NHS AP STATISTICS — COURSE SYLLABUS

2019-2020 Academic Year

Office hours: Every morning from 7:30 to 8:15, M-F.
Most days after school until 4:00 PM.
By appointment only for any other time.

Important: AP Exam!

TBD, May 2020

3 Rs of Class Expectations

1. **R**espect: show respect for yourself, to others, and for the environment; be courteous; treat others as you wish to be treated.
2. **R**esponsibility: arrive on time; be prepared; perform to the best of your ability; always try your hardest.
3. **R**egulations: know and follow **all** district, school, and classroom rules and procedures.
    a. District policies include everything in the ACPS Code of Student Conduct, especially pages 14-17.
    b. School rules include no food, no Big Gulp or Starbucks in classrooms, adhering to proper dress code, and not being tardy.
    c. Classroom procedures include the following:
        i. **Turn your cell phone off and place it in your assigned slot.**
        ii. Place all backpacks/bags at the side of the classroom as you enter.
        iii. Take only items listed on the board with you to your work station. Note: ii and iii keep the floor clear of all obstructions so that we can safely perform any class activities that require us to move around.
        iv. Note: Because you are college students, I will not micromanage your bathroom breaks as I do lower level classes. If you are out of the classroom during critical instruction, it is your responsibility to find out what you missed.
4. Consequences for not meeting the above expectations are progressive and follow school policy.
    a. Verbal/written warning, a friendly and respectful attempt to simply redirect for first offense.
    b. Verbal or written contact with your parent/guardian or other authority figure (coach, dean, counselor, etc. as deemed appropriate) for second offense.
    c. Referral to the dean or other administrator.
    d. Note, no matter what, after three tardies, it is school policy that you have earned a referral: do not be late!

Course Description

Statistics is unlike any math course you have taken before. In AP Stats, there is significantly more reading, writing, and thinking. It is rigorous, challenging, and there is a lot of work. You can immediately see the applicability of ideas learned to many things in life, however, so this might be the most fun math class you ever take. This course prepares you for the AP Statistics Exam, for which you can receive college credit. It is the equivalent of an introductory, one semester long statistics course required for several majors. Ultimately, becoming statistically literate will help you make informed life decisions based on real data, as well as protect you from those using misleading or faulty statistical claims.

In this course specifically, students develop strategies for collecting, organizing, analyzing, and drawing conclusions from data. Students design, administer, and tabulate results from surveys and experiments. Probability and simulations aid students in constructing models for chance behavior. Sampling distributions provide the logical structure for confidence intervals and hypothesis tests. Students use a TI-Nspire graphing calculator, Microsoft

Excel, Web-based java applets, and other statistical freely available, open-access statistics software to investigate statistical concepts. To develop effective statistical communication skills, students are required to prepare frequent written and oral analyses of real data.

Student Learning Outcomes

Students fully participating in this course will:

1. Learn how to ask statistical questions to produce data.
2. Learn how to collect data to answer statistical questions (surveys, experiments, observational studies, simulations).
3. Learn how to analyze collected data (graphical & numerical summaries).
4. Learn how to model data (probability, random variables, sampling distributions).
5. Learn how to interpret analyzed data and draw conclusions (inference procedures—confidence intervals, significance tests).
6. Communicate statistical ideas clearly, completely, and precisely via oral and written arguments.
7. Learn when and how to utilize appropriate technology to perform all the above in a variety of settings.
8. Become critical consumers of published statistical results by achieving heightened awareness of ways in which statistics can be improperly used to mislead, confuse, or distort the truth.

Quarterly Learning Activities & Grade Distribution

CATEGORY	POSSIBLE POINTS	POINTS AS %
Participation	50	5%
Notebooks	1 @ 100 = 100	10%
Reading Check Quizzes	9 @ 3.3 = 100	10%
Homework	3 @ 50 = 150	15%
Tests/Projects	3 @ 200 = 600	60%
TOTALS	1000	100%

Notes on quarterly learning activities

Participation: This category includes attendance, group discussion, labs, practice free response questions (FRQs), etc. Essentially, these 50 points are meant as freebies. However, you lose points for each unexcused absence, inattention, failure to complete a class assignment, etc. No one should lose any points! This course follows ACPS guidelines for absences and make-up policies; please consult your student code of conduct handbook.

Notebooks: Your notebook determines 10% of your grade. Keep class and reading notes in a section. Keep class activities in a separate section. Keep homework in a section of its own and returned quizzes and tests in yet another section. You want all these items in order, legible, and accessible so you can reference them when studying for your exams. Furthermore, each student will have a quarterly grade sheet to track their own progress. Each time you get an assignment or test back, record the score in the appropriate column. This will let you keep track of your own grade at all times. This helpful chart should go at the front of your notebook. **No credit will be given for sloppy, incomplete, missing, or late notebooks.**

Reading check quizzes: In every college course, there is much information to learn, understand, and absorb on your own! Thus, you must absolutely read your textbook when assigned. Take notes on what you read and keep them in your notebook. Because this is imperative, I will quiz you weekly on the assigned reading with multiple choice questions. Such quizzes account for 10% of your quarterly grade. See below for an example. **There are no make-up reading check quizzes** for unexcused absences.

Homework: In this class, homework provides necessary extra practice on material and prepares you for the formal exam. You will be assigned select questions for each chapter, in both multiple choice and free response formats. You are encouraged to work together in study groups. However, everyone must do their own work and use their own words on all free response questions (FRQs). For each chapter, I will select an FRQ or two and grade them; you will not know which ones. I will use the College Board's E, P, I system to grade FRQs on homework. We will practice this together in class, often, so you know what to expect. (See your textbook for details.) The importance that quality homework provides to your learning equitably reflects in your quarterly grade—15%. In this course, there is no such thing as late homework. It is either turned in, or it is not. Cut-off dates follow our quarterly grade submission guidelines.

