Unit 10: Data Analysis & Statistics

Content Area: **TEMPLATE**
Course(s):
Time Period: **Full Year**
Length: **4 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will learn the process of statisical investigations. They will construct graphs such as line plots, histrograms, and box-and-whisker plots to represent distributions of data and analyze them. They will also compare data distributions using what they know about measure of center and variabiability.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Essential Questions:

- What kind of information can we get from different types of graphs?
- How can the mean, median, mode, and range be used to describe the shape of the data?

Enduring Understandings:

- Statistics are numerical data relating to a group of individuals; statistics is also the name for the science of collecting, analyzing and interpreting such data.
- Data provide powerful perspectives on everyday phenomena.
- Our society is data driven and the ability to understand and interpret data allows us to make informed decisions.

CONTENT AREA STANDARDS

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.6.SP.A	Develop understanding of statistical variability.
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	Summarize and describe distributions.
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.5	Summarize numerical data sets in relation to their context, such as by:
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.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.K-12.NJSLSA.SL4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
LA.K-12.NJSLSA.SL5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
LA.K-12.NJSLSA.L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.7	Communicating About Computing and Design
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will 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.

- A statistical question anticipates an answer that varies from one individual to the next and is written to account for the variability in the data.
- Dot plots are suitable for small to moderate size data sets and are useful for highlighting the distribution of the data.
- A histogram shows the distribution of continuous data using intervals on the number line.
- A box plot shows the distribution of values in a data set by dividing the set into quartiles.
- Measure of center and measure of variation allow for data to be analyzed from different reference points.
- A distribution can be described by its center, spread, and shape.
- Mean Absolute Deviation (MAD) describes the variability of the data set by determining the absolute deviation (the distance) of each data piece from the mean and then finding the average of these deviations.

Procedural Knowledge

Students will be able to:

- Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
- Recognize that a measure of center for a numerical data set summarizes all of its values with a single number.
- Recognize that a measure of variation describes how the values of a numerical data set vary with a single number.
- Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
- Summarize numerical data sets in relation to their context by reporting the number of observations.
- Summarize numerical data sets in relation to their context by describing the nature of the attribute under investigation.
- Summarize numerical data sets in relation to their context by giving quantitative measures of center.
- Summarize numerical data sets in relation to their context by giving quantitative measures of variability.
- Summarize numerical data sets in relation to their context by relating the choice of measures of center to the shape of the data distribution and the context in which the data were gathered.
- Summarize numerical data sets in relation to their context by relating the choice of measures variability to the shape of the data distribution and the context in which the data were gathered.

EVIDENCE OF LEARNING

Formative Assessments

- Observations/Checklists
- Classwork

- Do Now Questions/Exit Tickets
- Self Assessment Questions
- Journal:
    - How does the median respond to certain changes in data?
    - What happens to the mean when smaller/larger data values are added to the data set?
- IXL Skills Practice
- Student Proficiency Scale

Summative Assessments

- Portfolio Artifacts

Averages are based upon participation/preparation, classwork, and quizzes. Student marking period grades are either O (outstanding), S (satisfactory), or U (unsatisfactory).

RESOURCES (Instructional, Supplemental, Intervention Materials)

- *CMP3 Data About Us*
- IXL- Recommended Skills Practice
    - GG.3 Interpret Line Plots
    - GG.4 Create Line Plots
    - GG.14 Interpret Histograms
    - GG.15 Create Histograms
    - GG.23 Box Plots
    - HH.1 Identify Statistical Questions
    - HH.2 Identify Mean, Median, Mode and Range
    - HH.5 Changes in Mean, Median, Mode and Range
    - HH.6 Calculate Mean Absolute Deviation
    - HH.7 Calculate Quartiles and Interquartile Range
    - HH.10 Describe Distributions in Line Plots
- Desmos Activity: Creating Histograms
- MathXL for School
- Illustrative Mathematics Performance Tasks
- NCTM Illuminations
- Quiz Review Sheet (see classroom teacher)

INTERDISCIPLINARY CONNECTIONS

- Computations
- Financial/Economic/Business/Entrepenerial Literacy
- Data Collection/Analysis

- Statistics

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.