Branchburg Township Public Schools

Office of Curriculum and Instruction

Math 6 Math Curriculum

Adopted by the Board of Education October 2022

This curriculum is aligned with the 2016 New Jersey Student Learning Standards in Mathematics

Curriculum Scope and Sequence			
Content Area	Mathematics	**Course Title/Grade Level:**	Math 6

Topic/Unit Name		Suggested Pacing (Days/Weeks)
Topic/Unit #1	Whole Numbers, Ratios and Proportional Reasoning	8-9 weeks
Topic/Unit #2	Rational Number Operations	10-11 weeks
Topic/Unit #3	Algebraic Expressions and Equations	8-9 weeks
Topic/Unit #4	Area, Surface Area, and Volume	3-4 weeks
Topic/Unit #5	Data Analysis	3-4 weeks

Topic/Unit 1 Title	Whole Numbers, Ratios and Proportional Reasoning (Chapters 0, 1, and 2)	Approximate Pacing	8-9 weeks

STANDARDS

NJSLS (Math)

6.RP.A.1: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
6.RP.A.2: Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.
6.RP.A.3.A: Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
6.RP.A.3.B: Solve unit rate problems including those involving unit pricing and constant speed.
6.RP.A.3.C Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
6.NS.B.2: Fluently divide multi-digit numbers using the standard algorithm.
6.NS.B.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.

Standards for Mathematical Practice
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.
6-Attend to Precision.
7-Look for and make use of structure.
8-Look for and express regularity in repeated reasoning.

Interdisciplinary Connections:

Science Cross-Cutting Concept: Stability and Change
Small changes in one part of a system might cause large changes in another part.
(Students use ratio and rate reasoning to solve real-world problems involving quantities that change in relation to one another.)
RL.6.1: Cite textual evidence and make relevant connections to support analysis of what the text says explicitly as well as inferences drawn from the text.

(When students solve word problems related to ratios and rates, involving whole numbers, students must extract the relevant details of the text to determine how to approach the problem.)

Computer Science & Design Thinking	Career Readiness, Life Literacies and Key Skills
8.2.8.ITH.1: Explain how the development and use of technology influences economic, political, social, and cultural issues. *(In the beginning of the year, students learn proper etiquette for using Google classroom and other online platforms for safety and appropriateness.)*	**9.1.8.CP.1**: Compare prices for the same goods or services. *(Students use unit costs involving whole numbers to compare prices of similar products to determine the most ideal purchase based on cost per unit, quality, and quantity of the item.)*

UNIT/TOPIC ESSENTIAL QUESTIONS AND ENDURING OBJECTIVES/UNDERSTANDINGS

-How can you use mathematics to describe change and model real-world situations?
-What is the relationship between fractions, decimals, and percents?
-When is it helpful to write a fraction, decimal, or percent in a different form?
-How do unit rates help us compare quantities (costs, for example)?
-How can using the greatest common factor and least common multiple be used to solve real-world problems?

STUDENT LEARNING OBJECTIVES

Key Knowledge	Process/Skills/Procedures/Application of Key Knowledge
Students will know: coordinate plane, equivalent ratios, graph, greatest common factor, least common multiple, ordered pair, origin, prime factorization, rate, ratio, ratio table, unit price, unit rate, x-axis, x-coordinate, y-axis, y-coordinate, least common denominator, percent, part to part comparison, part to whole comparison, divisibility, rational number, simplify, annex	***Students will be able to:*** -Make comparison statements using ratios -Compare and order fractions, decimals, and percents -Use tables, bar diagrams, and equivalent ratios to solve percent problems -Scale up/down ratios to find equivalent ratios -including ratios with denominators that are factors of 100, requiring 1 step to solve -Calculate unit rates when one both quantities are whole numbers -Find two different unit rates from a rate -Find the greatest common factor of two numbers -Find the least common multiple of two numbers

