Grade 6

Grade 6- Critical Areas

In Grade 6, instructional time should focus 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.

1. Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.
2. Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.
3. Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as $3x = y$) to describe relationships between quantities.
4. Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability.

Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected. Students in Grade 6 also build on their work with area in elementary school by reasoning about relationships among shapes to determine area, surface area, and volume. They find areas of right triangles, other triangles, and special quadrilaterals by decomposing these shapes, rearranging or removing pieces, and relating the shapes to rectangles. Using these methods, students discuss, develop, and justify formulas for areas of triangles and parallelograms. Students find areas of polygons and surface areas of prisms and pyramids by decomposing them into pieces whose area they can determine. They reason about right

Additional Clusters | * Benchmarked Standard

Key:

Major Clusters | Supporting |

rectangular prisms with fractional side lengths to extend formulas for the volume of a right rectangular prism to fractional side lengths. They prepare for work on scale drawings and constructions in Grade 7 by drawing polygons in the coordinate plane.

Vocabulary: Building the Language of Mathematics for Students

Sixth Grade				
Ratios and Proportional Relationsh ip s	**The Number System**	**Expressions and Equations**	**Geometry**	**Statistics and Probability**
Understa nd ratio concepts and use ratio reasoning to solve problems. ratio, equivalent ratios, tape diagram, unit rate, part-to-part, part-to-whole, percent	**Apply and extend previous understanding of multiplication and division to divide fractions by fractions.** reciprocal, multiplicative inverses, visual fraction model **Compute fluently with multi-digit numbers and find common factors and multiples.** multi-digit **Compute fluently with multi-digit numbers and find common factors and multiples.** greatest common factor, least common multiple, prime numbers, composite numbers, relatively prime, factors, multiples, distributive property, prime factorization **Apply and extend previous understanding of numbers to the system of rational numbers.** rational numbers, opposites, absolute value, greater than, >, less than, <, greater than or equal	**Apply and extend previous understanding of arithmetic to algebraic expressions.** exponents, base, numerical expressions, algebraic expressions, evaluate, sum, term, product, factor, quantity, quotient, coefficient, constant, like terms, equivalent expressions, variables **Reason about and solve one-variable equations and inequalities.** inequalities, equations, greater than, >, less than, <, greater than or equal to, ≥, less than or equal to, ≤,	**Solve real-world problems involving area, surface area, and volume.** area, surface area, volume, decomposing, edges, dimensions, net, vertices, face, base, height, trapezoid, isosceles, right triangle, quadrilateral, rectangles, squares,	**Develop understanding of statistical variability.** statistics, data, variability, distribution, dot plot, histograms, box plots, median, mean **Summarize and describe distributions.** this cluster are: box plots, dot plots, histograms, frequency tables, cluster, peak, gap, mean, median, interquartile range, measures of center, measures of variability, data, Mean Absolute Deviation (M.A.D.),

	to, ≥, less than or equal to, ≤, origin,	profit, exceed **Represent and analyze quantitative relationships between dependent and independent variables.**	parallelograms, trapezoids, rhombi, kites,	quartiles, lower quartile (1st quartile or Q1), upper quartile (3rd

● Additional Clusters | * Benchmarked Standard

● Major Clusters | ● Supporting |

	quadrants, coordinate plane, ordered pairs, *x*-axis, *y*-axis, coordinates	dependent variables, independent variables, discrete data, continuous data

The Common Core State Standards for Mathematical Practice are practices expected to be integrated into every mathematics lesson for all students Grades K-12. Below are a few examples of how these Practices may be integrated into tasks that Grade 6 students complete.

Practice Explanation and Example

MP1) Make Sense and Persevere in Solving Problems. Mathematically proficient students in Grade 6 start by explaining to themselves the meaning of the problem and looking for entry points to its solution. They solve problems involving ratios and rates and discuss how they solved them. Sixth graders solve real world problems through the application of algebraic and geometric concepts. They seek the meaning of a problem and look for efficient ways to represent and solve it. They check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?" Example: to understand why a 20% discount followed by a 20% markup does not return an item to its original price, a 6th grader might translate the situation into a tape diagram or a general equation; or they might first consider the result for an item prices at $1.00 or $10.00.

