Haverhill High School

AP Statistics

Curriculum Map

Grades 12

AP Statistics

General Outline:

Term	Topic(s)	Chapters*
1	*Exploratory Analysis & Descriptive Statistics*	**1** A Case Study **2** Exploring Distributions **6** Two-Way Tables (Moore) **3** Relationships Between Two Quantitative Variables
	Planning & Conducting a Study	**4** Sample Surveys and Experiments
2	*Probability*	**5** Introducing Probability (Moore) **6** Probability Models **7** Probability Distributions **10** Sampling Distributions (Moore)
3	*Statistical Inference*	**13** Confidence Intervals: the Basics (Moore) **14** Tests of Significance: the Basics (Moore) **9** Inference for Means **8** Inference for Proportions
4	*Statistical Inference*	**10** Chi-Square Tests **11** Inference for Regression
	Review & AP Exam *Final Projects*	**12** Case Studies

Primary Textbook:

- Watkins, Scheaffer & Cobb, *Statistics in Action* Key Curriculum Press, 2004

Supplementary Textbook:

- Moore, David S. *The Basic Practice of Statistics*, W.H. Freeman & Co. 2004, 3rd ed. (Moore)

Technology:

- TI-83 and TI-84 Graphing Calculators
- *MiniTab 15* Statistical Software, Minitab Inc., Addison-Wesley Publishing co.

Additional Resources:

- Rossman, Chance & Barr Von Oehsen, *Workshop Statistics, Discovery with Data and the Graphing Calculator*, Key College Publishing, 2002, 2nd ed
- *Against All Odds,* The Annenberg/CPB Collection, 1989 (Video Series)
- *Breaking Vegas,* The History Channel *(Video Documentary)*
- Peck, Roxy, Statistics, A Guide to the Unknown, Thompson, 2006, 4th ed.;
- Gonick, Larry & Smith, Woollcott, The Cartoon Guide to Statistics, Collins Reference, 1993
- Huff, Darrell, How to Lie with Statistics, W.W. Norton & Company, 1993

Instructional Activities	**Assessment**
Direct Instruction	Quizzes
Class Exercises / Activities	Chapter Tests
Cooperative Learning	Class work
Homework Exercises	Homework
Study Guides / Chapter Reviews	Graphing Calculator Activities
Spiral Activities	Computer Lab / MiniTab Activities
Technology Integration	Project Assessment
Integrated Skills Projects	Self Assessment & Peer Reviews
Released AP Free Response	Free Response Rubric
Independent Reading	

TERM 1

Topic	Chapters and Topics	Timeline
Exploratory Analysis & Descriptive Statistics	**1 A Case Study - WESTVACO** **2 Exploring Distributions** • Graphical Displays of Distributions • Measures of Center & Spread • The Normal Distribution **6 Two-Way Tables** (Moore) **3 Relationships Between Two Quantitative Variables** • Scatterplots • Lines of Best Fit & Least Square Regression • Correlation • Diagnostics & Residuals	**Week 1** **Weeks 2 - 4** **Weeks 5 - 7**
Planning & Conducting a Study	**4 Sample Surveys and Experiments** • Rationale & Methods for Sampling • Randomization • Experiments and Inference About Cause • Designing Experiments to Reduce Variability	**Weeks 8 – 9**

Learning Standards:

- 12.D.2 Select an appropriate graphical representation for a set of data and use appropriate statistics (e.g., quartile or percentile distribution) to communicate information about the data.
- 12.D.5 Describe a set of frequency distribution data by spread (i.e., variance and standard deviation), skewness, symmetry, number of modes, or other characteristics. Use these concepts in everyday applications.
- 12.D.4 Apply uniform, normal, and binomial distributions to the solutions of problems.
- 12.D.3 Apply regression results and curve fitting to make predictions from data.
- 12.D.1 Design surveys and apply random sampling techniques to avoid bias in the data collection.
- 12.D.7 Compare the results of simulations (e.g., random number tables, random functions, and area models) with predicted probabilities.

