Unit 8: Display, Describe, and Summarize Data

Content Area: **Mathematics**
Course(s):
Time Period: **May**
Length: **3-4 weeks**
Status: **Published**

Essential Questions

- How can I find the mean, median, mode, and range of a data set?
- How can I use a box plot, frequency table, or histogram to display data?
- How can I use the MAD and IQR to describe the spread of a data set?

Enduring Understandings

- A statistical question anticipates variability in responses and can be answered by collecting and analyzing data.
- The mean, median, and mode are measures that can be used to describe the center of a data set. The range is a measure that can be used to describe the variability of a data set.
- A box plot is a good choice for displaying a distribution of numerical data values on a number line.
- Data values can be organized into equal intervals and displayed in a frequency table or histogram.
- Measures of variability, such as the mean absolute deviation (MAD) and interquartile range (IQR), describe the spread and clustering of data in a set.
- Data sets may be described using different measures of center and variability.
- A set of numerical data collected to answer statistical question has a distribution that can be described by its center, spread, or overall shape.

Critical Knowledge and Skills

Vocabulary

Statistical Question

Mean

Median

Mode

Range

Box Plot

Quartiles

Frequency Table

Histogram

Absolute Deviation

Mean Absolute Deviation (MAD)

Interquartile Range (IQR)

Outlier

Data Distribution

Learning Objectives

- 8-1: Recognize Statistical Questions
    - Identify statistical questions
    - Write statistical questions and display the collected data
- 8-2: Summarize Data Using Mean, Median, Mode, and Range
    - Determine the mean, median, mode, and range of a data set
- 8-3: Display Data in Box Plots
    - Display data in a box plot
    - Interpret and analyze a box plot
- 8-4: Display Data in Frequency Tables and Histograms
    - Organize data into equal intervals and display data in a frequency table or histogram
    - Interpret and analyze a histogram
- 8-5: Summarize Data Using Measures of Variability
    - Calculate the mean absolute deviation (MAD) and interquartile range (IQR) of a data set.
    - Summarize data using measures of variability.
- 8-6: Choose Appropriate Statistical Measures
    - Select the most appropriate measure of center and variability of a data set.
    - Use measures to describe data sets.
- 8-7: Summarize Data Distribution
    - Describe the center, spread, and overall shape of a data set.
    - Summarize numerical data sets using measures of center and related measures of variability.

Resources

- Lesson Resources
    - Student Edition
    - Additional Practice Workbook
    - Teaching Resources
        - Reteach to Build Understanding, Additional Vocabulary Support, Build Mathematical Literacy, Enrichment
    - Digital Lesson Courseware
        - Today's Challenge, Visual Learning Animation Plus, Key Concepts, Additional Examples, 3-Act Mathematical Modeling, Online Practice powered by MathXL for School, Virtual Nerd Video Tutorials, Animated Glossary, Digital Math Tools, Online Math Games
- Topic Resources
    - Student's Edition
        - Review What You Know, Build Literacy in Mathematics, Mid-Topic Checkpoint and Performance Task, Topic Review, Fluency Practice Activity, STEM Project
    - Digital Topic Support for Students
        - Math Practice Animations, STEM Project, 3-Act Mathematical Modeling Lesson

Standards for Mathematical Practice and Content

CCSS.Math.Practice.MP1	Make sense of problems and persevere in solving them.
CCSS.Math.Practice.MP2	Reason abstractly and quantitatively.
CCSS.Math.Practice.MP3	Construct viable arguments and critique the reasoning of others.
CCSS.Math.Practice.MP4	Model with mathematics.
CCSS.Math.Practice.MP6	Attend to precision.
CCSS.Math.Practice.MP7	Look for and make use of structure.
CCSS.Math.Practice.MP8	Look for and express regularity in repeated reasoning.
MA.6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
MA.6.SP.A.2	Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
MA.6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
MA.6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

MA.6.SP.B.5a	Reporting the number of observations.
MA.6.SP.B.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
MA.6.SP.B.5c	Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
MA.6.SP.B.5d	Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

INTERDISCIPLINARY CONNECTIONS

Career Readiness, Life Literacies, & Key Skills (CLKS)

Career Readiness, Life Literacies, and Key Skills Practices describe the habits of the mind that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These practices should be taught and reinforced in all content areas with increasingly higher levels of complexity and expectation as a student advances through a program of study.

Practices:

Act as a responsible and contributing community members and employee

Attend to financial well-being

Demonstrate creativity and innovation

Utilize critical thinking to make sense of problems and persevere in solving them

Model integrity, ethical leadership and effective management

Use technology to enhance productivity increase collaboration and communicate effectively

Work productively in teams while using cultural/global competence

9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option

9.4.8.GCA.2: Demonstrate openness to diverse ideas and perspectives through active discussions to achieve a group goal.

9.4.8.IML.2: Identify specific examples of distortion, exaggeration, or misrepresentation of information.

9.4.8.IML.3: Create a digital visualization that effectively communicates a data set using formatting techniques such as form, position, size, color, movement, and spatial grouping (e.g., 6.SP.B.4, 7.SP.B.8b). • 9.4.8.IML.4: Ask insightful questions to organize different types of data and create meaningful visualizations.

9.4.8.TL.3: Select appropriate tools to organize and present information digitally

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP11. Use technology to enhance productivity.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

9.1.8.C.1 Compare and contrast credit cards and debit cards and the advantages and disadvantages of using each.

9.1.8.B.1 Distinguish among cash, check, credit card, and debit card.

9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.

Computer Science & Design Thinking (CS & DT)

Computing Systems

Troubleshooting a problem is more effective when knowledge of the specific device along with a systematic process is used to identify the source of a problem.

Data & Analysis

People use digital devices and tools to automate the collection, use, and transformation of data.

8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices.

8.2.8.NT.1: Examine a malfunctioning tool, product, or system and propose solutions to the problem.

INTERDISCIPLINARY CONNECTIONS

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6-8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST.6-8.7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

NJSLSA.W4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.