



West Windsor-Plainsboro Regional School District
Math 6
Summer 2023

Math Equity Statement

ALL learners should have access to rigorous, high-level mathematical content in an environment where risk-taking, deep conceptual understanding, and growth mindset are the norm.

Core Beliefs:

Our district's strategic goals prioritize teaching and learning from a productive standpoint. Building upon the principles of *Catalyzing Change in High School Mathematics*, we aim to cultivate equitable mathematics practices and shift from deficit-based to productive beliefs. According to the National Council of Teachers of Mathematics (NCTM, 2020), "Mathematics education must be equitable, ensuring that each and every student has access to high-quality mathematics teaching and learning opportunities." Our objective is for every student to perceive themselves as capable, knowledgeable, and meaning-makers in mathematics.

Drawing from *Catalyzing Change* and *Mathematical Mindsets* by Jo Boaler (2016), we embrace the following beliefs:

- All students are capable of learning mathematics at high levels.
- All students will progress on their mathematical journey.
- Developing a growth mindset is essential for learning.
- Visual and deep thinking enhance mathematical understanding.
- Mathematics learning is fostered through discourse and collaboration.
- Mistakes are integral to the learning process.

Math Workshop:

Catalyzing Change states that teaching should provide opportunities for each and every student to develop a positive mathematical identity, recognizing their own mathematical abilities and potential. The Math Workshop instructional model enables meaningful mathematics engagement, reflection, and the realization of students' potential as mathematicians. By incorporating student choice, problem-solving, targeted small group instruction, and deliberate practice of critical grade-level concepts (Lempp, 2017), Math Workshop creates an environment where students feel comfortable taking intellectual risks. Sienna (2009) outlines four values to support students in taking risks and fostering discourse, which include:

- Valuing the thinking process alongside correct answers.
- Valuing problems that allow for multiple solutions.
- Valuing inquisitive responses.
- Valuing tolerance for mistakes (Sienna, 2009, p. 68).

Math Workshop embraces these values and fosters a supportive, collaborative learning environment for all students. It is the instructional model employed by our dedicated teachers.

Unit 1: Number Fluency (Ratios, Fractions, Decimals)**Content Area:** Mathematics**Course & Grade Level:** Math 6, Sixth**Summary and Rationale**

Number Sense plays a critical role in the development of a mathematician's mindset. It empowers mathematicians to manipulate various number representations, make estimations, and assess the reasonableness of their answers. This unit focuses on fostering a comprehensive comprehension of diverse representations of rational numbers. It delves into the exploration of multiple representations of ratios, fractions, and decimals, elucidating their interrelationships and practical applications. Additionally, the unit extends students' understanding of addition, subtraction, and multiplication to encompass division. Ultimately, students will acquire the ability to operate adeptly, effectively, and precisely with positive, rational numbers by the culmination of this unit.

Recommended Pacing

24 days

New Jersey Student Learning Standards for Mathematics**Standards for Mathematical Practice****CPI #** **Cumulative Progress Indicator (CPI)**

1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.**CPI #** **Cumulative Progress Indicator (CPI)**

1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
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.
3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

5.NF.A Use equivalent fractions as a strategy to add and subtract fractions.**CPI #** **Cumulative Progress Indicator (CPI)**

1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

6.NS.A Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**CPI #** **Cumulative Progress Indicator (CPI)**

1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
---	---

6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples.	
CPI #	Cumulative Progress Indicator (CPI)
2	Fluently divide multi-digit numbers using the standard algorithm.
3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
CPI #	Cumulative Progress Indicator (CPI)
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.
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
CPI #	Cumulative Progress Indicator (CPI)
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
Interdisciplinary Standards Science	
MS-PS1	Matter and Its Interactions
Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has a mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two. NGSS, Appendix L, page 21	
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> ● Proportional reasoning can be used to quantify and compare situations and model real-life phenomena. ● Mathematical problem solvers apply a variety of strategies and methods to solve problem situations. ● Number sense develops through experience. ● A quantity can be expressed numerically in different ways. 	
Unit Essential Questions	
<ul style="list-style-type: none"> ● How can you tell if a relationship is proportional? ● How does finding the common characteristics among similar problems help mathematicians become more efficient problem solvers? ● What kinds of experiences help develop number sense? ● How do I determine the best numerical representation (pictorial, symbolic, objects) for a given situation? ● How do mathematical ideas interconnect and build on one another to produce a coherent whole? ● What makes a computational strategy both effective and efficient? 	