Tests: Are weighted 60% of each quarter's grade and include multiple choice and FRQs, which are graded like your homework problems using the E, P, I rubric as well as projects. Tests must all be done without peer help, teacher assistance, or reference to notes. You may also be assessed with a project-in-lieu-of-test. These will be rubric based, performance and problem-solving oriented, and cumulative of all prior material. (See examples at end of syllabus). **There are no retests, test corrections, or make-up exams** for unexcused absences. Make-up policy for excused absences will follow district guidelines (consult your Student Handbook).

Grading Scale

Percentage	Letter Grade	Grade Point	Percentage	Letter Grade	Grade Point
90-100	A	4.0	70-76	C	2.0
87-89	B+	3.0	67-69	D+	1.0
80-86	B	3.0	60-66	D	1.0
77-79	C+	2.0	<60 or 0	F or I	0.0

Note: Your grade throughout the year, ideally, will serve as an indicator of your expected score on the real AP exam. Roughly, A+ students should get a 5, A- & B+ students should get a 4, and B- students should get a 3. As this is an AP course, your GPA is weighted for high school. While a C represents passing in high school, note, most college do not grant credit for your major unless the course is at least a B. So, just because you pass the course here in high school, that does not equate to you getting college credit in your major for the course at a university (which AP is meant to emulate). Please see your guidance counselor for additional questions as to how this counts at any particular college or university.

Provided Textbook & Project Resources

The Practice of Statistics, 5th Edition, by Starnes, Tabor, Yates, & Moore, W. H. Freeman & Co., 2014. You should have already received your textbook. You may keep it at home most of the time. The textbook is your responsibility. If lost or damaged, you will be put on the debt list.

Fantasy Baseball with a Statistical Twist, Lori Koban & Erin McNelis, MATHEMATICS TEACHER, vol. 102, no. 4, November 2008, pages 264-271. (Find this posted for you on Google Classroom). Your first semester exam project portion will come from this source. It is cumulative in nature, and it requires you to use your graphing calculator or other statistical software skills.

Required Materials for Course Success

1. Large 3-ring binder with dividers
2. College-ruled loose-leaf notebook paper
3. Graph paper

4. Pencils (no. 2, regular or mechanical) and pens
5. Erasers
6. TI-Nspire CX graphing calculator or equivalent alternatives (see below for details)

Calculator Information

You need a graphing calculator for homework and the official AP Statistics exam. Also, both ACT and SAT allow students to use calculators on their math sections. If you do not buy a TI-Nspire CX, other recommended graphing calculators for statistics, listed in order of preference, include: TI-83/84 and TI-89, HP Prime, or Casio graphing calculator. TI-Nspire also has a software/app version for the I-pad, if you prefer. TI-Nspire CX graphing calculators are provided for you at school, as a privilege. Treat them with respect; others use them too! Thus, you may leave your calculator at home. You can also check these out to use come test time if you do not have one of your own.

Skyward

Please utilize the new grading system, Skyward, to regularly access grades and track your progress. The school board website provides a link to Skyward. At any time, please let me know if you spot an error. I will update grades at least weekly. I am usually pretty prompt at getting grades into the system. It only takes me a day or two. This is a handy way to stay on top of your grade and progress for any class at any time. (To see your progress within the context of the quarter, please refer to your hard copy grade chart you are to fill out for your notebook.) Additionally, progress reports go out every mid-quarter, and report cards go out every quarter.

Working Class Schedule: Date below subject to change

Expect to receive **detailed** assignments, reading schedules, quizzes, and classwork plans for each chapter as we progress through the material. I will give you hard copies in class of the detailed schedule for each chapter with due dates, specific questions to practice, when to read which pages, and dates for the weekly reading quizzes. Furthermore, if you lose this at any time, you can always find it and print it out again from Google Classroom. If you are absent, please find the extras in your AP Stats Absent Folder or look on Google Classroom to find the most current schedule. I will also use e-mail (through Google Classroom and Skyward) to update you on any significant changes should they arise (hurricanes, substitutes, etc.). Here, please find the projected schedule and semi-detailed topic outline below.

August 14 to 18:	Chapter 1, Exploring Data, **test on August 21.**
August 22 to September 5:	Chapter 2, Data Distribution, **test on September 6.**
September 7 to 29:	Chapter 3, Describing Relationships, **test on September 28-29.**
	Statistics project #1 also due on September 29.

Practice AP EXAM on teacher work-day, October 20: cumulative through chapters 1-4! Earn your score and replace any, and all, grades lower than that up to now! This is a great way to help your 1st nine weeks' grade if you got off to a rough start.

October 2 to October 25:	Chapter 4, Designing Studies, PROJECT/PRESENTATION **October 23-25.**
October 26 to November 14:	Chapter 5, Probability, **test on November 13-14.**
November 15 to December 12:	Chapter 6, Random Variables, **test on December 11-12.**
December 13-15:	**SEMESTER EXAM (cumulative test component and project component)**
December 17 to January 12:	Chapter 7, Sampling Distributions, **cumulative test on January 11-12.**

January 13 to February 5:	Chapter 8, Estimating, **test on February 2-5.**
February 6 to 23:	Chapter 9, Testing a Claim, **test on February 22-23.**
February 24 to March 14:	Chapter 10, Comparing Two Groups, **cumulative test on March 13-14.**
March 15 to April 10:	Chapter 11, Inference, **test on April 9-10.**
April 11 to April 27:	Chapter 12, Regression, **cumulative test on April 26-27.**
April 28 to May 16:	Cumulative Review
May 17:	**AP Statistics Exam, Afternoon, May 17**
Post AP Exam:	See below for activity and project examples/rubrics

A note about alignment of textbook chapters with the school's quarterly calendar: Since you take the final exam three weeks before school ends, the pacing of units in the textbook does not match the secondary school system's quarterly calendar. Regardless, each quarter will be associated with three chapters for purposes of assigning grades. Also note that cumulative semester exams (projects) count as 20% of your overall semester grade.

