Pascack Valley Regional High School District

Pascack Hills High School, Montvale, New Jersey 07645
Pascack Valley High School, Hillsdale, New Jersey 07642

Course Name: Advanced Placement Statistics

Born On: July, 2011
Previous Revision: August, 2020
Current Revision: August, 2023
Board Approval" 8/28/23

Course Description: This full-year, five-credit course is based on the standards and requirements of the College Board's *Advanced Placement Statistics* curriculum. The purpose of the course is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. Students are exposed to four broad conceptual themes:

1. Exploring Data: Observing patterns and departures from patterns
2. Planning a Study: Deciding what and how to measure
3. Anticipating Patterns: Producing models using probability models using probability theory and simulation
4. Statistical Inference: Confirming models

All mathematics courses in the Pascack Valley Regional High School District are designed to address multiple learning styles and needs, and accommodations and modifications are made for students with disabilities, multilingual students, students at risk of failure, gifted and talented students, and students with 504 plans. *Calculus* builds on concepts learned and skills developed in *Precalculus*, while also spiraling in those concepts and skills to reinforce and strengthen students' algebraic foundation. Additionally, *Calculus* anticipates higher-level mathematics that will be learned in college-level math and applied math courses, and enrichment opportunities are provided to challenge students and engage them in rich, interesting mathematics. Students are encouraged to analyze data using tools and models to make valid and reliable claims (9.4.12.IML.3), and various technologies are integrated throughout the curriculum, including scientific calculators, graphing calculators, specialized software, and various Internet programs and subscriptions. These tools enrich the curriculum by giving students' access to additional mathematical representations, and they also help to differentiate by providing students with additional options to engage with mathematical tasks.

The Pascack Valley Regional High School Mathematics Department integrates 21st century life and career skills across its courses, with the dual goal of informing students about careers and fields of study that use mathematics (9.3.ST.5, 9.3.ST-ET.5 and 9.3.ST-SM.2), and helping students improve the quantitative, mathematical, and statistical reasoning skills they will need to be effective producers and consumers of quantitative information in their everyday lives (9.2.12.CAP.2). Mathematics courses address the *New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills*, with a particular emphasis on demonstrating the ability to reflect, analyze and use creative skills and ideas (9.4.12.CI.1), investigating new challenges and opportunities for personal growth, advancement and transition (9.4.12.CI.3), identifying problem-solving strategies used in the development of an innovative product or practice (9.4.12.CT.1), and explaining the potential benefits of collaborating to enhance critical thinking and problem solving (9.4.12.CT.2). Mathematics courses also address the *New Jersey Student Learning Standards for English Language Arts Companion Standards*, with a particular focus on following complex multistep procedures (RST.9-10.3/RST.11-12.3), determining the meaning of symbols, key terms, and other domain-specific words and phrases (RST.9-10.4/RST.11-12.3), and translating quantitative or technical information expressed in words into visual forms and translating information expressed visually or mathematically into words (RST.9-10.7). Similarly, the mathematics department seeks to support students by providing them with opportunities to use quantitative, statistical, and mathematical reasoning in interdisciplinary contexts, in contexts that are meaningful to students, and in contexts that attend to the contributions and perspectives of historically

marginalized groups. Specifically, mathematics courses will look to incorporate, when appropriate, contributions and experiences of people from the LGBTQ+ community and individuals with disabilities, and references to issues of social and cultural relevance, including climate change.