Content Understandings
<ul style="list-style-type: none"> ● Ratios can be set equal to each other to form proportional relationships. ● Problems involving equivalent ratios can be solved using a variety of models. ● Every quotient of whole numbers (non-zero divisor) is a rational number. ● Ratios, fractions and decimals can be written in different forms.
Content Questions
<ul style="list-style-type: none"> ● How can ratios and rates be used to compare, model, and represent two quantities/values? ● How can we use ratios to solve a variety of real world problems? ● How can I describe a relationship between two quantities using proportionality?
Objectives
<p>We are learning to/that:</p> <ul style="list-style-type: none"> ● Define double number line, equivalent ratio, rate, ratio, ratio table, tape diagram, unit rate, algorithm, decimal, dividend, divisor, factor, fraction, greatest common factor (GCF), least common multiple (LCM), multiple, quotient, remainder, reciprocal, and unit fraction. ● Describe the ratio relationship between two quantities. ● Use tables, tape diagrams, double number lines and equations to find equivalent ratios and rates. ● Identify a unit rate and solve unit rate problems, including unit pricing and constant speed. ● Use ratios to describe proportional situations and make predictions. ● Convert between fractions and decimals. ● Fluently add, subtract, multiply and divide decimals and fractions. ● Solve authentic problems using decimals and fractions appropriately. ● Find GCF and LCM using a variety of strategies
Evidence of Learning
<input checked="" type="checkbox"/> Formative Assessment
<input checked="" type="checkbox"/> Summative Assessment
<input checked="" type="checkbox"/> Alternative Assessment
<input checked="" type="checkbox"/> Benchmark
Assessment plan includes teacher-designed formative and summative assessments, a district common assessment, self-assessments, and performance tasks. During each common, formative, and summative assessment, teachers will provide alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. Accommodations
Resources
Core Text: EdGems Core Math Course 1, McCaw, 2018

Unit 2: Expressions & Equations

Content Area: Mathematics

Course & Grade Level: Math 6, Sixth

Summary and Rationale

An understanding of proportionality serves as the fundamental building block for the study of linear functions in algebra. Algebra, as the language of mathematics, facilitates effective communication among mathematicians when dealing with mathematical problems. By employing algebraic reasoning to model real-world scenarios, mathematicians can connect problems to algebraic expressions and evaluate their solutions. Algebra also equips mathematicians with the necessary tools to represent and analyze relationships between variable quantities. In this unit, students will acquire the skills to manipulate equations and solve for unknown quantities, thereby deepening their comprehension of the Laws of Equality. Moreover, this unit will expand students' understanding of ratios and foster their ability to solve single- and multi-step problems through the lens of proportionality. Students will employ ratios and proportionality to tackle a wide range of problems, including those involving percentages. Additionally, they will develop the ability to distinguish proportional relationships from other types of relationships.

Recommended Pacing

28 days

New Jersey Student Learning Standards for Mathematics

Standards for Mathematical Practice

CPI #	Cumulative Progress Indicator (CPI)
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers

5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
7	Understand ordering and absolute value of rational numbers.

6.EE.A Apply and extend previous understandings of arithmetic to algebraic expressions.

CPI #	Cumulative Progress Indicator (CPI)
1	Write and evaluate numerical expressions involving whole-number exponents.
2	Write, read, and evaluate expressions in which letters stand for numbers.
3	Apply the properties of operations to generate equivalent expressions.