AP Course Outline:

I. Exploring Data: Describing Patterns and departures from patterns (20% - 30%):
   A. Constructing & Interpreting Graphical Displays of Distributions of Univariate Data
   B. Summarizing Distributions of Univariate Data
   C. Comparing Distributions of Univariate Data.
   D. Exploring Bivariate Data
   E. Exploring Categorical Data.

II. Sampling and Experimentation: Planning & Conducting a Study (10% - 15%)
   A. Overview of methods of data collection
   B. Planning & conducting surveys
   C. Planning & conducting experiments
   D. Generalizability of results and types of conclusions from observational studies, experiments and surveys

TERM 2

Topic	Chapters & Topics	
Probability	**9 YMS Introducing Probability** • Idea of Probability • Randomness • Probability Models **6 Probability Models** • Samples Spaces with Equally Likely Outcomes • Addition Rule & Disjoint Events • Conditional Probability • Independent Events	**Weeks 10 - 12**
	7 Probability Distributions • Random Variables & Expected Value • Binomial Distribution • Geometric Distribution	**Weeks 13 – 15**
	10 Sampling Distributions (Moore) • Parameters and Statistics • Estimation & Law of Large Numbers • Sampling Distributions • Sampling Distribution of Sample Mean • Central Limit Theorem • Statistical Process Control	**Weeks 16 – 18**

Learning Standards:

- 12.D.4 Apply uniform, normal, and binomial distributions to the solutions of problems.
- 12.D.6 Use combinatorics (e.g., “fundamental counting principle," permutations, and combinations) to solve problems, in particular, to compute probabilities of compound events. Use technology as appropriate.
- 12.D.7 Compare the results of simulations (e.g., random number tables, random functions, and area models) with predicted probabilities.

AP Course Outline:

III. Anticipating Patterns; Exploring random phenomena using probability and simulation (20% - 30%)
   A. Probability
   B. Combining independent random variables
   C. The normal distribution
   D. Sampling distributions

TERM 3

Topic	Chapters	
Statistical Inference	**13 YMS <u>Confidence Intervals: The Basics</u>** • Estimating with Confidence • Confidence Intervals for the Population Mean • How Confidence Intervals Behave • Choosing the Sample Size	**Weeks 19 - 20**
	14 YMS <u>Tests of Significance: The Basics</u> • Reasoning of Tests of Significance • Stating Hypotheses • Test statistics, P-values, Statistical Significance • Tests of a Population Mean • P-values and Significance Levels • Tests from Confidence Intervals	**Weeks 21 - 22**
	9 <u>Inference for Means</u> • Toward a Confidence Interval & Significance Test for Mean • Estimating Sigma: The T-Distribution • Effect of Long Tails and Outliers • Inference for Difference Between Two Means • Paired Comparison	**Weeks 23 – 24**
	8 <u>Inference for Proportions</u> • Estimating a Proportion with Confidence • Testing a Proportion • Confidence Interval & Significance Test for Difference of Two Proportions	**Weeks 25 - 26**

<u>Learning Standards:</u>

- 12.D.4 Apply uniform, normal, and binomial distributions to the solutions of problems.

<u>AP Course Outline:</u>

IV. Statistical Inference: Estimating population parameters and testing hypotheses (30% - 40%)
   A. Estimation (point estimators & confidence intervals)
   B. Tests of Significance

TERM 4

Topic	Chapters	
Statistical Inference	**10 Chi-Square Tests** • Testing a Probability Model: Chi-Square Goodness of Fit Test • Chi-Square Test of Homogeneity • Chi-Square Test of Independence **11 Inference for Regression** • Variation in the Estimated Slope • Making Inferences About Slope • Transforming for a Better Fit	**Weeks 27 - 28** **Weeks 29 - 30**
Exam Review	***NA***	**Weeks 31 - 32**
Final Projects	**12 Case Studies**	**Weeks 33 – 36**

Learning Standards:

- 12.D.3 Apply regression results and curve fitting to make predictions from data.
- 12.D.4 Apply uniform, normal, and binomial distributions to the solutions of problems.

AP Course Outline:

IV. Statistical Inference: Estimating population parameters and testing hypotheses (30% - 40%)
  A. Estimation (point estimators & confidence intervals)
  B. Tests of Significance