

AP STATISTICS

Course Description

AP Statistics is the high school equivalent of a one semester, introductory college statistics course. In this course, 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 phenomena. Sampling distributions provide the logical structure for confidence intervals and hypothesis tests. Students use a TI-84 graphing calculator and computer based statistical software to investigate statistical concepts. To develop effective statistical communication skills, students are required to prepare frequent written and oral analyses of real data. Students will also work in groups to complete projects based on real world statistical applications. Projects will require them to collect, analyze and interpret data.

Course Pre Requisite

Students entering grade ten, eleven or twelve who have successfully completed algebra II. Each student will be required to complete a summer A.P. Statistics packet, which will develop a solid foundation for student's success in the course.

Primary Textbook References and Resource Materials

(Noted with the following letters in the course outline)

- Text: The Practice of Statistics (5th edition), by Yates, Moore, and Starnes, W. H. Freeman & Co., 2008. ISBN-10: 1-4641-0873-0 ISBN-13: 978-1-4641-0873-0
- Texas Instruments TI-84 graphing calculator
- Other resource material
- Computer software
- Worksheets for introduction, reinforcement and/or review
- Homework problems assignments assigned from TPS book
- Activities and projects (short and/or long term)
- AP practice multiple choice and/or free response problems

Course Outline

Unit	Topics	Type of Assignments	Timeline
1 Exploring Data	Bar graphs, pie charts, two way tables, marginal distributions relationships between categorical variables, dot plots, describing shape, comparing distributions, stemplots, histograms, measuring center mean and median, comparing mean and median, measuring spread: IQR, identifying outliers, 5-number summary, boxplots, measuring spread with standard deviation, choosing center and spread	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Matching graphs -Getting to know you -Hiring Discrimination ▪ Case Study (TPS) ▪ Unit Test 	9 days
2 Modeling Distributions of Data	Measuring position, percentiles, cumulative relative frequency graphs, z-scores, transforming data, density curves, 68-95-99.7 rule, standard normal distribution, normal distribution calculations, assessing normality	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	7 days
3 Describing Relationships	Explanatory and response variables, scatterplots, measuring linear association, correlation, least squares regression line, prediction, residuals, calculating LSRL, residual plots, r and r^2 , interpreting regression	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -CSI: missing cookies ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	8 days
4 Designing Studies	Sample surveys, random sampling methods, inference for sampling, observational studies, experiments, blocking, class experiments	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Federalist Papers -Distracted Driving -Heart Beating -Response Bias ▪ Case Study (TPS) ▪ Unit Test ▪ Cumulative Test 1 ▪ 	12 days
5	Probability, simulation, rules of	<ul style="list-style-type: none"> ▪ Homework examples 	

Probability: What Are the Chances?	probability, venn diagrams and probability, conditional probability, independence	<ul style="list-style-type: none"> ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -1 in 6 wins -Investigate Randomness ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	8 days
6 Random Variables	Discrete random variables, expected value, standard deviation and variance of a discrete random variable, continuous random variables, linear transformations, normal random variables, binomial settings and binomial random variables, binomial probabilities, mean and standard deviation of a binomial distribution, geometric random variables	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Lucky Day? ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	9 days
7 Sampling Distributions	Parameters and statistics, sampling variability, describing sampling distributions, sampling distribution of \hat{p} , using the normal approximation of \hat{p} , sampling distribution of \bar{x} , mean and standard deviation sampling from normal population, central limit theorem	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -German Tank -Reach for Chips -Sampling Heights -Candy Machine -Pennies ▪ Applets ▪ Case Study (TPS) ▪ Unit Test ▪ Cumulative Test 2 	7 days
8 Estimating with Confidence	Confidence intervals, confidence levels, constructing confidence intervals, conditions for estimating p, constructing confidence intervals for p, four step process, choosing sample size, problem of unknown σ , t-distributions, conditions for estimating μ , constructing confidence interval for μ	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Mystery Mean -Beads ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	8 days
9	Stating hypotheses, significance tests,	<ul style="list-style-type: none"> ▪ Homework examples 	

Testing a Claim	interpreting p-values, statistical significance, type I and II errors, one-sample z test for a proportion, two-sided tests, power of a test, carrying out significance test for μ , one sample t test, two-sided tests and confidence intervals, inference for means: paired data	<ul style="list-style-type: none"> ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Free Throw Shooter -Power of a Test -Investigate Power ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	8 days
10 Comparing Two Populations or Groups	Sampling distribution of a difference between two proportions, confidence intervals for $p_1 - p_2$, significance tests for $p_1 - p_2$, two-sample t statistic, confidence intervals for $\mu_1 - \mu_2$, significance tests for $\mu_1 - \mu_2$	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Yawning Contagious -Polyester ▪ Applets ▪ Case Study (TPS) ▪ Unit Test ▪ Cumulative Test 3 	8 days
11 Inference for Distributions of Categorical Data	Comparing observed and expected counts, chi-square statistic, chi-square distributions and p-values, carrying out a chi-square test, comparing distributions of categorical variable, expected counts and chi-square statistic, chi-square test for homogeneity, chi-square test for independence	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Candyman ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	6 days
12 More about Regression	Sampling distribution of b, conditions for regression inference, constructing confidence interval for slope, performing significance test for slope, transforming with powers and roots, transforming with logarithms	<ul style="list-style-type: none"> ▪ Homework examples ▪ Practice MC and FRQ ▪ Calculator Practice ▪ Class Activities <ul style="list-style-type: none"> -Helicopter Experiment ▪ Applets ▪ Case Study (TPS) ▪ Unit Test 	7 days

AP EXAM REVIEW:

Students will be reviewing throughout the year as well as a review session once all curriculum has been completed.

- Cumulative tests throughout the book (4)
- Practice AP Free response questions
- Mock grading sessions
- Practice multiple choice questions (on unit tests as well as practice throughout the year)
- Timed practice exam with review

GRADING:

Grading in this course will be determined by performance on tests, quizzes, homework, activities, and projects.

According to our district math grading policy the weight of assignments is as follows:

- 10% Homework
 - Homework will be inspected and/or collected. Students may receive full, partial, or no credit depending on effort. Some homework assignments that are collected may be graded for correctness.
- 40% Formative Assessments
 - Formative assessments will include classwork, activities, quizzes, and other in class/take home assignments. Quizzes will be announced ahead of time. Activities will occur during class time, but will often be asked to be finished at home for a grade.
- 50% Summative Assessments
 - Summative assessments will include projects, activities and tests. Tests will be given at the conclusion of each unit. Review material will be provided. Tests will mimic an AP exam with multiple choice and FRQs.

AP STATISTICS EXAM:

Students will take the AP Statistics exam in May (1 day: 3 hours)

POST AP EXAM PROJECT

Students will work in teams of 3 – 4 to design and carry out a survey project on a topic of their selection, write a summary report, and give a 10-15 minute oral synopsis to their classmates. Each student collects data and analyzes it using the techniques learned in the curriculum and prepared a written analysis. Evaluation is done using a 4 point rubric like the AP free response questions.