MP4c-Statistics

Content Area: **Math**
Course(s): **Algebra 1 Accelerated**
Time Period: **Marking Period 4**
Length: **enVision Chapter 11, 13 Days**
Status: **Published**

Big Ideas

- Represent data using box plots, dot plots, and histograms
- Use measures of center and variability to interpret and compare data
- Relate the shape of data displays to measures such as mean, median, and MAD
- Use standard deviation to quantify and analyze the spread of data
- Calculate measures of frequency to analyze and interpret categorical data using two-way frequency tables

Cross Curricular Integration

Integration Area: Science

MS-ESS2-6: Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

MS-ESS3-5: Ask questions to clarify evidence of the factors that have caused climate change.

Activity:
Students will analyze temperature data from a selected region (e.g., local city, a major U.S. city, or a global location). They will use this data to calculate the mean temperature and standard deviation for a particular month over several years. The goal is to help students understand how standard deviation can reveal the variability in temperature patterns and why this is important in discussions of climate change.

Diversity Integration

Objective: Interpret and compare differences in the shape, center, and spread of different data sets.

Description of Activity: Students will explore the concept that the world is a large place, examine how statistics can be used to help in understanding the world and its people, and create graphs of statistics found in the award-winning children's book If the World Were a Village by David A. Smith.

CSDT Technology Connection

8.1.8.DA.1 Organize and transform data collected using computational tools to make it usable for a specific purpose.

8.1.8.DA.4 Transform data to remove errors and improve the accuracy of the data for analysis

Enduring Understandings

Statistics and Probability

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. 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.

Interpreting Categorical & Quantitative Data

S.ID. A1[M] Represent data with plots on the real number line (dot plots, histograms, and box plots).

- Organizing and Displaying Data
- Frequency and Histograms

S.ID.A2[M] 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.

- Data Distributions

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).

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.

Statistics and Probability

8.SP.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.

8.SP.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.

8.SP.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.

8.SP.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. 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.

Mathematical Practices Focus

1. Make sense of problems and persevere in solving them.

2. Reason abstractly and quantitatively. Pages 472, 480, 487, 495

3. Construct viable arguments and critique the reasoning of others. Page 495

4. Model with mathematics. Pages 465, 501

5. Use appropriate tools strategically. Page 465

6. Attend to precision. Page 472

7. Look for and make use of structure. Pages 465, 472, 480, 487, 495

8. Look for and express regularity in repeated reasoning. Page 480, 487