MP2) Reason abstractly and quantitatively. Mathematically proficient students in Grade 6 represent a wide variety of real world contexts through the use of real numbers and variables in mathematical expressions, equations, and inequalities. Sixth graders are able to contextualize to understand the meaning of the number or variable as related to the problem. They decontextualize to manipulate symbolic representations by applying properties of operations. For example, they can apply ratio reasoning to convert measurement units and proportional relationships to solve percent problems. Grade 6 students use properties of operations to generate equivalent expressions and use the number line to understand multiplication and division of rational numbers.

MP3) Construct viable arguments and critique the reasoning of others. Mathematically proficient students in Grade 6 construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays. They refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students. Proficient sixth graders progress from arguing exclusively through concrete referents such as physical objects and pictorial representations, to also include symbolic representations such as expressions and equations. Sixth graders can answer questions like, "How did you get that"? "Why is that true?", and "Does that always work?" Proficient 6th graders explain their thinking to others and respond to others' thinking.

MP4) Model with mathematics. Mathematically proficient students in Grade 6 can apply the mathematics they know to solve problems arising in everyday life. For example, 6th graders might apply proportional reasoning to plan a school event or analyze a problem in the community. Proficient students model problem situations symbolically, graphically, tabularly, and contextually. They form expressions, equations, or inequalities from real world contexts and connect symbolic and graphical representations. Sixth graders begin to explore covariance and represent two quantities simultaneously. They use number lines to compare numbers and represent inequalities. Students in Grade 6 use measures of center

● Major Clusters | ● Supporting |

● Additional Clusters | * Benchmarked Standard

Key:

and variability and data displays (i.e. box plots and histograms) to draw inferences about and make comparisons between data sets. Sixth graders connect and explain the connections between the different representations. They use all representations as appropriate to a problem context.

MP5) Use appropriate tools strategically. Mathematically proficient students in Grade 6 consider the available tools (including estimation and technology) when solving a mathematical problem and decide when certain tools might be helpful. Students in 6th grade might decide to represent similar data sets using dot plots with the same scale to visually compare the center and variability of the data. They use physical objects or applets to construct nets and calculate the surface area of three dimensional figures. This practice is also related to looking for structure (SMP 7), which often results in building mathematical tools that can then be used to solve problems.

MP6) Attend to precision. Mathematically proficient students in Grade 6 continue to refine their mathematical communications skills by using clear and precise language in their discussions with others and in their own reasoning. Sixth graders use appropriate terminology when referring to rates, ratios, geometric figures, data displays, and components of expressions, equations or inequalities. Students in Grade 6 are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context.

MP7) Look for and make use of structure. Mathematically proficient students in Grade 6 routinely seek patterns or structures to model and solve problems. They recognize patters that exist in ratio tables recognizing both the additive and multiplicative properties. Sixth graders can apply properties to generate equivalent expressions (i.e. $6 + 2x = (2 + x)$ by distributive property. They solve equations (i.e. $2c + 3 = 15$, $2c = 12$ by subtraction property of equality, $c = 6$ by division property of equality). They compose and decompose two-and three-dimensional figures to solve real world problems involving area and volume.

MP8) Look for and express regularity in repeated reasoning. Mathematically proficient students in Grade 6 use repeated reasoning to understand algorithms and make generalizations about patterns. They solve and model problems. They may notice that $a/b \div c/d = ad/bc$ and construct other examples and models that confirm their generalizations. Students in Grade 6 connect place value and their prior work with operations to understand algorithms to fluently divide multi-digit numbers and perform all operations with multi-digit decimals. Sixth graders informally begin to make connections between covariance, rates, and representations showing the relationships between quantities

● Major Clusters | ● Supporting |

● Additional Clusters | * Benchmarked Standard

Key:

Pacing Guide - Year-at-a-Glance - Timing based upon 4 Marking Periods at 9 weeks each

Pacing Guide	Standards for Mathematical Content	Unit Focus	Standards for Mathematical Practice