4	Identify when two expressions are equivalent
6.EE.B Reason about and solve one-variable equations and inequalities.	
CPI #	Cumulative Progress Indicator (CPI)
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.
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.
7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
6.RP.A Understand ratio concepts and use ratio reasoning to solve problems.	
CPI #	Cumulative Progress Indicator (CPI)
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.
6.EE.B Reason about and solve one-variable equations and inequalities.	
CPI #	Cumulative Progress Indicator (CPI)
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.
8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
CPI #	Cumulative Progress Indicator (CPI)
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 that information is expressed visually (e.g. in a flowchart, diagram, model, graph or table)
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
CPI #	Cumulative Progress Indicator (CPI)
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
Interdisciplinary Standards Science	
MS-PS2	Motion and Stability: Forces and Interactions
Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression $F_1 + F_2$ in a diagram as representing the net force on an object. NGSS, Appendix L, page 22	
Instructional Focus	
Unit Enduring Understandings	

- Proportional reasoning can be used to quantify and compare situations and model real-life phenomena.
- Algebraic equations are powerful tools for exploring, reasoning about, and representing situations.
- Algebraic properties can generate equivalent expressions and equations even when their symbolic forms differ.
- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- The symbolic language of algebra is used to represent known and unknown quantities.
- The solution set to an inequality is a specific, infinite set that can be represented in many ways.

Unit Essential Questions

- How is the value of a rational number determined?
- What makes a number line a useful mathematical tool?
- How can we use proportional relationships to make predictions?
- How are fractions, decimals and percentages related to one another?
- How can you tell if a relationship is proportional?
- How can algebraic equations be used to represent situations and solve real-world problems?
- What makes a solution to a real-life problem reasonable?
- How is algebra used to represent known and unknown quantities?
- How can inequalities be used to represent situations?

Content Understandings

- The value of a rational number is determined by its magnitude and direction on a number line (vertical and horizontal).
- In a proportion, the ratios of two quantities remain constant as the corresponding values of the quantities change.
- The Distributive Property is a property that allows you to simplify computations or algebraic expressions that include parentheses.
- The order of operations describes the rules to follow when evaluating an expression with more than one operation.
- Inequalities have multiple answers that can make statements true.

Content Questions

- How is a number line used to represent and compare rational numbers?
- What is the most efficient method to find the missing value in a proportion?
- What is the difference between an expression and an equation?

Objectives

We are learning to/that:

- Define positive numbers, negative numbers, integers, opposites, absolute value, rational numbers, constant ratios, conversion, conversion factor, metric system, unit rate, US Customary system, variable, algebraic expression, term, constant, and coefficient, equivalent expressions, like terms, inequalities, solution set, factoring and percent.
- Define a ratio and describe a relationship between two quantities using proportionality.
- Use keywords such as sum, difference, product, and quotient to describe specific operations.
- Define variables using let statements.
- Use inverse operations to solve equations.
- Compare and order integers and use integers to represent real-world situations.
- Order and compare rational numbers.
- Identify a unit rate and solve unit rate problems, including unit pricing and constant speed.
- Use ratios to describe proportional situations and make predictions.
- Use proportional relationships to solve real world problems involving ratio, rates and percentages.
- Solve percent problems by using a variety of different strategies.
- Convert between fractions, decimals and percentages.
- Use proportional reasoning to convert between units of measurement.

- Write and evaluate numerical and algebraic expressions containing exponents, using the order of operations.
- Write expressions involving variables
- Recognize and combine like terms to generate equivalent expressions.
- Use the Distributive Property to perform calculations and simplify expressions.
- Apply the Distributive Property to generate equivalent expressions.
- Factor out the GCF in algebraic and numerical expressions.
- Determine if a number is a solution of an equation.
- Write and solve one-step equations using inverse operations to solve all four operations with positive numbers.
- Write inequalities and display the solution on a graph.

