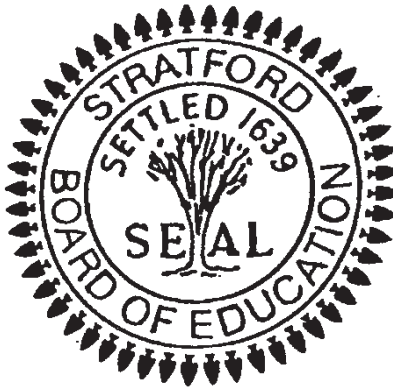


# STRATFORD PUBLIC SCHOOLS

## Stratford, Connecticut



*"Tantum eruditi sunt liberi"*  
Only The Educated Are Free

## AP STATISTICS

Adopted by the Board of Education on June 25, 2012

**Irene Cornish**  
Superintendent

**Elaine Watson**  
Assistant Superintendent

## **DISTRICT MISSION**

The mission of the Stratford Public Schools is to develop a community of learners in which students acquire the knowledge, skills and confidence to meet the challenges of a changing and increasingly diverse 21st century society.

## **DISTRICT CORE VALUES**

Students will acquire content knowledge, strengthen higher-order thinking, and develop character in order to address 21st century challenges.

## **BUNNELL HIGH SCHOOL BELIEFS**

We believe teachers must work collaboratively in support of student learning and to model collaboration as a social skill with students. We believe that a rigorous curriculum for all students, an acceptance of diversity, and a culture that actively welcomes all learners will contribute to a more knowledgeable community and society. We believe in the value of a strong education as a means of preparing students for work and life in the remainder of the 21st century.

## **STRATFORD HIGH SCHOOL BELIEFS**

- a safe, positive school climate that embraces diversity is essential to ensure respect and opportunity for each individual
- students should understand the world beyond their community in order to contribute to a global society
- parents and students must share responsibility and work in partnership with the school in order to improve academic performance and to develop lifelong learners
- students should use technology effectively to acquire, process, and deliver information

## **BUNNELL HIGH SCHOOL and STRATFORD HIGH SCHOOL**

### **LEARNING EXPECTATIONS**

All students will...

- use real-world digital and other research tools to access, evaluate and effectively apply information appropriate for authentic tasks. (Academic)
- work independently and collaboratively to solve problems and accomplish goals. (Civic-Social)
- communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes. (Academic)
- demonstrate innovation, flexibility and adaptability in thinking patterns, work habits and working/learning conditions. (Academic)
- effectively apply the analysis, synthesis and evaluation processes that enable productive problem solving. (Academic)
- value and demonstrate personal responsibility, character, cultural understanding and ethical behavior. (Civic-Social)
- show competence in all core academic subjects and other fields of interest, including the ability to clearly and effectively communicate content information in multiple formats. (Academic)

**Stratford Public Schools  
AP Statistics Unit Plans**

<b>Unit Name: Exploring Data Unit #1</b> <b>Synopsis:</b> Describing patterns and departures from patterns	<b>Est. # of Weeks:</b> 9 (Aug, Sept, Oct)
<b>STUDENT LEARNING GOALS</b>	
<b>CCSSM – Common Core State Standards for Math</b> <div style="text-align: center;"><u><b>Statistics and Probability</b></u></div> <b>Interpreting Categorical and Quantitative Data</b> <b>Summarize, represent, and interpret data on a single count or measurement variable</b> <ol style="list-style-type: none"> <li>1. Represent data with plots on the real number line (dot plots, histograms, and box plots).</li> <li>2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</li> <li>3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</li> <li>4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.</li> </ol> <b>Summarize, represent, and interpret data on two categorical and quantitative variables</b> <ol style="list-style-type: none"> <li>5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.</li> <li>6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.           <ol style="list-style-type: none"> <li>a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. <i>Use given functions, or choose, a function suggested by the context. Emphasize linear, quadratic, and exponential models.</i></li> <li>b. Informally assess the fit of a function by plotting and analyzing residuals.</li> <li>c. Fit a linear function for a scatter plot that suggests a linear association.</li> </ol> </li> </ol> <b>Interpret linear models</b> <ol style="list-style-type: none"> <li>7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</li> <li>8. Compute (using technology) and interpret the correlation coefficient of a linear fit.</li> <li>9. Distinguish between correlation and causation.</li> </ol>	
<b>Interdisciplinary Standards</b> <b>Standard 1: Information Strategies</b> Students determine their need for information and apply strategies to select, locate, and access information resources. <b>Standard 2: Information Use</b> Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests. <b>Standard 3: Information and Technology Application</b> Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information. <b>Standard 4: Literacy and Literary Appreciation</b> Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions. <b>Standard 5: Personal Management</b> Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.	
<b>21<sup>st</sup> Century Skills</b> <ol style="list-style-type: none"> <li>1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.</li> <li>2. Work independently and collaboratively to solve problems and accomplish goals.</li> <li>3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.</li> <li>4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.</li> <li>5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.</li> <li>6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.</li> </ol>	