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Content/Topic:	Key Learning Items/Concepts and Pacing Guide	Observable Proficiencies and Skills:	NJSLS	Formative, Summative, Benchmark, and Alternative Assessments	Core Instructional and Supplemental Materials/ Modifications and Accommodations
Unit 1 – Exploring Data: Observing Patterns and Departures from Patterns **Time:** 8 weeks *(see column 2 for a more detailed breakdown)* **Content Statement:** Exploratory analysis of data makes use of graphical and numerical techniques to study patterns and departures from patterns. Emphasis should be placed on interpreting information from graphical and numerical	**Key learning items/concepts:** 1. Interpret graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot) a. Center and spread (1 day) b. Clusters and gaps (1 day) c. Outliers and other unusual features (1 day) d. Shape (1 day) 2. Summarize distributions of univariate data a. Measuring center: median, mean (2 days) b. Measuring spread: range, interquartile range, standard deviation (2 days) c. Measuring position: quartiles, percentiles, standardized scores (z-scores) (2 days) d. Using boxplots (2 days) e. The effect of changing units on summary measures (1 day) 3. Comparing distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots) a. Comparing center and spreads: within group, between group variation (1 day) b. Comparing clusters and gaps (1 day) c. Comparing outliers and other unusual features (1 day)	*1. Interpret graphical displays of distributions of univariate data (dotplot, stemplot, histogram, cumulative frequency plot)* *2. Summarize distributions of univariate data* *3. Compare distributions of univariate data (dotplots, back-to-back stemplots, parallel boxplots)* *4. Explore bivariate data* *5. Explore categorical data: frequency tables*	**NJSLS Content Standards** *AP Statistics* builds on many of the concepts and skills learned in the New Jersey Student Learning Standards, and in particular, S-ID and S-IC. **NJSLS SMP** MP1. Make sense of problems and persevere in solving them MP2. Construct viable arguments and critique the reasoning of others MP3. Reason abstractly and quantitatively MP4. Model with mathematics MP5. Attend to precision MP6. Use appropriate tools strategically MP7. Look for and make use of structure MP8. Look for and express regularity in repeated reasoning **NJSLS for ELA Companion Standards**	Students will be assessed regularly throughout this course, with a focus on both conceptual understanding and procedural fluency. Assessment tools may include the following: - quizzes (F) - tests (S) - performance tasks (F/S) - projects (S) - homework (F) - discussions (F) - journals (F) - Form A, B, or C benchmark (B) - alternative assessments (A) - Take home	Selection of primary sources *Suggestion(s):* Texts: *STATS Modeling The World* 3rd Edition, Bock, Velleman, De Veaux (on grade level); Moore, David S. *The Basic Practice of Statistics.* 2nd ed. (remediation); Deltamath (remediation, on grade level, and advanced) Resources: - Minitab - Microsoft Excel - TI-83/84 Calculator - Rossman, Allan J., and Beth L. Chance. *Workshop Statistics: Discovery with Data and Minitab. 2nd* ed. New York: Key College, 2000. - Peck, Olsen, and Devore. *Introduction to Statistics and Data Analysis.* 2nd ed. Pacific Grove, Calif.: Duxbury, 2004. - College Board website: www.collegeboard.com/ap **Modifications and Accommodations:** **Students with special needs:** Teachers and support staff will attend to all modifications and accommodations listed in students' IEPs and 504s. Teachers will incorporate manipulatives, extra time, alternative assessments, scaffolding, spiraling, technology, and flexible grouping to support

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| displays and summaries. | d. Comparing shapes (2 days) 4. Exploring bivariate data a. Analyzing patterns in scatterplots (2 days) b. Correlation and linearity (2 days) c. Least-squares regression line (2 days) d. Residual plots, outliers, and influential points (2 days) e. Transformations to achieve linearity: logarithmic and power transformation (2 days) 5. Exploring categorical data: frequency tables a. Marginal and joint frequencies for two-way tables (2 days) b. Conditional relative frequencies and association (2 days) **Content-specific modifications and accommodations** - use multiple representations and technology to support conceptual understanding - allow calculator use to focus attention on conceptual understanding **Interdisciplinary/additional connections** - draw on contexts with applications from other fields - draw on contexts with climate change applications - draw on contexts from diverse populations | | RST.9-10.3 RST.9-10.4 RST.9-10.7 RST.11-12.3 RST.11-12.4 **NJSLS-CLKS** **- 21st Century Life and Careers** 9.4.12.CI.1 9.4.12.CI.3 9.4.12.CT.1 9.4.12.CT.2 **- Technology** 9.4.12.IML.3 9.4.12.TL.2 9.4.12.IML.4 9.4.12.IML.9 9.4.12.IML.10 **- Career Education** 9.2.12.CAP.2 9.3.ST.5 9.3.ST-ET.5 9.3.ST-SM.2 **NJSLS – CSDT** 8.1.12.DA.1 8.1.12.DA.5 8.1.12.DA.6 8.1.12.AP.1 8.2.12.ETW.2 | exams and investigations (F) - On-line work including AP exam open ended questions (F) - Administration of previous AP exam sections and questions based on relevant topics (F) | student learning. **Multilingual students:** Teachers and support staff will work to support multilingual students in their first language and in English, providing materials and/or resources to support students' understanding. Students will be given additional time, as appropriate, and translation tools will be utilized as needed. **Students at risk of school failure:** Formative and summative data will be used to monitor student success, and students at risk of failure will receive additional supports and services, which may include parent consultation, extra help, and differentiation strategies, including small group instruction, group work, scaffolding, and spiraling. **Gifted and Talented Students:** Students who excel in their mastery of course standards will be further challenged with more complex tasks, extensions of concepts and skills, and extended problem solving and critical thinking opportunities. |