COURSE OUTLINE:

Chapter 1

Day	Topics	**Learning Objectives** Students will be able to …	Suggested assignment
1	Chapter 1 Introduction	• Identify the individuals and variables in a set of data. • Classify variables as categorical or quantitative.	1, 3, 5, 7, 8
2	1.1 Bar Graphs and Pie Charts, Graphs: Good and Bad	• 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.	11, 13, 15, 17
3	1.1 Two-Way Tables and Marginal Distributions, Relationships between Categorical Variables: Conditional Distributions	• 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.	19, 21, 23, 25, 27–32
4	1.2 Dotplots, Describing Shape, Comparing Distributions, Stemplots	• Make and interpret dotplots and stemplots of quantitative data. • Describe the overall pattern (shape, center, and spread) of a distribution and identify any major departures from the pattern (outliers). • Identify the shape of a distribution from a graph as roughly symmetric or skewed. • Compare distributions of quantitative data using dotplots or stemplots.	37, 39, 41, 43, 45, 47
5	1.2 Histograms, Using Histograms Wisely	• Make and interpret histograms of quantitative data. • Compare distributions of quantitative data using histograms.	53, 55, 59, 60, 65, 69–74

6	1.3 Measuring Center: Mean and Median, Comparing the Mean and Median, Measuring Spread: Range and *IQR,* Identifying Outliers, Five-Number Summary and Boxplots	• Calculate measures of center (mean, median). • Calculate and interpret measures of spread (range, *IQR*). • Choose the most appropriate measure of center and spread in a given setting. • Identify outliers using the $1.5 \times IQR$ rule. • Make and interpret boxplots of quantitative data.	79, 81, 83, 87, 89, 91, 93
7	1.3 Measuring Spread: Standard Deviation, Choosing Measures of Center and Spread, Organizing a Statistics Problem	• 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
8	Chapter 1 Review/FRAPPY!		Chapter 1 Review Exercises
9	Chapter 1 Test		

Chapter 2

Day	**Topics**	**Learning Objectives** Students will be able to…	**Suggested assignment**
1	2.1 Measuring Position: Percentiles; Cumulative Relative Frequency Graphs; Measuring Position: *z*-scores	• 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.	1, 3, 5, 9, 11, 13, 15
2	2.1 Transforming Data	• Describe the effect of adding, subtracting, multiplying by, or dividing by a constant on the shape, center, and spread of a distribution of data.	17, 19, 21, 23, 25–30
3	2.2 Density Curves, The 68–95–99.7 Rule; The Standard Normal Distribution	• 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.	33, 35, 39, 41, 43, 45, 47, 49, 51
4	2.2 Normal Distribution Calculations	• 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.	53, 55, 57, 59
5	2.2 Assessing Normality	• Determine if a distribution of data is approximately Normal from graphical and numerical evidence.	54, 63, 65, 66, 67, 69–74

6	Chapter 2 Review/FRAPPY!		Chapter 2 Review Exercises
7	Chapter 2 Test		

Chapter 3

Day	Topics	**Learning Objectives** Students will be able to …	Suggested assignment
1	Chapter 3 Introduction 3.1 Explanatory and response variables, displaying relationships: scatterplots, describing scatterplots	• Identify explanatory and response variables in situations where one variable helps to explain or influences the other. • Make a scatterplot to display the relationship between two quantitative variables. • Describe the direction, form, and strength of a relationship displayed in a scatterplot and recognize outliers in a scatterplot.	1, 5, 7, 11, 13
2	3.1 Measuring linear association: correlation, facts about correlation	• 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.	14–18, 21
3	3.2 Least-squares regression, interpreting a regression line, prediction, residuals	• 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.	27–32, 35, 37, 39, 41, 45
4	3.2 Calculating the equation of the least-squares regression line, determining whether a linear model is appropriate: residual plots	• 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.	43, 47, 49, 51
5	3.2 How well the line fits the data: the role of *s* and r^2 in regression	• 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.	48, 50, 55, 58
6	3.2 Interpreting computer regression output, regression to the mean, correlation and regression wisdom	• 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.	59, 61, 63, 65, 69, 71–78
7	Chapter 3 Review/FRAPPY!		Chapter Review Exercises
8	Chapter 3 Test		Project #1

Chapter 4

Day	Topics	**Learning Objectives** Students will be able to…	**Suggested assignment**
1	4.1 Introduction, The Idea of a Sample Survey, How to Sample Badly, How to Sample Well: Simple Random Sampling	• 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.	1, 3, 5, 7, 9, 11
2	4.1 Other Random Sampling Methods	• Distinguish a simple random sample from a stratified random sample or cluster sample. Give the advantages and disadvantages of each sampling method.	13, 17, 19, 21, 23, 25
3	4.1 Inference for Sampling, Sample Surveys: What Can Go Wrong?	• Explain how undercoverage, nonresponse, question wording, and other aspects of a sample survey can lead to bias.	27, 29, 31, 33, 35
4	4.2 Observational Study versus Experiment, The Language of Experiments	• 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.	37–42, 45, 47, 49, 51, 53, 55
5	4.2 How to Experiment Badly, How to Experiment Well, Completely Randomized Designs	• 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.	57, 59, 61, 63, 65
6	4.2 Experiments: What Can Go Wrong? Inference for Experiments	• Describe the placebo effect and the purpose of blinding in an experiment. • Interpret the meaning of statistically significant in the context of an experiment.	67, 69, 71, 73
7	4.2 Blocking	• Explain the purpose of blocking in an experiment. • Describe a randomized block design or a matched pairs design for an experiment.	75, 77, 79, 81, 85
8	4.3 Scope of Inference, The Challenges of Establishing Causation	• Describe the scope of inference that is appropriate in a statistical study.	83, 87–94, 97–104
9	4.3 Data Ethics (optional topic)	• Evaluate whether a statistical study has been carried out in an ethical manner.	Chapter 4 Review Exercises
10	Chapter 4 Review/FRAPPY!		Chapter 4 AP® Practice Exam
11	Chapter 4 Project		Presentations

