AP Statistics 2019 - 2020

Course Information:

Course Title: AP Statistics	**No. of Credits:** 1.0
Length of Course: Full year	**Grade Levels:** 10 - 12

Instructor Information:

Instructor: Michael George	**E-mail:** georgem@wlwv.k12.or.us
Classroom: E206	**Resource Site:** Google Classroom
Phone: 503-673-7800	
Office Hours: 7:15-8:15 or by appointment.	

Course Description:

The purpose of the AP course in statistics is to introduce students to the major concepts and tools for collecting, analyzing and drawing conclusions from data. Students are exposed to four broad conceptual themes:

1. Exploring Data
2. Sampling and Experimentation
3. Anticipating Patterns
4. Statistical Inference

The study of statistics blends the rigor, calculations, and deductive thinking of mathematics; the real-world examples and problems of the social sciences; the decision-making needs of business and medicine; and the laboratory method and experimental procedures of the natural sciences.

(College Board: Statistics Course Description, 2010)

Student Learning Objectives:

Upon completion of this course the student will be able to:

I. Exploring Data: Describing patterns and departures from patterns (20%–30%) Exploratory analysis of data makes use of graphical and numerical techniques to study patterns and departures from patterns. Emphasis should be placed on interpreting information from graphical and numerical displays and summaries.

II. Sampling and Experimentation: Planning and conducting a study (10%–15%) Data must be collected according to a well-developed plan if valid information on a conjecture is to be obtained. This plan includes clarifying the question and deciding upon a method of data collection and analysis.

III. Anticipating Patterns: Exploring random phenomena using probability and simulation (20%–30%) Probability is the tool used for anticipating what the distribution of data should look like under a given model.

IV. Statistical Inference: Estimating population parameters and testing hypotheses (30%–40%) Statistical inference guides the selection of appropriate models.

(College Board: AP Statistics Teacher's Guide, 2008)

Grading
- Assignments: 25%
- Quizzes/Tests: 60%
- Final: 15%

Grading Information
- Grades will be updated regularly and should be accessible online at least every two weeks.
- Students seeking help can visit during office hours or by appointment.
- Students should take responsibility for communication with their teachers.
- Keep track of your grades/attendance every week.

Course Expectations
- Respect:

- Effort:

- Learn:

- Bathroom - Only 2 students may leave the classroom at a time. No Exceptions! Students will use the sign out sheet and hall pass when leaving the classroom for any reason. Minimize time out of the classroom.
- Cell Phones – Class is not the time or place to be using your cell phone for personal reasons. All cell phones are to be placed in the cell phone holder for the duration of class.
- Plagiarism of any kind, including attempting to pass off someone else's work as your own will result in an automatic zero for the assignment and a referral.
- Attendance is mandatory. Students who miss class for any reason are expected to make up missed work on their own time.
- **Excused Absences**
    - Class progresses when you are absent. It is your responsibility to retrieve the missing assignments and any notes. Find someone who can assist you if you miss class. You have two days to make up an assignment before it is considered late. You should stop in to see me if you are absent!
    - Late assignments are worth C credit or below.
    - If you are absent the day before a test and return the day of the test, you will be expected to take the test. (Tests are posted well in advance and our review day does not include any new information).
    - If you miss a test you will need to make it up within 1 weeks or it will become a zero. You may make up the test during my office hours.

Technology

- You are expected to use a graphing calculator at all suitable times. You need to have a TI-83 or TI-84 because of the statistical features we will be using on it. Appropriate calculator/computer skills will be taught throughout the course.
- You will also have access to a statistical program when necessary. You will also be required to use a statistical program in completing several assignments. The computer programs include Excel, R, Fathom and JMP. We will utilize computers throughout the course

Course Resources

<u>Primary Text</u>

Bock, David E., Velleman, Paul F., and De Veaux, Richard D. *Stats: Modeling the World*. 3rd ed. Boston: Addison-Wesley, 2010.

<u>Additional Resources</u>

Peck, Roxy. Olsen, Chris, Devore, Jay L. *Introduction to Statistics and Data Analysis.* 5th ed. Boston: Cengage Learning, 2016.

