

# Verona Public School District Curriculum Overview

## 6th Grade Math (Above)



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### **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 four critical areas: (1) connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems; (2) completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking. The Above level of Grade 6 math also focuses on two critical areas from Grade 7 Math: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations.

### **Prerequisite(s):**

Grade 5 math and teacher recommendation



**Standard 8: Technology Standards**

<b>8.1: Educational Technology:</b> <i>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.</i>	<b>8.2: Technology Education, Engineering, Design, and Computational Thinking - Programming:</b> <i>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.</i>
A. Technology Operations and Concepts B. Creativity and Innovation C. Communication and Collaboration D. Digital Citizenship E. Research and Information Fluency <b>X</b> F. Critical thinking, problem solving, and decision making	A. The Nature of Technology: Creativity and Innovation B. Technology and Society C. Design <b>X</b> D. Abilities for a Technological World E. Computational Thinking: Programming

**SEL Competencies and Career Ready Practices**

<b>Social and Emotional Learning Core Competencies:</b> <i>These competencies are identified as five interrelated sets of cognitive, affective, and behavioral capabilities</i>	<b>Career Ready Practices:</b> <i>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.</i>
<b>Self-awareness:</b> 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.	<b>X</b> 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.
<b>Self-management:</b> 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. CRP6. Demonstrate creativity and innovation. <b>X</b> CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP11. Use technology to enhance productivity.
<b>Social awareness:</b> 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.
<b>Relationship skills:</b> 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.	<b>X</b> 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.
<b>Responsible decision making:</b> 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. <b>X</b> CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. CRP9. Model integrity, ethical leadership, and effective management.

**Standard 9: 21<sup>st</sup> Century Life and Careers**

<b>9.1: Personal Financial Literacy:</b> <i>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.</i>	<b>9.2: Career Awareness, Exploration &amp; Preparation:</b> <i>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.</i>	<b>9.3: Career and Technical Education:</b> <i>This standard outlines what students should know and be able to do upon completion of a CTE Program of Study.</i>
A. Income and Careers B. Money Management C. Credit and Debt Management D. Planning, Saving, and Investing <b>X</b> E. Becoming a Critical Consumer F. Civic Financial Responsibility G. Insuring and Protecting	A. Career Awareness (K-4) <b>X</b> 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 <b>X</b> O. Science, Technology, Engineering & Math P. Transportation, Distribution & Log.

**Course Materials**

<b>Core Instructional Materials:</b> <i>These are the board adopted and approved materials to support the curriculum, instruction, and assessment of this course.</i>	<b>Differentiated Resources:</b> <i>These are teacher and department found materials, and also approved support materials that facilitate differentiation of curriculum, instruction, and assessment of this course.</i>
<ul style="list-style-type: none"> <li>● <b>Big Ideas Math Advanced 1</b></li> </ul>	<ul style="list-style-type: none"> <li>● Howard County Maryland Math Support Center  <a href="http://hcpssfamilymath.weebly.com/math-7-gr-67.html">http://hcpssfamilymath.weebly.com/math-7-gr-67.html</a></li> <li>● <a href="http://www.corestandards.org/Math/">http://www.corestandards.org/Math/</a></li> <li>● <a href="http://www.state.nj.us/education/modelcurriculum/math/6.shtml">http://www.state.nj.us/education/modelcurriculum/math/6.shtml</a></li> <li>● <a href="http://map.mathshell.org/">http://map.mathshell.org/</a></li> </ul>



Unit 1: Number Sense

Unit Duration: 29 days

Stage 1: Desired Results

Established Goals:

- 6.NS.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.2 Fluently divide multi-digit numbers using the standard algorithm.
- 6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- 6.NS.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.
- 6.EE.1 Write and evaluate numerical expressions involving whole-number exponents.
- 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. For example, describe the expression  $2(8 + 7)$  as a product of two factors; view  $(8 + 7)$  as both a single entity and a sum of two terms.