Chapter 5

Day	Topics	**Learning Objectives** Students will be able to…	**Suggested assignment**
1	5.1 The Idea of Probability, Myths about Randomness	• Interpret probability as a long-run relative frequency.	1, 3, 7, 9, 11
2	5.1 Simulation	• Use simulation to model chance behavior.	15, 17, 19, 23, 25
3	5.2 Probability Models, Basic Rules of Probability	• Determine a probability model for a chance process. • Use basic probability rules, including the complement rule and the addition rule for mutually exclusive events.	27, 31, 32, 39, 41, 43, 45, 47
4	5.2 Two-Way Tables, Probability, and the General Addition Rule, Venn Diagrams and Probability	• 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.	29, 33–36, 49, 51, 53, 55
5	5.3 What Is Conditional Probability?, The General Multiplication Rule and Tree Diagrams,	• 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.	57–60, 63, 65, 67, 71, 73, 77, 79
6	5.3 Conditional Probability and Independence: A Special Multiplication Rule	• Determine whether two events are independent. • When appropriate, use the multiplication rule for independent events to compute probabilities.	81, 83, 85, 89, 91, 93, 95, 97–99
7	Chapter 5 Review/FRAPPY!		Chapter 5 Review Exercises
8	Chapter 5 Test		

Chapter 6

Day	Topics	**Learning Objectives** Students will be able to…	Suggested assignment
1	Chapter 6 Introduction, 6.1 Discrete Random Variables, Mean (Expected Value) of a Discrete Random Variable	• Compute probabilities using the probability distribution of a discrete random variable. • Calculate and interpret the mean (expected value) of a discrete random variable.	1, 3, 5, 7, 9, 11, 13
2	6.1 Standard Deviation (and Variance) of a Discrete Random Variable, Continuous Random Variables	• Calculate and interpret the standard deviation of a discrete random variable. • Compute probabilities using the probability distribution of a continuous random variable.	14, 15, 17, 18, 21, 23, 25
3	6.2 Linear Transformations	• Describe the effects of transforming a random variable by adding or subtracting a constant and multiplying or dividing by a constant.	27–30, 35, 37, 39–41, 43, 45
4	6.2 Combining Random Variables, Combining Normal Random Variables	• 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.	47, 49, 51, 53, 55, 57–59, 61
5	6.3 Binomial Settings and Binomial Random Variables, Binomial Probabilities	• Determine whether the conditions for using a binomial random variable are met. • Compute and interpret probabilities involving binomial distributions.	63, 65, 66, 69, 71, 73, 75, 77
6	6.3 Mean and Standard Deviation of a Binomial Distribution, Binomial Distributions in Statistical Sampling	• Calculate the mean and standard deviation of a binomial random variable. Interpret these values in context.	79, 81, 83, 85, 87, 89
7	6.3 Geometric Random Variables	• Find probabilities involving geometric random variables.	93, 95, 97, 99, 101–104
8	Chapter 6 Review/FRAPPY!		Chapter 6 Review Exercises
9	Chapter 6 Test		

EXAM REVIEW: 3 DAYS

SEMESTER 1 EXAM: Simulated AP format with Multiple Choice, Free Response

Chapter 7

Day	Topics	**Learning Objectives** Students will be able to…	**Suggested assignment**
1	Introduction: German Tank Problem, 7.1 Parameters and Statistics	• Distinguish between a parameter and a statistic.	1, 3, 5
2	7.1 Sampling Variability, Describing Sampling Distributions	• 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.	7, 9, 11, 13, 15, 17, 19
3	7.2 The Sampling Distribution of $\hat{p}$, Using the Normal Approximation for $\hat{p}$.	• Find the mean and standard deviation of the sampling distribution of a sample proportion $\hat{p}$. Check the 10% condition before calculating $\sigma_{\hat{p}}$. • Determine if the sampling distribution of $\hat{p}$ is approximately Normal. • If appropriate, use a Normal distribution to calculate probabilities involving $\hat{p}$.	21–24, 27, 29, 33, 35, 37, 39
4	7.3 The Sampling Distribution of $\overline{x}$: Mean and Standard Deviation, Sampling from a Normal Population	• Find the mean and standard deviation of the sampling distribution of a sample mean $\overline{x}$. Check the 10% condition before calculating $\sigma_{\overline{x}}$. • If appropriate, use a Normal distribution to calculate probabilities involving $\overline{x}$.	43–46, 49, 51, 53, 55
5	7.3 The Central Limit Theorem	• Explain how the shape of the sampling distribution of $\overline{x}$ is affected by the shape of the population distribution and the sample size. • If appropriate, use a Normal distribution to calculate probabilities involving $\overline{x}$.	57, 59, 61, 63, 65–68
6	Chapter 7 Review/FRAPPY!		Chapter 7 Review Exercises
7	Chapter 7 Test		Cumulative AP® Practice Exam 2