**Key Vocabulary**

**Sec 1.1** frequency table, bar graph, pie chart, two-way table, marginal distribution, conditional distribution, association, “state, plan, do, conclude”

**Sec 1.2** dot plot, stem plot, histogram, shape, center, spread, outlier, symmetric, skewed, mode

**Sec 1.3** variability, mean, median, quartiles, interquartile range, five-number summary, boxplot, variance, standard deviation, resistant

**Sec 2.1** percentile, z-score, cumulative relative frequency graph, transform data, mean & standard deviation of a density curve

**Sec 2.2** Normal distribution, 68-95-99.7 Rule, Table A, Normal probability plot

**Sec 3.1** scatterplot, explanatory variable, response variable, direction, form, strength, positive association, negative association, correlation  $r$

**Sec 3.2** regression line, predict, slope, intercept  $a$ , extrapolation, least-squares regression line, residual, residual plot, standard deviation of the residuals  $s$ , coefficient of determination  $r^2$ , influential observations

**Enduring Understandings**

Exploratory analysis of data makes use of graphical and numerical techniques to study patterns and departures from patterns.

Emphasis is placed on interpreting information from graphical and numerical displays and summaries.

**Essential Questions**

How is data explored to observe data patterns and departures from patterns?

**Learning Objectives / Grade Level Expectations****Students will be able to...**

- A. Construct and interpret graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot), identify the following:
  - 1. Center and spread
  - 2. Clusters and gaps
  - 3. Outliers and unusual features
  - 4. Shape
- B. Summarize distributions of univariate data
  - 1. Measure center: median, mean
  - 2. Measure spread: range, interquartile range, standard deviation
  - 3. Measure position: quartiles, percentiles, standardized scores (z-scores)
  - 4. Draw and analyze boxplots
  - 5. Understand the effect of changing units on summary measures
- C. Compare distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots)
  - 1. Compare center and spread: within group, between group variation
  - 2. Compare clusters and gaps
  - 3. Compare outliers and unusual features
  - 4. Compare shapes
- D. Explore bivariate data
  - 1. Analyze patterns in scatterplots
  - 2. Calculate correlation and test for linearity
  - 3. Find the least-squares regression line
  - 4. Understand residual plots, outliers, and influential points
  - 5. Use transformations to achieve linearity: logarithmic and power transformation
- E. Explore categorical data
  - 1. Analyze frequency tables and bar charts
  - 2. Calculate marginal and joint frequencies for two-way tables
  - 3. Understand conditional relative frequencies and association
  - 4. Compare distributions using bar charts
- F. The Normal distribution
  - 1. Apply properties of the Normal distribution
  - 2. Use tables of the Normal distribution
  - 3. Use the Normal distribution as a model for measurements

## ASSESSMENT PLAN

### Summative Assessment(s)

Chapter Tests 1, 2, 3 and Section Quizzes

Chapter 1 Project: Exploring Quantitative Data (Titanium Binder pg 8)

### Formative and Diagnostic Assessment(s)

PBA #1 Reaction Times (Titanium Binder pg 7) 21<sup>st</sup> Century Skills #1-5

CFA #1 (Sec 1.1)

