



West Windsor-Plainsboro Regional School District
Pre-Algebra H&A
July 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	
Content Area: Mathematics	
Course & Grade Level: Pre-Algebra H&A, Sixth	
Summary and Rationale	
<p>Students will develop a comprehensive understanding of various representations of real numbers, including rational numbers, during this unit. The focus will be on exploring multiple ways of representing real numbers using fractions, decimals, integers, square roots, and cube roots. The unit aims to extend students' understanding of basic arithmetic operations (addition, subtraction, multiplication, and division) to encompass all rational numbers while preserving the properties of these operations and the relationships between addition/subtraction and multiplication/division.</p> <p>Throughout the unit, students will apply these properties to practical situations and relate negative numbers to everyday contexts, such as amounts owed or temperatures below zero. By doing so, students will be able to articulate and interpret the rules governing the addition, subtraction, multiplication, and division of negative numbers. The ultimate goal is to foster a unified comprehension of real numbers and their various representations, enabling students to confidently work with rational numbers and apply their knowledge to real-world scenarios.</p>	
Recommended Pacing	
23 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.
7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.	
CPI #	Cumulative Progress Indicator (CPI)
1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
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.
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.
7.NS.A Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
CPI #	Cumulative Progress Indicator (CPI)
1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram
2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
3	Solve real-world and mathematical problems involving the four operations with rational numbers.
8.NS.A Know that there are numbers that are not rational, and approximate them by rational numbers	
CPI #	Cumulative Progress Indicator (CPI)
1	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).
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 of 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, events and models. ● Mathematical problem solvers apply a variety of strategies and methods to solve problem situations. ● Number sense develops through experience. ● Numerical operations apply to all real numbers. ● Our number system is complex and formed by many sets of numbers. 	
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 me to be a more efficient problem solver? ● What kinds of experiences help develop number sense? ● How do I determine the best numerical representation (pictorial, symbolic, objects) for a given situation? ● How are mathematical operations between different sets of numbers related? 	
Content Understandings	
<ul style="list-style-type: none"> ● Problems involving equivalent ratios can be solved using a variety of models. ● The definitions of absolute value, additive inverse, base, cube root, exponent, integer, opposites, perfect cube, perfect square, power, radical sign, radicand, rational number, repeating decimal, square root, and terminating decimal. ● That every rational number has a decimal expansion that terminates or repeats. ● That every quotient of integers (non-zero divisor) is a rational number. ● That numbers that are not rational are irrational. 	
Content Questions	
<ul style="list-style-type: none"> ● How are proportional relationships displayed in different representations? ● Why is unit rate important for analyzing a proportional relationship? ● Which representation of a rational number is most appropriate for the given situation? ● How do exponents simplify work with very large and very small numbers? 	
Objectives	

We are learning to/that:

- Identify, describe, and find the absolute values of integers.
- Fluently add, subtract, multiply and divide integers.
- Apply properties of operations to simplify expressions with integers and/or rational numbers.
- Find GCF and LCM using a variety of strategies. (Suggested Strategies: Listing, Boot/Ladder, Prime Factorization, & Venn Diagrams)
- Fluently add, subtract, multiply and divide rational numbers.
- Compare irrational numbers using rational approximations.
- Evaluate square roots and cube roots, including those resulting from solving equations.

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: Big Ideas Accelerated, Boswell and Larson, 2017

Unit 2: Expressions, Equations, and Inequalities

Content Area: Mathematics

Course & Grade Level: Pre-Algebra H&A, Sixth

Summary and Rationale

In addition to developing a unified understanding of different representations of real numbers and rational numbers, this unit emphasizes the importance of solving equations. Students will work extensively with expressions, equations, and inequalities to establish a robust foundation of prerequisite skills necessary for progressing to Pre-Algebra and beyond.

The curriculum centers on logical reasoning, enabling students to approach problem-solving with a clear and systematic approach. Through this logical framework, students will gain skill in manipulating expressions, and they will learn to do so purposefully, guided by the properties of arithmetic and the laws of equality. This deliberate approach to expression manipulation will help students build a strong grasp of algebraic concepts.

As students delve deeper into the unit, they will further refine their ability to use algebraic equations and inequalities to model real-life situations. This skill is invaluable in many fields, from science and engineering to economics and social sciences. The ability to create mathematical models and solve equations allows students to analyze and understand complex problems, making informed decisions and predictions.