	-Find the prime factorization of two digit numbers -Use prime factorization to solve real-world problems involving factors and multiples (by listing prime factors) -Fluently divide multi-digit numbers using the standard algorithm -Shade in diagrams to represent percentages less than 100
ASSESSMENT OF LEARNING	
Summative Assessment (Assessment at the end of the learning period)	Chapter quizzes and tests
Formative Assessments (Ongoing assessments during the learning period to inform instruction)	-Chapter pre-test, Ticket-in-the-Door, Ticket-out-the-Door, spot-checking specific homework problems from "independent practice" sections, "Got it" and "Guided Practice" selected problems from ConnectEd -Online formative assessment websites: www.thatquiz.org, www.kahoot.com, www.quizizz.com, www.edulastic.com, www.edpuzzle.com) -Mid-Chapter 1 Check (pg. 58 #'s 1-7) -Mid-Chapter 2 Check (pg. 128 #'s 1-9) -Teacher Observation
Alternative Assessments (Any learning activity or assessment that asks students to *perform* to demonstrate their knowledge, understanding and proficiency)	-Ratios and Rates Choice Board: Students choose from 4 different activities to demonstrate their learning about ratios and rates. Activities highlight different learning styles including written, visual, and artistic. -Halloween Stations Activity: Students complete a variety of activities involving ratio/rate word problems, decimal place value, fraction/decimal/percent candy conversions, and adding/subtracting fractions. -Aleks Review: Students complete sample questions to review/practice for the assessment.
Benchmark Assessments (used to establish baseline achievement data and measure progress towards grade level standards; given 2-3 X per year)	-Fall Math MAP Assessment - used to measure individual student growth over time -Initial math reflection sample - a writing sample used to pinpoint students' starting points in explaining mathematical reasoning -Ex: (1) **a.** Explain how you can find the greatest common factor of two numbers. Provide an example to support your explanation. **b.** Explain how you can find the least common multiple of two numbers. Provide an example to support your explanation.

	-Ex. (2) **a.** Tell how to write a percent as a fraction and as a decimal. Provide an example. **b.** A store is having a sale on clothing at 30% off the regular price. How would you find the amount taken off of a jacket that is regularly priced at $40? Explain your reasoning.

RESOURCES

Core instructional materials:
ConnectEd Course 1 (McGraw Hill); www.connected.mcgraw-hill.com
www.aleks.com

Supplemental materials:
-Explore Learning Gizmos: Factor Trees (Activity A), Part-to-Part and Part-to-Whole Ratios (Activity A and B #'s 1-3), and Fraction, Decimal, Percent (Area and Grid Models-Activities A-C)
-Hands-On Resources: Versatiles, grocery ads to relate to the real world (unit pricing)
-Useful websites: Factor Trees, simplifying fractions, What is a ratio?, https://www.mathplayground.com/Decention, www.Khanacademy.com, www.brainpop.com, www.sheppardsoftware.com
Diversity: ada,ada video Juan de la Cierva,Juan de la Cierva Curricular Mandates- percentage of US population with a Bachelor's Degree *(graph on page 8)* Obama, ASnapshotofAsianHistoryPercentandFractionofaWhole-1.pdf

Modifications for Learners

See appendix

Topic/Unit 2 Title	Rational Number Operations (Chapters 3, 4, and 5)	Approximate Pacing	10-11 weeks

STANDARDS

NJSLS (Math)

6.RP.A.3.D Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
6.NS.A.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.2: Fluently divide multi-digit numbers using the standard algorithm.
6.NS.B.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
6.NS.C.5: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values.
6.NS.C.6.A: Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself.
6.NS.C.6.B: Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
6.NS.C.6.C: Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
6.NS.C.7.A: Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
6.NS.C.7.B: Write, interpret, and explain statements of order for rational numbers in real-world contexts.
6.NS.C.7.C: Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.C.7.D: Distinguish comparisons of absolute value from statements about order.
6.NS.C.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.

Standards for Mathematical Practices
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.

6-Attend to Precision.
7-Look for and make use of structure.
8-Look for and express regularity in repeated reasoning.

Interdisciplinary Connections:

SL.6.1.B: Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.
(Students work together to set a schedule for completing the tasks in the shopping project. Each student is assigned individual roles to complete. Students work collegially to get the project done, taking their partner/group member's ideas into consideration.)
RL.6.4: Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
(Students decipher word problems related to fractions to determine which operations to apply to solve.)

