Verona Public School District
Curriculum Overview

Math Grade 6

Curriculum Committee Members:
Lisa Sarett
Larissa Smith

Supervisor:
Glen Stevenson

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Verona Public Schools
121 Fairview Ave., Verona, NJ 07044
www.veronaschools.org

Verona Public Schools Mission Statement:

The mission of the Verona Public Schools, the center of an engaged and supportive community, is to empower students to achieve their potential as active learners and productive citizens through rigorous curricula and meaningful, enriching experiences.

Course Description:

In Grade 6, instructional time focuses on five critical areas: (1) writing, interpreting, and using expressions and equations; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (4) developing understanding of statistical thinking; and (5) continuing exploration of Geometry with attention to triangles, volumes of rectangular prisms, and polygons.

Prerequisite(s):

Math Grade 5

Standard 8: Technology Standards

8.1: Educational Technology: *All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.*	**8.2: Technology Education, Engineering, Design, and Computational Thinking - Programming:** *All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.*
A. Technology Operations and Concepts B. Creativity and Innovation C. Communication and Collaboration D. Digital Citizenship E. Research and Information Fluency **X** F. Critical thinking, problem solving, and decision making	A. The Nature of Technology: Creativity and Innovation B. Technology and Society C. Design **X** D. Abilities for a Technological World E. Computational Thinking: Programming

SEL Competencies and Career Ready Practices

Social and Emotional Learning Core Competencies: *These competencies are identified as five interrelated sets of cognitive, affective, and behavioral capabilities*	**Career Ready Practices:** *These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness.*
Self-awareness: The ability to accurately recognize one's emotions and thoughts and their influence on behavior. This includes accurately assessing one's strengths and limitations and possessing a well-grounded sense of confidence and optimism.	**X** CRP2. Apply appropriate academic and technical skills. CRP9. Model integrity, ethical leadership, and effective management. CRP10. Plan education and career paths aligned to personal goals.
Self-management: The ability to regulate one's emotions, thoughts, and behaviors effectively in different situations. This includes managing stress, controlling impulses, motivating oneself, and setting and working toward achieving personal and academic goals.	CRP3. Attend to personal health and financial well-being. **X** CRP6. Demonstrate creativity and innovation. **X** CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity.
Social awareness: The ability to take the perspective of and empathize with others from diverse backgrounds and cultures, to understand social and ethical norms for behavior, and to recognize family, school, and community resources and supports.	CRP1. Act as a responsible and contributing citizen and employee. CRP9. Model integrity, ethical leadership, and effective management.
Relationship skills: The ability to establish and maintain healthy and rewarding relationships with diverse individuals and groups. This includes communicating clearly, listening actively, cooperating, resisting inappropriate social pressure, negotiating conflict constructively, and seeking and offering help when needed.	**X** CRP4. Communicate clearly and effectively and with reason. CRP9. Model integrity, ethical leadership, and effective management. CRP12. Work productively in teams while using cultural global competence.
Responsible decision making: The ability to make constructive and respectful choices about personal behavior and social interactions based on consideration of ethical standards, safety concerns, social norms, the realistic evaluation of consequences of various actions, and the well-being of self and others.	CRP5. Consider the environmental, social, and economic impact of decisions. CRP7. Employ valid and reliable research strategies. **X** CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership, and effective management.

Standard 9: 21st Century Life and Careers

9.1: Personal Financial Literacy: *This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.*	**9.2: Career Awareness, Exploration & Preparation:** *This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.*	**9.3: Career and Technical Education:** *This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.*
A. Income and Careers B. Money Management C. Credit and Debt Management D. Planning, Saving, and Investing **X** E. Becoming a Critical Consumer F. Civic Financial Responsibility G. Insuring and Protecting	A. Career Awareness (K-4) **X** B. Career Exploration (5-8) C. Career Preparation (9-12)	A. Agriculture, Food & Natural Res. B. Architecture & Construction C. Arts, A/V Technology & Comm. D. Business Management & Admin. E. Education & Training F. Finance G. Government & Public Admin. H. Health Science I. Hospital & Tourism J. Human Services K. Information Technology L. Law, Public, Safety, Corrections & Security M. Manufacturing N. Marketing **X** O. Science, Technology, Engineering & Math P. Transportation, Distribution & Log.

