AP Statistics Syllabus
Fall 2010

Purpose

I have two goals in teaching AP Statistics. The first is to provide enough knowledge of statistics that you can continue to use it in college and career applications. The second is to help you pass the AP Statistics exam with the highest score possible.

Course Materials

The text for AP Statistics is *Introduction to Statistics and Data Analysis* by Peck, Olsen and Devore. In addition to the text, you will need a TI-84 (or TI-83) graphing calculator. We will also allow use of the TI-Nspire CAS, which can be used on the AP Statistics Exam. It would be helpful if everyone could bring 2 three-ring notebooks to organize our class work. I will provide most of the remaining materials needed for the class. Individuals may wish to purchase additional materials to help study for the AP exam.

Course Outline

Chapter 1 and 2 7 blocks

1.1 Three Reasons to Study Statistics
1.2 The Nature and Role of Variability
1.3 Statistics and Data Analysis
1.4 Types of Data and Some Simple Graphical Displays

Activity – Ping Pong Launch

2.1 The Data Analysis Process
2.2 Sampling
2.3 Statistical Studies: Observation and Experimentation
2.4 Simple Comparative Experiments
2.5 More on Experimental Design
2.7 Communicating and Interpreting the Results of Statistical Analyses

Activity – The Stroop Effect

Chapter 3 5 blocks

3.1 Displaying Categorical Data: Bar Charts and Pie Charts
3.2 Displaying Numerical Data: Stem-and-Leaf Displays
3.3 Displaying Numerical Data: Frequency Distributions and Histograms
3.4 Displaying Bivariate Numerical Data
3.5 Communicating and Interpreting the Results of Statistical Analyses

Activity – Locating States

Chapter 4 6 blocks

4.1 Describing the Center of a Data Set
4.2 Describing Variability in a Data Set
4.3 Summarizing a Data Set: Boxplots
4.4 Interpreting Center & Variability: Chebyshev's Rule, Empirical Rule, z scores
4.5 Communicating and Interpreting the Results of Statistical Analyses

Activity – Data Collection

Chapter 5 6 blocks

5.1 Correlation
5.2 Linear Regression: Fitting a Line to Bivariate Data
5.3 Assessing the Fit of a Line
5.4 Nonlinear Relationships and Transformations
5.5 Communicating and Interpreting the Results of Statistical Analyses

Activities – Transforming Data (with M&M's)
Spring Break

Chapter 6 8 blocks

6.1 Chance Experiments and Events
6.2 Definition of Probability
6.3 Basic Properties of Probability
6.4 Conditional Probability
6.5 Independence
6.6 Some General Probability Rules
6.7 Estimating Probabilities Empirically and Using Simulation

Activities – ESP Test
Monty Hall Problem
Flipping Hershey Kisses
Flipping Thumb Tacks
Is This a Fair Coin?

Chapter 7 9 blocks

7.1 Random Variables
7.2 Probability Distributions for Discrete Random Variables
7.3 Probability Distributions for Continuous Random Variables
7.4 Mean and Standard Deviation of a Random Variable
7.5 The Binomial and Geometric Distributions
7.6 Normal Distributions
7.7 Checking for Normality and Normalizing Transformations

7.8 Using the Normal Distribution to Approximate a Discrete Distribution

Activity – Odd and Even

Chapter 8 4 blocks

8.1 Statistics and Sampling Variability
8.2 The Sampling Distribution of a Sample Mean
8.3 The Sampling Distribution of a Sample Proportion

Chapter 9 5 blocks

9.1 Point Estimation
9.2 Large-Sample Confidence Interval for a Population Proportion
9.3 Confidence Interval for a Population Mean
9.4 Communicating and Interpreting the Results of Statistical Analyses

Activity – The Age of a Penny

Chapter 10 5 blocks

10.1 Hypotheses and Test Procedures
10.2 Errors in Hypothesis Testing
10.3 Large-Sample Hypothesis Tests for a Population Proportion
10.4 Hypothesis Tests for a Population Mean
10.5 Power and the Probability of Type II Error
10.6 Communicating and Interpreting the Results of Statistical Analyses

Activity – Hypothesis Testing of Consumer Goods

Chapter 11 5 blocks

11.1 Inferences Concerning the Difference Between Two Population or Treatment Means Using Independent Samples
11.2 Inferences Concerning the Difference Between Two Population or Treatment Means Using Paired Samples
11.3 Large-Sample Inferences Concerning a Difference Between Two Population or Treatment Proportion
11.5 Communicating and Interpreting the Results of Statistical Analyses

Activity – Do Double Stuf Oreos Really Have Double the Stuff?

