Modified Lesson #3: Scatter Plots and Best Fit Lines

Goals, Objectives, and Planning

State Standards

8.13.b.The student will construct and analyze scatterplots.

A.11. The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve real-world problems, using mathematical models. Mathematical models will include linear and quadratic functions.

AFDA.3. The student will collect data and generate an equation for the curve (linear, quadratic, exponential, and logarithmic) of best fit to model real-world problems or applications. Students will use the best fit equation to interpolate function values, make decisions, and justify conclusions with algebraic and/or graphical models.

PS.4. The student will analyze scatterplots to identify and describe the relationship between two variables, using shape; strength of relationship; clusters; positive, negative, or no association; outliers; and influential points.

Content Objectives

- To graph a relation (a set of ordered pairs) on a coordinate plane.
- To notice trends of the relation between two variables by looking at their scatterplot.
- To understand, identify, and construct examples of linear correlation.
- To construct a line of best fit that best describes a linear correlation.
- To make predictions about future data using the line of best fit.

Key Vocabulary

Data point; scatterplot (scatter plot); ordered pair; model; correlation; independent; best-fit line; slope; regression line.

Materials

Notecards with teacher-made examples of scatterplots, transparency bars with a line printed on them; access to Internet.

SIOP Features

Preparation:	**Scaffolding:**	**Group Options:**
__Adaptation of content	__Modeling	__Whole class
__Links to background	__Guided Practice	__Small groups
__Links to past learning	__Independent practice	__Partners
__Strategies incorporated	__Comprehensible input	__Independent
Integration of Process:	**Application:**	**Assessment:**
__Reading	__Hands-on	__Individual
__Writing	__Meaningful	__Group
__Speaking	__Linked to objectives	__Written
__Listening	__Promotes engagement	__Oral

Lesson Sequence

Task for Engagement

Each small group of students will be given a variety of scatterplots to examine and will discuss the similarities and differences among the plots. This activity elicits student-created meaning of correlation and trend. Students will place the transparency bar over the plot to see if the line passes close to most of the data points. If applicable, students will find the equation of that line using whichever method preferred.

Questions for Exploration

1. In how many groups did you place the scatterplots? Why did you group them this way?
2. On which scatterplots did the line fit well? Why do you think the line didn't fit well on the other plots?
3. Use markers to color-code the plots with the corresponding equations. Write the equations on separate index cards in that color, and draw the line of best fit with the same color. Now group the equations in groups that you think are logical. What do you notice about the groups of equations?

Questions for Explanation

1. What name did you give the group of equations with positive slope? Negative slope? What about the group of scatter plots with no best fitting equation? Were there any scatterplots that might have a nonlinear equation of best fit? What name would you give this group?
2. Pick a random scatterplot and its linear equation. Predict a data point that is not present on the plot. What did you do to predict this value?

Elaboration:

1. Answer *true* or *false* for the following two statements: A scatterplot is a relation. A scatterplot is a function. Explain your answers. Remember your definitions of *relation* and *function*.
2. If a scatterplot has a correlation, it describes the relation between two variables, but does not necessarily imply causation. Identify a scatterplot you worked with today in which the value of one variable does not cause the value of the other. Is it possible for there to be two points with the same x-coordinate? The same y-coordinate?