

AP Statistics Course Syllabus

Course Description

AP Statistics is a full year, college level course exploring statistics concepts. This class teaches and requires students to demonstrate fluent understanding of concepts and procedures, reason abstractly, model with mathematics, analyze data, solve problems, and evaluate conclusions. Throughout the course, students will analyze and solve real-world problems. Students who successfully complete this course will have mastered Statistics standards and will be ready to take the AP Statistics Exam. In alignment with the skills and dispositions detailed in the *Portrait of the Crusader*, students practice solving problems with innovation and imagination; they think critically about the synthesis of data, and they respond with defensible, original work.

Assessment Practices

Throughout the course, teachers strive to include varied assessments, including traditional quizzes and tests to measure skills; problem/solution/explanation opportunities where students solve a complex problem and communicate their reasoning; and, real-world scenarios where students define the problem, develop a plan, and solve the problem. Many assessment opportunities are modeled after the AP Statistics exam.

Essential Questions

1. How do we represent patterns and operations using statistics?
2. How do we interpret and analyze real life situations using statistics?
3. How do we use technology to solve and/or visualize mathematical sentences?

Curriculum Framework

First Quarter:

Summer Work to Reinforce the Skills of Data Analysis

- Identify Qualitative/Quantitative Numbers
- Identify Populations vs. Samples
- Calculate Mean/Median/Mode
- Calculate Quartiles
- Mathematically determine outliers
- Use and evaluate frequency tables
- Calculate variance and standard deviation

Graphing/Displays

- Interpret and create pie charts/histograms/line graphs/box-and-whisker plots
- Evaluate and analyze data from these displays
- Use flow charts to describe experimental design

Sampling & Surveys

- Recognize the different types of sampling methods
- Determine which sampling method to use in specific situations
- Recognize what variable affects data in specific situations

Density Curves

- Describe density curves
- Identify mean and median from the density curves
- Use the Normal Distribution
 - Empirical Rule
 - Properties of the Standard Normal Distribution
 - z-scores and z-lookups

Second Quarter:

Probability

- Review the probability number line
- Explain the Law of Large Numbers
- Determine probabilities with cards & dice
- Describe probability events
- Calculate the complement of an event
- Determine probability intersections and unions
- Identify dependent and independent probability situations
- Identify mutually exclusive probability situations
- Apply the Multiplication Rule
- Use permutations, combinations, and the Fundamental Counting Principle
- Recognize the 3 types of probability: classical, empirical, and subjective
- Create and interpret tree diagrams

Correlation

- Identify response variables and explanatory variables
- Create scatterplots
- Describe the strength of correlation
- Describe correlation based on scatter plots
- Calculate correlation
- Calculate Least Squares Regression Line (LSRL)
- Graph the LSRL

Discrete and Continuous Random Variables

- Use probability distributions
- Identify success and failure
- Determine expected value of a discrete random variable
- Explain binomial settings
- Determine binomial and geometric probability

Third Quarter:

Sampling Distributions

- Identify a statistic and parameter
- Writing AP appropriate responses to sampling distributions
- Describing the shape, center, and variability of a sampling distribution
- Identify specific notation of variables for sampling distributions
- Apply the Central Limit Theorem

Confidence Intervals

- Identify and interpret confidence intervals
- Describe and calculate the margin of error
- Identify and find critical values
- Use one sample z intervals for a population proportion
- Use one sample t intervals for a population mean
- Calculate the standard error
- Find the sample size for desired margin of error

Fourth Quarter:

Hypothesis Testing

- Identify and write the Null and Alternative Hypothesis
- Describe the tails (left, right and two) from the alternative hypothesis
- Describe and identify P-values
- Find significance values
- Identify Type I Error and Type II Errors
- Explain conditions for performing a significance test
- Calculate the standardized test statistic
- Know when to reject or fail to reject the null hypothesis

Comparing Two Proportions/Means

- Use confidence intervals for two proportions
- Use two-sample z intervals for difference between two proportions
- Use two-sample t intervals for difference between two means
- Compare and analyze paired data

Chi-Square Tests

- Use and calculate the chi-square test statistic
- Find P-values for chi-square tests.
- Perform a chi-square test for goodness of fit

Resources

Stats Modeling The World 5th Edition AP Edition

MyMathLab. (mymathlabforschool.com)

Graphing Calculator (Necessary TI-84+)

Desmos application (ISO/Android or [web](#))

Grading Policy

20 % MyMathLab,

25% Quizzes

25% Student Work

30 % Tests