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Unit 2 – Planning a Study: Deciding what and how to measure **Time:** 4 weeks *(see column 2 for a more detailed breakdown)* **Content Statement:** 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	**Key learning items/concepts:** 1- Overview methods of data collection including a. Census (1 day) b. Sample survey (1 day) c. Experiment (1 day) d. Observational study (1 day) 2- Planning and conducting surveys a. Characteristics of a well-designed and well-conducted surveys (1 day) b. Populations, samples, and random selection (1 day) c. Sources of bias in surveys (1 day) d. Simple random sampling (1/2 day) e. Stratified random sampling (1/2 day) 3- Planning and conducting experiments a. Characteristics of a well-designed and well-conducted survey (1 day) b. Treatments, control groups, experimental units, random assignments, and replication (1 day) c. Sources of bias and confounding Including placebo effect and blinding (1 day) d. Completely randomized design (1 day) 4- Generalizability of results from observational studies, experimental studies, surveys (1 week) **Content-specific modifications and accommodations** - use multiple representations and	*1. Identify data collection methods* *2. Identify characteristics of different survey types* *3. Identify characteristics of experiments*	**NJSLS Content Standards** *AP Statistics* builds on many of the concepts and skills learned in the New Jersey Student Learning Standards, and in particular, S-ID and S-IC. **NJSLS SMP** MP1. Make sense of problems and persevere in solving them MP2. Construct viable arguments and critique the reasoning of others MP3. Reason abstractly and quantitatively MP4. Model with mathematics MP5. Attend to precision MP6. Use appropriate tools strategically MP7. Look for and make use of structure MP8. Look for and express regularity in repeated reasoning **NJSLS for ELA Companion Standards** RST.9-10.3 RST.9-10.4 RST.9-10.7	Students will be assessed regularly throughout this course, with a focus on both conceptual understanding and procedural fluency. Assessment tools may include the following: - quizzes (F) - tests (S) - performance tasks (F/S) - projects (S) - homework (F) - discussions (F) - journals (F) - Form A, B, or C benchmark (B) - alternative assessments (A) - Take home exams and investigations (F)	Selection of primary sources *Suggestion(s):* Texts: *STATS Modeling The World* 3rd Edition, Bock, Velleman, De Veaux (on grade level); Moore, David S. *The Basic Practice of Statistics.* 2nd ed. (remediation); Deltamath (remediation, on grade level, and advanced) Resources: - Minitab - Microsoft Excel - TI-83/84 Calculator - Rossman, Allan J., and Beth L. Chance. *Workshop Statistics: Discovery with Data and Minitab. 2nd* ed. New York: Key College, 2000. - Peck, Olsen, and Devore. *Introduction to Statistics and Data Analysis.* 2nd ed. Pacific Grove, Calif.: Duxbury, 2004. - College Board website: www.collegeboard.com/ap **Modifications and Accommodations:** **Students with special needs:** Teachers and support staff will attend to all modifications and accommodations listed in students' IEPs and 504s. Teachers will incorporate manipulatives, extra time, alternative assessments, scaffolding, spiraling, technology, and flexible grouping to support student learning. **Multilingual students:** Teachers and support staff will work to support multilingual students in their first language and in English,