Unit 1 - 9 weeks **Operations and Reasoning about Ratios**	● 6.NS.A.1 ● 6.NS.B.2 ● 6.RP.A.1 ● 6.RP.A.2 ● 6.RP.A.3* ● 6.NS.B.3 ● 6.NS.B.4	● Apply and extend previous understandings of multiplication and division to divide fractions by fractions ● Compute fluently with multi-digit numbers and find common factors and multiples ● Understand ratio concepts and use ratio reasoning to solve problems	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics.
Unit 1: Suggested Open Educational Resources	6.NS.A.1 Traffic Jam 6.RP.A.1 Games at Recess 6.RP.A.2 Price per pound and pounds per dollar 6.RP.A.3 Voting for Three, Variation 1 6.RP.A.3c Shirt Sale 6.NS.B.3 Reasoning about Multiplication and Division and Place Value, Part 1 6.NS.B.4 Factors and Common Factors 6.NS.B.4 Multiples and Common Multiples		MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.
Unit 2 - 9 weeks **Expressions and 3-D Geometry**	● 6.EE.A.1 ● 6.EE.A.2 ● 6.EE.A.3 ● 6.EE.A.4 ● 6.EE.B.6 ● 6.G.A.2 ● 6.G.A.4	● Apply and extend previous understandings of arithmetic to algebraic expressions ● Reason about and solve one-variable equations and inequalities ● Solve real-world and mathematical problems involving area, surface area, and volume	MP.8 Look for and express regularity in repeated reasoning.
Unit 2: Suggested Open Educational Resources	6.EE.A.1 The Djinni's Offer 6.EE.A.2 Rectangle Perimeter 1 6.EE.A.4 Rectangle Perimeter 2 6.EE.A.4 Equivalent Expressions 6.G.A.2 Volumes with Fractional Edge Lengths 6.G.A.4 Nets for Pyramids and Prisms		

Unit 3 - 9 weeks **Equations, The Rational Number System and 2-D Geometry**	● 6.EE.B.5 ● 6.EE.B.7 ● 6.NS.C.5 ● 6.NS.C.6 ● 6.NS.C.7 ● 6.EE.B.8 ● 6.NS.C.8* ● 6.G.A.3 ● 6.G.A.1	● Reason about and solve one-variable equations and inequalities ● Apply and extend previous understandings of numbers to the system of rational numbers ● Solve real-world and mathematical problems involving area, surface area, and volume	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics.
Unit 3: Suggested Open Educational Resources	6.EE.B.5 Make Use of Structure 6.EE.B.7 Morning Walk 6.NS.C.5 Warmer in Miami 6.NS.C.6 Mile High 6.NS.C.7 Jumping Flea 6.NS.C.7a Fractions on the Number Line 6.NS.C.7b Comparing Temperatures 6.EE.B.8 Fishing Adventures 1 6.NS.C.8 Nome, Alaska 6.G.A.1, 6.G.A.3 Polygons in the Coordinate Plane		MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.
Unit 4 - 9 weeks Variability, Distributions, and Relationships between Quantities	● 6.EE.C.9 ● 6.SP.A.1 ● 6.SP.A.2 ● 6.SP.A.3 ● 6.SP.B.4 ● 6.SP.B.5 ● 6.RP.A.3* ● 6.NS.C.8*	● Represent and analyze quantitative relationships between dependent and independent variables ● Develop understanding of statistical variability ● Summarize and describe distributions ● Understand ratio concepts and use ratio reasoning to solve problems ● Apply and extend previous understandings of numbers to the system of rational numbers	

| Unit 4: Suggested Open Educational Resources | 6.EE.C.9 Families of Triangles
6.SP.A.1 Identifying Statistical Questions
6.SP.A.2, 6.SP.B.4 Puppy Weights
6.SP.A.3 Is It Center or Is It Variability?
6.SP.B.5c Number of Siblings
6.SP.B.5d Mean or Median? | |

Grade 6: Interdisciplinary Connections

_____ Language Arts _____ Science _____ Social Studies _____ World Languages _____ Arts

21st Century Themes

___ Global Awareness ___ Financial, Economic, Business and Entrepreneurial Literacy ___ Civic Literacy ___ Health Literacy ___ Environmental Literacy

21st Century Life and Careers Standards

Career Ready Practices:
- 9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors

