

Know-Understand-Do (KUD)

Grade: 8th

Unit: Insights into Data

Critical Area of Focus and/or Parts of Narrative:

Narrative 1: Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems..... Students also use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question and to interpret components of the relationship (such as slope and y-intercepts) in terms of the situation.

Standards for Mathematical Practice:

1. Make sense of problems & persevere in solving them.
2. Reason abstractly & quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

By the end of this unit, students will...

UNDERSTAND:

- Data can be represented, compared and analyzed. In order to represent, compare, and analyze, attention must be given to methods of collection, representing and analyzing; and tools are needed to establish a basis for comparison (mean, quartiles, common scale, histogram, box plot, scatterplot etc.)
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KNOW:

New Knowledge:

- A data point on a scatterplot represents the relationship between 2 variables (i.e- the coordinate (2,000,50) may mean a car weighs 2,000 lbs and gets 50 miles per gallon)
- Bias(when certain outcomes are favored unfairly) can occur within samples/sampling
- Possible causes of bias (i.e- incorrectly choosing the sample, neglecting to account for the people who do not respond, letting interviewers select the people they want to interview)
- Population is all the outcomes or individuals that are of interest in a particular question
- A simulation can be used to replicate a real life situation (possibly using random number table)
- A graph can be changed to justify or support your argument (i.e- change the scales, represent a portion of the data, origins are excluded)
- The clustering of the points on a scatterplot determines the correlation
- A line of best fit can be used to model data and predict future values

Extended:

- Data points can be compared to the mean of the rest of the data to better interpret and draw conclusions about the scatter plot and its data points

DO:

Statistics and Probability

Investigate patterns of association in bivariate data.

1. 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. **CC.8.SP.1**
 - Identify the misrepresentation of data, and correct it (if possible)
 - Represent data graphically and describe data with statistical measures (mean, median and mode)
 - Describe correlation in a scatter plot in pre-formal terms like weak, moderate, strong, positive, negative, linear and non-linear
 - Draw conclusions based on data and representations of the data
2. 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. **CC.8.SP.2**
 - Draw straight lines that summarize data and use the

Know-Understand-Do (KUD)

- Data can be represented graphically
- Characteristics (clusters, outliers, trends, mean, median, mode, range) of data can be analyzed to better understand the data and make predictions
- some representations might be more appropriate given the context of the data
- know which measure of center is appropriate to use to represent the data
- a histogram compares frequency to another variable
- a histogram can be used to find measures of center
- the slope represents the rate of change between 2 quantities (i.e.- a slope of $\frac{2}{3}$ could mean a child could grow 2 inches over the course of 3 years)
- A box plot is a graphical representation of the spread of a data set and the spread of each quartile does not have to be equal
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equations of these lines to predict outcomes

3. 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.* **CC.8.SP.3**

- Describe the meaning of the slope and the y-intercept of the line in terms of the context

- collect data through survey, experiment, and simulation;

** bulleted items are book goals

Vocabulary:

Mathematically proficient students acquire precision in the use of mathematical language by engaging in discussion with others and by giving voice to their own reasoning. By the time they reach high school they have learned to examine claims, formulate definitions, and make explicit use of those definitions. The terms students should learn to use with increasing precision in this unit are:

Connections: