Unit 5: Data Collection and Analysis

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **7 weeks**
Status: **Published**

Unit Rationale

This unit is designed to support students in data collection and analysis. Students will recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. Inturn, they will describe the nature of the attribute under investigation, including how it was measured and its units of measurement. Students will display numerical data in plots on a number line, including dot plots, number lines, histograms and summarize numerical data sets in relation to their context. Students will learn to relate visual aspects of a data display to mathematical properties of the data. Students will analyze dot plots and histograms to cull as much information as possible from them. Students will display numerical data in plots on a number line, including box plots. Students will learn to compute the mean absolute deviation (MAD).Students learn to use measures of variability to describe a data set. Finally, 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.

Essential Questions

How do mathematicians identify a statistical question and describe data?

How do mathematicians Use dot plots to display data?

How do mathematicians Make histograms and frequency tables to display data?

How do mathematicians describe a set of data using mean, median, and mode?

How do mathematicians choose an appropriate measure of center to describe a data set?

How do mathematicians describe overall patterns in a data set?

How do mathematicians use box plots to display data?

How do mathematicians determine and use the mean absolute deviation of a set of data points?

How do mathematicians summarize a set of data by using range, interquartile range, and mean absolute deviation?

How do mathematicians describe the distribution of a data set collected to answer a statistical question?

Standards

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

	Analyzing and Interpreting Data
SOC.5-8.1.1.1	Construct timelines of the events occurring during major eras including comparative events in world history for the different civilizations.

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.6-8.DA	Data & Analysis

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

WRK.9.2.8.CAP.3	Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
WRK.9.2.8.CAP.8	Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.

New Jersey Student Learning Standards: Content Area

MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MA.6.EE.A.2a	Write expressions that record operations with numbers and with letters standing for numbers.
MA.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.G.A.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
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.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Pre-Assessment

Module 14: Data Collection and Displays "Are You Ready?" pg 438

Module 15: Measures of Center "Are You Ready?" pg 464

Module 16: Variability and Data Distribution "Are You Ready?" pg 486

Benchmark Assessments

Into Math Benchmark BOY, MOY, and EOY growth measure.

SUMMATIVE/END-OF-UNIT ASSESSMENTS

Module 14: Data Collection and Displays "Are You Ready?"

Module 15: Measures of Center "Are You Ready?"

Module 16: Variability and Data Distribution "Are You Ready?"

Instructional Plan

Module 14: Data Collection and Display

Lesson 14.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	14.3 We are learning to make histograms and frequency tables to display data.

Student Learning Strategies	Construct a Bar Graph Organize Data Construct a Table to Organize Data
Success Criteria	I can make a histogram and frequency table, and I can answer questions about data displayed in these ways
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 453, 454) Check Understanding (pg. 455) Exit Ticket (TM pg. 458)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg.453B) **Mini-Lesson:** Spark Your Learning (TM pg. 453D) Build Understanding (p. 577-578) **Guided Practice:** Check Understanding (pg. 455) **Independent Practice:** On Your Own (pg. 456-457) Exit Ticket (TM pg. 458) Teacher Resources Into Math Teacher Edition Module 14 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 453C)

Lesson 14.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	14.2 We are learning to use dot plots to display data.
Student Learning Strategies	Construct a Line Plot to Organize Data Construct a Table to Organize Data
Success Criteria	I can make a dot plot to display data, and use a dot plot to answer questions about data.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 445, 446) Check Understanding (pg. 447) Exit Ticket (TM pg. 574)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg.445B) **Mini-Lesson:** Spark Your Learning (TM pg. 445D) Build Understanding (p. 445-447)

	Guided Practice: Check Understanding (pg. 447) **Independent Practice:** On Your Own (pg. 448-449) Exit Ticket (TM pg. 449) Teacher Resources Into Math Teacher Edition Module 14 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 445C)

Lesson 14.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	14.1 We are learning to identify a statistical question and describe data.
Student Learning Strategies	Construct a Line Plot to Organize Data Construct a Table to Organize Data
Success Criteria	I can identify a statistical question, and I can describe the attributes of a data set.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 439, 440) Check Understanding (pg. 441) Exit Ticket (TM pg. 566)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 439B) **Mini-Lesson:** Spark Your Learning (TM pg. 439D) Build Understanding (p. 440-441) **Guided Practice:** Check Understanding (pg 441) **Independent Practice:** On Your Own (pg.442) Exit Ticket (TM pg. 442) Teacher Resources Into Math Teacher Edition Module 14 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 441C)

Module 15

Lesson 15.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	15.1 We are learning to describe a set of data using mean, median, and mode.
Student Learning Strategies	Estimation
Success Criteria	I can find the mean, median, and mode of a set of data.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 465, 466, 467) Check Understanding (pg. 467) Exit Ticket (TM pg. 588)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 465B) **Mini-Lesson:** Spark Your Learning (TM pg 465D) Build Understanding (p. 466-467) **Guided Practice:** Check Understanding (pg. 467) **Independent Practice:** On Your Own (pg. 468) Exit Ticket (TM pg. 468) Teacher Resources Into Math Teacher Edition Module 15 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg.465C)

MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
MA.6.G.A.2	Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
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.