Computer Science & Design Thinking	Career Readiness, Life Literacies and Key Skills
8.2.8.ED.3: Develop a proposal for a solution to a real-world problem that includes a model (e.g., physical prototype, graphical/technical sketch). *(Students create bar diagrams to represent the division of a fraction by a fraction. Students explain how they chose to set up their bar diagram and why it makes sense.)*	**9.1.8.EG.2:** Explain why various sources of income are taxed differently. **9.1.8.PB.3**: Explain how to create a budget that aligns with financial goals. *(Students calculate sales tax using decimal operations. The class discusses the different sales tax rates in various states and reviews how to convert the percentages into decimals before multiplying.)*

UNIT/TOPIC ESSENTIAL QUESTIONS AND ENDURING OBJECTIVES/UNDERSTANDINGS

-How can decimal/fraction operations be used in everyday life?
-How is estimation helpful when computing with fractions and decimals?
-How can integers be used to represent real world situations?

STUDENT LEARNING OBJECTIVES

Key Knowledge	Process/Skills/Procedures/Application of Key Knowledge
Students will know: compatible numbers, Commutative Property, dimensional analysis, reciprocal, unit ratio, absolute value, bar notation, integer, negative integer, opposites, positive integer, ordered pair, quadrants, x-axis, x-coordinate, y-axis, y-coordinate, origin, pre-image, image, prime notation, reflection rational number, repeating decimal, terminating decimal	***Students will be able to:*** -Estimate products and quotients to place the decimal correctly -Compare and order rational numbers -Convert a rational number to a decimal using long division -Determine the missing factor in a decimal multiplication problem -Ex: ____ x 0.4 = 1.6 -Apply decimal operation skills to compute tax, tip, discount, and other percent applications -Add, subtract, multiply and divide positive fractions, mixed numbers, and decimals -Evaluate numeric expressions involving positive fractions and decimals (2 numbers) -Apply math properties when computing with positive fractions and decimals -Explain why two positive fractions less than 1 have a product also less than 1 -Explain why a whole number divided by a fraction less than one has a quotient greater than the whole number dividend -Explain how the process used to divide fractions is similar to the process used to multiply fractions -Use dimensional analysis to convert units of measurement (1-step) -Plot ordered pairs on the coordinate plane (rational numbers) -Reflect ordered pairs over the x-axis or the y-axis. -Calculate absolute value of integers
ASSESSMENT OF LEARNING	
Summative Assessment (Assessment at the end of the learning period)	Chapter quizzes and tests

Formative Assessments (Ongoing assessments during the learning period to inform instruction)	-Chapter pre-test, Ticket-in-the-Door, Ticket-out-the-Door, spot-checking specific homework problems from "independent practice" sections, "Got it" and "Guided Practice" selected problems from ConnectEd -Online formative assessment websites: www.thatquiz.org, www.kahoot.com, www.quizizz.com, www.edulastic.com, www.edpuzzle.com) -Mid-Chapter 3 Check (pg. 214 #'s 1-9) -Mid-Chapter 4 Check (pg. 300 #'s 1-5, and 7) -Mid-Chapter 5 Check (pg. 374 #'s 1-11) -Teacher Observation
Alternative Assessments (Any learning activity or assessment that asks students to *perform* to demonstrate their knowledge, understanding and proficiency)	-Shopping Project: Students redecorate a room of their choice on a budget of $900. Students "shop" for items on store websites, and apply percent skills such as calculating tax, discounts, sale prices, and total cost. Students record their calculations in an "item cost spreadsheet." -Chapter 4: Fraction Operations Choice Board: all operations with fractions and unit conversions -Robinson's Family Vacation: Students use a pre-made coordinate plane to map the distance traveled on a vacation.
Benchmark Assessments (used to establish baseline achievement data and measure progress towards grade level standards; given 2-3 X per year)	-Winter Math MAP Assessment - used to measure individual student growth over time -Mid Year Cumulative Math Assessment - used to assess students' retention of math concepts -Math reflection sample - used to continually develop students' mathematical reasoning -Ex. **(1) a.** The process for multiplying two decimal numbers is **b.** When multiplying decimals, estimation can be used to determine if your answer is reasonable by -Ex. **(2) a.** Show and explain how to graph ordered pairs on the coordinate plane. Use at least three points to support your explanation from different regions of the coordinate plane. **b.** Show and explain how to reflect a point over the y-axis on the coordinate plane. Use one of your ordered pairs from number one above to support your explanation. **c.** Show and explain how to find the distance between two ordered pairs in different quadrants on the coordinate plane. Use two of your ordered pairs from number one above to support your explanation.
RESOURCES	
Core instructional materials: ConnectEd Course 1 (McGraw Hill); www.connected.mcgraw-hill.com www.aleks.com	

