

ADVANCED PLACEMENT STATISTICS SYLLABUS

AP Statement:

Advanced placement courses often involve some risk-taking on the part of both students and teachers because the experiences are often more exploratory, experimental, and open-ended than the standard classroom experience. In addition, they should be distinguished by a difference in the quality of the work expected, not merely an increase in the quantity, since it is the equivalent to a college level course.

Students may have to devote additional time and effort to AP course work and, in turn, they will have greater opportunities for learning. AP course work should enable students to become actively involved in the literature and content, learn about scholarly and creative processes by participating in them, and personalize the learning experience through imagination, critical analysis, and application. AP students should learn to express and defend their ideas while attaining the distance necessary to accept constructive criticism. AP courses should incorporate opportunities for students to become reflective thinkers who possess the potential to become an initiator of learning and accomplishment, exploring areas of his/her interest within the designated course of study.

Course Description:

AP Statistics is a college-equivalent course for students who have been recommended by their most recent math teacher, and have successfully passed Algebra II. Students are expected to possess the determination and initiative to take on a college-level course, including the corresponding workload. The course follows the AP Statistics curriculum established by the College Board. The objective of this course is to provide an introduction to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students will be exposed to several broad conceptual themes of Statistics such as exploring data, planning a study, modeling and anticipating patterns, and statistical inference.

Performance Standards/Objectives:

www.collegeboard.com

Anticipated Classroom Format:

This course will consist of 4 basic elements. These include homework/in-class assignments and labs, projects and special problems, "Prep for Exam" AP questions, tests and quizzes. Several teaching methods will be implemented, including lecture and discussion, cooperative groups, and hands-on labs and activities. Technology, including graphing calculators and computers, will be an integral part of the course, and students will be expected to use technology as a tool for investigating and applications of learned concepts. However, understanding and application of formulas will also be a requirement.

Resources:

Class text: *Statistics: The Art and Science of Learning From Data – 2nd Ed.*, Agresti and Franklin, Pearson Prentice Hall 2009.

Supplemental Resources:

AP Statistics Summer Institute Resource Binder 2003 by Paul Myers (including worksheets, activities, previous Free- Response questions, etc.); Master Math Mentor (online)-AP Statistics Student Manual

Technology used:

TI-83+/TI-84/TI-84+ graphing calculator
Fathom statistical software
ActivStats statistical software
MiniTab statistical software

| Unit | Time | Topics | Resources |
|------|---------|---|--|
| 1 | 7 weeks | Exploring and Organizing Data <ol style="list-style-type: none"> 1. Display Data w/graphs (with and without the TI-83/84/+ calculator) 2. Describe Data w/Numbers 3. Normal Distributions (use of TI-83/84/+) 4. Z (standardized distrib.) – table, TI-83/84/+ 5. Scatterplots & Correlation 6. Least-squares Regression – formulas, TI-83/84/+ 7. Transforming Data-nonlinear data 8. Categorical Data/Simpson’s Paradox | <i>Chapters 1-3 (Statistics, 2nd ed.)</i> <i>Parking Lot Activity (MMM)</i> <i>McDonald’s Case Study Problem (MMM)</i> <i>Alligator Problem (transforming nonlinear data)</i> Guess the correlation! (Applet) 1997-FR #1, 6 2004B-FR #1 1999-FR #4 2005-FR #3 2000-FR #3 2006-FR #2 |
| 2 | 2 weeks | Planning a Study/Producing Data <ol style="list-style-type: none"> 1. Design Samples 2. Design Experiments 3. Simulate Experiments (Table B, ProbSim and randint on TI-83/84/+) 4. Good vs. Bad Designs 5. Bias and Placebo Effect 6. Drawing Conclusions | <i>Chapter 4 (Statistics, 2nd ed.)</i> <i>Population of Newton (MMM)</i> <i>Survey Project</i> 1999-FR #3 2004-FR #2 2001-FR #4 2006-FR #5 2002-FR #2 2007-FR #2 2003-FR #4 |
| 3 | 7 weeks | Anticipating Patterns & Probability <ol style="list-style-type: none"> 1. Probability Models & Distributions 2. General Probability Rules 3. Discrete Random Variables 4. Continuous Random Variables 5. Means & Variances of Random Variables 6. Binomial Distributions (use of TI-83/84/+) 7. Geometric Distributions (use of TI-83/84/+) 8. Sampling Distributions of Means & Proportions 9. CLT 10. Law of Large Numbers 11. Simulations | <i>Chapters 5-7 (Statistics, 2nd ed.)</i> <i>Game of Craps</i> <i>The Casino Lab</i> <i>Plinko Activity</i> <i>Pennsylvania Powerball Game (MMM)</i> <i>12 Days of Christmas (MMM)</i> 2001-FR #2 2005B-FR #2 2002-FR #3 2007B-Fr #2 2003B-FR #2 2004B-FR #3 |
| 4 | 9 weeks | Statistical Inference <ol style="list-style-type: none"> 1. Confidence Intervals (use of TI-83/84/+) 2. Tests of Significance (use of TI-83/84/+) 3. Making a decision (calculating a p-value) 4. Type I and Type II errors 5. One sample t procedures 6. Two sample/matched pairs t procedures 7. One sample z procedures for proportions 8. Two sample z procedures for proportions 9. Chi-square (goodness of fit, homogeneity, independence) 10. Inference for slope of regression (how to read Minitab output) | <i>Chapters 8-12 (Statistics, 2nd ed.)</i> <i>Flipping Thumbtacks Activity</i> <i>Pineapple Problem</i> <i>Comparing 2 Airplane Designs Activity</i> <i>Population of Newton-Pt. 2 (MMM)</i> 1997-FR #5 2001-FR #6 1998-FR #5 2003-FR #1, 2, 5 1999-FR #6 2007-FR #6 2000-FR #2 2007B-FR #5 |
| 5 | 4 weeks | AP Exam Review (Practice multiple-choice tests and free-response questions, applications and uses of TI-83/84/+) | <i>AP Statistics 3rd ed. By REA</i> <i>Practice Tests</i> <i>Released Exams</i> |
| 6 | 2 weeks | Post-Exam Projects – students to gather data, analyze, and draw conclusions based on results. | <i>End-of-Year Project</i> |

