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.

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

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

| 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 |
|--|---|--|--|---|---|
| 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 | 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 | 1. Identify data collection methods 2. Identify characteristic s of different survey types 3. Identify characteristic s 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 | 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 | 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 |
| | accommodations - use multiple representations and | | RST.9-10.4 RST.9-10.7 | investigations (F) | staff will work to support multilingual students in their first language and in English, |

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

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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 3 – Anticipating | Key learning items/concepts: | 1. Calculate probabilities | NJSLS Content Standards | Students will be assessed | Selection of primary sources Suggestion(s): |
| Patterns: Producing | 1- Probability as relative frequency a. "Law of large numbers" concept (1 | 2.Utilize properties of | AP Statistics builds on many of the concepts and | regularly throughout this | Texts: STATS Modeling The World 3rd Edition, Bock, Velleman, De Veaux (on grade |
| models using probability theory and | day) b. Addition rule, multiplication rule, conditional probability, and | the normal distribution to solve | skills learned in the New Jersey Student Learning Standards, and in | course, with a focus on both conceptual | level); Moore, David S. <i>The Basic Practice of Statistics</i> . 2nd ed. (remediation); Deltamath (remediation, on grade level, and advanced) |
| simulation | independence (1 day) c. Discrete random variables and their | problems 3. Explain the | particular, S-ID and S-IC. | understanding and procedural | Resources: |
| Time: 7 weeks (see column 2 | probability distributions, including binomial (2 days) | Central Limit Theorem | NJSLS SMP MP1. Make sense of | fluency. Assessment | - Minitab - Microsoft Excel |
| for a more detailed breakdown) | d. Simulation of probability distributions, including binomial and geometric (1 day) | | problems and persevere in solving them MP2. Construct viable | tools may include the following: | - TI-83/84 Calculator - Rossman, Allan J., and Beth L. Chance. Workshop Statistics: Discovery with Data |
| Content | e. Mean (expected value) and standard deviation of a random variable, and | | arguments and critique the reasoning of others | - quizzes (F) - tests (S) | and Minitab. 2nd ed. New York: Key College, 2000. |
| Statement: Probability is | linear transformation of random variable (2 days) | | MP3. Reason abstractly and quantitatively | - performance tasks (F/S) | - Peck, Olsen, and Devore. <i>Introduction to Statistics and Data Analysis</i> . 2nd ed. Pacific |
| the tool used for anticipating what the | 2- Combining independent random variables a. Notion of independence versus | | MP4. Model with mathematics MP5. Attend to precision | - projects (S) - homework (F) | Grove, Calif.: Duxbury, 2004 College Board website: |
| distribution of data should look | dependence (2 days) b. Mean and standard deviation for sums | | MP6. Use appropriate tools strategically | - discussions (F) | www.collegeboard.com/ap Modifications and Accommodations: |
| like under a given model. | and differences of independent random variables (2 days) | | MP7. Look for and make use of structure | - journals (F) - Form A, B, | Students with special needs: Teachers and support staff will attend to all modifications |
| | 3- the normal distribution a. properties of the normal distribution (2 days) | | MP8. Look for and express regularity in repeated reasoning | or C benchmark (B) - alternative | and accommodations listed in students' IEPs and 504s. Teachers will incorporate |
| | b. using tables of the normal distribution (2 days) | | NJSLS for ELA | assessments (A) | manipulatives, extra time, alternative assessments, scaffolding, spiraling, technology, and flexible grouping to support |
| | c. the normal distribution as a model for measurements (2 days) | | Companion Standards RST.9-10.3 | - Take home exams and | student learning. Multilingual students: Teachers and support |
| | 4- sampling distributions a. sampling distribution of a sample | | RST.9-10.4 RST.9-10.7 | investigations (F) | staff will work to support multilingual students in their first language and in English, |

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

| 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 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. | 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) - journals (F) - sorr 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, |

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

| 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 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. | REVIEW FOR AP STATISTICS TEST (2 weeks) a. Review past quizzes, tests, and testreviews 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 | _ | = | |
|--|--|--|---|
| curriculum. The purpose of the course is to introduce students to the r | NJSLS for ELA Companion Standards RST.9-10.3 RST.9-10.4 RST.9-10.7 RST.11-12.3 | - On-line work including AP exam open ended questions (F) - Administration | 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 |
| | 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 | of previous AP exam sections and questions based on relevant topics (F) - End of course project (F, S) | 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. |
| | 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 | | |

AP Statistics End of Year Project

General Information

This project is to be completed with a partner of your choice. You are to choose three 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

Project Declaration:

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

1. Partner Names

- 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

- Calculation of sample statistic $(x, \hat{p}, \text{ expected counts}, or b)$
- Calculation of test statistic $(t, z, or \chi^2)$
- 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.

Presentation:

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!