Transfer Goal:

Students will be able to independently 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:

- There are many ways to represent a number.
- Patterns, relations, and functions symbolically represent real-life situations and relationships; their extensions help to make predictions and generalizations.
- Numbers and procedures unify, clarify, and connect mathematical ideas—building on one another to produce a coherent whole.

Essential Questions:

- How do mathematical operations relate to each other?
- How do I determine the best numerical representation for a given situation?
- How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?

Students will know:

- Whole number operations
- Powers and exponents
- Order of operations
- Prime factorization
- Greatest common factor and least common multiple
- Multiplying and dividing fractions and mixed numbers
- Decimal operations
- Write and evaluate algebraic expressions
- Use properties of operations to generate equivalent expressions; commutative, associative, addition property of zero, multiplication property of zero and one, and distributive property.

Key Terms

Power, base, exponent, perfect square, Numerical expression, evaluate, Order of operations, Factor pair, factor tree, prime factorization, GCF, LCM, Reciprocal

Students will be able to:

- Fluently divide
- Write and evaluate with whole number exponents
- Find the prime factorization of a number
- Find the GCF and LCM of two whole numbers.
- Multiply fractions or whole numbers by fractions.
- Interpret a fraction as division; solve problems involving division of whole numbers leading to answers in the form of a mixed number.
- Add, subtract, multiply, and divide decimals to the hundredths place.
- Write and interpret numerical expressions.
- Use parentheses, brackets, or braces in numerical expressions.

Stage 2: Acceptable Evidence

Transfer Task

Chapter 2 – Alternate Assessment

Apply knowledge of decimal operations to determine the following:

- cost of filling a car’s gas tank
- miles per gallon for a specific road trip
- difference in cost using premium vs. regular gasoline
- how much gas can be purchased with cash on hand
- can student reach home without running out of gas
- total cost of the road trip

Reference Materials

Big Ideas – Chapters 1 and 2,

Envision – Topics 5 and 7 for review

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>



Unit 2: Expressions and Equations

Unit Duration: 39 days

Stage 1: Desired Results

Established Goals:

- 6.EE.1 Write & evaluate numerical expressions involving whole-number exponents.
- 6.EE.2 Write, read, & evaluate expressions in which letters stand for numbers. (a) Write expressions that record operations with numbers & with letters standing for numbers. (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. (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 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.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 lines
- 6.EE.9 Represent and analyze quantitative relationships between dependent and independent variables.
- 6.NS.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
- 6.NS.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. (a) Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; (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; (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.7 Understand ordering and absolute value of rational numbers.
- 6.NS.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.

Transfer Goal:

Students will be able to independently use their learning to...

- Develop understanding of variables and how they are related.
- Make generalizations about observed patterns and create rules to represent those patterns.
- To recognize negative numbers and their relationship to zero.

Students will understand that:

- Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.
- 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.
- 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.

Essential Questions:

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

Students will know:

- Variables, Expressions, and Properties
- Integers, opposites, and absolute value
- Comparing and ordering integers, fractions and decimals
- Coordinate plane
- Writing and solving equations in one variable and two variables
- Writing and solving inequalities

Key Terms

Algebraic expression, terms, like terms, Variable, coefficient, constant, Equivalent expression  
 Integers, positive numbers, negative numbers, Opposites, absolute value, Coordinate plane, origin, quadrants  
 Equation, solution, inverse operations, Independent variable, dependent variable, Inequality, solution set

Students will be able to:

- Write and evaluate algebraic expressions.
- Find the GCF in algebraic expressions.
- Apply the Commutative, Associative, and Distributive Properties to show expressions are equivalent.
- Describe quantities with positive and negative numbers.
- Compare and order integers and absolute value numbers.
- Graph ordered pairs in all four quadrants of the coordinate plane.
- Determine if a value is a solution.
- Solve one-step equations.
- Represent constraints with inequalities and recognize they can have infinitely many solutions.
- Solve one-step inequalities.

