NJCCCS AREA: Mathematics

North Brunswick Township Public Schools

AP Statistics

Acknowledgements

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Date: **New**_____

Revision **May 2012**

Board Adoption_____

This curriculum is aligned with the Advanced Statistics syllabus submitted to and approved by the College Boards.

New Jersey Core Curriculum Content Standard Area: Mathematics

Topic/Course: AP Statistics **Grade: 11-12** **Date: May 2012**

Essential Question NJCCC Standard	**NJCCCS-** Skills/Objectives	**Instructional Strategies** Activities/ Materials/ Technology/ Interdisciplinary Connections Cultural Diversity	**Modifications** ESL Special Education Academic Support/G&T	**Assessments** Formative Summative Benchmarks	**PACING**
4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.2,5 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 1.1** Display distributions with graphs. **Obj. 1.2** Describe distributions with numbers.	• Class discussions and group activities. • Develop dotplots, bar graphs, stemplots, histograms, and relative frequency plots. • Analyze for patterns in shape, center and spread of univariate data. • Define exploratory data analysis, distribution of a variable, categorical variable, quantitative variable, shape, center, spread, symmetric, skewed, outlier, mean, median, mode, quartile, five-number summary, interquartile range (IQR), standard deviation, variance, and linear transformation. • **Technology:** Use the graphing calculator to construct histograms. • **Technology:** Use formulas and graphing calculators to determine: o Mean, variance, and standard deviation for sets of data. o Five number summary and outliers for sets of data. • Choose appropriate measures of spread for sets of univariate data. • Exercises, teacher prepared review notes, supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, *AP Statistics Formula* Packet, *Hypothetical Exams* worksheet, *The Six Characteristics of a Dataset* worksheet, *Matching Graphs* worksheet, and TI-Nspire class set. The Practice of Statistics. W.H. Freeman and		**Formative** • Student oral responses • Homework • AP Free Response and Multiple-Choice Questions **Summative** • Test 1.1 • Test 1.2 • Problem Set 1	15 days

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		Company, 2008			
4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.2,5 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 2.1** Find areas under a density curve, find and interpret standardized scores and percentiles. **Obj. 2.2** Apply the normal distribution model to sets of data and use the normal probability plot to assess for normality.	• Class discussions and group activities. • Define standardized value, z-score, percentile, Chebyshev's inequality, mathematical model, density curve, normal curve, standard Normal distribution, Normal probability plot. • Find areas under density curves. • Discovery activity for standardized scores (worksheet: *Developing Standardized Scores).* • Find percentiles of datasets • Determine z-scores. • Calculate proportions for ranges of z-values. • Apply Chebyshev's Rule (normal distribution). • **Technology:** Use the graphing calculator to find percentiles and z-scores. • **Technology:** Perform Normal distribution calculations and make Normal probability plots using either a graphing calculator or Minitab. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, Z table of values, Charts of Chebyshev's Rule, TI-Nspire class set, Minitab. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple-Choice questions **Summative** • Test 2 • Problem Set 2	7 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.2,5 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 3.1** Graph bivariate data on a scatterplot, find and interpret the correlation coefficient, *r*. **Obj. 3.2** Determine and interpret the least squared regression line. **Obj, 3.3** Explain what is meant by an influential observation, define a lurking variable, explain association vs. causation.	• Class discussions and group activities • Define scatterplot, direction, form, strength, positive/negative association, correlation *r*, regression line, extrapolation, residual, bivariate data, coefficient of determination r^2, influential observation, lurking variable. • Identify explanatory and response variables. • Examine scatterplots for patterns, strength of relations, form, outliers. • Analyze scatterplots of bivariate data. • Computer and analyze *r*. • Match *r* to a graph. • Calculate and interpret LSRL. • Find and graph residuals and use to determine the appropriateness of a regression model. • Find and interpret the coefficient of determination. • Determine if an observation is influential . • Identify and determine effects of lurking variables. • Determine danger in using averaged data. • Explain difference between association and causation. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. • **Technology:** Use graphing calculator to make scatterplots, to compute, graph, and analyze LSRLs and *r*. **Materials:** Teacher prepared notes, graphing calculators, *Meaning of Slope and Y-Intercept* worksheet, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 3 • Problem Set 3	9 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.4,5; 4.4.12 C.1,3 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 4.1** Model nonlinear data using logarithmic or power transformations. **Obj. 4.3** Explain and establish association and causation. **4.4.12 A.2,5 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 4.2** Construct and analyze categorical data in two-way tables.	• Class discussions and group activities. • Define linear growth, exponential growth, power model, two-way table, marginal distributions, conditional distribution, Simpson's Paradox, common response, confounded, causation. • Use transformations to achieve linearity in nonlinear data. • Use inverse transformations to determine exponential, power, and polynomial models. • Explain difference between association and causation. • **Technology:** Use graphing calculators and Minitab to transform datasets of nonlinear data. • Determine marginal distributions in categorical data. • Find conditional distributions. • Understand and explain Simpson's Paradox. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** teacher prepared notes, graphing calculators, *Logarithm Review* worksheet, TI-Nspire class set, Mintab. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 4 • Problem Set 4 • Complete selected Part I exercises from text	9 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.3 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 5.1** Explain the difference between an observational study and an experiment. Define and be able to construct an SRS. **Obj. 5.2** Apply the principles of experimental design.	• Class discussions and group activities. • Identify various survey sampling methods and designs. • Identify sources of bias. • **Technology:** Use a random digit generator to select a simple random sample. • Use a random digit table to select a sample. • Define population, sample, census, voluntary response, convenience sampling, bias, simple random sample (SRS), systematic random sample, probability sample, stratified random sample, cluster sample, undercoverage, nonresponse, experimental units, subjects, treatment, factor, level, experiment, observational study, placebo (effect), completely randomized design, block, matched pairs design, blind, and double blind. • Identify basic principles and methods of experimental design. • Complete *Designing a Sample* worksheet. • **Technology:** Complete *Blocking by Breed* class activity to demonstrate real-life application of block design; use Minitab to assess effects of blocking. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, *Designing a Sample* and *Blocking by Breed* worksheets, TI-Nspire class set, Minitab. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 5 • Problem Set 5 • Complete selected Part II exercises from text	8 days