Sternstein, Martin. *Barron's: AP Statistics*. 8th ed. New York: Barron's. 2015.

Yates, Daniel S., David S. Moore, and Daren S. Starnes*. The Practice of Statistics*. 5th ed. New York: W. H. Freeman, 2015.

Methodology

This course focuses on real-life applications and decision making.   AP Statistics will feel different from any other math course you have taken before. We will study the mathematical engines that make statistics run, but we will also learn how to effectively read statistical studies (close reading) and how to accurately write descriptions and inferences of data sets (technical writing).

We will use <u>Stats: Modeling the World</u> (Bock, Velleman, De Veaux; abbreviated as BVD) as our primary resource. (Note: it is expected that you actually read the textbook.) From this text (and a few other resources) you will be responsible for completing one Problem Set per chapter. These Problem Sets are how your will develop practice and develop your statistical skills and are therefore crucial to your success in this course. At the end of each chapter your skills will be assessed with a quiz and at the end of each unit (multiple chapters) there will be a test.

Course Outline

Summer Assignment
BVD Chapters: 1-3
Topics Covered:
- What is Statistics and why do we care?
- What is data?
- Describing and displaying categorical data

Unit I: Exploring and Understanding Data
BVD Chapters: 4-6
Time Frame: Week 1 - 4
Topics covered:
- Introductory discussion of independence
- Describing and displaying quantitative data
- Summary statistics for quantitative data
- Outliers
- The normal distribution
- The effect of linear transformations to data sets on summary statistics
    - To include but not limited to: boxplots, dot plots, stem plots, back-to-back stem plots, histograms, frequency plots, and parallel boxplots.

Unit II: Regression
BVD Chapters: 7 - 9
Time Frame: Weeks 5 - 8
Topics covered:
- Displaying and describing scatterplots
- Analyzing two-variable quantitative data:
    - Correlation and the coefficient of determination
    - Least-squares regression
    - Slope and y-intercept
    - Residuals and residual plots
    - Outliers and influential points
- Transformations to achieve linearity

Unit III: Collecting Data (sampling and experimentation)
BVD Chapters: 11 - 13
Time Frame: Weeks 9 - 12
Topics covered:
- Designing surveys via various methods
- Bias in surveys
- Randomization and representative samples (Using graphing calculator)
- Experimental design:
    - Control
    - Random assignment of treatment
    - Replication
    - Placebo & blinding
    - Blocking and matched pairs
    - Confounding and lurking variables
    - Statistically significant difference (introduction)
- Observational studies

Unit IV: Probability
BVD Chapters: 14 - 18
Time Frame: Weeks 13 - 17
Topics covered:
- Basic probability principles including complement, independence and mutually exclusive
- Simulating probability scenarios
- Addition, multiplication and conditional probability rules
- Random variables:
    o Expected value and standard deviation
    o Rules for transforming and combining random variables
- Binomial and geometric distributions
- Sampling distributions for means and proportions

Semester 1 Review Week 18
1st Semester Final Week 19

Unit V: Inference for Proportions
BVD Chapters: 19-22
Time Frame: Weeks 20-24
Topics covered:
- Confidence intervals for one and two proportions
- Hypothesis testing for one and two proportions
- Type I and II errors and power

Unit VI: Inference for Means
BVD Chapters: 23-25
Time Frame: Weeks 25 - 28
Topics covered:
- Confidence intervals for one and two means (with t)
- Hypothesis testing for one and two means (with t)
- Confidence intervals and hypothesis testing for matched pairs means (with t)

Unit VII: Inference for Counts and Slope
BVD Chapters: 26-27
Time Frame: Weeks 29 - 31
Topics covered:
- Chi-square goodness-of-fit
- Chi-square for homogeneity and for independence
- Confidence interval for slope
- Hypothesis testing for slope

Review for the Exam
Time Frame: Week 32-34

AP Stats Exam – May 15th

Unit VIII: ANOVA Tests
BVD Chapters:
Time Frame: Weeks 35 - 36

2nd Semester Final – Cumulative**