CFA #2 (Sec 2.1)

UConn Stats 1100 Test #1

## LEARNING PLAN COMPONENTS

Textbook: The Practice of Statistics, 4<sup>th</sup> Ed, 2011, Starnes, Yates, Moore

Chapters 1, 2, 3

Quiz after 1 or 2 sections (Teacher's "Titanium" and "Yellow" resource binders)

Even numbered problems for class work, odd numbered problems assigned for homework

AP Central - Free Response questions (see textbook for suggested questions for Chp 1 page 1-6, Chp 2 page 2-4, Chp 3 page 3-4.

AP Released Exams 1997, 2002, 2007, for Multiple Choice questions

**Stratford Public Schools  
AP Statistics Unit Plans**

<b>Unit Name: Sampling and Experimentation Unit #2</b>	<b>Est. # of Weeks:</b>
Synopsis: Planning and conducting a study	5 (Oct, Nov)
<b>STUDENT LEARNING GOALS</b>	
<b>CCSSM – Common Core State Standards for Math</b>	
<b><u>Statistics and Probability</u></b>	
<b>Making Inferences and Justifying Conclusions</b>	
<b>Understand and evaluate random processes underlying statistical experiments</b>	
<ol style="list-style-type: none"> <li>Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</li> <li>Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. <i>For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?</i></li> </ol>	
<b>Make inferences and justify conclusions from sample surveys, experiments, and observational studies</b>	
<ol style="list-style-type: none"> <li>Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</li> </ol>	
<b>Interdisciplinary Standards</b>	
<b>Standard 1: Information Strategies</b>	
Students determine their need for information and apply strategies to select, locate, and access information resources.	
<b>Standard 2: Information Use</b>	
Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.	
<b>Standard 3: Information and Technology Application</b>	
Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.	
<b>Standard 4: Literacy and Literary Appreciation</b>	
Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.	
<b>Standard 5: Personal Management</b>	
Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.	
<b>21<sup>st</sup> Century Skills</b>	
<ol style="list-style-type: none"> <li>Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.</li> <li>Work independently and collaboratively to solve problems and accomplish goals.</li> <li>Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.</li> <li>Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.</li> <li>Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.</li> <li>Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.</li> </ol>	
<b>Key Vocabulary</b>	
<b>Sec 4.1</b> sample, survey, population, random sampling, SRS simple random sample, random digits, stratified random sample, cluster sample, response samples, convenience samples, sampling errors, undercoverage, sampling frame, non response, wording of questions, response bias	
<b>Sec 4.2</b> observational study, experiment, confounded, lurking variables, treatments, experimental units, design, control, random assignment, replication, bias, double and single blind, placebo, placebo effect, blocks, matched pairs	
<b>Sec 4.3</b> inference about the population, inference about cause and effect, lack of realism, institutional review board, informed consent, confidential	
<b>Enduring Understandings</b>	
Data must be collected according to a well-developed plan if valid information on a conjecture is to be obtained. This plan includes clarifying the question and deciding upon a method of data collection and analysis.	
<b>Essential Questions</b>	
How is an experiment designed and implemented from start to finish?	

**Learning Objectives / Grade Level Expectations****Students will be able to...**

- A. Overview of methods of data collection, understanding:
  - 1. Census
  - 2. Sample survey
  - 3. Experiment
  - 4. Observational study
- B. Plan and conduct a survey knowing:
  - 1. Characteristics of a well-designed and well-conducted survey
  - 2. Population, samples and random selection
  - 3. Sources of bias in sampling and surveys
  - 4. Sampling methods, including simple random sampling, stratified random sampling, and cluster sampling
- C. Plan and conduct an experiment knowing:
  - 1. Characteristics of a well-designed and well-conducted experiment
  - 2. Treatments, control groups, experimental units, random assignments, and replication
  - 3. Sources of bias and confounding, including placebo effect and blinding
  - 4. Completely randomized design
  - 5. Randomized block design, including match pairs design
- D. Generalizing results and types of conclusions that can be drawn from observational studies, experiments, and surveys