Course Materials

Core Instructional Materials: ***These are the board adopted and approved materials to support the curriculum, instruction, and assessment of this course.***	**Differentiated Resources:** ***These are teacher and department found materials, and also approved support materials that facilitate differentiation of curriculum, instruction, and assessment of this course.***
● EnVision Math Grade 6 2012 Edition	● Big Ideas Math Advanced 1 ● McDougal Littell Course 2 ● Eureka Math Grade 6

6th Grade Math (On-Level)

Unit 1: Variables, Expressions, Exponents, and Properties	Unit Duration: 19 days

Stage 1: Desired Results

Established Goals:

CCSS Math:

6.EE.1 Write & evaluate numerical expressions involving whole-number exponents.
6.EE.2 Write, read, & evaluate expressions in which letters stand for numbers.
6.EE.2.a Write expressions that record operations with numbers & with letters standing for numbers.
6.EE.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.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.
6.EE.3 Apply the properties of operations to generate equivalent expressions.
6.EE.4 Identify when two expressions are equivalent.
6.EE.6 Use variables to represent numbers & 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.

Transfer Goal:

Students will be able to independently use their learning to…make generalizations about observed patterns and create rules to represent those patterns.

Students will understand that:

- Computational fluency includes applying the most effective and efficient strategy when applicable.
- Number sense includes an intuitive understanding of numbers, their magnitude, relationships, and how they are affected by operations.
- The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
- Patterns relations, and functions symbolically represent real-life situations and relationships; their extensions help to make predictions and generalizations.
- Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.

Essential Questions:

- What makes a computational strategy both effective and efficient?
- What is number sense?
- How can change be best represented mathematically?
- How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?
- What makes an algebraic algorithm both effective and efficient?

Students will know:

- Using Variables to Write Expressions (enV. 2-1)
- Properties of Operations (2-2)
- Order of Operations (1-3 & 2-3)
- Distributive Property with Numbers (2-4)
- Mental Math (2-5)
- Evaluating Expressions (2-6)
- Using Expressions to Describe Patterns (2-7)
- Make a Table (2-8)

Key Terms

Topic 2 T. Ed. p. 30E

*sum (add in)	Associative Property (Add/Mult.)
*difference (add in)	Identity Property (Add/Mult.)
*product (add in)	*Zero Property (add in)
*quotient (add in)	order of operations
variable	Distributive Property
algebraic expression	evaluate
*coefficient (add in)	substitution
*term (add in)	*pattern/*rule (add in)
*constant (add in)	input/output table (*function table) (add in)
Commutative Property (Add/Mult.)	

Students will be able to:

- Write numerical expressions with variables to represent relations expressed verbally.
- Identify coefficients & use the term “coefficient.”
- Give missing addends & factors in equations & state the property used.
- Evaluate numeric or algebraic expressions with 3 or more numbers & up to 3 variables.
- Use the Distributive Property to evaluate numerical expressions & to compute mentally.
- Evaluate expressions, using mental math strategies & properties of operations, & justify the steps used to compute mentally.
- Evaluate algebraic expressions using substitution.
- Identify missing numbers in a pattern & write an algebraic expression to describe the pattern.
- Make & use tables to solve word problems.
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Stage 2: Acceptable Evidence

Transfer Task

Ticket Purchasing Proposal:

Students research the price of tickets for their favorite professional sports team, concert, event, etc. and find the prices for two (2) different categories of seats. Students create an input/output table to represent the prices of the tickets for at least 4 different quantities of tickets. Students write two (2) variable expressions that establish a rule for finding the cost of tickets per person plus a flat parking fee. Students provided a detailed justification of how they found their total price for the number of people in their family for their ideal seating category. Students publish their proposal as a small poster using Microsoft Word.