Stage 2: Acceptable Evidence

Transfer Task

Chapter 7 – Alternate Assessment

Apply knowledge of equations and inequalities to determine the following:

- Write and solve an equations to determine missing side length and amount of gravel needed for a fish tank
- Calculate the area of the base of a tank
- Calculate total cost to set up a fish tank
- Write and solve a two-step equation to determine how many fish can be purchased for a specific dollar amount.
- Calculate total cost of fish tank, including the fish.
- Write and solve an inequality to determine the minimum size for a table to hold the fish tank.

Reference Materials

Big Ideas – Chapters 3, 6, and 7

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>



Unit 3: Geometry

Unit Duration: 17 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  $V=lwh$  and  $V=bh$  to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world 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 independently use their learning to...

- Find the area, surface area and volume of any given shape, including irregular shapes and shaded areas.
- Find the volume and surface area of objects they encounter in their everyday lives.
- Relate finding the area of two-dimensional shapes to finding the surface area of three-dimensional objects.
- Relate volume to filling a three-dimensional figure.

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.
- The area of irregular shapes can be found by dividing a 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.

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?
- When would I need to find the surface area of an object versus the volume?

Students will know:

- Areas of parallelograms, triangles, and trapezoids.
- Areas of polygons in the coordinate plane.
- Areas of composite figures (Ch. 4 extension).
- Characteristics of three-dimensional figures.
- Surface area of prisms and pyramids.
- Volume of rectangular prisms.

Key Terms

- Polygon, Composite figure, Solid, polyhedron, net, Face, edge, vertex, Prism, pyramid, Surface area, volume

Students will be able to:

- Find areas of triangles, special quadrilaterals, and polygons.
- Find the distance between points with the same x- or y-coordinate.
- Draw polygons in the coordinate plane given vertices and find lengths of sides.
- Use nets made up of rectangles and triangles to find surface areas.
- Find the volumes of prisms with fractional edge lengths.

Stage 2: Acceptable Evidence

Transfer Task

Composite Figures Project:

Have each student create a floor plan for an irregularly shaped room or geographic area (e.g. garden), using three different geometric shapes. Then, have students find the areas and perimeters of the different regions of their floor plans and detail how they would use the perimeter and area of their place.

Cereal Box Surface Area Project:

A group project in which students create a net of a rectangular prism from a cereal box and then use it to determine the surface area and volume of the box. Students also find the weight of the cereal and use it to determine weight to volume ratios. Finally, students complete a quick mathematical scavenger hunt on their cereal box.

Reference Materials

Big Ideas – Chapter 4 Area

Big Ideas – Chapter 8 Surface Area/Volume

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>



<b>Unit 4: Ratios and Proportions</b>	<b>Unit Duration: 16 days</b>
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**Stage 1: Desired Results**

**Established Goals:**

- 6.RP.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.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.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. (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? (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. (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 independently use their learning to...

- Use ratios as comparisons of two numbers.
- Recognize the use of equivalence to solve problems.

**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:**

- Students will know:
- Ratios, ratio tables, and rates
- Comparing and graphing ratios
- Percents and solving percent problems
- Converting measures

Key Terms:

- Ratio, equivalent ratios, Rate, unit rate, equivalent rates, Percents, US Customary system, metric system, Conversion factor

**Students will be able to:**

- Compare ratios using tables.
- Find percent as a rate per 100.
- Solve problems involving finding the whole, given a part and the percent.
- Use ratio reasoning to convert measurement units.

**Stage 2: Acceptable Evidence**

**Transfer Task**

Understanding Percent – Coloring Creations:

- Write a ratio for each color.
- Write each ratio in fraction, decimal, and word form.
- Write each ratio as a percent.
- Calculate the sum of the percents, fractions, and decimals. Explain the relationship.
- Apply knowledge.
- Check for understanding.