**ASSESSMENT PLAN****Summative Assessment(s)**

Chapter Test 4 and Section Quizzes

**Formative and Diagnostic Assessment(s)**

PBA #2 Gallup Poll Worksheet (Titanium Binder pg 146) 21<sup>st</sup> Century Skills #1-5

CFA #3 (Sec 4.1)

UConn Stats 1100 Test #2

**LEARNING PLAN COMPONENTS**

Textbook: The Practice of Statistics, 4<sup>th</sup> Ed, Starnes, Yates, Moore

Chapter 4

Quiz after 1 or 2 sections (Teacher's "Titanium" and "Yellow" resource binders)

Even numbered problems for class work, odd numbered problems assigned for homework

AP Central - Free Response questions (see textbook for suggested questions for Chp 4 page 4-4.

AP Released Exams 1997, 2002, 2007, for Multiple Choice questions

**Stratford Public Schools**  
**AP Statistics Unit Plans**

<b>Unit Name: Anticipating Patterns Unit #3</b>	<b>Est. # of Weeks:</b>
<b>Synopsis:</b> Exploring random phenomena using probability and simulation	8 (Dec, Jan, Feb)
<b>STUDENT LEARNING GOALS</b>	
<b>CCSSM – Common Core State Standards for Math</b>	
<u><b>Statistics and Probability</b></u>	
<b>Conditional Probability and the Rules of Probability</b>	
<b>Understand independence and conditional probability and use them to interpret data</b>	
<ol style="list-style-type: none"> <li>1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).</li> <li>2. Understand that two events <math>A</math> and <math>B</math> are independent if the probability of <math>A</math> and <math>B</math> occurring together is the product of their probabilities, and use this characterization to determine if they are independent.</li> <li>3. Understand the conditional probability of <math>A</math> given <math>B</math> as <math>P(A \text{ and } B)/P(B)</math>, and interpret independence of <math>A</math> and <math>B</math> as saying that the conditional probability of <math>A</math> given <math>B</math> is the same as the probability of <math>A</math>, the conditional probability of <math>B</math> given <math>A</math> is the same as the probability of <math>B</math>.</li> <li>4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. <i>For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.</i></li> <li>5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. <i>For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.</i></li> </ol>	
<b>Use the rules of probability to compute probabilities of compound events in a uniform probability model</b>	
<ol style="list-style-type: none"> <li>6. Find the conditional probability of <math>A</math> given <math>B</math> as the fraction of <math>B</math>'s outcomes that also belong to <math>A</math>, and interpret the answer in terms of the model.</li> <li>7. Apply the Addition Rule, <math>P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)</math>, and interpret the answer in terms of the model.</li> <li>8. (+) Apply the general Multiplication Rule in a uniform probability model, <math>P(A \text{ and } B) = P(A)P(B A) = P(B)P(A B)</math>, and interpret the answer in terms of the model.</li> <li>9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.</li> </ol>	
<b>Using Probability to Make Decisions</b>	
<b>Calculate expected values and use them to solve problems</b>	
<ol style="list-style-type: none"> <li>1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.</li> <li>2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.</li> <li>3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. <i>For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.</i></li> <li>4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. <i>For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?</i></li> </ol>	
<b>Use probability to evaluate outcomes of decisions</b>	
<ol style="list-style-type: none"> <li>5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. <ol style="list-style-type: none"> <li>a. Find the expected payoff for a game of chance. <i>For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.</i></li> <li>b. Evaluate and compare strategies on the basis of expected values. <i>For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.</i></li> </ol> </li> <li>6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).</li> <li>7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).</li> </ol>	



**Interdisciplinary Standards****Standard 1: Information Strategies**

Students determine their need for information and apply strategies to select, locate, and access information resources.

**Standard 2: Information Use**

Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.

**Standard 3: Information and Technology Application**

Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.

**Standard 4: Literacy and Literary Appreciation**

Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.

**Standard 5: Personal Management**

Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.