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4.4.B Probability How can experimental and theoretical probabilities be used to make predictions or draw conclusions?	**4.4.12 A.1-3,5; 4.4.12 B.3 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 6.1** Simulate an experiment. **4.4.12 B.1-5; 4.4.12 C.1-3) 4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 6.2** Apply the vocabulary and general concepts of probability. **Obj. 6.3** To understand and apply general probability rules.	• Class discussions and group activities. • Define simulate, independent trials, random phenomenon, empirical, relative frequency, sample space, event, probability model, tree diagram, multiplication principle, sampling with/out replacement, equally likely outcomes, independent, disjoint events, complementary, joint probability, conditional probability. • Collect data by performing an experiment using simulation methods. • Given a probability problem: conduct a simulation in order to estimate the probability desired. • **Technology:** Use a graphing calculator to simulate a probability problem. • Distinguish between theoretical and empirical probability. • Identify a sample space and simple events. • Identify and use basic properties of probability using various text and teacher examples (covering: sampling with/out replacement, and vs. or, intersection vs. unions, equally likely outcomes). • Distinguish between independent and dependent events. • Construct a tree diagram. • Determine if two events are disjoint, complementary, or independent. • Define and find conditional probabilities. • Apply the use of tables to find probabilities. • Apply rules of multiplication and addition to solve problems with several stages. • Introduce and explain Bayes's rule. **Materials:** Teacher prepared notes, graphing calculators, TI-Nspire class set.		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 6 • Problem Set 6	14 days

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		The Practice of Statistics. W.H. Freeman and Company, 2008			