Supplemental materials:
-Explore Learning Gizmos: Integers, Opposites, and Absolute Value (Activity A and B), Sums and differences with decimals (Activity A)
-Hands-On Resources: Versatiles, integer chips
-Useful websites: Percent Shopping, Percents of Numbers, www.mathantics.com, www.Khanacademy.com, www.brainpop.com, www.sheppardsoftware.com
Diversity: Euro, Euro Video, Exchange rate, exchange rate video, The Cartesian Plane, Cartesian Video, John Lewis
AsianHeritagePreAlgebraDecimalsFractionsMixedNumbersProportions-1.pdf

Modifications for Learners

See appendix

Topic/Unit 3 Title	Algebraic Expressions and Equations (Chapters 6, 7, and 8)	Approximate Pacing	8-9 weeks

STANDARDS

NJSLS (Math)

6.EE.A.1: Write and evaluate numerical expressions involving whole-number exponents.
6.EE.A.2.A: Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 - y.
6.EE.A.2.B: Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
6.EE.A.2.C: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
6.EE.A.3: Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.
6.EE.A.4: Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same
6.EE.B.5: Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
6.EE.B.6: Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
6.EE.B.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.EE.B.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.
6.EE.C.9: Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and

relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.

Standards for Mathematical Practice
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.

Interdisciplinary Connections:

Science Cross-Cutting Concept: Patterns
Patterns can be used to identify cause and effect relationships.
(Students write one-step equations, graph relationships, and create tables using independent and dependent variables.)

Computer Science & Design Thinking	Career Readiness, Life Literacies and Key Skills
8.2.8.ED.2: Identify the steps in the design process that could be used to solve a problem. *(When solving equations, students identify which steps they must take to isolate the variable and solve for the unknown depending on which operations are present in the equation.)*	**9.1.8.PB.6**: Construct a budget to save for short-term, long-term, and charitable goals. *(Students write algebraic expressions and equations to represent real-world situations.)*

UNIT/TOPIC ESSENTIAL QUESTIONS AND ENDURING OBJECTIVES/UNDERSTANDINGS

-How are numerical expressions and algebraic expressions similar and different?
-What does it mean to "solve" an equation?
-Why is it useful to represent real-life situations algebraically?
-How do you represent functions in different ways?
-How are inequalities and equations related?

STUDENT LEARNING OBJECTIVES	
Key Knowledge	**Process/Skills/Procedures/Application of Key Knowledge**
Students will know: algebra, algebraic expression, Associative Properties, base, coefficient, Commutative Properties, constant, defining the variable, Distributive Property, equivalent expressions, evaluate, exponent, factor the expression, Identity Properties, like terms, numerical expression, order of operations, powers, properties, term, variable, Addition Property of Equality, Division Property of Equality, equals sign, equation, inverse operations, Multiplication Property of Equality, solution, solve, Subtraction Property of Equality	***Students will be able to:*** -Evaluate numeric and algebraic expressions involving exponents -Ex. $8 \times (3^2 + 2) - 11$ -Ex. Evaluate the expression if $a = 3$, $b = \frac{1}{3}$, and $c = 6$. $2c + 3a$ -Use variables to write algebraic expressions -Ex. The width *(w)* decreased by 6 meters -Simplify algebraic expressions by combining like terms -Ex. $6x + 2y + 9x$ -Write algebraic expressions from word phrases to help solve problems -Simplify expressions using properties (Distributive, Associative, Identity, Commutative) -Rewrite expressions using the Distributive Property -Apply properties of equality and inverse operations to solve one-step addition, subtraction, multiplication, and division equations -Explain why it is necessary to perform the same operation on each side of the equals sign to maintain equality -Combine like terms to simplify both sides of an equation before solving it -Use a function table to find input or output (one-step) -Use ordered pairs of a one-step function to create the graph of the function