Assessment/Evaluations/Required Student Products:

(Note: All student work should be of college-level quality, since this is a college-equivalent class. Late work accepted due to excused absences only.)

Homework/In-class activities: Problems assigned in class are meant to help students apply concepts recently learned. Questions on the homework will be discussed in class, and it may or may not be collected for a grade. If a student is absent for an in-class lab assignment, an alternative assignment may be given at the discretion of the teacher.

Projects and “Special Problems”: Projects and “Special Problems” will be assigned randomly throughout the course. These will require more time than homework assignments, and must be written in a report format. The report must include statistical evidence of all findings, and communicate clearly all information.

“Prep for Exam”/AP Questions: “Prep for Exam” problems are written in the style of the AP Exam, and are to familiarize students with the form of questions on the exam. Actual AP Exam questions from previous years will also be assigned, with the intent of preparing students for the exam. Both of these will require more time than the average homework assignment, but if given serious effort, will result in the students being better prepared for the exam.

Tests/Quizzes: Tests will be given at the end of each chapter. They will be a combination of multiple choice questions and short answer, similar to the AP Exam. Quizzes will be given at random and are usually unannounced. For this reason, students must be prepared DAILY. Note: It is expected that all students will take the AP Exam. If you do not plan on taking the AP Exam, please notify me immediately.

Attendance: Attendance cannot be emphasized enough in this class. Because of the fast pace of this course, missing one class period can be CRUCIAL to the student’s understanding and success. Attendance will be monitored, and if necessary, a student and/or parent conference may be recommended.

Grading Plan:

Evaluation will be done using the following breakdown:

| | | |
|----|---|-----|
| 1. | Homework (daily work, special problems, labs, etc.) | 10% |
| 2. | Tests and Quizzes | 90% |

Strategies for Student Learning:

These research proven strategies have a strong effect on student achievement; therefore, in this math class, students will:

- Identify similarities and differences
- Summarize and take notes
- Reinforce effort and provide recognition
- Complete homework / practice
- Represent in nonlinguistic manners
- Learn cooperatively
- Set objectives and provide feedback
- Generate and test hypotheses
- Answer questions, cues, and create advance organizers

Academic Honesty:

The student is urged to seek truth and beauty in and for themselves, as well as skills needed for a productive life. Academic honesty is essential in preserving one's own integrity, the integrity of the school, and in gaining a true education. The student pledges not to lie, cheat, or steal in the pursuit of his or her studies and is encouraged to report those who do. Improper academic conduct on the part of the student shall be interpreted to mean the obtaining and using of information during an examination by means other than those permitted by the teacher, including the supplying of such information to other students. Improper academic conduct shall also include plagiarism, i.e., the purchase and use of ghost-written papers and reports, or incorporating into a report, term theme, research paper, or project, ideas and information obtained from another person without giving credit to the person from whom such information was obtained. Further, inclusion of the published or unpublished writings of another person without duly noting these sources according to normal scholarly procedures shall be considered plagiarism. The above definition of academic misconduct applies equally to improper use of electronic sources of information and opinion (adapted from <http://www.westga.edu/~vpaa/handrev/207>).

Materials:

Students must have a 3-ring binder and paper, preferably a pencil, and a graphing calculator, preferably a TI-83/TI-83+/TI-84/TI-84+. If acquiring these materials is a problem, please discuss this immediately with your teacher. All students have access to a computer and the Internet here at school, but having this outside of class is highly recommended, since it will be used as a resource for projects and special assignments.