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6 (4.4.12 B.1-5; 4.4.12 C.1-3; 4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 7.1** To apply principles of discrete and continuous random variables.	• Class discussions and group activities. • Define random variable, discrete random variable, probability distribution, uniform distribution, continuous random variable, mean of a random variable, Law of Large Numbers, Law of Small Numbers. • Distinguish between a discrete random variable and a continuous random variable. • Construct and use a discrete probability distribution. • Find the mean and variance of a discrete random variable. • Use the "Law of Large Numbers." • Apply rules for addition and multiplication of means and variances. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 7 • Problem Set 7	7 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6 (4.4.12 B.1-5; 4.4.12 C.1-3; 4.5.12 B. 1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 8.1** To identify and apply properties of binomial distributions. **Obj. 8.2** To identify and apply properties of geometric distributions.	• Class discussions and group activities. • Define binomial distribution, sampling distribution, binomial coefficient, binomial probability, geometric setting, geometric random variable. • Determine if a probability distribution is binomial. • Apply the binomial formula to find a binomial distribution. • **Technology:** Use a graphing calculator to find any binomial probability. • Calculate the mean and variance of a binomial distribution. • Determine if a probability distribution is geometric. • Find probabilities of a geometric distribution. • Calculate the mean and variance of a geometric distribution. • Use simulation to solve geometric probability problems. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 8 • Problem Set 8	7 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.1, 3-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4** **Obj. 9.1** To analyze the sampling and probability distribution for counts. **Obj. 9.2** To analyze the sampling distribution of sample proportion. **Obj. 9.3** To analyze the sampling distribution of the sample mean and apply the Central Limit Theorem (CLT).	• Class discussions and group activities. • **Technology:** Exploration activity using TI-84/TI-Nspire: *Mean of Means.* • Define parameter, statistic, sampling variability, ubiased statistic, unbiased estimator, normal approximation. • Identify characteristics of a sampling distributions. • Describe bias and variability in terms of mean and spread of a sample distribution. • Explain how variability is controlled by sample size (complete calculations using calculator). • Define characteristics to identify when a problem involves a sample proportion or sample means. • Find the mean and standard deviation of a sample proportion. • Find the mean and standard deviation of sample means. • Interpret and apply the Central Limit Theorem. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, *Mean of* Means activity worksheet, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 9 • Problem Set 9 • Complete selected Part III exercises from text	9 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 10.1** To understand and utilize the necessary components of a confidence interval. **Obj. 10.2** To calculate and analyze confidence intervals for means. **Obj. 10.3** To calculate and analyze confidence intervals for proportions.	• Class discussions and group activities. • Define statistical estimation, point estimate, interval estimate, confidence interval, margin of error, critical value, standard error, t-distribution, robust. • Determine and explain how to check the necessary assumptions to construct confidence intervals for a mean. • Interpret the meaning of a confidence interval and margin of error. • Introduce the *t*-distribution. • Know and verify required assumptions for using *t* procedures. • Construct and interpret a confidence intervals for one sample mean (with σ known and unknown). • **Technology:** Use graphing calculators and TI-Nspires to construct confidence intervals with means or proportions. • Describe factors that affect a confidence interval and how it behaves (sample size, outliers, etc.). • Select an appropriate sample size for a preset margin of error. • Recognize a matched pairs data set. • Define the robustness of an inference procedure. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, *Confidence Intervals* packet, *Confidence Intervals for Means* summary worksheet, *Confidence Intervals for Proportions* summary worksheet, *Confidence Interval Forms*, *Assumptions Table*, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Quiz 10.1-10.2 • Test 10 • Problem Set 10	11 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 11.1** To understand the basic tenets of significance tests. **Obj. 11.2** To be able to completely carry out a significance test. **Obj. 11.3** Distinguish between statistical significance and practical importance. Identify the advantages and disadvantages of using P-values rather than a fixed level of significance.	