Evidence of Learning

Formative Assessment

Summative Assessment

Alternative Assessment

Benchmark

Assessment plan includes teacher-designed formative and summative assessments, a district common assessment, self-assessments, and performance tasks. During each common, formative, and summative assessment, teachers will provide alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. [Accommodations](#)

Resources

Core Text: EdGems Core Math Course 1, McCaw, 2018

Unit 3: Area and Volume

Content Area: Mathematics

Course & Grade Level: Math 6, Sixth

Summary and Rationale

This unit centers around the concept of volume. Understanding the real-life applications of volume is crucial as it builds upon students' prior knowledge of area and volume from Grade 5. In this unit, students will engage with more intricate and multi-step problems, incorporating surface area and volume with rational dimensions. By working with three-dimensional figures, students will tackle authentic mathematical problems that require the application of volume-related concepts.

Recommended Pacing

11 days

New Jersey Student Learning Standards for Mathematics

Standards for Mathematical Practice

CPI #	Cumulative Progress Indicator (CPI)
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

Standard: Geometry 6.G.A Solve real-world and mathematical problems involving area, surface area, and volume.

CPI #	Cumulative Progress Indicator (CPI)
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.
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.
3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
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.

New Jersey Student Learning Standards for English Language Arts Companion Standards

CPI #	Cumulative Progress Indicator (CPI)
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 that information is expressed visually (e.g. in a flowchart, diagram, model, graph or table)
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
CPI #	Cumulative Progress Indicator (CPI)
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> • Measurements can be used to describe, compare, and make sense of real-world situations, including area, volume, and surface area. • Geometry can be used to model many real life situations and to solve everyday problems. 	
Unit Essential Questions	
<ul style="list-style-type: none"> • How can spatial relationships be described with precise use of geometric language? • How are perimeter, area, surface area and volume related to one another? • How can geometric relationships be used to solve real world problems? 	
Objectives	
We are learning to/that:	
<ul style="list-style-type: none"> • Define area, base, composite figure, cubic unit, face, net, perimeter, perpendicular, polygon, prism, pyramid, solid, surface area, unit cube, and volume. • Use appropriate units for perimeter, area, and volume (linear, square and cubic). • Calculate the area of triangles, and special quadrilaterals (parallelograms and trapezoids). • Use nets to find surface areas of 3D figures composed of rectangles and triangles. • Calculate the volume of rectangular prisms (using the formulas $V = Bh$ and $V = lwh$) using a variety of rational number measurements. • Find the missing dimension given the area or volume of a figure. • Find perimeters and areas of composite two-dimensional figures. • Solve real-world problems involving surface areas and volumes of objects composed of prisms. 	
Evidence of Learning	
<input checked="" type="checkbox"/> Formative Assessment	
<input checked="" type="checkbox"/> Summative Assessment	
<input checked="" type="checkbox"/> Alternative Assessment	
<input checked="" type="checkbox"/> Benchmark	
Assessment plan includes teacher-designed formative and summative assessments, a district common assessment, self-assessments, and performance tasks. During each common, formative, and summative assessment, teachers will provide alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. Accommodations	
Resources	
Core Text: EdGems Core Math Course 1, McCaw, 2018	

Unit 4: Statistics

Content Area: Mathematics

Course & Grade Level: Math 6, Sixth

Summary and Rationale

Learning about statistics is important because it equips students with essential skills to interpret and analyze data, enabling them to make informed decisions and draw meaningful conclusions. Additionally, understanding statistics fosters critical thinking, promotes data literacy, and prepares students to navigate the increasingly data-driven world in which we live. In this unit, students will build on and reinforce their understanding of numbers while developing their ability to think statistically. They will recognize that data distributions may lack a definite center and that various measures of center yield different values. Furthermore, students will learn to describe and summarize numerical and categorical data sets using different data displays, as well as utilize data to discuss factual information and construct logical arguments.