Overall, mastering the art of solving equations not only lays the groundwork for advanced mathematical concepts but also empowers students to think critically, analyze data, and make informed decisions, skills that are vital in both academic and real-world settings. This unit's focus on problem-solving through equations and inequalities will equip students with essential tools for tackling various challenges in their academic lives.

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.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)
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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.
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.
Standard: Expressions and Equations 7.EE.A Use properties of operations to generate equivalent expressions.	
CPI #	Cumulative Progress Indicator (CPI)
1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.
7.EE.B Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
CPI #	Cumulative Progress Indicator (CPI)
3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities
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-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	

- 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 solution set to an inequality is a specific, infinite set.

Unit Essential Questions

- How can equations and inequalities be used to represent situations?
- What makes a solution to a real-life problem reasonable?
- What does the solution to an inequality represent in the context of the situation?

Content Understandings

- There are many ways to represent the solution set to an inequality.
- Rewriting expressions in different forms can show how the quantities are related

Content Essential Questions

- How do the properties of operations help us simplify and transform expressions and equations?
- What is the difference between an expression and an equation?
- How do I read and interpret a graph of inequality?

Objectives

We are learning to/that:

- Apply properties of operations to generate and identify equivalent expressions. (Distributive, Additive Inverse, Associative, Commutative).
- Add and subtract linear expressions with rational coefficients (use the distributive property and combine like terms).
- Factor out the GCF in algebraic and numerical expressions.
- Write, graph, and solve one-step equations and inequalities that include integers and/or rational numbers.
- Write, graph, and solve two-step equations and inequalities that include integers and/or rational numbers.
- Solve multi-step equations including equations with variables on both sides. (One Solution, No Solution, All Real Number Solutions)
- Solve literal equations for a given variable.

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: Big Ideas Accelerated, Boswell and Larson, 2017

Unit 3: Proportional Relationships

Content Area: Mathematics

Course & Grade Level: Pre-Algebra H&A, Sixth

Summary and Rationale

Proportional thinking is a fundamental and essential concept in middle school mathematics. It enables students to establish connections between ratios and proportionality, allowing them to solve both single- and multi-step problems in various real-world scenarios.

At this stage, students expand their comprehension of ratios and delve into the concept of proportionality. This understanding becomes a powerful tool for solving a diverse range of percent-related problems. Whether it involves calculating discounts, interest, taxes, tips, or percent changes, proportional thinking empowers students to analyze and interpret these situations with confidence and accuracy. Moreover, students learn to model and graph proportional relationships, including scale drawings. This skill is crucial for visualizing and representing real-world situations, making it easier to comprehend and communicate complex ideas.

Proportional thinking is not only vital for success in middle school mathematics, but also lays the groundwork for more advanced mathematical concepts in high school and beyond. It forms the basis for understanding linear relationships, rates, and proportions in algebra and other mathematical disciplines.

In everyday life, proportional thinking is ubiquitous, influencing decision-making, budgeting, and problem-solving. Whether it's comparing prices, calculating tips, or adjusting recipes, the ability to think proportionally empowers students to navigate various situations with mathematical proficiency and sound reasoning.

Overall, introducing and honing proportional thinking in middle school equips students with a powerful set of problem-solving tools that have practical applications in numerous fields. It fosters critical thinking, quantitative literacy, and analytical skills that are invaluable both inside and outside the classroom.

Recommended Pacing

12 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.
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.

7.RP.A Analyze proportional relationships and use them to solve real-world and mathematical problems.	
CPI #	Cumulative Progress Indicator (CPI)
2	Recognize and represent proportional relationships between quantities.
3	Use proportional relationships to solve multistep ratio and percent problems.
7.G.A Draw, construct, and describe geometrical figures and describe the relationships between them.	
CPI #	Cumulative Progress Indicator (CPI)
1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
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.
Instructional Focus	
Unit Enduring Understandings	
<ul style="list-style-type: none"> Portionality is a relationship between ratios that helps us understand growth and change. Proportional reasoning can be used to quantify and compare situations, events and models. 	
Unit Essential Questions	
<ul style="list-style-type: none"> How can you tell if a relationship is proportional? How can ratios and proportional reasoning be applied to mathematical models such as scale drawings? 	
Content Understandings	
<ul style="list-style-type: none"> In a proportion, the ratios of two quantities remains constant as the corresponding values of the quantities change. 	
Content Questions	
<ul style="list-style-type: none"> What is the most efficient method to find the missing value in a proportion? How can I describe a relationship between two quantities using proportionality? 	
Objectives	
We are learning to/that: <ul style="list-style-type: none"> Decide whether two quantities are proportional using ratio tables and/or graphs. Represent proportional relationships with models including equations Use proportionality to solve ratio problems. Use scale drawings to compute actual lengths and areas. Find the part and the whole of ratio relationships. Compare and order fractions, decimals, and percents. Use proportionality to solve percent problems. Use a percent equation to solve percent problems. Solve percent problems involving percentages of increase and decrease (includes mark-up and discount). 	