**21<sup>st</sup> Century Skills**

1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.
2. Work independently and collaboratively to solve problems and accomplish goals.
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.

**Key Vocabulary**

**Sec 5.1** law of large numbers, probability, simulation

**Sec 5.2** sample space S, event, complement, mutually exclusive(disjoint), union , intersection, general addition rule, Venn diagram

**Sec 5.3** conditional probability, independent, tree diagram, general multiplication rule

**Sec 6.1** random variable, probability distribution, discrete random variable, continuous random variable, mean of a random variable, expected value, variance of a random variable, standard deviation

**Sec 6.2** linear transformation, shape, center, spread, independent random variables

**Sec 6.3** binomial setting, binomial random variable, binomial distribution, binomial coefficient, mean, standard deviation, geometric setting, Normal approximation

**Sec 7.1** parameter, statistic, population distribution, sampling distribution, unbiased estimator, biased estimator, variability

**Sec 7.2** sampling distribution of  $\hat{p}$ , mean, standard deviation, Normal approximation

**Sec 7.3** sampling distribution of  $\bar{x}$ , mean, standard deviation, central limit theorem

**Sec 8.1** point estimate, point estimator, confidence interval, confidence level C, random, Normal, independent

**Sec 8.2** standard error, confidence interval for p, margin of error

**Sec 8.3** degrees of freedom (df), one-sample t interval

**Enduring Understandings**

Probability is the tool used for anticipating what the distribution of data should look like under a given model.

**Essential Questions**

How is probability and simulation used to predict outcomes?

**Learning Objectives / Grade Level Expectations****Students will be able to...**

A: Interpret probability, including:

1. Long – run relative frequency
2. “Law of large numbers” concept
3. Addition rule, multiplication rule, conditional probability, and independence
4. Discrete random variables and their probability distributions , including binomial
5. Simulation of probability distributions, including binomial and geometric
6. Mean(expected value) and standard deviation of a random variable, and linear transformation of a random variable

B: Combine independent random variables, understanding:

1. Notion of independence versus dependence
2. Mean and standard deviation for sums and differences of independent random variables

C: The Normal distribution

1. Apply properties of the normal distribution
2. Use tables of the normal distribution
3. Use the normal distribution as a model for measurements

D: Sampling distributions, understanding:

1. Sampling distribution of a sample proportion
2. Sampling distribution of a sample mean
3. Central Limit Theorem
4. Sampling distribution of a difference between two independent sample proportions
5. *T* distribution

**ASSESSMENT PLAN****Summative Assessment(s)**

Chapter Tests 5, 6, 7, 8 and Section Quizzes

**Formative and Diagnostic Assessment(s)**PBA #3 Airline Overbooking (Titanium Binder pg 202) 21<sup>st</sup> Century Skills #2 -5

CFA #4 ( Sec 5.1)

UConn Stats 1100 Test #3

**LEARNING PLAN COMPONENTS**Textbook: The Practice of Statistics, 4<sup>th</sup> Ed, Starnes, Yates, Moore

Chapters 5, 6, 7, 8

Quiz after 1 or 2 sections (Teacher’s “Titanium” and “Yellow” resource binders)

Even numbered problems for class work, odd numbered problems assigned for homework

AP Central - Free Response questions (see textbook for suggested questions for Chp 5 page 5-4, Chp 6 page 6-4, Chp 7 page 7-3, Chp 8 page 8-4)

