Unit Eleven - Descriptive Statistics

Content Area: **Mathematics**
Course(s): **Algebra 7**
Time Period: **May**
Length: **2 weeks**
Status: **Published**

Transfer

Big Idea: Descriptive Statistics

Enduring Understandings

Samples

Sets of numerical data are described using measures of central tendency and dispersion.

The way that data is collected, organized and displayed influences interpretation.

Essential Questions

Samples

How can collecting and analyzing data help you make decisions or predictions?

How can you make and interpret different representations of data?

How do people use data to influence others?

Critical Knowledge and Skills

Vocabulary

Vocabulary

Box-and-Whisker Plot, Causation, Correlation, Correlation Coefficient, Dispersion, Dot Plot, Extrapolation, Frequency, Frequency Table, Histogram, Interpolation, Interquartile Range, Line of Best Fit, Mean, Measures of Central Tendency, Median, Mode outcome, Outlier, Population Percentage, Quartiles, Range of a Data Set, Residual, Scatter Plot, Standard Deviation, Trend Line

Learning Objectives

Bloom's Taxonomy

Use random sampling to draw inferences about a population (7.SP.1,2)

Draw informal comparative inferences about two populations (7.SP.3,4)

Investigate patterns of bivariate data (8.SP.1,2,3,4)

Represent data with plots on the real number line (dot plots, histograms, and box plots (S.ID.1)

Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets (S.ID.2)

Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers) (S.ID.3)

Summarize categorical data for two categories in two-way frequency tables (S.ID.5)

Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies) (S.ID.5)

Recognize possible associations and trends in data (S.ID.5)

Represent data on two quantitative variables on a scatter plot and describe how the variables are related (S.ID.6)

Fit a function to the data of a scatter plot (S.ID.6)

Plot and analyze residuals of the fit of a function (S.ID.6)

Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data (S.ID.7)

Compute (using technology) and interpret the correlation coefficient of a linear fit (S.ID.7)

Distinguish between correlation and causation (S.ID.9)

Resources

Khan Academy: HIgh School Statistics

NCTM Illuminations: NBA Statistics for Box-and-Whisker Plots

NCTM Illuminations: Will the Best Candidate Win?

3 Act Math: Pumpkin Time-Bomb Activity

Standards

MA.S-ID.A	Summarize, represent, and interpret data on a single count or measurement variable
MA.S-ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MA.S-ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
MA.S-ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
MA.S-ID.B	Summarize, represent, and interpret data on two categorical and quantitative variables
MA.S-ID.B.5	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.
MA.7.SP.A	Use random sampling to draw inferences about a population.
MA.7.SP.A.1	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
MA.7.SP.A.2	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
MA.7.SP.B	Draw informal comparative inferences about two populations.
MA.7.SP.B.3	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
MA.8.SP.A	Investigate patterns of association in bivariate data.
MA.8.SP.A.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.
MA.7.SP.B.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.
MA.8.SP.A.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 (e.g. line of best fit) by judging the closeness of the data points to the line.
MA.8.SP.A.3	Use the equation of a linear model to solve problems in the context of bivariate

	measurement data, interpreting the slope and intercept.
MA.8.SP.A.4	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 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.