Marietta City Schools

2023–2024 District Unit Planner

AP Statistics

Unit title	**Unit 9: Inference for Quantitative Data: Slopes**	**Unit duration (hours)**	**1.5 Class Blocks**

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

Students may be surprised to learn that there is variability in slope. In their previous courses, the slope of the line of best fit does not vary for a particular set of bivariate quantitative data. In this unit, students learn how to construct confidence intervals for and perform significance tests about the slope of a population regression line when appropriate conditions are met.

GA DoE Standards

Standards

9.1 Introducing Statistics: Do Those Points Align?
9.2 Confidence Intervals for the Slope of a Regression Model
9.3 Justifying a Claim About the Slope of a Regression Model Based on a Confidence Interval
9.4 Setting Up a Test for the Slope of a Regression Model
9.5 Carrying Out a Test for the Slope of a Regression Model
9.6 Skills Focus: Selecting an Appropriate Inference Procedure

Concepts/Skills to support mastery of standards

- Identify and interpret statistics when doing inference for slopes
- Use a simulation to estimate a P-value when performing a significance test for slope
- Construct and interpret a confidence interval for the slope *B* of the population regression line
- Perform a significance test about the slope *B* of the population

Vocabulary

Slope	Simulation	Explanatory Variable	Response Variable	Least Square Regression Line
Standard Error	Linear	t-interval	t-test statistic	

Notation

Sampling distributions for simple linear regression:

Random Variable	Parameters of Sampling Distribution		Standard Error* of Sample Statistic
For slope: b	$\mu_b = \beta$	$\sigma_b = \frac{\sigma}{\sigma_x\sqrt{n}}$, where $\sigma_x = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n}}$	$s_b = \frac{s}{s_x\sqrt{n-1}}$, where $s = \sqrt{\frac{\sum(y_i - \hat{y}_i)^2}{n-2}}$ and $s_x = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$

Essential Questions

How can there be variability in slope if the slope statistic is uniquely determined for a line of best fit?
When is it appropriate to perform inference about the slope of a population regression line based on sample data?
Why do we not conclude that there is no correlation between two variables based on the results of a statistical inference for slopes?

Assessment Tasks
List of common formative and summative assessments.
Formative Assessment(s): Common Formative Assessment – Ticket out the Door **Summative Assessment(s):** Common Summative Assessment – Unit 9 material is included in the Spring Semester Mock AP Exam

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
Stats Medic: Confidence Interval for Slope (Does seat location matter- Part 2?)	1. Construct and interpret a confidence interval for the slope *B* of the population regression line.	Graphic organizers are provided for each lesson and additional practice as needed. Some students will move through the task independently. Others will need prompts and support for understanding.

Content Resources

- The Practice of Statistics, 5th Edition
- Notes, Review, and Extra Practice provided on Schoology
- Stats Medic
- College Board
- AP Statistics Formula Sheet