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	technology to support conceptual understanding - allow calculator use to focus attention on conceptual understanding **Interdisciplinary/additional connections** - draw on contexts with applications from other fields - draw on contexts with climate change applications - draw on contexts from diverse populations		RST.11-12.3 RST.11-12.4 **NJSLS-CLKS** **- 21st Century Life and Careers** 9.4.12.CI.1 9.4.12.CI.3 9.4.12.CT.1 9.4.12.CT.2 **- Technology** 9.4.12.IML.3 9.4.12.TL.2 9.4.12.IML.4 9.4.12.IML.9 9.4.12.IML.10 **- Career Education** 9.2.12.CAP.2 9.3.ST.5 9.3.ST-ET.5 9.3.ST-SM.2 **NJSLS – CSDT** 8.1.12.DA.1 8.1.12.DA.5 8.1.12.DA.6 8.1.12.AP.1 8.2.12.ETW.2	- On-line work including AP exam open ended questions (F) - Administration of previous AP exam sections and questions based on relevant topics (F)	providing materials and/or resources to support students' understanding. Students will be given additional time, as appropriate, and translation tools will be utilized as needed. **Students at risk of school failure:** Formative and summative data will be used to monitor student success, and students at risk of failure will receive additional supports and services, which may include parent consultation, extra help, and differentiation strategies, including small group instruction, group work, scaffolding, and spiraling. **Gifted and Talented Students:** Students who excel in their mastery of course standards will be further challenged with more complex tasks, extensions of concepts and skills, and extended problem solving and critical thinking opportunities.

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Unit 3 – Anticipating Patterns: Producing models using probability theory and simulation

Time: 7 weeks *(see column 2 for a more detailed breakdown)*

Content Statement: Probability is the tool used for anticipating what the distribution of data should look like under a given model. | **Key learning items/concepts:**

1- Probability as relative frequency
a. "Law of large numbers" concept (1 day)
b. Addition rule, multiplication rule, conditional probability, and independence (1 day)
c. Discrete random variables and their probability distributions, including binomial (2 days)
d. Simulation of probability distributions, including binomial and geometric (1 day)
e. Mean (expected value) and standard deviation of a random variable, and linear transformation of random variable (2 days)
2- Combining independent random variables
a. Notion of independence versus dependence (2 days)
b. Mean and standard deviation for sums and differences of independent random variables (2 days)
3- the normal distribution
a. properties of the normal distribution (2 days)
b. using tables of the normal distribution (2 days)
c. the normal distribution as a model for measurements (2 days)
4- sampling distributions
a. sampling distribution of a sample | *1. Calculate probabilities 2.Utilize properties of the normal distribution to solve problems 3. Explain the Central Limit Theorem* | **NJSLS Content Standards** *AP Statistics* builds on many of the concepts and skills learned in the New Jersey Student Learning Standards, and in particular, S-ID and S-IC.

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	proportion (2 days) b. sampling distribution of a sample mean (2 days) c. Central Limit Theorem (2 days) d. Sampling distribution of a difference between two independent sample proportions (2 days) e. Sampling distribution of a difference between two independent means (2 days) f. Simulation of sampling distributions (1 day) **Content-specific modifications and accommodations** - use multiple representations and technology to support conceptual understanding - allow calculator use to focus attention on conceptual understanding **Interdisciplinary/additional connections** - draw on contexts with applications from other fields - draw on contexts with climate change applications - draw on contexts from diverse populations		RST.11-12.3 RST.11-12.4 **NJSLS-CLKS** **- 21st Century Life and Careers** 9.4.12.CI.1 9.4.12.CI.3 9.4.12.CT.1 9.4.12.CT.2 **- Technology** 9.4.12.IML.3 9.4.12.TL.2 9.4.12.IML.4 9.4.12.IML.9 9.4.12.IML.10 **- Career Education** 9.2.12.CAP.2 9.3.ST.5 9.3.ST-ET.5 9.3.ST-SM.2 **NJSLS – CSDT** 8.1.12.DA.1 8.1.12.DA.5 8.1.12.DA.6 8.1.12.AP.1 8.2.12.ETW.2	- On-line work including AP exam open ended questions (F) - Administration of previous AP exam sections and questions based on relevant topics (F)	providing materials and/or resources to support students' understanding. Students will be given additional time, as appropriate, and translation tools will be utilized as needed. **Students at risk of school failure:** Formative and summative data will be used to monitor student success, and students at risk of failure will receive additional supports and services, which may include parent consultation, extra help, and differentiation strategies, including small group instruction, group work, scaffolding, and spiraling. **Gifted and Talented Students:** Students who excel in their mastery of course standards will be further challenged with more complex tasks, extensions of concepts and skills, and extended problem solving and critical thinking opportunities.

