distributions. 	BW 63, 65, 66, 69, 71, 73, 75, 77 BN p. 390-396
7	6.3 Mean and Standard Deviation of a Binomial Distribution, Binomial Distributions in Statistical Sampling	III.A.6	<ul style="list-style-type: none"> Calculate the mean and standard deviation of a binomial random variable. Interpret these values in context. Video - Against all Odds: Binomial Distributions 	BW 79, 81, 83, 85, 87, 89 BN p. 397-401
8	6.3 Geometric Random Variables		<ul style="list-style-type: none"> Find probabilities involving geometric random variables. 	BW 93, 95, 97, 99, 101–104 Prepare Chapter 6 packet
9	Chapter 6 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 6 	Chapter 6 Review Exercises
9	Chapter 6 Test			

Chapter 7 (2nd Quarter: 17 days)

Day	Topics	AP Topics	Learning Objectives/Activities	Assignment
1	Introduction to Unit 7		<ul style="list-style-type: none"> Review Test Scores from Chapter 6 Activity- The German Tank Problem 	BN p. 416
2	7.1 Parameters and Statistics		<ul style="list-style-type: none"> Distinguish between a parameter and a statistic. 	BW 1, 3, 5 BN p. 421-427 Video- Against all odds: Sampling Distributions
3	7.1 Sampling Variability, Describing Sampling Distributions	III.D	<ul style="list-style-type: none"> Distinguish among the distribution of a population, the distribution of a sample, and the sampling distribution of a statistic. Use the sampling distribution of a statistic to evaluate a claim about a parameter. Determine whether or not a statistic is an unbiased estimator of a population parameter. Describe the relationship between sample size and the variability of a statistic. 	BW 7, 9, 11, 13, 15, 17, 19 BN p. 433-438
4	7.2 The Sampling Distribution of \hat{p} , Using the Normal Approximation for \hat{p} . *Calculator Tutorials	III.D.1	<ul style="list-style-type: none"> Find the mean and standard deviation of the sampling distribution of a sample proportion \hat{p}. Check the 10% condition before calculating $\dagger_{\hat{p}}$. Determine if the sampling distribution of \hat{p} is approximately Normal. If appropriate, use a Normal distribution to calculate probabilities involving \hat{p}. * 	BW 21–24, 27, 29, 33, 35, 37, 39 BN p. 444-448
5	7.3 The Sampling Distribution of \bar{x} : Mean and Standard Deviation, Sampling from a Normal Population	III.D.2	<ul style="list-style-type: none"> Find the mean and standard deviation of the sampling distribution of a sample mean \bar{x}. Check the 10% condition before calculating $\dagger_{\bar{x}}$. If appropriate, use a Normal distribution to calculate probabilities involving \bar{x}. 	BW 43–46, 49, 51, 53, 55 BN p. 449-452
6	7.3 The Central Limit Theorem	III.D.3	<ul style="list-style-type: none"> Explain how the shape of the sampling distribution of \bar{x} is affected by the shape of the population distribution and the sample size. If appropriate, use a Normal distribution to calculate probabilities involving \bar{x}. Activity – Central Limit Theorem Simulation 	BW 57, 59, 61, 63, 65–68 Prepare Chapter 7 packet Finish and discuss CLT Simulation (wiki)
7	Chapter 7 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 7 	Chapter 7 Review Exercises
8	Chapter 7 Test			Start Midterm Project
9-12	Midterm Review		<ul style="list-style-type: none"> Review Content from Chapters 1-7 in preparation for Midterm Cumulative AP practice test # 2 	Work on Midterm project AP Practice tests via Text Ch. 1-7
13-17	Midterm Project & Presentations		<ul style="list-style-type: none"> Students work together on Midterm projects* Students present Midterm projects to classmates 	Ipads in class* Barron's -Review Covered Material

- Midterm – AP Cumulative Practice Test # 2 Covering material from Chapters 1 -7

End of Second Quarter

Chapter 8 (3rd Quarter: 9 days)

