# AP STATISTICS SYLLABUS
# 2008-2009

**AP STATISTICS COURSE OUTLINE**

**Prerequisites:**

All students each year come into AP Statistics after taking minimum Algebra 2 the previous year. There are students that take Calculus concurrently. All students, however, must have their current teacher's signature of approval in order to take AP Statistics to ensure appropriate ability.

**Teaching Strategies:**

New topics are explored in a variety of ways including lecture/notes, class activities, group labs and modeling of problem solving techniques. Dice games, M&M (and other food) activities, cards, pennies, and other labs are used throughout the course to aid in the understanding of probability and simulations. Individual projects are required for units in exploring data and sampling and experimentation. Students design a survey including sampling procedures, analysis of data, and a presentation of conclusions. **Writing is stressed** throughout the year with students practicing past AP free response questions on a regular basis. Students are **timed** for all practice questions as well as quizzes and chapter tests so that they get used to pacing themselves on written work. Statistical inference including hypothesis testing, confidence intervals, and tests of significance are taught using the four steps of identifying the parameter of the problem, choosing a procedure and verifying the conditions, showing calculations, and interpreting the answer in context of the problem. Students are encouraged throughout the course to look for statistical use in life and to bring ideas to class for discussion. My goal is for students to see the practicality of statistics and to critically view data and the conclusions drawn from it.

Graphing calculators (TI-83, 84, and 89 models) are used throughout the course to do:
(I use a TI-84+ Edition with an overhead LCD panel)

- Linear Regression
- Graphing of data to determine shape
- Simulations
- Transforming data
- Normal Distributions
- t & z-distributions
- Chi-square procedures
- Scatterplots and correlation

Students are graded in four areas: homework (problem sets which are 5 to 10 problems that cover the chapter), quizzes, special problems/projects, and tests. Homework problems from the text are given daily. Quizzes are given for each section and Chapter tests are given for most chapters.

## UNIT I: Exploratory Data Analysis

**Chapter 1: Exploring Data**

- Displaying distributions with graphs
- Activity – Measures of Spread
- Displaying distributions with numbers
- Comparing distributions of univariate data
- Free response questions and a special problem using chapter one to compare data.
- Quizzes 1.1, 1.2, and Chapter 1 Test

**Chapter 2: The Normal Distributions**

- Density Curves and Normal Distributions
- Dice Experiment
- Standard Normal Calculations
- Normal Distribution Activity
- Quizzes 2.1, 2.2

**Chapter 3: Examining Relationships**

- Scatterplots
- Correlation
- Correlation Activity
- Least-Squares Regression
- Residuals and residual plots
- Special Problem on Chapter 3
- Quizzes 3.1, 3.2, 3.3, and Chapter 3 Test

**Chapter 4: Two-Variable Data**

- Transforming Data (x, logy), (logx, logy), power models
- M&M, cheerios, or paper towel Activity– Exponential growth
- Correlation and regression
- Causation
- Conditional Distributions
- Simpson's Paradox
- Quizzes 4.2 and 4.3

## UNIT II: Sample Design Study

**Chapter 5: Producing Data**

- Design a survey Activity
- Designing Samples
- SRS/Stratified random sampling
- Designing Experiments
- Block Design
- Simulating Experiments
- Simulating Activity
- Quizzes 5.1 & 5.2 and Chapter 5 Test

## UNIT III: Probability

**Chapter 6: Probability and Randomness**

- Dice Activity
- Probability Rules
- Probability Models
- Decision Analysis
- Independence and Dependence
- Conditional Probabilities
- Dice Activity (Casino Lab)
- Quizzes 6.1, 6.2, 6.3, and Chapter 6 Test

**Chapter 7: Random Variables**

- Discrete and Continuous Random Variables
- Means and Variances of Random Variables
- Probability Distributions
- Rules for Means and Variances
- Law of Large Numbers
- Deal or No Deal
- Quizzes 7.1 & 7.2 and Chapter 7 Test

**Chapter 8: Binomial and Geometric Distributions**

- Binomial Distribution
- Binomial Formulas and Simulations
- Normal Approximation for Binomial Distributions
- Geometric Distributions
- Quiz 8.1/8.2

**Chapter 9: Sampling Distributions**

- Sampling Distribution Activity (Simulation of women's height)
- Sampling Distributions
- Sample Proportions Activity
- Sample Proportions
- CLT Activity
- Sample Means
- Central Limit Theorem
- Quizzes 9.1, 9.2, 9.3, and Chapter 9 Test

## UNIT IV: Statistical Inference

**Chapter 10: Introduction to Inference**

- Confidence Interval Activity
- Confidence Intervals and their meaning
- Margin of error
- Choosing sample size
- Inference Activity
- P-values
- One-sided and two-sided significance tests
- Statistical significance and what it means
- Type I &II Error, Power of a Test
- Special Problem – "The Pineapple Problem"
- Quizzes 10.1, 10.2, 10.4, and Chapter 10 Test

**Chapter 11: Inference for Distributions of Means**

- Inference for the mean of a population
- t-distributions
- Comparing two means
- Quizzes 11.1, 11.2

**Chapter 12: Inference for Proportions**

- Proportion Activity (M&M)
- Inference for a population proportion
- Comparing two proportions
- Standard Error
- Choosing sample size
- Pooled sample proportion
- Quizzes 11.1, 11.2

**Chapter 13: Inference for Tables: Chi-Square Procedures**

- GOF Activity (M&M)
- Goodness of Fit Test
- Titanic Exploration
- Test of Homogeneity
- Test of Association/Independence
- Inference for Two-way tables
- Quizzes 13.1, 13.2, and Chapter 11-13 Test

**Chapter 14: Inference for Regression**

- Linear Regression for inference
- Testing the hypothesis of no linear relationship
- Confidence interval vs. Prediction interval
- Regression conditions

**REVIEW FOR AP EXAM**

**TOPICS COVERED AFTER THE AP EXAM**

- Activities and videos
- Complete and present semester-long project on Survey or Experiment

**RESOURCES:**

**Major Text:** Yates, Moore, McCabe, *The Practice of Statistics, Second Edition.* Freeman and Company, 1999.

**References:**


Bohan, *AP Statistics: Preparing for the Advanced Placement Examination.* AMSCO, 2000.

Peck, Olsen, Devore, *Introduction to Statistics and Data Analysis, 2nd Edition.* Brooks/Cole, 2005.

Peterson, *Prep for the AP Exam Guide for Yates, Moore, and Starnes's The Practice of Statistics, 2nd Edition.* Freeman and Company, 2003.

Scheaffer, Gnanadesikan, Watkins, and Witmer, *Activity-Based Statistics.* Springer-Verlag New York, Inc., 1996.

Sternstein, *How to Prepare for the AP Statistics Exam, 2nd Edition.* Barron's Educational Services, Inc., 2000.

Yates, Moore, Starnes, *Golden Resource Binder, Second Edition.* Freeman and Company, 2003.

Yates, Moore, Starnes, *The Practice of Statistics: Student CD, 2nd Edition.* Freeman and Company, 2003.

Bock, Vellman, DeVeaux Stats: Modeling the World.