6th Grade Math (On-Level)

Unit 2: Number and Fraction Concepts	Unit Duration: 50 Days

Stage 1: Desired Results

Established Goals:

CCSS Math:

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

6.NS.2 Fluently divide multi-digit numbers using the standard algorithm.

6.NS.3 Fluently add, subtract, multiply, & divide multi-digit decimals using the standard algorithm for each operation.

6.NS.4 Find the greatest common factor of 2 or more whole #s less than or equal to 100 & the least common multiple of 2 numbers less than or equal to 12. Use the distributive property to express a sum of 2 whole numbers 1-100 with a common factor as a multiple of a sum of 2 whole numbers with no common factor.

6.EE.1 Write & evaluate numerical expressions involving whole-number exponents.

6.EE.2.b Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view 1 or more parts of an expression as a single entity.

6.EE.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.

6.EE.3 Apply the properties of operations to generate equivalent expressions (distributive property & combining like terms).

6.RP.1 Understand the concept of a ratio & use ratio language to describe a ratio relationship between 2 quantities

6.G.1 Find the area of right triangles, other triangles, special quadrilaterals, & polygons by composing into rectangles or decomposing into triangles & other shapes; apply these techniques in the context of solving real-world & mathematical problems.

Transfer Goal:

Students will be able to <u>independently</u> use their learning to…

- make generalizations about observed patterns and create rules to represent those patterns.
- choose the correct operation based on a word problem involving decimals, fractions, and mixed numbers and efficiently perform that operation.
- represent number values in a variety of ways and determine equivalence.

Students will understand that:

- Number sense includes an intuitive understanding of numbers, their magnitude, relationships, and how they are affected by operations.
- Numbers and procedures unify, clarify, and connect mathematical ideas--building on one another to produce a coherent whole.
- Counting, measuring, and/or labeling helps to represent the world quantitatively and communicate about the world around us.
- Patterns, relations, and functions symbolically represent real-life situations and relationships; their extensions help to make predictions and generalizations.

Essential Questions:

- What is number sense?
- How do operations affect numbers?
- How do mathematical ideas interconnect and build on one another to produce a coherent whole?
- How can counting, measuring, or labeling help to make sense of the world around us?
- How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?

Students will know:

- Variables, Expressions, and Properties
- Divisibility Tests (enV. 5-1)
- Number and fraction concepts (5-1 to 5-7)
- Decimals, Fractions, and Mixed Numbers (6-1 to 6-5)
- Operations with Fractions and Mixed Numbers (7-1 to 7-7, 8-1 to 8-5, & 9-1 to 9-5)

Key Terms

• Factor • Multiple • divisible • Divisibility Tests • prime number • composite number • prime factorization • greatest common factor (GCF) • *Distributive Property (add in; Big Ideas Adv. I) • *coefficient (add in) • *terms (add in) • *sum (add in) • *product (add in) • fraction • equivalent fractions • numerator • denominator • simplest form/*lowest terms	• *approximation (Course 2 L 4.5, Ex. 3) • Conjecture • proper fraction • improper fraction • mixed number • terminating decimal • repeating decimal • like denominators • common multiple • least common multiple (LCM) • unlike denominators • least common denominator (LCD) • *quick common denominator (QCD)(add in) • *rename (when borrowing in MN subtraction) (add in) • mixed number • *perimeter (add in) • *area (add in)

Students will be able to:

- Use divisibility rules to find factors & multiples of whole numbers.
- Use the Sieve of Eratosthenes to determine whether a number is prime or composite & find the prime factorization of a number.
- Find the greatest common factor of 2 or more numbers.
- *Use the Distributive Property to express a sum of 2 whole numbers 1-100 with a common factor as a multiple of a sum of 2 whole numbers with no common factor. (add in)
  Interpret & represent fractions as parts of a region, set, or segment.
- Find equivalent fractions.
- Write fractions in simplest form/lowest terms.
- *Compare & order fractions; determine whether two fractions are equivalent using various methods (Course 2, Lesson 4.5)
- Make & test conjectures applying all vocab. Terms.
- Use a fraction to represent division.
- Write equivalent fractions & decimals.
- Write improper fractions as mixed numbers & mixed numbers as improper fractions.
- Find equivalent decimals for fractions & mixed numbers.
- Draw a picture to solve a problem
- Add & subtract fractions with like denominators.
- Find the least common multiple of 2 or more numbers.
- Add & subtract fractions with unlike denominators.
- Estimate sums & differences of fractions & mixed numbers.
- Subtract mixed numbers.
- Make & use tables to solve word problems.
- Multiply fractions by whole numbers.
- Use compatible numbers and rounding to estimate with fractions.
- Multiply fractions.
- Multiply mixed numbers.
- Solve multiple-step word problems.

Stage 2: Acceptable Evidence

Transfer Task

Recipe Booklet:

Students will create a recipe booklet including three of their favorite recipes. The list of ingredients must include fractions, whole numbers, and mixed numbers. Students will include directions for doubling each recipe, dividing each recipe by two, and increasing the recipe so it can feed everyone in the class.

6th Grade Math (On-Level)

Unit 3: Expressions, Equations, & Inequalities	Unit Duration: 27 days

Stage 1: Desired Results

Established Goals:

CCSS Math:

6.EE.1 Write & evaluate numerical expressions involving whole-number exponents.
6.EE.2 Write, read, & evaluate expressions in which letters stand for numbers.
6.EE.2.a Write expressions that record operations with numbers & with letters standing for numbers.
6.EE.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.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.
6.EE.3 Apply the properties of operations to generate equivalent expressions.
6.EE.4 Identify when two expressions are equivalent.
6.EE.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.6 Use variables to represent numbers & 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.7 Solve real-world & mathematical problems by writing & solving equations in the form x + p = q and px = q for cases in which p, q, & x are all nonnegative rational numbers.
6.EE.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.

Transfer Goal:

Students will be able to <u>independently</u> use their learning to…make generalizations about observed patterns and create rules to represent those patterns.

Students will understand that:

- Computational fluency includes applying the most effective and efficient strategy when applicable.
- Number sense includes an intuitive understanding of numbers, their magnitude, relationships, and how they are affected by operations.
- The symbolic language of algebra is used to communicate and generalize patterns in mathematics.
- Patterns relations, and functions symbolically represent real-life situations and relationships; their extensions help to make predictions and generalizations.
- Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.

Essential Questions:

- What makes a computational strategy both effective and efficient?
- What is number sense?
- How can change be best represented mathematically?
- How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?
- What makes an algebraic algorithm both effective and efficient?

Students will know:

- Evaluating Variable Expressions With Multiple Operations including Positive Rational Numbers (Big Ideas Advanced I/teacher-created material)
- Rewriting Expressions as Sums (Big Ideas Advanced I/teacher-created material)
- The Parts of an Expression (Big Ideas Advanced I/teacher-created material)
- The Distributive Property With Variables (Big Ideas Advanced I/teacher-created material)
- Simplifying Expressions (Big Ideas Advanced I/teacher-created material)
- Properties of Equality (enV. Lesson 4-1)
- Solving Addition and Subtraction Equations (4-2)
- Solving Multiplication and Division Equations (4-4)
- Solving Equations Involving Fractions and Mixed Numbers (9-6)
- Looking for Patterns Involving Positive Rational Numbers (9-7)
- Independent and Dependent Variables (Big Ideas Advanced I/teacher-created material)
- Patterns and Equations (Lesson 15-2)
- Graphing Equations (Lesson 15-4)
- Understanding, Writing and Graphing Inequalities (Lesson 15-6)
- Solving Inequalities (15-6 Enrichment, Big Ideas Advanced I/teacher-created material)