Day	Topics	AP Topics	Learning objectives/Activities	Assignment
1	Introduction to Chapter 8		<ul style="list-style-type: none"> Review Midterm Scores Video- Against all odds: Confidence Intervals 	BN p. 465-475
2	8.1 The Idea of a Confidence Interval, Interpreting Confidence Intervals and Confidence Levels	IV.A.3	<ul style="list-style-type: none"> Interpret a confidence interval in context. Interpret a confidence level in context. 	BW 1, 3, 5, 7, 9 BN p. 476-479
3	8.1 Constructing a Confidence Interval; Using Confidence Intervals Wisely	IV.A.2	<ul style="list-style-type: none"> Determine the point estimate and margin of error from a confidence interval. Describe how the sample size and confidence level affect the length of a confidence interval. Explain how practical issues like non-response, under-coverage, and response bias can affect the interpretation of a confidence interval. 	BW 10, 11, 13, 15, 17, 19 BN p. 484-491
4	8.2 Conditions for Estimating p , Constructing a Confidence Interval for p , Putting It All Together: The Four-Step Process	IV.A.3, IV.A.4	<ul style="list-style-type: none"> State and check the Random, 10%, and Large Counts conditions for constructing a confidence interval for a population proportion. Determine critical values for calculating a $C\%$ confidence interval for a population proportion using a table or technology* TI-Family Construct and interpret a confidence interval for a population proportion. 	BW 20–24, 31, 33, 35, 37 BN p. 492-500
5	8.2 Choosing the Sample Size	IV.A.4	<ul style="list-style-type: none"> Determine the sample size required to obtain a $C\%$ confidence interval for a population proportion with a specified margin of error. 	BW 39, 41, 43, 45, 47 BN p. 501-506
6	8.3 The Problem of unknown \uparrow , When \uparrow Is Unknown: The t Distributions, Conditions for Estimating \sim	III.D.7 IV.A.6	<ul style="list-style-type: none"> Explain how the t distributions are different from the standard Normal distribution and why it is necessary to use a t distribution when calculating a confidence interval for a population mean. Determine critical values for calculating a $C\%$ confidence interval for a population mean using a table or technology*. TI -FAMILY State and check the Random, 10%, and Normal/Large Sample conditions for constructing a confidence interval for a population mean. 	BW 49–52, 55, 57, 59 BN p. 507-515
7	8.3 Constructing a Confidence Interval for \sim , Choosing a Sample Size	IV.A.6	<ul style="list-style-type: none"> Construct and interpret a confidence interval for a population mean. Determine the sample size required to obtain a $C\%$ confidence interval for a population mean with a specified margin of error. 	BW 61, 65, 69, 71, 73, 75–78 Prepare Chapter 8 packet
8	Chapter 8 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 8 	Chapter 8 Review Exercises
9	Chapter 8 Test			

Chapter 9 (3rd Quarter: 9 days)

Day	Topics	AP Topics	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 9		<ul style="list-style-type: none"> Review Chapter 8 scores Activity Test of Significance “Free Throw” Applet 	BN p. 529-537
2	9.1 Stating Hypotheses, The Reasoning of Significance Tests, Interpreting <i>P</i> -values, Statistical Significance	IV.B.1	<ul style="list-style-type: none"> State the null and alternative hypotheses for a significance test about a population parameter. Interpret a <i>P</i>-value in context. Determine if the results of a study are statistically significant and draw an appropriate conclusion using a significance level. 	BW 1, 3, 5, 7, 9, 11, 15 BN p. 538-544
3	9.1 Type I and Type II Errors, Power of a test		<ul style="list-style-type: none"> Interpret a Type I and a Type II error in context, and give a consequence of each. 	BW 13, 17, 19, 21, 23 BN p. 549-555
4	9.2 Carrying Out a Significance Test, The One-Sample <i>z</i> Test for a Proportion	IV.B.1, IV.B.2	<ul style="list-style-type: none"> State and check the Random, 10%, and Large Counts conditions for performing a significance test about a population proportion. Perform a significance test about a population proportion. 	BW 25–28, 31, 35, 39, 41 BN p. 556-560
5	9.2 Two-Sided Tests, Why Confidence Intervals Give More Information, Type II Error and the Power of a Test	IV.B.1	<ul style="list-style-type: none"> Use a confidence interval to draw a conclusion for a two-sided test about a population parameter. Interpret the power of a test and describe what factors affect the power of a test. Describe the relationship among the probability of a Type I error (significance level), the probability of a Type II error, and the power of a test. 	BW 43, 45, 47, 51, 53, 55, 57 BN p. 565-576
6	9.3 Carrying Out a Significance Test for μ , The One Sample <i>t</i> Test, Two-Sided Tests and Confidence Intervals	IV.B.4	<ul style="list-style-type: none"> State and check the Random, 10%, and Normal/Large Sample conditions for performing a significance test about a population mean. Perform a significance test about a population mean. Use a confidence interval to draw a conclusion for a two-sided test about a population parameter. 	BW 59–62, 65, 69, 73, 77, 79 BN p. 577-585
7	9.3 Inference for Means: Paired Data, Using Tests Wisely	IV.B.5	<ul style="list-style-type: none"> Perform a significance test about a mean difference using paired data. Activity – Catching Tic Tacs Calculator input 	BW 83, 85, 87, 89–91, 93, 95–102 Conclusion of Activity on Wiki-space Prepare Chapter 9 Packet
8	Chapter 9 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 9 	Chapter 9 Review Exercises
9	Chapter 9 Test			

