

AP STATISTICS

2008-2009

Course Outline and Content:

Unit 1, weeks 1-3

Exploring and Understanding Data, Ch. 1-6

- Using graphs to analyze both categorical and quantitative data
- Constructing and interpreting graphical data: boxplot, dotplot, stemplot, histogram, frequency charts, and cumulative frequency chart
- Describing distributions using center, spread, shape, clusters and gaps, outliers and other unusual features
- Measuring center, spread, and position: mean, median, range, IQR, standard deviation, quartiles, percentiles, standardized scores (z-scores)
- Summarizing the effect of changing units on summary measures
- Using the graphing calculator to display data in various ways for analysis

Activities:

- Matching Statistics to Graphs, Activity-Based Statistics
- Human Box Plot Activity
- Students use data generated in class for class activities

Unit 2, weeks 4-7

Exploring Relationships Between Variables, Ch. 7-10

- Analyzing scatterplots, timeplots, patterns, and linearity
- Finding possible correlation and the least squares regression line
- Understanding and interpreting residual plots, outliers, influential points, and coefficient of determination
- Transforming non-linear data to achieve linearity
- Using the graphing calculator to display and analyze data

Activities:

- Matching Descriptions to Scatterplots, Activity-Based Statistics
- Horse Power Lab
- Cheerios Lab
- “The Wave” Activity

Unit 3, weeks 8-11

Gathering Data, Ch. 11-13

- Exploring different methods of data collection: census, sample survey, experiment, observational study
- Understanding populations, samples, and random selection
- Planning and conducting a well-designed survey
- Exploring different sampling methods: simple random sampling, stratified random sampling, and cluster sampling
- Examining sources of bias in sampling and surveys
- Planning and conducting well-designed experiments: treatments, control groups, experimental units, random assignments, and replication
- Exploring sources of bias and confounding, including placebo effect and blinding, in experiments

Activities:

- Random Rectangles, Activity-Based Statistics
- Vietnam Lottery Activity
- Bear Hunting Activity

Unit 4, weeks 12 -16

Randomness and Probability, Ch. 14-17

- Interpreting probability
- Understanding and applying the “Law of Large Numbers”
- Understanding and using basic probability rules
- Using simulation to estimate probability
- Using discrete random variables and their probability distributions, means (expected value), and standard deviation
- Combining independent random variable: sums and differences
- Understanding notions of independence versus dependence
- Understanding the normal distribution and tables of the normal distribution as a model for measurements

Activities:

- Pig Rolling Activity
- Area of an Ellipse Activity
- US Air Activity
- “Lid Flipping” Law of Large Numbers Activity

Unit 5, weeks 1-4

From Data at Hand to the World at Large, Ch. 18-22

- Exploring sampling distributions: sample proportions and sample means
- Examining the Central Limit Theorem
- Establishing assumptions and conditions for inference
- Exploring and understanding confidence intervals and hypothesis tests for a proportion
- Examining sample size and margin of error
- Understanding p-values, alpha levels, Type I and Type II errors, and Power
- Performing and understanding confidence intervals and hypothesis tests for the difference between two proportions
- Using the graphing calculator to analyze results of inference procedures

Activities:

- World Toss Activity
- Capture/Recapture, Activity-Based Statistics
- Galapagos Penguins Activity
- Students will use data gathered in class to create confidence intervals and perform hypothesis tests

Unit 6, weeks 5-7

Learning About the World, Ch. 23-25

- Using the t-distribution and standard error to do one-sample t-procedures and interpret the results
- Understanding degrees of freedom
- Comparing two means using the two-sample t-interval and two-sample t-test
- Understanding matched pairs and distinguishing them from two-sample procedures
- Comparing z and t procedures
- Establishing assumptions and conditions required for inference
- Using the graphing calculator to analyze results of inference procedures

Activities:

- Candy Bar Activity (degrees of freedom)
- Frog Flying Activity

Unit 7, weeks 8-13 Inference When Variables Are Related, Ch. 26-27

- Performing the Chi-Square Test for Goodness-of-fit, homogeneity, independence
- Establishing assumptions and conditions required for inference
- Examining independence, and joint and marginal frequencies, in two-way tables
- Performing inference procedures for regression
- Using confidence intervals to estimate the slope
- Performing and interpreting a significance test for the slope of a line

Activities:

- Nenana Ice Classic Activity
- How do I learn? Activity

Review, weeks 14-AP Exam

EOY Project, weeks 18-21