Key Terms
variable
algebraic equation (versus an expression)
inverse operation
Addition Property of Equality
Subtraction Property of Equality
Multiplication Property of Equality
Division Property of Equality
*algebra tiles (add in)
reciprocal
input/output tables (function tables)
pattern/rule
independent variable
dependent variable
inequality

Students will be able to:

- Evaluate expressions with multiple variables and multiple operations including positive rational numbers using substitution.
- Rewrite expressions as sums.
- Identify the parts of an expression using appropriate vocabulary *including negative coefficients. (add in).
- Use the Distributive Property to write equivalent variable expressions and simplify variable expressions (positive number operations only).
- Simplify expressions including positive rational numbers.
- Apply properties of equality to balance equations, give missing addends and factors, and identify equivalent equations.
- Solve addition, subtraction, multiplication, and division equations involving positive rational numbers *using algebra tiles (add in) & the steps for solving algebraic equations and perform the check.
- Identify missing numbers in a pattern and write an algebraic expression & an algebraic equation to describe the pattern; *differentiate between expressions & equations. (add in)
- Make and use input/output (function) tables to solve word problems.
- Identify independent and independent variables.
- Graph linear equations.
- Understand, write, graph, and solve inequalities

Stage 2: Acceptable Evidence

Transfer Task

Class Pattern Book Page: Create an original pattern to be included as a page in the class Pattern Book for each period. The page should include a creative title, numbers in the pattern, spaces for a classmate to extend the pattern for three (3) additional numbers & to write the rule as a function, an answer key at the bottom with the three (3) additional numbers, the rule, the independent variable, & dependent variables identified. After revisions are made, the patterns should be compiled & published into a Class Patterns Book for all students to work on their peers' original problems.

Real-Life Inequality Situations Poster: Research & create four (4) real-life situations in sentence form using greater than, less than, greater than or equal to, and less than or equal to. Ex. In order to ride Kingda Ka at Great Adventure, you must be at least 54 inches tall. Translate each sentence into an inequality statement using the appropriate inequality symbols. Create a graph of each inequality. Identify three (3) possible solutions that would make each inequality true, and one (1) solution that is a nonexample. Include all information on a poster to be shared with your groups.

6th Grade Math (On-Level)

Unit 4: Ratios, Rates, Proportions & Percents	Unit Duration: 35 days

Stage 1: Desired Results

Established Goals:

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."

6.RP.A.2 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. (Note: limited to non-complex fractions)

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. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

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.RP.A.3.D Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Transfer Goal:

Students will be able to <u>independently</u> use their learning to…

- to solve real world problems by understanding relationships between objects and using those relationships to find solutions.
- to recognize the relationship between fractions, decimals, and percents and use that relationship to solve problems such as finding the tax, tip, discount, and interest.

Students will understand that:

- A proportion can be utilized to show the relationship between two ratios.
- Distance, rate, and time are applicable to various situations in the real world.
- A percent is a special kind of ratio in which a part is compared to a whole with 100 parts.
- Some percents can be approximated by simple fractions and used to estimate the percent of a number.

Essential Questions:

- What is the relationship between ratios and proportions?
- When can you apply distance, rate, and time to the real world?
- What is the meaning of percent?
- How can percent be estimated and found?

Students will know:

- Ratios (enV. 12-1)
- Equal Ratios and Proportions (12-2)
- Rates and Unit Rates (12-3)
- *Solving Proportions & Cross-Products (Course 2, Lesson 8.5)
- Comparing Rates (12-5) & *Better Buy (add in)
- Distance, Rate, and Time Formula (12-5)
- Solving Proportions using Ratio Tables, Unit Rates, Graphs & Diagrams (13-1 to 13-5)
- Percent (14-1)
- Fraction, Decimal, Percent Equivalents (14-2)
- Percents can be >100 and <1 (14-3)
- Estimating Percent (14-4)
- Finding Percent, Whole, & Base (14-5 & 14-6)
- *Applying Percents: Tax, Tip, & Discount including the 10 % mental trick (add in; teacher-created materials)
- Check for Reasonableness (14-7)