Chapter 10 (3rd Quarter 14 Days)

Day	Topics	AP Topics	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 10		<ul style="list-style-type: none"> Review Chapter 9 scores Activity – Is yawning contagious? Video – Against all odds: Inference for Proportions 	BN p. 604-607
2	10.1 The Sampling Distribution of a Difference between Two Proportions	III.D.4	<ul style="list-style-type: none"> Describe the shape, center, and spread of the sampling distribution of $\hat{p}_1 - \hat{p}_2$. 	BW 1, 3 BN p.608-610
3	10.1 Confidence Intervals for $p_1 - p_2$	IV.A.5	<ul style="list-style-type: none"> Determine whether the conditions are met for doing inference about $p_1 - p_2$. Construct and interpret a confidence interval to compare two proportions. 	BW 5, 7, 9, 11 BN p. 611-619
4	10.1 Significance Tests for $p_1 - p_2$, Inference for Experiments	IV.B.3	<ul style="list-style-type: none"> Perform a significance test to compare two proportions. TI-Family Tutorials* 	BW 13, 15, 17, 21, 23 BN p. 628-631
5	10.2 The Sampling Distribution of a Difference between Two Means	III.D.5	<ul style="list-style-type: none"> Activity – Does Polyester Decay? Describe the shape, center, and spread of the sampling distribution of $\bar{x}_1 - \bar{x}_2$. Determine whether the conditions are met for doing inference about $\mu_1 - \mu_2$. 	BW 31, 33, 35, 51 BN p.633-637
6	10.2 The Two-Sample t Statistic, Confidence Intervals for $\mu_1 - \mu_2$	IV.A.7	<ul style="list-style-type: none"> Construct and interpret a confidence interval to compare two means. TI Family Tutorials* 	BW 25–28, 37, 39 BN p. 638-649
7	10.2 Significance Tests for $\mu_1 - \mu_2$, Using Two-Sample t Procedures Wisely	IV.B.5	<ul style="list-style-type: none"> Perform a significance test to compare two means. (TI Family Tutorials*) Determine when it is appropriate to use two-sample t procedures versus paired t procedures. 	BW 41, 43, 45, 47, 53, 57–60 Prepare Chapter 10 packet
8	Chapter 10 Review/FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 10 	Chapter 10 Review Exercises
9	Chapter 10 Test			Bring in laptops for Lab work
10-14	Lab: Helicopter Activity to compare two sample and paired designs <i>NCSSM 2000</i>	I.A.1-3 I.B.1-3 II.C.1-3 IV.C.1	<ul style="list-style-type: none"> Interpret graphical displays of univariate data Center and spread, Outliers and other unusual features & Shape Summarize distributions of univariate data, Measuring center, Measuring spread, Using Box plots Plan and conduct an experiment by Characteristics of a well-designed and well-conducted experiment, Completely randomized design, Matched pairs design Look at Special case of normally distributed data, Two sample (independent and matched pairs) t procedures 	Make sure report is handed in on the 14 th day

Chapter 11 (3rd Quarter: 10 days)