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Unit 4 – Statistical Inference: Confirming Models **Time:** 13 weeks *(see column 2 for a more detailed breakdown)* **Content Statement:** Statistical inference guides the selection of appropriate models.	**Key learning items/concepts:** 1- Confidence intervals a. The meaning of a confidence interval (3-4 days) b. Large sample confidence interval for a proportion (3 days) c. Large sample confidence interval for a mean (3 days) d. Large sample confidence interval for a difference between two proportions (3 days) e. Large sample confidence interval for a difference between two means (unpaired and paired) (3 days) 2- Tests of significance a. Logic of significance testing, null and alternative hypotheses; p- values; one- and two-sided tests; concepts of Type I and Type II errors; concept of power (3-4 days) b. Large sample test of a proportion (3 days) c. Large sample test for a mean (3 days) d. Large sample test for a difference between two proportions (3 days) e. Large sample test for a difference between two means (unpaired and paired) (3 days) f. Chi-square test for goodness of fit, homogeneity of proportions, and independence (one- and two-way tables) (3-4 days) 3- Special case of normally distributed	*1. Calculate confidence intervals for means and proportions 2. Conduct hypothesis testing for means and proportions 3. Conduct Chi-square tests*	**NJSLS Content Standards** *AP Statistics* builds on many of the concepts and skills learned in the New Jersey Student Learning Standards, and in particular, S-ID and S-IC. **NJSLS SMP** MP1. Make sense of problems and persevere in solving them MP2. Construct viable arguments and critique the reasoning of others MP3. Reason abstractly and quantitatively MP4. Model with mathematics MP5. Attend to precision MP6. Use appropriate tools strategically MP7. Look for and make use of structure MP8. Look for and express regularity in repeated reasoning **NJSLS for ELA Companion Standards** RST.9-10.3 RST.9-10.4	Students will be assessed regularly throughout this course, with a focus on both conceptual understanding and procedural fluency. Assessment tools may include the following: - quizzes (F) - tests (S) - performance tasks (F/S) - projects (S) - homework (F) - discussions (F) - journals (F) - Form A, B, or C benchmark (B) - alternative assessments (A) - Take home exams and investigations (F)	Selection of primary sources *Suggestion(s):* Texts: *STATS Modeling The World* 3rd Edition, Bock, Velleman, De Veaux (on grade level); Moore, David S. *The Basic Practice of Statistics.* 2nd ed. (remediation); Deltamath (remediation, on grade level, and advanced) Resources: - Minitab - Microsoft Excel - TI-83/84 Calculator - Rossman, Allan J., and Beth L. Chance. *Workshop Statistics: Discovery with Data and Minitab. 2nd* ed. New York: Key College, 2000. - Peck, Olsen, and Devore. *Introduction to Statistics and Data Analysis.* 2nd ed. Pacific Grove, Calif.: Duxbury, 2004. - College Board website: www.collegeboard.com/ap **Modifications and Accommodations:** **Students with special needs:** Teachers and support staff will attend to all modifications and accommodations listed in students' IEPs and 504s. Teachers will incorporate manipulatives, extra time, alternative assessments, scaffolding, spiraling, technology, and flexible grouping to support student learning. **Multilingual students:** Teachers and support staff will work to support multilingual students in their first language and in English,

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	data a. t-distribution (3-4 days) b. Single sample t procedures (3-4 days) c. Two sample (independent and matched pairs) t procedures (3-4 days) d. Inference for the slope of least-squares regression line. (3-4 days) **Content-specific modifications and accommodations** - use multiple representations and technology to support conceptual understanding - allow calculator use to focus attention on conceptual understanding **Interdisciplinary/additional connections** - draw on contexts with applications from other fields - draw on contexts with climate change applications - draw on contexts from diverse populations		RST.9-10.7 RST.11-12.3 RST.11-12.4 **NJSLS-CLKS** **- 21st Century Life and Careers** 9.4.12.CI.1 9.4.12.CI.3 9.4.12.CT.1 9.4.12.CT.2 **- Technology** 9.4.12.IML.3 9.4.12.TL.2 9.4.12.IML.4 9.4.12.IML.9 9.4.12.IML.10 **- Career Education** 9.2.12.CAP.2 9.3.ST.5 9.3.ST-ET.5 9.3.ST-SM.2 **NJSLS – CSDT** 8.1.12.DA.1 8.1.12.DA.5 8.1.12.DA.6 8.1.12.AP.1 8.2.12.ETW.2	- On-line work including AP exam open ended questions (F) - Administration of previous AP exam sections and questions based on relevant topics (F)	providing materials and/or resources to support students' understanding. Students will be given additional time, as appropriate, and translation tools will be utilized as needed. **Students at risk of school failure:** Formative and summative data will be used to monitor student success, and students at risk of failure will receive additional supports and services, which may include parent consultation, extra help, and differentiation strategies, including small group instruction, group work, scaffolding, and spiraling. **Gifted and Talented Students:** Students who excel in their mastery of course standards will be further challenged with more complex tasks, extensions of concepts and skills, and extended problem solving and critical thinking opportunities.