	-Read, write, and graph basic inequalities -Solve one-step inequalities
ASSESSMENT OF LEARNING	
Summative Assessment (Assessment at the end of the learning period)	Chapter quizzes and tests
Formative Assessments (Ongoing assessments during the learning period to inform instruction)	-Chapter pre-test, Ticket-in-the-Door, Ticket-out-the-Door, spot-checking specific homework problems from "independent practice" sections, "Got it" and "Guided Practice" selected problems from ConnectEd -Online formative assessment websites: www.thatquiz.org, www.kahoot.com, www.quizizz.com, www.edulastic.com, www.edpuzzle.com) -Mid Chapter 6 Check: pg. 472 #'s 1-8 -Mid Chapter 7 Check: pg. 546 #'s 1-11 -Mid Chapter 8 Check: pg. 614 #'s 1-8 -Inequalities Worksheet: Students graph real world inequality problems -Teacher Observation
Alternative Assessments (Any learning activity or assessment that asks students to *perform* to demonstrate their knowledge, understanding and proficiency)	-Expressions/Equations Choice Project: Students choose from one of six projects to showcase their learning of expressions and equations. Projects range from writing and performing raps, creating video tutorials or skits, and more. Students may use ConnectEd (Chapter 6 and 7) as a reference tool, in addition to the internet. Knotts Berry Farm Amusement Park Activity: Students write inequalities to determine who can ride specific attractions at the amusement park. - "4 by 4 Challenge": Students compete in a "4 by 4 Challenge" involving order of operations with whole numbers. Students must work together productively to produce as many answers as possible, including all team members' responses. -Aleks Review: Students complete sample questions to review/practice for the assessment.
Benchmark Assessments (used to establish baseline achievement data and measure progress towards	-Math reflection sample - used to continually develop students' mathematical reasoning -Ex. 1. Show how you can determine if two expressions are equivalent by using math properties. Include one example of each property: a. Commutative Property b. Associative Property

grade level standards; given 2-3 X per year)	c. Identity property d. Distributive Property 2. Show how you can determine if two expressions are equivalent by combining like terms.
RESOURCES	
Core instructional materials: ConnectEd Course 1 (McGraw Hill); www.connected.mcgraw-hill.com www.aleks.com	
Supplemental materials: -Explore Learning Gizmos: Modeling 1-step equations (#'s 1-3), Simplifying Algebraic Expressions I (#'s 1-6, 10), Equivalent Algebraic Expressions I, Solving Linear Inequalities in 1-Variable, Function Machines 3 -Hands-On Resources: Versatiles, algebra tiles, equation balance scale -Useful websites:Intro to Exponents, www.Khanacademy.com, www.brainpop.com , www.sheppardsoftware.com, 1-step equations basketball/soccer, order of operations millionaire game **Diversity:** Equations for Equality diversity video on equality VIDEO	
Modifications for Learners	
See appendix	

Topic/Unit 4 Title	Area, Surface Area, and Volume (Chapters 9 and 10)	**Approximate Pacing**	3-4 weeks

STANDARDS

NJSLS (Math)

6.G.A.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
6.G.A.2: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real world and mathematical problems.
6.G.A.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.
6.G.A.4: Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Standards for Mathematical Practice
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.

Interdisciplinary Connections:

W.6.2 D: Use precise language and domain-specific vocabulary to inform about or explain a topic.
[Students explain how nets represent three-dimensional figures (rectangular and triangular prisms) using correct mathematical language and representation. Students must visually represent the concept using precise measurements.]

Computer Science & Design Thinking	Career Readiness, Life Literacies and Key Skills
8.2.8.ED.6: Analyze how trade-offs can impact the design of a product. **8.2.8.ED.7:** Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). *[Students sketch triangles given two dimensions (area, base, and/or height). If students use the area formulas incorrectly, they must revisit and revise their work.]*	**9.4.8.TL.6:** Collaborate to develop and publish work that provides perspectives on a real-world problem *[Students work in teams to create nets of three-dimensional figures (rectangular and triangular prisms). They must delegate tasks and communicate how they will approach the task.]*

UNIT/TOPIC ESSENTIAL QUESTIONS AND ENDURING OBJECTIVES/UNDERSTANDINGS
-How does finding the area of a figure differ from finding the surface area of a figure? In what real-world situations would you use area formulas to solve? In what real-world situations would you use surface area formulas to solve? -How can you solve equations to find missing dimensions in area and volume problems? -How are the areas of triangles and parallelograms related?