- Use scale drawing to compute actual lengths and areas.

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: Big Ideas Accelerated, Boswell and Larson, 2017

Unit 4: Geometry

Content Area: Mathematics

Course & Grade Level: Pre-Algebra H&A, Sixth

Summary and Rationale

In this course, students will build upon their previous knowledge of areas from Grade 5, engaging in more advanced problem-solving involving complex, multi-step scenarios. They will develop a deeper understanding of ratios and explore how ratios relate to similarity in geometric figures. By analyzing simple drawings that illustrate the relative size of quantities, students will gain proficiency in visualizing and comparing proportions.

Furthermore, the curriculum will introduce students to the relationships between angles formed by intersecting lines, setting the groundwork for future explorations in congruence and similarity within the realm of Geometry. This understanding will pave the way for more in-depth investigations into geometric properties and transformations.

A significant portion of the course will be devoted to working with three-dimensional figures, which will challenge students to apply their mathematical skills to solve authentic, real-world problems. This hands-on approach not only reinforces mathematical concepts but also encourages critical thinking and problem-solving abilities.

By the end of this course, students will have honed their spatial reasoning skills and developed a solid foundation in geometric concepts, setting the stage for more advanced studies in higher-level mathematics. The ability to solve multi-step problems and apply geometric principles to real-life situations equips students with valuable skills that extend beyond the classroom and are applicable in various disciplines and career paths.

Recommended Pacing

16 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.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.

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.
7.G.B Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	
4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
8.G.C Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	
CPI #	Cumulative Progress Indicator (CPI)
9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve 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.
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"> Geometric awareness develops through practice in visualizing, diagramming, and constructing. Geometric images provide the context in which properties can be noticed, definitions can be made and by which formulas can be derived. 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 are spatial relationships represented in sketches, drawings, and constructions? How are area, surface area, and volume found? How can the application of the attributes of geometric figures support mathematical reasoning and problem solving? How can geometric properties and theorems be used to describe, model, and analyze situations? 	
Content Understandings	
<ul style="list-style-type: none"> There are appropriate units for perimeter, area, and volume (linear, square and cubic). 	
Content Questions	
<ul style="list-style-type: none"> What are the formulas for area and volume? How can angle relationships be used to solve problems? 	
Objectives	

We are learning to/that:

- Classify quadrilaterals based on their properties.
- Measure and describe relationships among supplementary, complementary, vertical and adjacent angles.
- Classify and determine the measure of angles created when parallel lines are cut by a transversal.
- Demonstrate that the sum of the interior angle measures of a triangle is 180 degrees and apply this fact to find the unknown measures of angles and the sum of the angles of polygons.
- Calculate the area of triangles, and special quadrilaterals (parallelograms and trapezoids).
- Use values of pi to estimate and calculate the circumference and area of circles.
- Find perimeters and areas of composite two-dimensional figures, including semi-circles.
- Use nets to find surface areas of 3D figures
- Calculate the volume of prisms, cones, cylinders, and spheres using a variety of rational number measurements.
- Find the missing dimension given the area or volume of a figure.
- Solve real-world problems involving surface areas and volumes of objects composed of prisms, pyramids, and cylinders.