Chapter 8

Day	Topics	**Learning objectives** Students will be able to…	Suggested assignment
1	Chapter 8 Introduction; 8.1 The Idea of a Confidence Interval, Interpreting Confidence Intervals and Confidence Levels	• Interpret a confidence interval in context. • Interpret a confidence level in context.	1, 3, 5, 7, 9
2	8.1 Constructing a Confidence Interval; Using Confidence Intervals Wisely	• Determine the point estimate and margin of error from a confidence interval. • Describe how the sample size and confidence level affect the length of a confidence interval. • Explain how practical issues like nonresponse, undercoverage, and response bias can affect the interpretation of a confidence interval.	10, 11, 13, 15, 17, 19
3	8.2 Conditions for Estimating *p*, Constructing a Confidence Interval for *p*, Putting It All Together: The Four-Step Process	• State and check the Random, 10%, and Large Counts conditions for constructing a confidence interval for a population proportion. • Determine critical values for calculating a *C*% confidence interval for a population proportion using a table or technology. • Construct and interpret a confidence interval for a population proportion.	20–24, 31, 33, 35, 37
4	8.2 Choosing the Sample Size	• Determine the sample size required to obtain a *C*% confidence interval for a population proportion with a specified margin of error.	39, 41, 43, 45, 47
5	8.3 The Problem of unknown σ, When σ Is Unknown: The *t* Distributions, Conditions for Estimating μ	• Explain how the *t* distributions are different from the standard Normal distribution and why it is necessary to use a *t* distribution when calculating a confidence interval for a population mean. • Determine critical values for calculating a *C*% confidence interval for a population mean using a table or technology. • State and check the Random, 10%, and Normal/Large Sample conditions for constructing a confidence interval for a population mean.	49–52, 55, 57, 59
6	8.3 Constructing a Confidence Interval for μ, Choosing a Sample Size	• 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.	61, 65, 69, 71, 73, 75–78
7	Chapter 8 Review/FRAPPY!		Chapter 8 Review Exercises
8	Chapter 8 Test		

Chapter 9

Day	Topics	**Learning Objectives** Students will be able to…	**Suggested assignment**
1	9.1 Stating Hypotheses, The Reasoning of Significance Tests, Interpreting *P*-values, Statistical Significance	• State the null and alternative hypotheses for a significance test about a population parameter. • Interpret a *P*-value in context. • Determine if the results of a study are statistically significant and draw an appropriate conclusion using a significance level.	1, 3, 5, 7, 9, 11, 15
2	9.1 Type I and Type II Errors	• Interpret a Type I and a Type II error in context, and give a consequence of each.	13, 17, 19, 21, 23
3	9.2 Carrying Out a Significance Test, The One-Sample *z* Test for a Proportion	• 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.	25–28, 31, 35, 39, 41
4	9.2 Two-Sided Tests, Why Confidence Intervals Give More Information, Type II Error and the Power of a Test	• 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.	43, 45, 47, 51, 53, 55, 57
5	9.3 Carrying Out a Significance Test for μ, The One Sample *t* Test, Two-Sided Tests and Confidence Intervals	• 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.	59–62, 65, 69, 73, 77, 79
6	9.3 Inference for Means: Paired Data, Using Tests Wisely	• Perform a significance test about a mean difference using paired data.	83, 85, 87, 89–91, 93, 95–102
7	Chapter 9 Review/FRAPPY!		Chapter 9 Review Exercises
8	Chapter 9 Test		

Chapter 10

Day	Topics	**Learning Objectives** Students will be able to…	**Suggested assignment**
1	"Is Yawning Contagious?" Activity, 10.1 The Sampling Distribution of a Difference between Two Proportions	• Describe the shape, center, and spread of the sampling distribution of $\hat{p}_1 - \hat{p}_2$.	1, 3
2	10.1 Confidence Intervals for $p_1 - p_2$	• Determine whether the conditions are met for doing inference about $p_1 - p_2$. • Construct and interpret a confidence interval to compare two proportions.	5, 7, 9, 11
3	10.1 Significance Tests for $p_1 - p_2$, Inference for Experiments	• Perform a significance test to compare two proportions.	13, 15, 17, 21, 23
4	10.2 "Does Polyester Decay?" Activity, The Sampling Distribution of a Difference between Two Means	• Describe the shape, center, and spread of the sampling distribution of $\overline{x}_1 - \overline{x}_2$. • Determine whether the conditions are met for doing inference about $\mu_1 - \mu_2$.	31, 33, 35, 51
5	10.2 The Two-Sample *t* Statistic, Confidence Intervals for $\mu_1 - \mu_2$	• Construct and interpret a confidence interval to compare two means.	25–28, 37, 39
6	10.2 Significance Tests for $\mu_1 - \mu_2$, Using Two-Sample *t* Procedures Wisely	• Perform a significance test to compare two means. • Determine when it is appropriate to use two-sample *t* procedures versus paired *t* procedures.	41, 43, 45, 47, 53, 57–60
7	Chapter 10 Review/ FRAPPY!		Chapter 10 Review Exercises
8	Chapter 10 Test		Cumulative AP® Practice Exam 3

Chapter 11

Day	Topics	**Learning objectives** Students will be able to…	**Suggested assignment**
1	Activity: The Candy Man Can; 11.1 Comparing Observed and Expected Counts: The Chi-Square Statistic; The Chi-Square Distributions and *P*-values	• State appropriate hypotheses and compute expected counts for a chi-square test for goodness of fit. • Calculate the chi-square statistic, degrees of freedom, and *P*-value for a chi-square test for goodness of fit.	1, 3, 5
2	11.1 Carrying Out a Test; Follow-Up Analysis	• 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.	7, 9, 11, 15, 17
3	11.2 Comparing Distributions of a Categorical Variable; Expected Counts and the Chi-Square Statistic; The Chi-Square Test for Homogeneity	• Compare conditional distributions for data in a two-way table. • State appropriate hypotheses and compute expected counts for a chi-square test based on data in a two-way table. • Calculate the chi-square statistic, degrees of freedom, and *P*-value for a chi-square test based on data in a two-way table. • Perform a chi-square test for homogeneity.	19–22, 27, 29, 31, 33, 35, 37, 39
4	11.2 Relationships between Two Categorical Variables; the Chi-Square Test for Independence; Using Chi-Square Tests Wisely	• Perform a chi-square test for independence. • Choose the appropriate chi-square test.	41, 43, 45, 47, 49, 51–55
5	Chapter 11 Review/ FRAPPY!		Chapter 11 Review Exercises
6	Chapter 11 Test		