**Reference Materials**

Big Ideas – Chapter 5

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>



Unit 5: Number Sense – Rational Numbers

Unit Duration: 17 days

Stage 1: Desired Results

Established Goals:

- 7.NS.A.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. (a) Describe situations in which opposite quantities combine to make 0. (b) Show that a number and its opposite have a sum of 0 (are additive inverses). (c) Understand subtraction of rational numbers as adding the additive inverse,  $p - q = p + (-q)$ . Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (d) Apply properties of operations as strategies to add and subtract rational numbers.
- 7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. (b) Understand that integers can be divided, provided that the divisor is not zero. (d) Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- 7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Transfer Goal:

Students will be able to independently use their learning to...Write mathematical sentences to show relationships and solve problems.

Students will understand that:

- Rational numbers represent both positive and negative situations.
- Operations create relationships between numbers.

Essential Questions:

- What is the connection between negative numbers and the real world?
- How do we place numbers?
- What does the location of a number mean?

Students will know:

- Integers and absolute value
- Integer operations (add, subtract, multiply, and divide)
- Rational Numbers
- Operations with rational numbers (add, subtract, multiply, and divide)

Key Terms:

- Integers, Absolute Value, Opposites, Additive Inverse, Rational number, Terminating decimal, Repeating decimal

Students will be able to:

- Use and justify rules for addition, subtraction, multiplication, and division of integers.
- Find the absolute values of integers.
- Add, subtract, multiply, and divide integers.
- Add, subtract, multiply, and divide rational numbers.
- Apply properties of operations as strategies to perform operations with rational numbers.
- Convert a rational number to a decimal using long division.

Stage 2: Acceptable Evidence

Transfer Task

Create a graphic organizer introducing integers and absolute value:

- Include the definition of absolute value and sample problems.
- Include the rules for operations with integers and sample problems.

Write a description of how to use a number line or counters to solve a specific integer problem.

Describe how operations using integers and rational numbers are similar and how they are different.

Reference Materials

Big Ideas – Chapter 11 Integers

Big Ideas – Chapter 12 Rational Numbers

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>



Unit 6: Statistics

Unit Duration: 18 days

Stage 1: Desired Results

Established Goals:

- 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: (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.

Transfer Goal:

Students will be able to independently use their learning to...To pose questions, collect and analyze data, and make interpretations to answer questions.

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:

- Introduction to statistics
- Mean, measures of center, and measures of variation
- Mean absolute deviation
- Frequency Charts (supplemental material)
- Stem-and-Leaf plots, histograms
- Shapes of distribution
- Box-and-Whisker Plots

Key Terms:

- statistics, statistical question, mean, median, mode, range, outlier, measure of center, measure of variation, quartiles, first quartile, third quartile, interquartile range, mean absolute deviation, stem-and-leaf plot, stem, leaf, frequency table, frequency, histogram, box-and-whisker plot, five-number summary

Students will be able to:

- Recognize statistical questions as ones anticipating variability.
- Understand that data used to answer statistical questions has a distribution that can be described by center and spread.
- Use measures of center to summarize all of the values in a data set with a single number.
- Use measures of variation to summarize how all of the values in a data set vary with a single number.
- Display data on a number line, including line (dot) plots, stem-and-leaf plots, histograms, and box-and-whisker plots.
- Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, and a measure of variation describes how its values vary with a single number.
- Understand that data used to answer statistical questions has a distribution that can be described by center, spread, and shape.
- Choose appropriate measures of center and variation based on shape.

Stage 2: Acceptable Evidence

Transfer Task

Statistical Measures (Chapter 9 Alternative Assessment)

- Show complete understanding of displaying and interpreting data in a dot plot by finding and evaluating the measures of center, outlier(s), IQR, and MAD of a data set.
- Compare statistical measures and determine which measure gives the best information.

Data Displays (Chapter 10 Alternative Assessment)

- Show complete understanding of displaying and interpreting data in a stem-and-leaf plot, histogram, and double box-and-whisker plot. Identify distributions of data. Determine which display is most appropriate in order to determine specific information.