Day	Topics	AP Topics	Learning objectives/Activities	Assignment
1	Introduction to Chapter 11		<ul style="list-style-type: none"> Review Chapter 10 Test Scores Activity: The Candy Man Can (M&M) or extended M & M lab 	BN p. 678-684
2	11.1 Comparing Observed and Expected Counts: The Chi-Square Statistic; The Chi-Square Distributions and <i>P</i> -values	III.D.8 V.B.6	<ul style="list-style-type: none"> State appropriate hypotheses and compute expected counts for a chi-square test for goodness of fit. Calculate the chi-square statistic, degrees of freedom, and <i>P</i>-value for a chi-square test for goodness of fit. 	BW 1, 3, 5 BN p. 685-690
3	11.1 Carrying Out a Test; Follow-Up Analysis		<ul style="list-style-type: none"> Perform a chi-square test for goodness of fit. Conduct a follow-up analysis when the results of a chi-square test are statistically significant. 	BW 7, 9, 11, 15, 17 BN p. 696-712
4	11.2 Comparing Distributions of a Categorical Variable; Expected Counts and the Chi-Square Statistic; The Chi-Square Test for Homogeneity *(TI –family tutorials)		<ul style="list-style-type: none"> Compare conditional distributions for data in a two-way table. State appropriate hypotheses and compute expected counts for a chi-square test based on data in a two-way table. Calculate the chi-square statistic, degrees of freedom, and <i>P</i>-value for a chi-square test based on data in a two-way table. * Perform a chi-square test for homogeneity. 	BW 19–22, 27, 29, 31, 33, 35, 37, 39 BN p. 713-722
5	11.2 Relationships between Two Categorical Variables; the Chi-Square Test for Independence; Using Chi-Square Tests Wisely		<ul style="list-style-type: none"> Perform a chi-square test for independence. Choose the appropriate chi-square test. 	BW 41, 43, 45, 47, 49, 51–55 Prepare Chapter 11 packet
6	Chapter 11 Review/ FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 11 	Chapter 11 Review Exercises
7	Chapter 11 Test			
8-9	Lab-Corn Genetics, Chi-Square Analysis	IV.B.6	<ul style="list-style-type: none"> Students will understand the importance of Chi-Square Analysis with Genetics by observing corn 	AP practice tests Ch. 8-11 via text
10	Cumulative AP practice Test # 3		<ul style="list-style-type: none"> MC and FR questions covering topics from Chapters 1 -11 	

End of Third Quarter

Chapter 12 (4th Quarter: 34 days)

Day	Topics	AP Topics	Learning Objectives/Activities	Assignment
1	Introduction to Chapter 12		<ul style="list-style-type: none"> Review chapter 11 tests results Against all odds: Inference for regression 	BN p. 739-743
2	12.1 Sampling Distribution of b ; Conditions for Regression Inference		<ul style="list-style-type: none"> Check the conditions for performing inference about the slope s of the population (true) regression line.* TI-family tutorials 	BW 1, 3 BN p. 744-750
3	12.1 Estimating the Parameters; Constructing a Confidence Interval for the Slope	IV.A.1, IV.A.8	<ul style="list-style-type: none"> Interpret the values of a, b, s, SE_b, and r^2 in context, and determine these values from computer output. Construct and interpret a confidence interval for the slope s of the population (true) regression line. 	BW 5, 7, 9, 11 BN p. 751-757
4	12.1 Performing a Significance Test for the Slope	IV.B.7	<ul style="list-style-type: none"> Perform a significance test about the slope s of the population (true) regression line. 	BW 13, 15, 17 BN p. 765- 770
5	12.2 Transforming with Powers and Roots	I.D.5	<ul style="list-style-type: none"> Use transformations involving powers and roots to find a power model that describes the relationship between two variables, and use the model to make predictions. 	BW 19–24, 31, 33 BN p. 781-784
6	12.2 Transforming with Logarithms; Putting it all Together: Which Transformation Should We Choose?		<ul style="list-style-type: none"> Activity- “Decay of Skittletum” Use transformations involving logarithms to find a power model or an exponential model that describes the relationship between two variables, and use the model to make predictions. Determine which of several transformations does a better job of producing a linear relationship. 	BW 35, 37, 39, 41, 43, 45, 47–50 Prepare Chapter 12 packet
7	Chapter 12 Review/ FRAPPY!		<ul style="list-style-type: none"> Practice Free Response & MC from released Exams Summarize all calculator input for Chapter 12 	Chapter 12 Review Exercises
8	Chapter 12 Test			
9	Introduction to Final Project		See description in Syllabus	
10-25	Review for AP [®] Exam (Approximately 10-15 days)		<ul style="list-style-type: none"> Best Strategies for review + ppt Jeopardy MC Practice Exam 1 – 2007 MC Practice Exam 1 – 2007 Strategies for Free Response FRQ Mock Exam1 – 2007 FRQ Mock Exam1 – 2007 Grading Session & Review Inference Procedure Practice Inference Review Probability Review Mock Exam 2 FULL 2012 +90 minutes Afterschool Mock Exam 3 FULL 2013 +90 minutes Afterschool 	Students are to work on projects and study on their own using 1) Study Guides, 2) Against all odds videos 3) Binders
~ 10 days After AP [®] Exam	Final Project Completion & Presentations		<ul style="list-style-type: none"> Complete projects with classmates guided help Present final projects in front of classmates 	Laptops are to be brought in!

End of 4th Quarter