AP Released Exams 1997, 2002, 2007, for Multiple Choice questions

**Stratford Public Schools**  
**AP Statistics Unit Plans**

<b>Unit Name: Statistical Inference Unit #4</b>	<b>Est. # of Weeks:</b>
<b>Synopsis:</b> Estimating population parameters and testing hypotheses	7 (Feb, Mar, Apr)
<b>STUDENT LEARNING GOALS</b>	
<b>CCSSM – Common Core State Standards for Math</b>	
<b><u>Statistics and Probability</u></b>	
<b>Making Inferences and Justifying Conclusions</b>	
<b>Understand and evaluate random processes underlying statistical experiments</b>	
<ol style="list-style-type: none"> <li>1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</li> <li>2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. <i>For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?</i></li> </ol>	
<b>Make inferences and justify conclusions from sample surveys, experiments, and observational studies</b>	
<ol style="list-style-type: none"> <li>3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</li> <li>4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.</li> <li>5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.</li> <li>6. Evaluate reports based on data.</li> </ol>	
<b>Interdisciplinary Standards</b>	
<b>Standard 1: Information Strategies</b>	
Students determine their need for information and apply strategies to select, locate, and access information resources.	
<b>Standard 2: Information Use</b>	
Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.	
<b>Standard 3: Information and Technology Application</b>	
Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.	
<b>Standard 4: Literacy and Literary Appreciation</b>	
Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.	
<b>Standard 5: Personal Management</b>	
Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.	
<b>21<sup>st</sup> Century Skills</b>	
<ol style="list-style-type: none"> <li>1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.</li> <li>2. Work independently and collaboratively to solve problems and accomplish goals.</li> <li>3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.</li> <li>4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.</li> <li>5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.</li> <li>6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.</li> </ol>	
<b>Key Vocabulary</b>	
<b>Sec 9.1</b> significance test, null hypothesis, alternative hypothesis, P-value, significance level $\alpha$ , statistically significant, Type I error, Type II error, power, fail to reject $H_0$	
<b>Sec 9.2</b> test statistic, one-sample z test for a proportion, state, plan, do, conclude	
<b>Sec 9.3</b> one-sample t statistic, one-sample t test, random, normal, independent	
<b>Sec 10.1</b> shape, center, spread, random, normal, independent, two-sample z interval, pooled	
<b>Sec 10.2</b> shape, center, spread, random, normal, independent, two-sample t statistic	
<b>Sec 11.1</b> chi-square goodness of fit test, observed count, expected count, chi-square statistic, chi-square distribution	

<p><b>Enduring Understandings</b> Statistical inference guides the selection of appropriate models.</p>
<p><b>Essential Questions</b> How does one choose and use statistical inference to confirm models?</p>
<p><b>Learning Objectives / Grade Level Expectations</b> <b>Students will be able to...</b></p> <p>A. Estimation (point estimators and confidence intervals), understanding:</p> <ol style="list-style-type: none"> <li>1. Population parameters and margin of errors</li> <li>2. Properties of point estimators, including unbiasedness and variability</li> <li>3. Logic of confidence intervals, meaning of confidence level and confidence intervals, and properties of confidence intervals</li> <li>4. Large sample confidence interval for a proportion</li> <li>5. Large sample confidence interval for a difference between two proportions</li> <li>6. Confidence interval for a mean</li> <li>7. Confidence interval for a difference between two means (unpaired and paired)</li> <li>8. Confidence interval for the slope of a least-squares regression line</li> </ol> <p>B. Tests of significance, understanding:</p> <ol style="list-style-type: none"> <li>1. Logic of significance testing, null and alternative hypotheses, P- values; one and two sided tests; concept of Type I and Type II errors; concept of power</li> <li>2. Large sample test for a proportion</li> <li>3. Large sample test for a difference between two proportions</li> <li>4. Test for a mean</li> <li>5. Test for a difference between two means (unpaired and paired)</li> <li>6. Chi-square test for goodness of fit, homogeneity of proportions, and independence (one and two way tables)</li> <li>7. Test for the slope of a least-squares regression line</li> </ol>
<p><b>ASSESSMENT PLAN</b></p>
<p><b>Summative Assessment(s)</b> Chapter Tests 9, 10, 11 and Section Quizzes</p>
<p><b>Formative and Diagnostic Assessment(s)</b> PBA #4 Spinning Heads (Titanium Binder pg 409) 21<sup>st</sup> Century Skills #2 -5 UConn Stats 1100 final test</p>
<p><b>LEARNING PLAN COMPONENTS</b></p>
<p>Textbook: The Practice of Statistics, 4<sup>th</sup> Edition 2011, Starnes, Yates, Moore Chapters 9, 10, 11 Quiz after 1 or 2 sections (Teacher’s “Titanium” and “Yellow” resource binders) Even numbered problems for class work, odd numbered problems assigned for homework AP Central - Free Response questions (see textbook for suggested questions for Chp 9 page 9-4, Chp 10 page 10-4, Chp 11 page 11-4 AP Released Exams 1997, 2002, 2007, for Multiple Choice questions</p>