Chapter 12

Day	Topics	**Learning Objectives** Students will be able to …	**Suggested assignment**
1	Activity: The Helicopter Experiment; 12.1 Sampling Distribution of *b*; Conditions for Regression Inference	• Check the conditions for performing inference about the slope β of the population (true) regression line.	1, 3
2	12.1 Estimating the Parameters; Constructing a Confidence Interval for the Slope	• 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 β of the population (true) regression line.	5, 7, 9, 11
3	12.1 Performing a Significance Test for the Slope	• Perform a significance test about the slope β of the population (true) regression line.	13, 15, 17
4	12.2 Transforming with Powers and Roots	• 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.	19–24, 31, 33
5	12.2 Transforming with Logarithms; Putting it all Together: Which Transformation Should We Choose?	• 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.	35, 37, 39, 41, 43, 45, 47–50
6	Chapter 12 Review/ FRAPPY!		Chapter 12 Review Exercises
7	Chapter 12 Test		Cumulative AP® Practice Test 4

AP EXAM REVIEW (minimum 10 days)

- Practice AP Free Response Questions
- Choosing the Correct Inference Procedure
- Flash cards
- Mock Grading Sessions
- Rubric development by student teams
- Practice Multiple Choice Questions

EXAMPLE AP Statistics reading check quiz (Ch. 1) NAME_____

1. Categorical data: it makes sense that you can find an average for categorical variables. T or F
2. In the displayed graph on the board, we can say there is an association between being male and that his response of "good chance" or "almost certain" is higher versus being female. If there were no association, the graph would should:
    a. Male and female bar heights the same across the board.
    b. Male heights as even higher for "almost certain."
    c. Female heights as higher than males for all categories.
    d. It cannot be determined from the information provided.
3. Describe the shape of the dot plot we made in class about women mathematicians in the company:
    a. Skewed left.
    b. Skewed right.
    c. Symmetric.
    d. Bimodal.
4. When you hear someone talk about the average, most often they are referring to a measure of central tendency called the:
    a. Median.
    b. Mean.
    c. Mode.
5. Using mean versus using median: if a data distribution is strongly skewed, it is advisable to use the _____ because it is more stable and not affected by extremely high or extremely low data points (outliers).
6. Order the five-number summary from least to greatest: Q1, Q3, Maximum, Median, Minimum.
7. Which item measures the typical distance of values in a distribution from the mean?
    a. Variance.
    b. Standard deviation.
    c. Regression.
    d. Correlation.
8. Statistics Problems Demand Consistency: or State, Plan, Do, Conclude. This is the same thing you learned in prior math courses when solving word problems: APSC, Analyze, Plan, Solve, Check. Discuss.

9. You would most likely choose to use a box plot when:
    a. Examining side-by-side comparisons of more than one distribution.
    b. To display categorical data.
    c. You want to get a feel for the shape of the distribution.
    d. Your data consists of only a small sample size.
10. When you look at the data in any graph, there are four things you should always try to identify.
    a. Shape, center, spread, outliers.
    b. Mean, median, standard deviation, variance.
    c. Correlation, regression, z-score, histogram.
    d. Bar graph, dot plot, box plot, distribution.

AP Stats Project #1: Exploring Univariate Quantitative Data

Introduction—The purpose of this project is for you to engage with a set of quantitative data that you find interesting. You will apply all the tools for analysis learned in the initial chapter to create graphical displays of the data and state your findings, in context, in a report. This is terrific practice for free-response questions on the real AP exam in May! Complete your project in Word and attach screen shots of the graphical displays from your TI-Nspire as needed. Follow this project outline and refer to the performance rubric to ensure you meet expectations.

I. Locate a set of quantitative data of interest to you for analysis in a newspaper, magazine, research journal, or the internet. Your data set should include **at least 50** individual data points.
   a. Describe your data set.
   b. Give its web address.
   c. Describe what you intend to investigate.
   d. Include background information about your data so that the project becomes interesting to the reader (your audience is your teacher and fellow statistic colleagues).
   e. You may include photos from the website or consulted journal here if you wish.

II. Create appropriate graphs (stemplot, boxplot, dotplot, histogram, etc.) of your data set.
   a. Include at least two graphical displays appropriate for your quantitative variables.
   b. Be sure to label both axes correctly.
   c. Use appropriate scales for your y-axis.

III. Calculate appropriate summary statistics (measures of center and spread) for your data set.
   a. Determine, based on the shape of your data in the graphs you created, which measures of center and spread to use.
   b. Calculate appropriate measures of center and spread by hand (show your work) or using technology (state which measure you used from the calculator printout, recall, there is S and σ for standard deviation).
   c. Use graphs from part II to determine if you need to calculate outliers. If so, do so using the 1.5 x IQR rule.
   d. Create a summary table of your statistical calculations.