Recommended Pacing

10 days

New Jersey Student Learning Standards for Mathematics

Standards for Mathematical Practice

CPI #	Cumulative Progress Indicator (CPI)
-------	-------------------------------------

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

2	Reason abstractly and quantitatively.
---	---------------------------------------

3	Construct viable arguments and critique the reasoning of others.
---	--

4	Model with mathematics.
---	-------------------------

5	Use appropriate tools strategically.
---	--------------------------------------

6	Attend to precision.
---	----------------------

7	Look for and make use of structure.
---	-------------------------------------

8	Look for and express regularity in repeated reasoning.
---	--

6.SP.A Develop understanding of statistical variability.

CPI #	Cumulative Progress Indicator (CPI)
-------	-------------------------------------

1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers
---	---

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.
---	--

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.
---	---

6.SP.B B. Summarize and describe distributions

CPI #	Cumulative Progress Indicator (CPI)
-------	-------------------------------------

4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
---	---

5	Summarize numerical data sets in relation to their context.
---	---

New Jersey Student Learning Standards for English Language Arts Companion Standards

CPI #	Cumulative Progress Indicator (CPI)
-------	-------------------------------------

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 that information is expressed visually (e.g. in a flowchart, diagram, model, graph or table)
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
CPI #	Cumulative Progress Indicator (CPI)
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
Interdisciplinary Standards Science	
MS-PS1	Matter and Its Interactions
Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot. NGSS< Appendix L, page 22	
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> • The manner in which data is collected, analyzed, represented, and summarized influences the messages that are ultimately conveyed. • Statistical questions anticipate variability in the data. • Different graphs are appropriate for different kinds of situations. • A set of data collected to answer a statistical question has a distribution, which can be described by its center, spread, and overall shape. 	
Unit Essential Questions	
<ul style="list-style-type: none"> • How can the collection, analysis, representation, and summary of data be used to answer questions and influence conclusions? • What are the purposes of statistical measures and data displays? • How do statistical measures and data displays bring meaning to individual data values? 	
Content Understandings	
<ul style="list-style-type: none"> • Measures of central tendency, while all referred to as "averages," provide distinct descriptions of the data, highlighting different aspects of its distribution. • A measure of variation summarizes how all of the values in a data set vary with a single number. 	
Content Questions	
<ul style="list-style-type: none"> • How do I know which measure of central tendency best describes my data? 	
Objectives	
We are learning to/that:	
<ul style="list-style-type: none"> • Define: bias, box-and-whisker plot, categorical data, dot plot, first quartile, five-number summary, frequency table, histogram, interquartile range (IQR), mean, measures of center, measures of variability, median, mode, numerical data, outlier, range, statistical question, and statistics, and third quartile. • Recognize and create statistical questions that anticipate useful data results. • Calculate mean, median, mode and range. • Display data on a histogram, box-and-whisker plot and a dot plot. • Generate multiple samples of data to make inferences about a population. • Select and justify a measure of central tendency (mean, median, or mode) that best represents a set of data. • Describe any overall patterns in a set of data, as well as any striking deviations from the overall pattern (outliers). 	
Evidence of Learning	

<input checked="" type="checkbox"/> Formative Assessment
<input checked="" type="checkbox"/> Summative Assessment
<input checked="" type="checkbox"/> Alternative Assessment
<input checked="" type="checkbox"/> Benchmark
Assessment plan includes teacher-designed formative and summative assessments, a district common assessment, self-assessments, and performance tasks. During each common, formative, and summative assessment, teachers will provide alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. Accommodations
Resources
Core Text: EdGems Core Math Course 1, McCaw, 2018

Unit 5: Rational Numbers & The Coordinate Plane

Content Area: Mathematics

Course & Grade Level: Math 6, Sixth

Summary and Rationale

The study of integers is important because it provides a fundamental understanding of positive and negative numbers, which are essential in various real-life contexts, such as finance, temperature, and coordinates. Additionally, mastering integers helps develop critical thinking skills, logical reasoning, and problem-solving abilities, enabling students to navigate and analyze numerical relationships more effectively. Students will develop an understanding of positive and negative numbers by relating them to everyday contexts, such as amounts earned or owed, or temperatures above or below zero. Building upon this foundation, students will learn to compare, order, and graph integers and rational numbers on a number line. Additionally, graphing lines and figures on a coordinate plane will provide a visual representation of equations and aid in the identification of missing coordinates.