Key Terms:
ratio
rate
terms
unit rate
*better buy (add in)
proportion
*Cross Products Property (add in)
double-number line/tape diagram
Percent

Students will be able to:

- Express comparisons as ratios in three ways.
- Find equal ratios and determine if two ratios form a proportion.
- Use the Cross-Products Property, unit rates, ratio tables, double number lines, & other methods to solve proportions.
- Use a formula to solve problems involving distance, rate, and time.
- Interpret percents as parts of a hundred.
- Find equivalent forms of fractions, decimals, and percents.
- Express percents as fractions and decimals and vice versa.
- Estimate percents of numbers.
- Find a percent of a number and what percent one number is out of another.
- Find the whole given the part and the percent.
- *Find tax, tip, and discount; use “the 10% mental trick” where appropriate.
- Check for reasonableness when computing percent problems.

Stage 2: Acceptable Evidence

Transfer Task

Student Jumping Jack Rates Partner Activity:
Students will count how many jumping jacks he/she can do in a given amount of time and calculate unit rates (per second & per minute) determining which of the two would be the most useful and provide their rationale for the decision. Students will calculate various other equivalent rates for given amounts of time. Students will compare their unit rate to that of their partner to determine who has the better (or faster rate). Students will create their own challenging amount of time for their partner to calculate his/her rate for and take turns solving and correcting each other’s. *Variations may include a “scavenger hunt” traveling around the room to find students who have lower rates, higher rates, or equivalent rates per varying amounts of time by performing the necessary calculations.

Running a Small Business:
Students will take out a loan to start a small business. They will use their knowledge of percent to calculate interest on the loan and the monthly payment. They will calculate monthly expenses and monthly profit. They will also find the percent profit and choose a repayment plan based on these choices.

6th Grade Math (On-Level)

Unit 5: Geometry	Unit Duration: 15 days

Stage 1: Desired Results

Established Goals:

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 = l w h and V = b h 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.

Transfer Goal:

Students will be able to <u>independently</u> use their learning to…

- to find the area, surface area and volume of any given shape, including irregular shapes and shaded areas.
- to find the volume and surface area of objects they encounter in their everyday lives.

Students will understand that:

- The distance around an object is its perimeter.
- The amount of space (in square units) inside an object is its area.
- Perimeter is used when putting up a fence, installing moulding around a room, etc. as they go around the outside of the room.
- Area is used when installing flooring, wall paper, painting an entire wall, etc., as one must determine the number of square units needed to cover the space.
- The area of irregular shapes can be found by decomposing the shape into polygons for which formulas exist for finding the area.
- The volume is the measure of space inside an object.
- The surface area is the measure of the area of the object's surface.
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Essential Questions:

- What are the meanings of perimeter and area?
- What rationales can be used for determining when to find perimeter versus when to find area?
- How can perimeter and area of certain shapes be found?
- Why would a person need to find the surface area of an object versus the volume?

Students will know:

- Perimeter of Irregular Figures (enV. 17-1)
- Area of Rectangles and Irregular Figures (17-2) *add in cut-outs/shaded areas
- Area of Parallelograms and Triangles (17-3)
- Area of Trapezoids (17-3 Enrichment)
- Surface Area of Polyhedrons (18-2)
- Volume of Rectangular Prisms (18-3)
- Volume with Fractional Edge Lengths (18-4)
- Use Objects & Reasoning (18-5)

Key Terms:
perimeter
area
parallelogram
trapezoid
polyhedron
pyramids
prisms
volume
net
surface area

Students will be able to:

- Find the area of rectangles and irregular figures.
- Find the area of parallelograms, triangles, and trapezoids.
- Find the height or base when given the area for parallelograms, triangles. & trapezoids.
- Use models to simulate perimeter and area.
- Find the surface area of solids using both nets & formula(s).
- Find the volume of rectangular prisms; find the length, width, height, or Base (length x width) when given the volume.
- Use objects and reasoning to solve problems; deconstruct objects into front, back, right side, left side, top, & bottom view on graph paper to determine surface area.