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: Big Ideas Accelerated, Boswell and Larson, 2017

Unit 5: Statistics	
Content Area: Mathematics	
Course & Grade Level: Pre-Algebra H&A, Sixth	
Summary and Rationale	
<p>Building upon their foundational understanding of numbers, this course will focus on developing students' statistical thinking skills. They will learn to analyze and interpret data distributions, understanding that not all datasets have a definite center, and different methods of measuring center can yield varying values. The curriculum will emphasize the importance of effectively summarizing numerical data sets through various data displays. Students will learn to describe data using tools such as histograms, box plots, and scatter plots, gaining proficiency in presenting information visually.</p> <p>Through this statistical thinking approach, students will enhance their ability to analyze and draw meaningful conclusions from real-world data. They will also develop critical thinking skills as they make informed decisions based on data analysis, a valuable asset in various academic and professional fields.</p> <p>Ultimately, this course aims to equip students with the essential statistical literacy needed to understand and interpret information in an increasingly data-driven world. By honing their ability to work with data and recognize different patterns, students will become more effective problem solvers and informed decision-makers in a wide range of disciplines.</p>	
Recommended Pacing	
7 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)
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 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, such as by: <ul style="list-style-type: none"> a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

	c. 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. d. 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.
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
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. 	
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? How can data collection assist in making predictions? 	
Content Understandings	
<ul style="list-style-type: none"> 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 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"> When is each measure of central tendency appropriate? What is the best way to display my data? 	
Objectives	
We are learning to/that:	
<ul style="list-style-type: none"> Recognize and create statistical questions that anticipate useful data results. 	

- Calculate mean, median, mode and range
- Display data on a histogram, box-and-whisker plots, and line plots.
- Generate multiple samples of data to draw 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

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: Big Ideas Accelerated, Boswell and Larson, 2017

Unit 6: Foundations of Algebra

Content Area: Mathematics

Course & Grade Level: Pre-Algebra H&A, Sixth

Summary and Rationale

In Pre-Algebra, students will solidify their understanding of various topics as they bridge the gap to Algebra 1. The curriculum aims to establish connections among different mathematical concepts, promoting a more comprehensive understanding of the subject.

Students will begin by connecting linear functions expressed as equations with their corresponding tables and graphs. This integration of different representations will deepen their grasp of linear relationships, laying a strong foundation for future studies in algebraic functions. Furthermore, students will explore proportional relationships and their connection to the steepness of related lines, known as the slope. Understanding the concept of slope is crucial for comprehending the behavior of linear functions and analyzing their graphical representations.

The course will also expand on students' knowledge of real numbers, delving into the Pythagorean Theorem. This exploration will help them understand square roots and their decimal approximations, paving the way for more advanced applications of square roots in geometry and other mathematical fields.

By bringing together these diverse topics, students will develop a well-rounded and rooted foundation in mathematics. These connections will enhance their problem-solving skills, critical thinking abilities, and overall mathematical proficiency. As students prepare for Algebra 1, this comprehensive approach will not only solidify their understanding of the individual concepts but also empower them to see the interconnections between different mathematical ideas. This higher level of mathematical thinking will serve as a valuable asset in their academic journey and future endeavors.

Recommended Pacing

6 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.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.

8.EE.B Understand the connections between proportional relationships, lines, and linear equations.

CPI #	Cumulative Progress Indicator (CPI)
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5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
Standard: Geometry 8.G.B Understand and apply the Pythagorean Theorem.	
CPI #	Cumulative Progress Indicator (CPI)
7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real world and mathematical problems in two and three dimensions.
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.
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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"> Rate of change is used to model phenomena and describe it with an equation. The Pythagorean Theorem can be used to find the missing side lengths of a right triangle. 	
Unit Essential Questions	
<ul style="list-style-type: none"> What types of relationships can be modeled by linear graphs? What is the relationship between linear equations and their graphs? 	
Content Understandings	
<ul style="list-style-type: none"> The Pythagorean Theorem is used in relation to right triangles. Slope is a representation of rate of change. 	
Content Questions	
<ul style="list-style-type: none"> How do I define linear equation, rise, run, solution of a linear equation, slope, slope intercept form, x-intercept, and y-intercept? How is slope used to measure, model and calculate change? 	
Objectives	
We are learning to/that:	
<ul style="list-style-type: none"> Describe how patterns grow and expand patterns using an equation. Graph linear equations using a variety of strategies. Write an equation in two variables and analyze the relationship between the independent and dependent variables using graphs and tables. Calculate the slope of a line using a variety of methods. Recognize positive slope, negative slope, zero slope, and undefined slope. Write an equation in two variables and analyze the relationship between the independent and dependent variables using graphs and tables. Use the Pythagorean Theorem to find missing lengths of a right triangle. 	
Evidence of Learning	
<input checked="" type="checkbox"/> 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](#)

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