• Class discussions and group activities. • Explain how to write null and alternative hypotheses. • Know and verify the conditions for significance tests. • Explain how a test statistic is formed—know the general formula. • Discuss p-values and their relationship with the null hypothesis (the "evidence against" idea) • Interpret the meaning of statistical significance. • Identify and explain the four steps in hypothesis testing (hypotheses, conditions, calculations, interpretation) • Conduct a z test for a population mean. • Explain the difference between a one-sided test and a two-sided test. • Discuss how to choose an appropriate level of significance. • Define Type I error, Type II error, and power. • Determine Type I versus Type II errors and consequences of each. • Given a real-life example be able to determine the Type I and Type II errors and be able to provide an argument for which error you believe to be more harmful. • Understand the relationship between alpha and beta and their complements. • Interpret the power of a test. • **Technology:** View the Java applet provided by *The Practice of Statistics* resource collection. **Materials:** Teacher prepared notes, graphing calculators, *Type I and Type II Errors* worksheet, *Concept of Significance* worksheet, Java Applet provided by Resources of TPS, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Quiz 11.1-11.3 • Test 11 • Problem Set 11	10 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 12.1** To understand and make inferences for a sample mean using a significance test (t-test). **Obj. 12.2** To understand and make inferences for a sample proportion using significance tests.	• Class discussions and group activities. • Define one-sample t statistic. • Know and verify required assumptions for inference about a mean, or a pair of means. • Determine appropriate critical values from a *t* table. • Perform a t-test of significance • Know and verify required assumptions for inference about a proportion. • Perform a test of significance for a population proportion for decision-making. • Read and interpret Minitab printouts concerning significance tests. • **Technology:** Use graphing calculators/TI Nspires and Minitab to complete inference problems. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, *Inference* Tests worksheets, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Quiz 12.1 • Quiz 12.2 • Problem Set 12	8 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 13.1** To compare two means. **Obj. 13.2** To compare two proportions.	• Class discussions and group activities. • Discuss the difference between the two-sample z statistic and the two-sample t statistic. • Know and verify the three conditions necessary for doing inference involving two population means. • Use two-sample t procedures to conduct tests of significance to compare two means. • Perform a significance test for comparing the proportions of two populations. • Compare and contrast the robustness of two-sample inference procedures to one-sample inference procedures. • Find a confidence interval for comparing the proportions of two populations. • **Technology:** Use graphing calculators/TI Nspire and Minitab to complete two-sample inference problems and compute confidence intervals. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 13 • Problem Set 13	6 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 14.1** To make inferences with a goodness-of-fit test (chi-squared test) **Obj. 14.2** To make inferences for a two-way table.	• Class discussions and group activities. • Define an example of when a chi-square test for goodness of fit is appropriate. • Define the χ^2 statistic, degrees of freedom for the χ^2 statistic, homogeneity of populations. • Complete Activity 14A: "I Didn't Get Enough Reds" to simulate the ideas behind goodness of fit. • Calculate expected counts for each category in a distribution. • Perform a chi-squared goodness of fit test. • Distinguish between test for homogeneity and independence. • Perform a chi-squared test to make decisions for a two-way table. • **Technology:** Use a graphing calculator/TI Nspire and Minitab to complete goodness of fit problems. • **Technology:** Provide students with necessary calculator programs for goodness of fit problems. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, Calculator Programs for χ^2 tests, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 14 • Problem Set 14	7 days