STUDENT LEARNING OBJECTIVES	
Key Knowledge	**Process/Skills/Procedures/Application of Key Knowledge**
Students will know: base, height, perpendicular, parallelogram, polygon, triangular prism, rectangular prism, composite figure, congruent, formula, substitute, cubic units, square units, surface area, volume, net, area	***Students will be able to:*** -find the area of triangles and parallelograms -find the missing dimension (base or height) when given the other dimension and the area of a triangle Ex: Asia is designing a triangular-shaped window with a height of 12 inches and an area of 36 square inches. What is the length of the base of the window? -find the areas of composite figures by deconstructing them into quadrilaterals and triangles -find the volume of rectangular and triangular prisms algebraically and using models

	-find the volume of rectangular prisms with rational number dimensions -find the missing dimension (length, width, or height) when given the other two dimensions and the volume of a rectangular prism -find the surface area of rectangular and triangular prisms algebraically and using nets -solve real-world problems involving area, volume, and surface area
ASSESSMENT OF LEARNING	
Summative Assessment (Assessment at the end of the learning period)	Chapter quizzes and tests
Formative Assessments (Ongoing assessments during the learning period to inform instruction)	-Chapter pre-test, Ticket-in-the-Door, Ticket-out-the-Door, spot-checking specific homework problems from "independent practice" sections, "Got it" and "Guided Practice" selected problems from ConnectEd -Online formative assessment websites: www.thatquiz.org, www.kahoot.com, www.quizizz.com, www.edulastic.com, www.edpuzzle.com) -Mid-Chapter 9 Check (pg. 696 #'s 1-8) -Mid Chapter 10 Check (pg. 758 #'s 1-8) -Would You Rather (Perimeter of a bedroom)- with teacher guidance -Teacher Observation
Alternative Assessments (Any learning activity or assessment that asks students to *perform* to demonstrate their knowledge, understanding and proficiency)	-Moving Time Activity: Students determine the amount of boxes that can fit in a moving truck (volume) based on given dimensions. Additionally, students calculate the amount of paper needed to cover certain boxes (surface area). -Coordinate Geometry: (Students are given points to graph on a coordinate plane. Students must identify the shape and find the area for 6 out of 8 problems). -Composite Figures Activity: Students choose 6 out of 8 composite figures, find the area, and show how they deconstructed each figure.
Benchmark Assessments (used to establish baseline achievement data and	-End of Year Cumulative Math Assessment (used to assess students' retention of math concepts) -Math reflection sample (used to continually develop students' mathematical reasoning)

measure progress towards grade level standards; given 2-3 X per year)	
RESOURCES	
Core instructional materials: ConnectEd Course 1 (McGraw Hill); www.connected.mcgraw-hill.com www.aleks.com	
Supplemental materials: -Explore Learning Gizmos: Area of Triangles (Activity A) -Hands-On Resources: Versatiles, 3-dimensional models with foldable nets -Useful websites:www.mathantics.com, www.Khanacademy.com, www.brainpop.com, www.sheppardsoftware.com **- Diversity -** Using the LGBTQ++ flag to find the area of composite figures, LGBTQ history video	
Modifications for Learners	
See appendix	

Topic/Unit 5 Title	Data Analysis (Chapters 11 and 12)	Approximate Pacing	3-4 weeks

STANDARDS

NJSLS (Math)

6.SP.A.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
6.SP.A.2: Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
6.SP.A.3: Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.
6.SP.B.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
6.SP.B.5.A: Summarize numerical data sets in relation to their context, such as by:reporting the number of observations.
6.SP.B.5.B: Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
6.SP.B.5.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.
6.SP.B.5.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.

Standards for Mathematical Practice
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.
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.

Interdisciplinary Connections:

Science and Engineering Practice: Analyzing and Interpreting Data
Analyze and interpret data to provide evidence for phenomena.

(Students conduct a "jumping jack" experiment to see how many jumps each classmate can do in a minute. Students analyze the data by creating various statistical displays and interpret their class' findings.)

Science and Engineering Practice: Constructing Explanations and Designing Solutions
Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena.
(In the "Reaction Time I" Gizmo, students explain which measure of center best represents the data. They explain their answer using the data collected from the simulation.)