IV. Write a narrative, in context, based on analysis of your graph(s) and summary statistics. (This will take at least 250 words, probably more.) Be sure to address, at a minimum, the following items (feel free to include others if they contribute to your analysis):
   a. Shape—is the shape clear or does one type of graph more clearly show a shape than another? In the display, does scaling make any difference in the overall

shape? Is the data skewed or symmetric? How will this affect which measures of center and spread you should use?

b. Unusual features, such as outliers and gaps—are there any outliers? How do you know? If so, identify them and either justify eliminating them or explain their presence.
c. Spread—What percentage of your data points are within one standard deviation of the mean? Or perhaps you used IQR? Discuss the middle 50% of your data in context.
d. Use appropriate terminology.
e. Write in complete, grammatically correct sentences.
f. Once more: context, context, context! What does it all mean? How can this data help you or someone else make an informed decision?

V. Submit electronically via Google Classroom or e-mail by September 29, 2017.

GRADING RUBRIC

Source Documentation and Quantity of Data			
Essentially Correct	***High Partially Correct***	***Low Partially Correct***	***Incorrect***
• The student selected a source appropriate for the assignment. • The student correctly referenced the source. • The source contains at least 50 individual data points.	• The student selected a source appropriate for the assignment. EITHER • The student made a citation error. OR • The source does not contain at least 50 individual data points.	• The student selected a source appropriate for the assignment. • The student failed to cite the source.	• The student selected an inappropriate source for the assignment.
Accuracy of Graphs			
Essentially Correct	***High Partially Correct***	***Low Partially Correct***	***Incorrect***
After selecting an appropriate source for this assignment, • The student has used all required statistical techniques	After selecting an appropriate source for this assignment, • The student has generally used each of the required	After selecting an appropriate source for this assignment, • The student has used some of the required statistical	After selecting an appropriate source for this assignment, • The student's use of statistical techniques is majorly flawed or

correctly and appropriately. • The student has included at least two appropriate graphs for the data. • The student has labeled both the x and y axes appropriately on selected graphs. • The y-axis scale is clear and appropriate.	statistical techniques correctly and appropriately, with only minor omissions or errors. • The student has included at least two appropriate graphs for the data. • The student has labeled both the x and y axes appropriately on selected graphs. • The y-axis scale is clear and appropriate.	techniques correctly and appropriately, with a plethora of minor omissions or errors. • The student has included one appropriate graph for the data. • The student has labeled both the x and y axes appropriately on selected graph. • The y-axis scale is somewhat misleading.	completely inappropriate. • The student has included one or no appropriate graph for the data. • The student has mislabeled or forgotten to label the x and y axes appropriately on selected graph. • The y-axis scale is misleading.
<u>Accuracy of Summary Statistics</u>			
Essentially Correct	***High Partially Correct***	***Low Partially Correct***	***Incorrect***
After selecting an appropriate source for this assignment, • The student has calculated all required statistical techniques correctly and appropriately. • The student has included appropriate measures for center. • The student has included appropriate measures for spread.	After selecting an appropriate source for this assignment, • The student has generally calculated each of the required statistical techniques correctly and appropriately, with only minor omissions or errors. • The student has included appropriate measures for center.	After selecting an appropriate source for this assignment, • The student has calculated some of the required statistical techniques correctly and appropriately, with a plethora of minor omissions or errors. • The student has included appropriate measures for center. • The student has included	After selecting an appropriate source for this assignment, • The student's use of statistical calculations is majorly flawed or completely inappropriate. • The student has included appropriate measures for center. • The student has included appropriate measures for spread.

• The student correctly assessed the necessity of outlier calculations and performed them perfectly.	• The student has included appropriate measures for spread. • The student correctly assessed the necessity of outlier calculations, but made minor errors in calculations.	appropriate measures for spread. • The student determined that outlier calculations were necessary, but major flaws in the calculations or only rough estimates were given.	• The student failed to determine the necessity for outlier calculations.
<u>Quality of Analysis in Context</u>			
Essentially Correct	***High Partially Correct***	***Low Partially Correct***	***Incorrect***
• The student thoroughly and accurately analyzes the data set based on the statistical techniques employed, in the context of the data. • Correct terminology is used throughout the report. • Justification for selected measures of center and spread are correct and thorough. • The connection to context is clear.	• The student accurately analyzes the data set based on the statistical techniques employed, in the context of the data. • Correct terminology is generally used in the report. • There are only minor omissions or errors. • Justification for selected measures of center and spread are correct but skimpy. • The connection to context is clear.	• The student in generally analyzes the data set based on the statistical techniques employed, in the context of the data. • Correct terminology is used sparingly in the report. • There may be key omissions or inaccurate conclusions made. • No justification for selected measures of center and spread (which is correctly selected) is provided.	• The student attempted to analyze the data using statistical techniques, but missed key ideas. • Terminology in the report is inadequate or missing. • Key omissions or inaccurate conclusions are made. • Measures of center and spread selected are incorrect. • There is inadequate or missing connection to context.

		• There may be an inadequate connection to context.	
<u>Organization, Transition, Appearance, Calculations Shown</u>			
Essentially Correct	***High Partially Correct***	***Low Partially Correct***	***Incorrect***
• The student carefully organized the report. • There is natural flow from statistical techniques to analysis. • The report is neat in appearance. • The calculations for measures of center and spread are included (or equivalent calculator printout), complete, and easy to find in a summary table.	There are minor flaws in one of these areas: • Organization. • Transition/flow. • Appearance. • Calculation for measures of center and spread. • Summary table of statistics.	There are major flaws in of these areas OR minor flaws in two or more: • Organization. • Transition/flow. • Appearance. • Calculation for measures of center and spread. • Summary table of statistics.	Two or more of these areas are completely inadequate: • Organization. • Transition/flow. • Appearance. • Calculation for measures of center and spread. • Summary table of statistics.
<u>English Mechanics</u>			
Essentially Correct	***High Partially Correct***	***Low Partially Correct***	***Incorrect***
• The student uses correct grammar. • The student punctuates properly. • The student writes coherently, exhibiting logical	The student has a minor flaw in one of these areas: • Correct grammar. • Proper punctuation. • Logical flow/coherence. • Spelling.	The student has a major flaw in one of these areas or minor flaws in two or more: • Correct grammar. • Proper punctuation. • Logical flow/coherence. • Spelling.	The student has major flaws in two or more of these areas: • Correct grammar. • Proper punctuation. • Logical flow/coherence. • Spelling.

flow from one point to the next. • The student commits no spelling mistakes.			