**Stratford Public Schools  
AP Statistics Unit Plans**

<b>Unit Name: AP Exam / UConn Review &amp; 4<sup>th</sup> Quarter Project Unit #5</b>	<b>Est. # of Weeks:</b>
<b>Synopsis:</b> Strategies for taking the AP Exam and reviewing for UConn Final	6 (May, June)
<b>STUDENT LEARNING GOALS</b>	
<b>CCSSM – Common Core State Standards for Math</b>	
<u><b>Statistics and Probability</b></u>	
<b>Interpreting Categorical and Quantitative Data</b>	
<b>Conditional Probability and the Rules of Probability</b>	
<b>Using Probability to Make Decisions</b>	
<b>Making Inferences and Justifying Conclusions</b>	
<b>Interdisciplinary Standards</b>	
<b>Standard 1: Information Strategies</b>	
Students determine their need for information and apply strategies to select, locate, and access information resources.	
<b>Standard 2: Information Use</b>	
Students evaluate, analyze, and synthesize information and data to solve problems, conduct research, and pursue personal interests.	
<b>Standard 3: Information and Technology Application</b>	
Students use appropriate technologies to create written, visual, oral and multimedia products that communicate ideas and information.	
<b>Standard 4: Literacy and Literary Appreciation</b>	
Students extract meaning from fiction and non-fiction resources in a variety of formats. They demonstrate an enjoyment of reading, including an appreciation of literature and other creative expressions.	
<b>Standard 5: Personal Management</b>	
Students display evidence of ethical, legal, and social responsibility in regard to information resources and project and self-management.	
<b>21<sup>st</sup> Century Skills</b>	
1. Use real-world digital and other research tools to access, evaluate, and effectively apply information appropriate for authentic tasks.	
2. Work independently and collaboratively to solve problems and accomplish goals.	
3. Communicate information clearly and effectively using a variety of tools/media in varied contexts for a variety of purposes.	
4. Demonstrate innovation, flexibility, and adaptability in thinking patterns, work habits, and working/learning conditions.	
5. Effectively apply the analysis, synthesis, and evaluative processes that enable productive problem solving.	
6. Value and demonstrate personal responsibility, character, cultural understanding, and ethical behavior.	
<b>Key Vocabulary</b>	
Multiple choice, free response, investigative task, scoring rubric – complete, substantial, developing, minimal response	
<b>Enduring Understandings</b>	
Knowing the format of the AP and UConn exams, what to expect and how it is scored will be beneficial in taking the AP and UConn exams.	
<b>Essential Questions</b>	
How does one prepare for the AP Statistics and UConn final exam?	

**Learning Objectives / Grade Level Expectations**

**Students will be able to...**

**A. Know test taking strategies for:**

1. Multiple choice questions
2. Free response questions
3. Investigative task using formulas and tables with and without the TI –84 calculator
4. Reading computer printout

**B. Understand the 4 main topics of:**

1. Descriptive statistics
2. Experimental design
3. Probability
4. Inference

**C. Complete Practice Tests**

1. AP Statistic tests from 1997, 2002, 2007
2. AP Statistics released free response questions 1997-2011
3. Previous UConn final exams

**ASSESSMENT PLAN**

**Summative Assessment(s)**

AP Statistics test

UConn final

PBA # 5 Test Question Development OR Group Project - 4<sup>th</sup> quarter project , 21<sup>st</sup> Century Skills #1 -5

**Formative and Diagnostic Assessment(s)**

AP Statistic tests from 1997, 2002, 2007

AP Statistics released free response questions 1997-2011

Previous UConn final exams

**LEARNING PLAN COMPONENTS**

College Board AP Central – Statistics

UConn Husky CT Website