Lesson 15.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	15.2 We are learning to find an appropriate measure of center to describe a data set
Student Learning Strategies	Estimation
Success Criteria	I can choose an appropriate measure of center to describe a data set.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 471) Check Understanding (pg. 473) Exit Ticket (TM pg. 474)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 471B) **Mini-Lesson:** Spark Your Learning (TM pg. 471D) Build Understanding (p. 472-473) **Guided Practice:** Check Understanding (pg. 473) **Independent Practice:** On Your Own (pg. 474) Exit Ticket (TM pg. 474 Teacher Resources Into Math Teacher Edition Module 15 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 471C)

MA.1.G.A.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
MA.6.SP.B.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

Lesson 15.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	15.3 We are learning to choose an appropriate measure of center to describe a data set
Student Learning Strategies	Estimation
Success Criteria	I can choose an appropriate measure of center to describe a data set.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 477) Check Understanding (pg. 478) Exit Ticket (TM pg. 480)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 477) **Mini-Lesson:** Spark Your Learning (TM pg. 477D) Build Understanding (p. 477-478) **Guided Practice:** Check Understanding (pg. 478) **Independent Practice:** On Your Own (pg. 479) Exit Ticket (TM pg. 480) Teacher Resources Into Math Teacher Edition Module 15 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 477C)

MA.6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio $a{:}b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
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.5b	Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

Module 16

Module 16: VARIABILITY AND DATA DISTRIBUTION

Lesson 16.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	16.1 We are learning to describe overall patterns in a data set.
Student Learning Strategies	Use a Dot Plot to Display Data Use Tables to Display Data
Success Criteria	I can use a dot plot or histogram to describe the overall patterns in a data set, including clusters, gaps, peaks, and symmetry.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 487,488) Check Understanding (pg. 489) Exit Ticket (TM pg. 490)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 487B) **Mini-Lesson:** Spark Your Learning (TM pg. 487D) Build Understanding (p. 488-489) **Guided Practice:** Check Understanding (pg. 489)**Independent Practice:** On Your Own (pg.490) Exit Ticket (TM pg. 490) Teacher Resources Into Math Teacher Edition Module 16 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 487C)

Lesson 16.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	16.2 We are learning to use box plots to display data.
Student Learning Strategies	Use the Mean or Median Use Mental Math
Success Criteria	I can make a box plot for a set of numerical data.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 493, 494) Check Understanding (pg.496) Exit Ticket (TM pg. 498)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 493B) **Mini-Lesson:** Spark Your Learning (TM pg. 493D) Build Understanding (p. 494-496) **Guided Practice:** Check Understanding (pg. 496) **Independent Practice:** On Your Own (pg. 497-498) Exit Ticket (TM pg. 498) Teacher Resources Into Math Teacher Edition Module 16 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 493C)

Lesson 16.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	16.3 We are learning to determine and use the mean absolute deviation of a set of data points.
Student Learning Strategies	Use a Dot Plot to Display Data Use Tables to Display Data
Success Criteria	I can compute the MAD of a data set and use the MAD to describe data.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 501) Check Understanding (pg. 504) Exit Ticket (TM pg. 506)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 501B) **Mini-Lesson:** Spark Your Learning (TM pg. 501D) Build Understanding (p. 502-503) **Guided Practice:** Check Understanding (pg. 504) **Independent Practice:** On Your Own (pg. 505-506) Exit Ticket (TM pg. 506) Teacher Resources Into Math Teacher Edition Module 16 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 501C)

Lesson 16.4

Student Learning Intentions (SLI) WALT: (We are learning to…)	16.4 We are learning to summarize a set of data by using range, interquartile range, and mean absolute deviation.
Student Learning Strategies	Use a Dot Plot to Display Data Use Tables to Display Data
Success Criteria	I can interpret the range, IQR, and MAD of a data set
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 509, 510) Check Understanding (pg. 511) Exit Ticket (TM pg. 513)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 511B) **Mini-Lesson:** Spark Your Learning (TM pg. 511D) Build Understanding (p. 509-510) **Guided Practice:** Check Understanding (pg. 511) **Independent Practice:** On Your Own (pg. 512) Exit Ticket (TM pg. 514) Teacher Resources Into Math Teacher Edition Module 16 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 511C)

Lesson 16.5

Student Learning Intentions (SLI) WALT: (We are learning to…)	16.5 We are learning to describe the distribution of a data set collected to answer a statistical question.
Student Learning Strategies	Use a Dot Plot to Display Data Use Tables to Display Data
Success Criteria	I can choose an appropriate display for a data set and compute the measures of center and variability.
Formative Assessment (drives instructional decisions)	Turn and Talk (pgs. 517) Check Understanding (pg. 518) Exit Ticket (TM pg. 520)
Activities and Resources	**Warm Up:** Activate Prior Knowledge (TM pg. 517B) **Mini-Lesson:** Spark Your Learning (TM pg. 517D) Build Understanding (p. 517-518) **Guided Practice:** Check Understanding (pg. 518) **Independent Practice:** On Your Own (pg. 519) Exit Ticket (TM pg. 520) Teacher Resources Into Math Teacher Edition Module 16 & Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM pg. 517C)