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4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj. 15.1** To make inferences about the linear regression model.	• Class discussions and group activities. • Find and interpret standard error about the LSRL. • Construct and interpret the confidence interval and perform a significance test about the regression slope. • **Technology:** Use a graphing calculator/TI Nspire and Minitab to complete inference on linear regression problems. • Exercises, teacher prepared notes, teacher prepared supplemental problems. **Materials:** Teacher prepared notes, graphing calculators, TI-Nspire class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions **Summative** • Test 15 • Problem Set 15	4 days
4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-6; 4.4.12 B.1-6; 4.4.12 C.1-4; (4.5.12 A.1-6; 4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Objective** To demonstrate skills needed for success on the AP exam.	• Complete AP practice tests (multiple-choice and free response). • Assess other students responses to free response questions. • Discuss test tips for the AP exam. • Intense self and group review activities. **Materials:** Teacher prepared practice tests and review materials, graphing calculators, TI-Nspire class set, Barron's AP Exam Review book class set. The Practice of Statistics. W.H. Freeman and Company, 2008		**Formative** • Student oral responses • Homework • AP Free Response and Multiple Choice questions	10 days

Essential Question NJCCC Standard	**NJCCCS-** Skills/Objectives	**Instructional Strategies** Activities/ Materials/ Technology/ Interdisciplinary Connections Cultural Diversity	**Modifications** ESL Special Education Academic Support/G&T	**Assessments** Formative Summative Benchmarks	**PACING**
4.4.A Data Analysis How can the collection, organization, interpretation, and display of data be used to answer this question?	**4.4.12 A.1-3,5,6; 4.4.12 B.4-6 (4.5.12 B.1-4; 4.5.12 C.3,4; 4.5.12 D.1,2,4; 4.5.12 E.3; 4.5.12 F.1-4)** **Obj.** To make inferences for a population spread. **Obj.** To perform a one-way analysis of variance (ANOVA).	• Class discussions and group activities. • Determine the F statistic and degree of freedom for a specified F distribution. • Conduct an F test of significance. • State and verify assumptions for using the ANOVA. • Conduct and ANOVA test. • Complete an ANOVA project. • Exercises, teacher prepared review notes, teacher prepared supplemental problems. **Materials:** Teacher prepared note materials, teacher prepared homework problems, graphing calculators, TI-Nspire class set.		**Formative** • Student oral responses • Homework **Summative** • F test/ANOVA Test • ANOVA project.	7 days

NORTH BRUNSWICK TOWNSHIP HIGH SCHOOL

(2355) AP Statistics (Recommended for College Bound)
Grades 11, 12
5 Credits - 1 Year
Co-requisite: Precalculus or higher

Course Description:
The *Advanced Placement Statistics* course introduces students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes; exploring data, planning a study, anticipating patterns, and statistical inference. The *AP Statistics* course is an excellent option for any student who has good problem-solving skills as well as solid language arts skills that are needed to interpret and write analyses of statistical word problems. A TI-83^+ or TI-84 graphing calculator is necessary for success.

Proficiencies: (As presented in AP Statistics – Topic Outline from the College Board)
At the completion of this course the student will be able to:
1. Use dotplots, stemplots, histograms, and cumulative frequency plots to interpret graphical displays of distributions: center, spread, shape, clusters, gaps, outliers, and other unusual features.
2. Summarize distributions of univariate data: measuring center, spread, and position with respect to quartiles, percentiles and standardized scores (z-scores).
3. Compare distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots,).
4. Construct and interpret graphical displays of bivariate data (scatter plots, regression lines, residual plots, outliers, influential points, correlation, transformations to achieve linearity).
5. Explore categorical data through frequency tables and bar charts to determine association and conditional relative frequencies and compare distributions.
6. Know the methods of data collection (census, sample survey, experiment, observational study). Identify characteristics of a well-designed and well-conducted survey (populations, samples and random selection; sources of bias, simple random sampling, stratified random sampling, cluster sampling)
7. Identify characteristics of a well-designed and well-conducted experiment (treatments, control groups, experimental units, randomization, replication, sources of bias, confounding, placebo effect and blinding, randomized design, block design, matched pairs design)
8. Apply the rules of elementary probability theory ("Law of Large Numbers," addition and multiplication rules, conditional probability, independence).
9. Perform simulations with probability distributions, including binomial and geometric.
10. Determine the mean (expected value) and standard deviation of a random variable, including when combining independent random variables.
11. Understand and apply the properties and concepts of the normal distribution.
12. Understand sampling distributions (sample proportion, sample mean, Central Limit Theorem, difference between two sample proportions, difference between two sample means, simulation of a sampling distribution, t-distribution, Chi-square distribution).
13. Estimate population parameters using point estimators.
14. Understand the logic of and interpret confidence intervals. Apply and interpret confidence intervals for: large sample proportion(s), mean(s), slope of LSRL.
15. Understand the logic of tests of significance: null and alternative hypotheses; p-values, one- and two-sided tests, concepts of Type I and Type II errors, concept of power. Apply and interpret tests of significance: large sample proportion(s), mean(s), goodness of fit, homogeneity, independence, and slope of LSRL.

Course Requirements:
1. Students will be expected to maintain a high level of participation and preparedness.
2. Students will be expected to attend class regularly.
3. Students will be expected to complete all assignments.
4. Students will be expected to successfully accomplish all graded work to include unit tests, quizzes and reports, and all class projects.
5. Students will be cooperative in class and contribute to the growth of the class.

Evaluation Procedures:
Marking period grades will be determined by

Performance Assessments	90%
Homework	10%