Recommended Pacing

10 days

New Jersey Student Learning Standards for Mathematics

Standards for Mathematical Practice

CPI #	Cumulative Progress Indicator (CPI)
1	Make sense of problems and persevere in solving them.
2	Reason abstractly and quantitatively.
3	Construct viable arguments and critique the reasoning of others.
4	Model with mathematics.
5	Use appropriate tools strategically.
6	Attend to precision.
7	Look for and make use of structure.
8	Look for and express regularity in repeated reasoning.

6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers

CPI #	Cumulative Progress Indicator (CPI)
5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates
7	Understand ordering and absolute value of rational numbers.
8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

6.G.A Solve real-world and mathematical problems involving area, surface area, and volume.

CPI #	Cumulative Progress Indicator (CPI)
--------------	--

3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
Standard: Expressions and Equations 6.EE.C Represent and analyze quantitative relationships between dependent and independent variables	
CPI #	Cumulative Progress Indicator (CPI)
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.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
CPI #	Cumulative Progress Indicator (CPI)
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 that information is expressed visually (e.g. in a flowchart, diagram, model, graph or table)
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
CPI #	Cumulative Progress Indicator (CPI)
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
New Jersey Student Learning Standards for Computer Science and Design Thinking	
CPI #	Cumulative Progress Indicator (CPI)
8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> • A relationship between two variables can be represented in a variety of ways including contextual situations, equations, tables, and graphs. • The coordinate plane is used to model both mathematical and real world phenomena. 	
Unit Essential Questions	
<ul style="list-style-type: none"> • How is the value of a rational number determined? • How is the coordinate plane used to model both mathematical and real world phenomena? • How can variables be used to represent two quantities in a real-world problem that change in relationship to one another? 	
Content Understandings	
<ul style="list-style-type: none"> • The value of a rational number is determined by its magnitude and direction on a number line (vertical and horizontal). • Graphs are a way to visually display equations. The input (x) is paired with the output (y) to create ordered pairs which can be graphed on a coordinate plane. • A relationship between two variables can be represented in a variety of ways. The most common models are contextual situations, equations, tables and graphs. 	
Content Questions	
<ul style="list-style-type: none"> • How do I calculate the exact value of a number? • When is it more efficient to use a table or a graph or an equation? 	
Objectives	

We are learning to/that:

- Define positive numbers, negative numbers, integers, opposites, absolute value, rational numbers, independent and dependent variables. and constant ratios.
- Describe aspects of the coordinate plane such as x-axis, y-axis, origin, quadrants, and ordered pairs.
- Identify the properties of quadrilaterals and how to identify and plot their vertices on a coordinate grid.
- Compare and order integers and use integers to represent real-world situations.
- Order and compare rational numbers.
- Graph points on the coordinate plane (all 4 quadrants).
- Find the distance between 2 points on the coordinate plane (vertical and horizontal only).
- Reflect points over the x-axis and y-axis on the coordinate plane.
- Use properties of quadrilaterals to solve problems on a coordinate plane.
- Create input-output tables for equations with two variables.
- Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane.
- Write two-variable equations for tables, graphs and contextual situations.
- Graph a two-variable equation on the coordinate plane.

Evidence of Learning Formative Assessment Summative Assessment Alternative Assessment Benchmark

Assessment plan includes teacher-designed formative and summative assessments, a district common assessment, self-assessments, and performance tasks. During each common, formative, and summative assessment, teachers will provide alternative assessment opportunities that adhere to 504 and IEP requirements. Alternative assessments are individualized for the needs of all students. [Accommodations](#)

Resources

Core Text: EdGems Core Math Course 1, McCaw, 2018