Unit 5: AP Exam Review and Group Project: Inference

Content Area: **Mathematics**
Course(s):
Time Period: **Marking Period 4**
Length: **10 weeks**
Status: **Published**

Brief Summary of Unit

The AP Test Review Unit covers the primary concepts of data collection, display, summary, bivariate summary, probability, random variables, sampling distributions, and inferential statistics.

In this unit, students will complete a final group project on a topic of their choice. Students will demonstrate an understanding of the conceptual themes of statistics.

Standards

Analyzing various sets of data will allow students to explore studies about people from different backgrounds. Statistical studies and analysis provides students an opportunity to read about historical statistics about people's cultures. Embracing the diversity within society incorporates the following:

Amistad Commission

This unit also reflects the goals of the Department of Education and the Amistad Commission including the infusion of the history of Africans and African-Americans into the curriculum in order to provide an accurate, complete, and inclusive history regarding the importance of of African-Americans to the growth and development of American society in a global context.

Asian American and Pacific Islander History Law

This unit includes instructional materials that highlight the history and contributions of Asian Americans and Pacific Islanders in accordance with the New Jersey Student Learning Standards in Social Studies.

New Jersey Diversity and Inclusion Law

In accordance with New Jersey’s Chapter 32 Diversity and Inclusion Law, this unit includes instructional materials that highlight and promote diversity, including:

economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance.

Commission on Holocaust Education

This unit further reflects the goals of the Holocaut Education mandate where students are able to identify and analyze applicable theories concerning human nature and behavior; understand that genocide is a consequence of prejudice and discrimination; understand that issues of moral dilemma and conscience have a profound impact on life; and understand the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.S-IC.B.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
MA.S-IC.B.4	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.
MA.S-IC.B.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.
MA.S-IC.B.6	Evaluate reports based on data.
LA.K-12.NJSLSA.L4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
LA.K-12.NJSLSA.L5	Demonstrate understanding of word relationships and nuances in word meanings.
	Mathematical and computational thinking in 9–12 builds on K–8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
TEC.K-12.8.1	All students will use computer applications to gather and organize information and to solve problems.
TEC.K-12.8.2	All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual

	society, and the environment.
WORK.K-12.9.1	All students will develop career awareness and planning, employability skills and foundational knowledge necessary for success in the workplace.
WORK.K-12.9.2	All students will develop career awareness and planning, employability skills and foundational knowledge necessary for success in the workplace.

Transfer

Students will start with an interesting and meaningful question (with measurable variables), use a good design for data collection, summarize the data visually, numerically, and verbally , use the data to make appropriate inferences and reach sound conclusions about the original question.

Demonstration of how/why/where/when data analysis appears in real life applications.

Essential Questions

- How is scoring of open ended questions done?
- What are differences the first 5 open ended question and the last question?
- Should you guess on the multiple choice and/or open ended questions?
- How can the entire data collection process be put together to conduct a statistically significant study?
- How does the project relate to overall goals in Statistics?
- How are the themes in Statistics interrelated?

Essential Understandings

- The format of the AP Statistics test is standard although the questions/topics that are emphasized may vary from year to year.
- Creation of a study guide is a useful tool when taking important exams.
- Study groups are useful for most students.
- By showing a classmate how to answer a question you are demonstrating complete understanding.
- Almost all data can be tested for significance.
- Data must be collected properly for test results to be valid.
- The internet is a valuable resource but not the only source of data.
- Learning can be more useful when applied to one’s personal interests.
- Statistics have every day practical uses and to be statistically literate is valuable in their future endeavors.

Students Will Know

- Key concepts/vocabulary

- The conditions that must be met to properly conduct inferential statistics.
- The nature of sampling variability and how sampling distributions help to filter out some of its effects.
- The basic principles behind inferential statistics.

Students Will Be Skilled At

- construct a survey.
- collect data on the survey.
- summarize the data.
- analyze the data.
- report their results.

Evidence/Performance Tasks

- Assessments
    - Formative: Daily assessments using examples from class notes, NJSLA test bank problems, and/or Albert/AP Classroom assessments
    - Summative: Teacher-created assessments, NJSLA test bank problems, Big Ideas Math online platform problems, Albert/AP Classroom and/or Big Ideas Math unit assessments
    - Benchmark: IXL or teacher created diagnostic assessments in addition to unit assessments from Big Ideas Math
    - Alternative Assessments: Student-centered activities such as scavenger hunts, various projects involving real world applications, and differentiated learning tasks in Khan Academy, DeltaMath, and IXL
- Answer essential questions
- Class discussion of daily topic
- Teacher Observation
- Tests and quizzes that assess the essential questions
- Classwork and homework that assess the essential questions
- Written assignments that assess the essential questions that involves providing explanations
- Provide alternative means of assessments for certain students
- Evaluate when and when not to use the calculator.
- Know when to “guess” on multiple-choice questions.
- Recognize extraneous information in a question.
- Communicate your statistical knowledge on the free-response questions.
- Check assumptions.
- Clearly identify variables when using a formula, writing it down then substituting.

- Identify which tests to use in what parts of the problem.
- Know how to score a free response answer using an official AP rubric.

Learning Plan

Group presentations:

- Use all skills from previous units in a comprehensive manner.
- Organize an experiment to collect data from fellow students on personal taste preferences.
- Analyze the results of experiment using a significance test and confidence interval.
- Write a conclusion on findings and difficulties with experiment.
- Create a multimedia presentation to present findings.
- Work cooperatively with group members.

Materials

Core Book List including Practice of Statistics

Supplemental materials: AP Classroom, Khan Academy, Edia, and DeltaMath

- District approved textbook
- Khan Academy
- Laptops, TI-84 graphing calculator to conduct project research
- Practice exams, formula sheets for AP Exam Review
- Smart Board to present group projects (Powerpoint, Prezi)
- Teacher created activiites
- Teacher created notes

Suggested Strategies for Modifications

Possible accommodations/modification for AP Statistics