Reference Materials

Big Ideas – Chapter 9 Statistical Measures

Big Ideas – Chapter 10 Data Displays

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>





Unit 7: Expressions and Equations

Unit Duration: 10 days

Stage 1: Desired Results

Established Goals:

- 7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.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.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.
- 7.EE.4a Solve word problems leading to equations of the form  $px + q = r$  and  $p(x + q) = r$ , where  $p$ ,  $q$ , and  $r$  are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

Transfer Goal:

Students will be able to independently use their learning to...To rewrite expressions in different forms showing how the quantities are related.

Students will understand that:

- Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole.
- 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.
- 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.

Essential Questions:

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

Students will know:

- Algebraic expressions
- Adding and subtracting linear expressions
- Solving equations using all operations
- Solving two-step equations

Key Terms:

- like terms, simplest form, linear expression, factoring an expression, equivalent equations

Students will be able to:

- Add, subtract, factor, and expand linear expressions with rational coefficients.
- Understand that rewriting expressions in different forms can show how the quantities are related.
- Write, graph, and solve one-step equations (includes negative numbers).
- Solve two-step equations.
- Compare algebraic solutions to arithmetic solutions

Stage 2: Acceptable Evidence

Transfer Task

Expressions and Equations (Chapter 13 Alternative Assessment)

- Show a complete understanding of writing, simplifying, and evaluating algebraic expressions and equations.
- Solve two-step equations.
- Compare and contrast both ways of solving an equation and determine which is more efficient.

Reference Materials

Big Ideas – Chapter 13 Expressions and Equations

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>



Unit 8: Ratios and Proportions

Unit Duration: 15 days

Stage 1: Desired Results

Established Goals:

- 7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- 7.RP.2 Recognize and represent proportional relationships between quantities. (a) Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. (b) Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (c) Represent proportional relationships by equations. For example, if total cost  $t$  is proportional to the number  $n$  of items purchased at a constant price  $p$ , the relationship between the total cost and the number of items can be expressed as  $t=pn$ . (d) Explain what a point  $(x, y)$  on the graph of a proportional relationship means in terms of the situation, with special attention to the points  $(0, 0)$  and  $(1, r)$  where  $r$  is the unit rate.
- 7.RP.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Transfer Goal:

Students will be able to independently use their learning to...Analyze proportional relationships and use them to solve real-world and mathematical problems.

Students will understand that:

- Proportional relationships express how quantities change in relationship to each other.

Essential Questions:

- When and why do I use proportional comparisons?
- How does comparing quantities describe the relationship between them?

Students will know:

- Ratios and rates
- Writing and solving proportions
- Slope and direct variation
- Percents and decimals
- Comparing and ordering fractions, decimals, and percents
- Percent proportion, percent equation
- Percent of increase and decrease
- Discount, markups, simple interest

Key Terms:

- ratio, rate, unit rate, complex fraction, proportion, proportional, cross products, slope, direct variation, constant of proportionality, percent of change, percent of increase, percent of decrease, percent error, discount, markup, interest, principal, simple interest

Students will be able to:

- Find unit rates associated with ratios of fractions, areas, and other quantities in like or different units.
- Decide whether two quantities are proportional using ratio tables and graphs.
- Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions.
- Represent proportional relationships with equations.
- Explain what a point  $(x, y)$  means on a proportional graph in context, particularly  $(0, 0)$  and  $(1, r)$ , where  $r$  is the unit rate.
- Use proportionality to solve ratio problems.
- Compare fractions, decimals, and percents.
- Use proportionality to solve percent problems.
- Use the percent equation.
- Solve percent problems involving percent of increase and decrease, and simple interest.

Stage 2: Acceptable Evidence

Transfer Task

Ratios and Proportions (Chapter 14 Alternative Assessment)

- Show a complete understanding of finding a unit rate, evaluating expressions, and comparing ratios.

Percents (Chapter 15 Alternative Assessment)

- Show a complete understanding of finding percents, calculating markdowns, and simple interest.

Reference Materials

Big Ideas – Chapter 14 Ratios/Prop.

Big Ideas – Chapter 15 Percents

Howard County Maryland Math Support Center <http://hcpssfamilymath.weebly.com/math-7-gr-67.html>