Chapter 12 4 blocks

12.1 Chi-Square Tests for Univariate Categorical Data
12.2 Tests for Homogeneity and Independence in a Two-Way Table
12.3 Communicating and Interpreting the Results of Statistical Analyses

Activity – M&Ms Goodness of Fit Test

Chapter 13 5 blocks

13.1 The Simple Linear Regression Model
13.2 Inferences About the Slope of the Population Regression Line
13.3 Checking Model Adequacy
13.6 Communicating and Interpreting the Results of Statistical Analyses

Tests and quizzes - for all chapters will be from the test bank that accompanies the Peck, Olsen, DeVore text. These tests reflect the content and style used on the AP exam.

If things go as scheduled, most of the text material should be completed by mid-March. This would give us a bit more than a month to review and take practice tests for the AP exam. Any time remaining after the AP Exam will be used to create final projects for the class or to cover any remaining topics of interest.

Use of Technology – Our primary tool for performing statistical analysis in this course will be the TI-84 (or TI-83), or the TI-Nspire CAS. You will find this technology very useful in speeding up some of the tedious number crunching used in statistics. We will become familiar with Minitab output from the text, and we will use some online statistical tools (like SISA or SOCR). We can also do some interesting probability simulations, both online and with calculators.

Guidelines for Written Projects – There will be times throughout the year when students will be asked to turn in a written report related to an activity, or summarize an article on statistics. The following guidelines apply to this written work:

1) Include any data that was collected for the activity. It can be typed or handwritten. Also include appropriate charts or graphs.

2) Include any statistical formulas needed for the analysis, and show the numerical computations that were used.

3) The length of written analysis will vary, but the style used will be the same as taught in our language arts classes (that means use MLA style).

There will also be times when oral reports are given.

Experimental Design – We will discuss experimental design early in the course (Chapter 2), and make reference to it frequently throughout the course. Even though there may not be a lot of numbers involved, the experimental design question on the free response portion of the AP Exam may be the most difficult. We will design experiments and use our own data whenever possible. Here are some things to consider when designing an experiment:

1) What is the research question (what am I trying to find out)? What variables are involved?

2) What sampling method should be used? Am I sampling from the population of interest?

3) What is the role of randomization?

4) How can I control extraneous variables? How should I use blocking?

5) Is there replication?

6) Did I conduct an experiment or observational study? How does this affect my conclusion?

Grading

The standard CHS grading scale will be used for all work:

100% - 90% = A, 89% - 80% = B, 79% - 70% = C, 69% - 60% = D, 59% - 00% = F

Quarter grades will be determined (roughly) as follows:

Tests = 50%, Quizzes = 30%, Homework/Projects = 20%
Semester Grades will be determined (roughly) as follows:

1^{st} Quarter = 50%, 2^{nd} Quarter = 50%

Some adjustment in these stated guidelines may occur.

I look forward to an interesting year working with you in AP. We may need to be flexible with the schedule, but we should have fun and learn a lot. People often tell me the one thing they like best about statistics is how it applies to life and seems to be quite useful.

Remember that if you are having difficulty, don't let your small problem turn into a big one. Please talk to me or contact me at 659-5167 or keith.townsley@central-clinton.k12.ia.us

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Other Resources for AP Statistics

Textbooks

The Practice of Statistics, Second Edition, Yates, Moore, Starnes (Freeman)

Elementary Statistics, 8th Edition, Triola, (Addison Wesley)

Activities/Test Preparation

Activities and Projects for High School Statistics Courses, Millard, Turner (Freeman)

Prep for the AP Exam Guide for Yates, Moore, and Starne's The Practice of Statistics, Peterson (Freeman)

Barron's How to Prepare for the AP Statistics Examination, Sternstein (Barron's)

AP Central - http://www.collegeboard.com/student/testing/ap/about.html