AP Scoring Guidelines (abbreviate the above categories with E, HP, LP, and I)

4 Complete Response (100%)

At least five parts E with a maximum of one part HP.

3 Substantial Response (85%)

At least four parts E and maximum of two parts LP or better.

OR Five parts E with one I.

OR All parts at least HP.

2 Developing Response (70%)

At least three parts E and the rest at least LP.

OR Two parts E and the rest HP.

OR All parts HP.

1 Minimal Response (55%)

Any combination of other results less than those listed above (for example, two parts I)

Chapter 4 Project*:* Students work in teams of 2 to design and carry out an experiment to investigate response bias, write a summary report, and give a 10 minute oral synopsis to their classmates. *See rubric below.*

GRADING RUBRIC

Response Bias Project	4 = Complete	3 = Substantial	2 = Developing	1 = Minimal
Introduction	• Describes the context of the research • Has a clearly stated question of interest • Provides a hypothesis about the question of interest • Question of interest is of appropriate difficulty	• Introduces the context of the research and has a specific question of interest • Suggests hypothesis OR has appropriate difficulty	• Introduces the context of the research and question of interest OR has question of interest and a hypothesis	• Briefly describes the context of the research
Data Collection	• Method of data collection is clearly described • Includes appropriate randomization • Describes efforts to reduce bias, variability, confounding • Quantity of data collected is appropriate	• Method of data collection is clearly described • Some effort is made to incorporate principles of good data collection • Quantity of data collected is appropriate	• Method of data collection is described • Some effort is made to incorporate principles of good data collection	• Some evidence of data collection
Graphs and Summary Statistics	• Raw data is included in a two-way table (categorical) or in lists (quantitative) • Appropriate graphs are included • Graphs are neat, easy to compare, and clearly labeled, including clear identification of treatments • Appropriate summary statistics are included in discussion (e.g., percentages for categorical data, means for quantitative data)	• Appropriate graphs are included • Graphs are neat, clearly labeled, and easy to compare • Appropriate summary statistics or raw data are included	• Graphs and summary statistics are included	• Graphs or summary statistics are included
Conclusions	• 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.)	• Makes a correct conclusion • Discusses what inferences are appropriate or shows good evidence of critical reflection	• Makes a partially correct conclusion • Shows some evidence of critical reflection	• Makes a conclusion

Poster, Presentation, & Communication	• Has a clear, holistic understanding of the project • Poster is well organized, neat, and easy to read • Poster included pictures of data collection in progress and is visually appealing • Oral is well organized	• Has a clear, holistic understanding of the project, but poster is unorganized, lacks visual appeal, or oral presentation is not organized	• The poster and oral presentation have several problems	• Commun-ication and organizatio n are poor

After the AP® Exam: Final Project *(See rubric on next page)*

Purpose: The purpose of this project is for you to 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 (25 points): 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.

Poster (75 points):

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

Presentation: You will be required to give a 5 minute oral presentation to the class.

Rubric for Final Project

Final Project	4 = Complete	3 = Substantial	2 = Developing	1 = Minimal
Introduction	• 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	• Introduces the context of the research and has a specific question of interest • Has correct parameter/ hypotheses OR has appropriate difficulty	• Introduces the context of the research and has a specific question of interest OR has question of interest and parameter/ hypotheses	• Briefly describes the context of the research
Data Collection	• Method of data collection is clearly described • Includes appropriate randomization • Describes efforts to reduce bias, variability, confounding • Quantity of data collected is appropriate	• Method of data collection is clearly described • Some effort is made to incorporate principles of good data collection • Quantity of data is appropriate	• Method of data collection is described • Some effort is made to incorporate principles of good data collection	• Some evidence of data collection
Graphs and Summary Statistics	• 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	• Appropriate graphs are included • Graphs are neat, clearly labeled, and easy to compare • Appropriate summary statistics are included	• Graphs and summary statistics are included	• Graphs or summary statistics are included
Analysis	• 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	• Correct inference procedure is chosen • Lacks justification, lacks interpretation, or makes a calculation error	• Correct inference procedure is chosen • Test statistic/*P*-value or confidence interval is calculated correctly	• Inference procedure is attempted
Conclusions	• 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.)	• Makes a correct conclusion • Discusses what inferences are appropriate • Shows some evidence of critical reflection	• Makes a partially correct conclusion (such as accepting null). • Shows some evidence of critical reflection	• Makes a conclusion
Overall Presentation/ Communication	• Clear, holistic understanding of the project • Poster is well organized, neat and easy to read	• Clear, holistic understanding of the project • Statistical vocabulary is used correctly	• Poster is not well done or communication is poor	• Communication and organization are very poor

	• Statistical vocabulary is used correctly • Poster is visually appealing	• Poster is unorganized or isn't visually appealing,		

Please detach, fill out, sign, and return within 5 days as part of your 30 participation points.

AP Statistics 2019-2020

We have received and read the course syllabus. We understand that e-mail is a great way to stay in contact, should we have any questions, feedback, or comments about your instruction. We understand you are available for extra help per the schedule given above. Finally, please contact us if needed via the provided method(s) below.

E-mail: _____ Phone: _____

Parent/Guardian Name: _____ Student Name: _____

Parent/Guardian Signature: _____ Student Signature: _____

Date: _____

Additional comments, concerns, questions: