



Algebra 1 Unit 3: Two-Variable Statistics

Unit Focus

The unit begins with categorical data arranged in two-way tables that students are asked to analyze. Students then examine the relative frequencies of the combinations of those categorical variables. Students find the relative frequencies for combinations relative to the whole data set, as well as row or column relative frequencies to look at subgroups within categories. The row and column relative frequency tables are ultimately used to find evidence to determine if any associations are present in the data.

The unit then transitions to bivariate numerical data, which are visualized using scatter plots and lines of best fit. Students use technology to compute the lines of best fit and observe how well the linear models match the data. Correlation coefficients are used to quantify the goodness of fit for linear models.

The unit closes with an exploration of the difference between correlation and causal relationships, as well as an opportunity to apply this learning to areas of interest, like anthropology and sports.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core Mathematics: 8 - Model with mathematics. (CCSS.MATH.MP.4) - Use appropriate tools strategically. (CCSS.MATH.MP.5) Mathematics: 9-12 - Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. (CCSS.MATH.CONTENT.HSS.ID.B.5) - Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. (CCSS.MATH.CONTENT.HSS.ID.B.6.A) - Informally assess the fit of a function by plotting and analyzing residuals. (CCSS.MATH.CONTENT.HSS.ID.B.6.B) - Fit a linear function for a scatter plot that suggests a linear association. (CCSS.MATH.CONTENT.HSS.ID.B.6.C) - Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. (CCSS.MATH.CONTENT.HSS.ID.C.7)	<i>Students will be able to independently use their learning to...</i> T1 Choose appropriate tools to make reaching solutions more efficient, accessible and accurate. T2 Apply models to solve problems.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians create or use models to generalize, represent, and solve problems. U2 Mathematicians strategically use different tools to build conceptual knowledge or solve problems.	<i>Students will keep considering...</i> Q1 What model best represents this problem?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 Vocabulary: two-way table, categorical variable, variable, relative frequency table, association, correlation coefficient, negative relationship, positive	<i>Students will be skilled at...</i> S1 Calculating values in a relative frequency table and describe what the values mean in everyday language.

Stage 1: Desired Results - Key Understandings

- Compute (using technology) and interpret the correlation coefficient of a linear fit. (CCSS.MATH.CONTENT.HSS.ID.C.8)
- Distinguish between correlation and causation. (CCSS.MATH.CONTENT.HSS.ID.C.9)

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- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)

relationship, strong relationship, weak relationship, causal relationship

K2 Two variables have an association if the two variables are statistically related to each other.

K3 A correlation coefficient close to 1 or -1 represents a strong correlation.

S2 Creating two-way tables based on information given in everyday language.

S3 Inspecting patterns in relative frequency tables and two-way tables to determine if there is a possible association between two variables of interest.

S4 Drawing a linear model that fits the data well and use the linear model to estimate values.

S5 Looking for connections between two variables to analyze whether or not there is a causal relationship.

S6 Predicting and estimating values not given in the data set by using an equation representing the linear model.

S7 Interpreting the rate of change and the y-intercept for a line of best fit.

S8 Using technology to find the line of best fit.

S9 Determining which linear model is a better fit for a given data set.

S10 Using the correlation coefficient to determine the goodness of fit for a linear model.

S11 Using technology to find the correlation coefficient.