Stage 2: Acceptable Evidence

Transfer Task

Designing a House:
Find missing dimensions of a rectangular house and determine the area and perimeter for the house. Determine the cost for flooring and moulding in one or more rooms given choices for each, by applying area and perimeter formulas to determine the amount of each material needed.

Packing and Shipping:
Students will evaluate the volume and surface area of a rectangular prism needed to ship an irregular solid. They will calculate the volume of empty space in the container. Students will be using real models to measure and evaluate and will choose appropriate units.

6th Grade Math (On-Level)

Unit 6: Data & Statistics	Unit Duration: 15 days

Stage 1: Desired Results

Established Goals:

CCSS 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. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

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 Summarize numerical data sets in relation to their context, such as by:

6.SP.B.5.a 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.

Transfer Goal:

Students will be able to <u>independently</u> use their learning to…•to analyze a statistical representation and agree or refute it based on the data utilized and the interpretation of the data.

Students will understand that:

- The message conveyed by the data depends on how the data is collected, represented, and summarized. The amount of space inside an object is its area.
- The results of statistical investigation can be used to support or refute an argument.

Essential Questions:

- How can the collection, organization, interpretation, and display of data be used to answer questions and solve real world problems?
- How is data used in the real world?

Students will know:

- Statistical Questions (19-1)
- Data Sets (19-2/teacher-created materials)
- Mean, Median, Mode, Range (combine 19-3 & 19-4/teacher-created materials)
- Frequency Tables (19-5/teacher-created materials)
- Histograms (19-5/teacher-created materials)
- Box Plots (19-6/teacher-created materials)
- Measures of Variability (19-7/teacher-created materials)
- Appropriate Use of Statistical Measures (19-8/teacher-created materials)
- Summarizing Data Distributions (19-9/teacher-created materials)
- *Mean Absolute Deviation (MAD) (add in; teacher-created materials)

Key Terms:
statistical question frequency table
data distribution histograms
dot plot/line plot
mean/average
range median
mode outlier
*minimum (add in)
*maximum (add in)
*lower/first quartile (add in)
*upper/third quartile (add in)
interquartile Range (IQR)
box plot
*mean absolute deviation (MAD) (add in)

Students will be able to:

- Determine whether a question is a statistical question or not, and display data sets using dot plots and bar graphs.
- Describe data distributions by looking at their center, spread, and overall shape.
- Find the mean of data sets.
- Find the median, mode, and range of data sets.
- Make and use frequency tables and histograms.
- Solve problems using the Try, Check, and Revise strategy.

Stage 2: Acceptable Evidence

Transfer Task

Teacher Jump Rope Data Analysis Task:
In groups, students find the mean, median, mode, range, minimum, maximum, IQR, & MAD for the data. Determine whether the mean or median is the better summary of the center of the data based on whether or not an outlier(s) is present, and determine whether the range or IQR is a better measure of the variability of the data providing appropriate justification for the group's decision. Students also create a dot/line plot, box plot, frequency table, & histogram for the data. The students will collaboratively write a data analysis summary question that can be answered by looking just at their group's histogram. Individually, each student will create an original statistical question based on his/her own interests that he/she would like to analyze the data for demonstrating an appropriate statistical question.

Survey & DVD Sales Task:
Students will use knowledge of data and statistics to analyze surveys and DVD sales from a pretend fund-raising project. Given a set of survey data, students will write a statistical question; make a dot plot of the data and describe its shape; find the mean, median, mode, and range of the data; identify any outliers; and make claims/generalizations based on a given box plot. *Variations on this task include having students collect the data themselves and/or work cooperatively.