Computer Science & Design Thinking*:*	**Career Readiness, Life Literacies and Key Skills:**
8.2.8.ED.6: Analyze how trade-offs can impact the design of a product. **8.2.8.ED.7:** Design a product to address a real-world problem and document the iterative design process, including decisions made as a result of specific constraints and trade-offs (e.g., annotated sketches). *(Students develop a real-world, statistical question and poll a specific amount of people to summarize responses in a report).*	**9.1.8.PB.5**: Identify factors that affect one's goals, including peers, culture, location, and past experiences. **9.4.8.IML.4**: Ask insightful questions to organize different types of data and create meaningful visualizations. *(Students work in groups to complete a data analysis project. They must delegate tasks and communicate how they will approach the task.)* .

UNIT/TOPIC ESSENTIAL QUESTIONS AND ENDURING OBJECTIVES/UNDERSTANDINGS
-Why is it important to choose an appropriate display for a set of data? -How do you determine which measure of center best describes a given data set? -What do measures of variation (range, interquartile range, mean absolute deviation) tell you about a data set?

STUDENT LEARNING OBJECTIVES	
Key Knowledge	**Process/Skills/Procedures/Application of Key Knowledge**
Students will know: average, quartiles, interquartile range mean, deviate, mean absolute deviation, measures of center, measures of variation, median, mode, outliers, range, statistical	***Students will be able to:*** -Calculate various measures of center (mean, median, mode) and variation(range, interquartile range)

question, box and whisker plot, cluster, distribution, dot plot, frequency distribution, gap, histogram, line graph, line plot, peak	-Identify which measurement of central tendency best represents a data set -Write and recognize a statistical question as being quantifiable and having variability in responses -Calculate the interquartile range and explain what it tells about the variation of the data -Calculate the mean absolute deviation of a data set and explain what it tells about the variation of the data -Explain how an outlier affects the mean, median, and mode of a data set -Explain why the choice of measure of center and spread vary based on the type of data display -Construct and analyze line plots, histograms, and box and whisker plots -Select an appropriate display for a set of data
ASSESSMENT OF LEARNING	
Summative Assessment (Assessment at the end of the learning period)	Chapter quizzes and tests
Formative Assessments (Ongoing assessments during the learning period to inform instruction)	-Chapter pre-test, Ticket-in-the-Door, Ticket-out-the-Door, spot-checking specific homework problems from "independent practice" sections, "Got it" and "Guided Practice" selected problems from ConnectEd -Online formative assessment websites: www.thatquiz.org, www.kahoot.com, www.quizizz.com, www.edulastic.com, www.edpuzzle.com) -Mid Chapter 11 Check: pg 828 #'s 1-7 -Mid Chapter 12 Check: pg. 890 #'s 1-4 -Teacher Observation
Alternative Assessments (Any learning activity or assessment that asks students to *perform* to demonstrate their knowledge,	-Data Project: Students collect data to answer a statistical question they come up with. Then, students display their results in a variety of graphical representations (box and whisker plot, histogram, line plot) and analyze their data using mean absolute deviation.

understanding and proficiency)	-Statistics Escape Room: Students apply problem-solving skills to find the mean, median, mode and range. Students work to solve each level to find the ultimate code to the escape room. -"Movie Mogul" 21st century math project: Students analyze movie statistics, calculate measures of center and variation, and compare/analyze two or more sets of data (completed with teacher guidance).
Benchmark Assessments (used to establish baseline achievement data and measure progress towards grade level standards; given 2-3 X per year)	-Spring Math MAP Assessment (used to measure individual student growth over time) -Math reflection sample (used to continually develop students' mathematical reasoning)
RESOURCES	
Core instructional materials: ConnectEd Course 1 (McGraw Hill); www.connected.mcgraw-hill.com www.aleks.com	
Supplemental materials: -Explore Learning Gizmos: Reaction Time I (Activity A) -Hands-On Resources: Versatiles -Useful websites: www.meta-chart.com, www.mathantics.com, www.Khanacademy.com, www.brainpop.com(statistics), www.sheppardsoftware.com**.** histogram tutorial**,** Online Box Plot Maker -**Diversity** - Holocaust - using information to make histograms and analyze the data (VIDEO to accompany lesson)	
Modifications for Learners	
See appendix	