Unit 5 - Functions and Descriptive Statistics

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

Unit Overview

The unit introduces the concepts and misconception of statistics. The unit reviews central tendencies and presents ways in which data can be displayed. Students will represent data on the real number line (i.e. dot plots, histograms, and box plots) and use statistics to compare and interpret differences in shape, center, and spread in the context of the data (account for effects of outliers). Data will also be summarized in two-way frequency tables by interpreting trends and associations between two categories. Students will other further their knowledge of linear models to draw conclusions about the relationship between two variables by interpreting the slope, y-intercept and the correlation coefficient of the line of best fit within a scatter plot. Students will also distinguish between correlation and causation.

Enduring Understandings

The results of a statistical investigation can be used to support or refute an argument.
Data sets can be displayed and compared by using dot plots, scatter plots, box plots, histograms.
Mean, median, mode, IQR, range and standard deviation can be used in interpreting and understanding data

Essential Questions

How can the collection, organization, interpretation, and display of data be used to answer questions?
How can statistical methods be used to find and interpret relationships between sets of data?
How can two-way tables of categorical data be used to recognize associations and trends between the two categories of categorical data?
How can data be displayed and compared, and what information can be gathered from the displays?
How do the results of a statistical investigation used to support an argument?

Learning Objectives

be able to calculate the mean, mode, median, IQR, range and standard deviation of a set of data.
be able to display data using frequency tables, histograms, stem-and-leaf plots, box-and-whisker plots, and scatter plots.
be able to graph the line of best fit of a scatter plot and write a prediction equation for the line.
be able to choose a data display.
be able to explain why a graph is misleading.
Career Exploration – Explore the course catalog of the local high schools, specifically examining the courses in math and possible careers requiring upper levels of math.

Standards: Content

MATH.9-12.S.ID.A	Summarize, represent, and interpret data on a single count or measurement variable
MATH.9-12.S.ID.A.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
MATH.9-12.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.
MATH.9-12.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).
MATH.9-12.S.ID.A.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
MATH.9-12.S.ID.B	Summarize, represent, and interpret data on two categorical and quantitative variables
MATH.9-12.N.Q.A	Reason quantitatively and use units to solve problems
MATH.9-12.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.
MATH.9-12.S.ID.B.6	Represent data on two quantitative variables on a scatter plot and describe how the variables are related.
MATH.9-12.S.ID.B.6.a	Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.
MATH.9-12.N.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MATH.9-12.S.ID.C	Interpret linear models
MATH.9-12.S.ID.C.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
MATH.9-12.S.ID.C.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
MATH.9-12.S.ID.C.9	Distinguish between correlation and causation.

Standards: Interdisciplinary

PFL.9.1.8.CDM.4	Evaluate the application process for different types of loans (e.g., credit card, mortgage, student loans).
PFL.9.1.8.CP.1	Compare prices for the same goods or services.
CS.6-8.8.1.8.AP.1	Design and illustrate algorithms that solve complex problems using flowcharts and/or pseudocode.
CS.6-8.8.1.8.AP.2	Create clearly named variables that represent different data types and perform operations on their values.
CS.6-8.8.1.8.DA.1	Organize and transform data collected using computational tools to make it usable for a specific purpose.
CS.6-8.8.1.8.DA.4	Transform data to remove errors and improve the accuracy of the data for analysis.

CS.6-8.8.1.8.DA.5 Test, analyze, and refine computational models.

Assessment Evidence

Formative	Collaborative Activities, Homework, Classwork, Discussion, Independent Class Assignment, Informal Observations of Students, Games, Exit Slips, Pre-Assessments, Math Message – Warm up, Questioning, Teacher Made Pages, Learning Centers, LinkIt, Problem of the Day, Problem of the Week, Entrance Slips, Pre-Assessments
Summative	LinkIt Benchmark Assessments, Tests, Pre-Assessments, Quizzes, Written Responses
Alternative & Benchmark	Alternative – Reteaching, One on One Conferencing, Learning Centers, Levels Homework, Higher Order Thinking Problems, Additional leveled practice Benchmark - LinkIt Benchmark Assessments, Totowa TPA
Assessment Evidence Resource	

Instructional Resources

Smartboard, Computers, iPads, websites and digital interactives/models, multi-media presentations, video streaming, Brain Pop, Microsoft 365, Primary and Secondary Source Documents, Assorted Manipulatives, Khan Academy, Crosswalk Coach for the Common Core Standards, Ready Common Core Mathematics Instruction and Practice, Common Core Coach, Calculators, Reveal Math Resources.

Instructional Resource List

Curricular Mandates

Below are the curricular requirements as defined in NJ Administrative Code and Statute

	Amistad		Diversity, Equity, and Inclusion
	Holocaust		LGBT and Disabilities (Grades 6-12)
	Climate Change		Asian American & Pacific Islander

Social Emotional Learning (SEL) Competencies

NJ Social and Emotional Learning Competencies & Sub-Competencies

	Self-Awareness	X	Relationship Skills
X	Responsible Decision-Making		Social Awareness
X	Self-Management		

21st Century Skills & Themes

	Global and Cultural Awareness	X	Technology Literacy		Planning and Budgeting
X	Creativity and Innovation		Financial Institutions		Risk Management and Insurance
X	Information and Media Literacy		Digital Citizenship		Economic and Government Influences
	Critical Thinking and Problem Solving		Credit Profile	X	Career Awareness and Planning
	Civic Financial Responsibility		Financial Psychology		