



Grade 8 Pre-Algebra - Unit E - Associations in Data

Unit Focus

In this unit, students analyze bivariate data - using scatter plots and fitted lines to analyze numerical data, and using two-way tables to analyze categorical data.

Students make and examine scatter plots, interpreting points in terms of the quantities represented and identifying scatter plots that could represent verbal descriptions of associations between two numerical variables. Students see examples of how a line can be used to model an association between measurements displayed in a scatter plot and they compare values predicted by a linear model with the actual values given in the scatter plot (MP4). They draw lines to fit data displayed in scatter plots and informally assess how well the line fits by judging the closeness of the data points to the lines (MP4). Students compare scatter plots that show different types of associations (MP7) and learn to identify these types. They make connections between the overall shape of a cloud of points, the slope of a fitted line, and trends in the data, e.g., “a line fit to the data has a negative slope and the scatter plot shows a negative association between price of a used car and its mileage.” Outliers are informally identified based on their relative distance from other points in a scatter plot. Students examine scatter plots that show linear and non-linear associations as well as some sets of data that show clustering, describing their differences (MP7). Lastly, students use two-way tables to analyze categorical data.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Standards - Common Core - Mathematics: 8 - Investigate patterns of association in bivariate data. - Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (CCSS.MATH.CONTENT.8.SP.A.1) - Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. (CCSS.MATH.CONTENT.8.SP.A.2) - Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. (CCSS.MATH.CONTENT.8.SP.A.3) - Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing	<i>Students will be able to independently use their learning to...</i> T1 Apply models to solve problems. (MP4)	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians create or use models to generalize, represent, and solve problems.	<i>Students will keep considering...</i> Q1 What model best represents this problem? Q2 How can the model created be tested and improved?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 Vocabulary: scatter plot, outlier, negative association, positive association, two-way table, clustering K2 That a model of data, such as a line of fit, can be used to predict values that are not given in the data.	<i>Students will be skilled at...</i> S1 Drawing a scatter plot to show data that has two paired variables and be able to describe the meaning of each point. S2 Drawing a model that best represents a scatter plot and use that model to make predictions about a data set.

Stage 1: Desired Results - Key Understandings

data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?

(CCSS.MATH.CONTENT.8.SP.A.4)

- Mathematical Practices
- Model with mathematics. (CCSS.MATH.MP.4)

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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)

K3 A good model line goes in the same direction as the points, as approximately the same steepness as the points, and has roughly the same number of points above the line as it has below.

K4 What may cause a nonlinear association or clustering of data points in context.

K5 Whether categorical data has a positive, negative, or no association using a relative frequency table or segmented bar graph.

S3 Identifying outliers on a scatter plot.

S4 Identifying if a scatter plot has a negative association or a positive association.

S5 Using the slope of a line fit to data in a scatter plot to say how the variables are connected in real-world situations.

S6 Using a two-way table to find associations among variables.

S7 Creating a two-way table that represents relative frequencies.

S8 Using scatter plots to decide if two variables have a linear association.

S9 Describing features of a scatter plot, including linear/nonlinear and clustering using informal language.

S10 Identifying the same data represented in a bar graph, a segmented bar graph, and a two-way table.

S11 Creating a two-way table and a segmented bar graph that represent relative frequencies.