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Unit 5 – AP and Post-AP **Time:** 8 weeks *(see column 2 for a more detailed breakdown)* **Content Statement:** Statistical inference guides the selection of appropriate models.	**Key learning items/concepts:** REVIEW FOR AP STATISTICS TEST (2 weeks) a. Review past quizzes, tests, and test-reviews b. Complete AP open-ended questions from previous tests c. Complete previous AP Exam POST AP EXAM (6 weeks) a. Complete Final Exam b. Complete End of Year Project (described below) **Content-specific modifications and accommodations** - use multiple representations and technology to support conceptual understanding - allow calculator use to focus attention on conceptual understanding **Interdisciplinary/additional connections** - draw on contexts with applications from other fields - draw on contexts with climate change applications - draw on contexts from diverse populations	*1. Demonstrate proficiency on AP Statistics exam* *2. Conduct statistical analysis on a topic of interest*	**NJSLS Content Standards** *AP Statistics* builds on many of the concepts and skills learned in the New Jersey Student Learning Standards, and in particular, S-ID and S-IC. **NJSLS SMP** MP1. Make sense of problems and persevere in solving them MP2. Construct viable arguments and critique the reasoning of others MP3. Reason abstractly and quantitatively MP4. Model with mathematics MP5. Attend to precision MP6. Use appropriate tools strategically MP7. Look for and make use of structure MP8. Look for and express regularity in repeated reasoning	Students will be assessed regularly throughout this course, with a focus on both conceptual understanding and procedural fluency. Assessment tools may include the following: - quizzes (F) - tests (S) - performance tasks (F/S) - projects (S) - homework (F) - discussions (F) - journals (F) - Form A, B, or C benchmark (B) - alternative assessments (A) - Take home exams and investigations (F)	Selection of primary sources *Suggestion(s):* Texts: *STATS Modeling The World* 3rd Edition, Bock, Velleman, De Veaux (on grade level); Moore, David S. *The Basic Practice of Statistics.* 2nd ed. (remediation); Deltamath (remediation, on grade level, and advanced) Resources: - Minitab - Microsoft Excel - TI-83/84 Calculator - Rossman, Allan J., and Beth L. Chance. *Workshop Statistics: Discovery with Data and Minitab. 2nd* ed. New York: Key College, 2000. - Peck, Olsen, and Devore. *Introduction to Statistics and Data Analysis.* 2nd ed. Pacific Grove, Calif.: Duxbury, 2004. - College Board website: www.collegeboard.com/ap **Modifications and Accommodations:** **Students with special needs:** Teachers and support staff will attend to all modifications and accommodations listed in students' IEPs and 504s. Teachers will incorporate manipulatives, extra time, alternative assessments, scaffolding, spiraling, technology, and flexible grouping to support student learning. **Multilingual students:** Teachers and support staff will work to support multilingual students in their first language and in English,

AP Statistics: AP Statistics is a full-year, five-credit course is based on the standards and requirements of the College Board's *Advanced Placement Statistics* curriculum. The purpose of the course is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data.

| | | | | **NJSLS for ELA Companion Standards** RST.9-10.3 RST.9-10.4 RST.9-10.7 RST.11-12.3 RST.11-12.4 **NJSLS-CLKS - 21st Century Life and Careers** 9.4.12.CI.1 9.4.12.CI.3 9.4.12.CT.1 9.4.12.CT.2 **- Technology** 9.4.12.IML.3 9.4.12.TL.2 9.4.12.IML.4 9.4.12.IML.9 9.4.12.IML.10 **- Career Education** 9.2.12.CAP.2 9.3.ST.5 9.3.ST-ET.5 9.3.ST-SM.2 **NJSLS – CSDT** 8.1.12.DA.1 8.1.12.DA.5 8.1.12.DA.6 8.1.12.AP.1 8.2.12.ETW.2 | - On-line work including AP exam open ended questions (F) - Administration of previous AP exam sections and questions based on relevant topics (F) - End of course project (F, S) | providing materials and/or resources to support students' understanding. Students will be given additional time, as appropriate, and translation tools will be utilized as needed. **Students at risk of school failure:** Formative and summative data will be used to monitor student success, and students at risk of failure will receive additional supports and services, which may include parent consultation, extra help, and differentiation strategies, including small group instruction, group work, scaffolding, and spiraling. **Gifted and Talented Students:** Students who excel in their mastery of course standards will be further challenged with more complex tasks, extensions of concepts and skills, and extended problem solving and critical thinking opportunities. |

<center>**AP Statistics End of Year Project**</center>

<u>General Information</u>

    This project is to be completed with a partner of your choice. You are to choose <u>three</u> areas of interest, collect data from these areas, and perform a statistical analysis of the data. Your analysis must include the test of a hypothesis that you create about the data you have collected. You must use a different test style, seen below, for each of the three data sets. No test style can be repeated. In other words, a different test style for each data set.

1. Two-Sample *t*-Test   or   Matched-Pair *t*-Test

2. Two-Proportion *z*-Test   or   Chi-Square Test

3. Linear Regression *t*-Test

<u>Project Declaration</u>:

    You are to e-mail me with the following information:

1. Partner Names

<center>14</center>

2. Your area of study and the reason for choosing that area. This is to be written in paragraph form; specific supporting details of your reasons must be included.

3. The test that you will be performing for each data set.

4. Description of how you plan on collecting the data.

5. H_o and H_a for each of the three data sets in your project.

Power Point Presentation:

The following is required for each data set.

1. Your area of study and the reason for choosing that area. This is to be written in paragraph form; specific supporting details of your reasons must be included.

2. Your method of data collection and sampling technique.

Your data analysis: data list and appropriate graphs:

- List of data
- Histograms
- Box-Plots
- Five Number Summary
- Mean and Standard Deviation
- Description of shapes of graphs
- Comparison of mean v. median
- Circle Graphs
- Bar Graphs
- Scatter Plots with Regressions Line and Equation
- Residual Plots

3. Hypothesis test

- Stated H_o and H_a for each data set in words and symbols
- Check of all necessary assumptions to run test

15

- Calculation of sample statistic ($\bar{x}$, $\hat{p}$, expected counts, or b)
- Calculation of test statistic (t, z, or χ^2)
- Calculation of p-value
- Proper conclusion based on both p-value <u>and</u> test statistic. Comment on whether or not your results match with what you expected
- The type of error, Type I or Type II, that could have occurred based on your conclusion and what that would mean within the proper context.

4. Confidence interval (Except for χ^2)
- Standard Error used to create confidence interval
- Proper confidence level used to coincide with Hypothesis Test.
- Calculation of Confidence Interval
- Proper description of what the Confidence Interval describes.
- Statement of how to use Confidence Interval to come up with same conclusion from Hypothesis Test.

5. Description of lurking variable and how that might affect your conclusions.
6. etc.

<u>Presentation:</u>

All groups are to present their power point to the class. Presentations should be about 10 minutes, which will include

questions by me and other students in the class. There will be three presentations per. I will have a sign up sheet available for you

on. First come first serve.

Your presentations will involve an explanation of the material that you have mastered through the use of a power point

presentation. Your presentation must be understandable to your fellow classmates. Your presentation should be creative and at an

appropriate level for the mature thinkers found in our AP Statistics class.

Finally, on the day of your presentation you are to submit 3 well written multiple-choice questions that deal with the statistical concepts that relate to your project. These questions will be used to create an assessment that all are required to take when the presentations are completed.

As members of the audience you are expected to be courteous. Inappropriate behavior will result in a deduction of your project grade. You are expected to be in class during all presentations. You are also expected to be curious, asking appropriate questions at appropriate times during the presentations. Good luck and have fun!