- 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education
- 9.1.8.EG.8: Analyze the impact of currency rates over a period of time and the

impact on trade, employment, and income
- 9.1.8.FP.1: Describe the impact of personal values on various financial scenarios
- 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish
- 9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest
- 9.2.8.CAP.2: Develop a plan that includes information about career areas of interest
- 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
- 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.
- 9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.
- 9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.
- 9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
- 9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g.,

volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.
- 9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.
- 9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills
- 9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
- 9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level

Unit 1 Grade 6- Operations and Reasoning About Ratios		
Content Standards	**Suggested Standards for Mathematical Practice and P21 Skills**	**Critical Knowledge & Skills**

● 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. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup*	MP.4 Model with mathematics.
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration Media Literacy
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● divide a fraction by a fraction.
		    ● represent division of fractions using visual models.
		      ● interpret quotients of fractions in the context of the problem.
		      ● compute quotients of fractions in order to solve word problems.
		    ● write equations to solve word problems involving division of fraction by a fraction.
		    ● use the relationship between multiplication and division to explain division of fractions.
		
		Learning Goal 1: Compute quotients of fractions.
		Learning Goal 2: Construct visual fraction models to represent quotients of fractions and use the relationship between multiplication and division to explain division of fractions.
		Learning Goal 3: Solve real-world problems involving quotients of fractions and interpret the solutions in the context given.

of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?		
● 6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.		Concept(s): No new concept(s) introduced Students are able to: ● use the standard algorithm to divide multi-digit numbers with speed and accuracy. Learning Goal 4: Fluently divide multi-digit numbers using the standard algorithms.

● 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."
	MP.2 Reason abstractly and quantitatively.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s):
		     ● A ratio shows relative sizes or values of two quantities.
		
		Students are able to:
		     ● describe a ratio relationship between two quantities using ratio language.
		
		Learning Goal 5: Explain the relationship of two quantities in given ratio using ratio language.

● 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.
For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."
	MP.2 Reason abstractly and quantitatively.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s):
		     ● A rate is a ratio comparing two different types of quantities.
		Students will be able to:
		     ● determine the unit rate given a ratio relationship.
		     ● describe a unit rate relationship between two quantities using rate language.
		
		Learning Goal 6: Use rate language, in the context of the ratio relationship, to describe a unit rate.

● 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. *(benchmarked)	MP.2 Reason abstractly and quantitatively.
	MP.4 Model with mathematics.
	MP.5 Use appropriate tools strategically MP.6 Attend to precision.
	MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning
		Concept(s): No new concept(s) introduced
		Students are able to:
		     ● use ratio and rate reasoning to create tables of equivalent ratios relating quantities with *whole number* measurements, find missing values in tables and plot pairs of values.
		     ● compare ratios using tables of equivalent ratios.
		     ● solve real world and mathematical problems involving unit rate (including unit price and constant speed).

| 6.RP.A.3a. 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.3b. 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.3c. 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.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. | Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration ICT Literacy | ● calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent.
● convert measurement units using ratio reasoning.
● transform units appropriately when multiplying and dividing quantities.

Learning Goal 7*:* Create and complete tables of equivalent ratios to sole real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.
Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities. |
| ● 6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. | | Concept(s): No new concept(s) introduced
Students are able to:
● add and subtract multi-digit decimals with accuracy and efficiency. ● multiply and divide multi-digit decimals with accuracy and efficiency.

Learning Goal 9: Fluently add, subtract, multiply and divide multi-digit decimals. |

● 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.	MP.7 Look for and make use of structure.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s): No new concept(s) introduced
		Students are able to:
		     ● create lists of factors for two whole numbers less than or equal to 100; find the largest factor common to both lists.
		     ● create lists of multiples for two whole numbers less than or equal to 12; find the smallest multiple common to both lists.
		
		Learning Goal 10: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two numbers less than or equal to 12.

Unit 1 Grade 6 Operations and Reasoning About Ratios

District/School Formative Assessment Plan District/School Summative Assessment Plan Georgia Department of Education Practice,

Learning, and Formative assessments

https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-1.pdf

https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-2.pdf

Homework practice
Exit tickets
Journal writing

Metacognitive activities (articulation/communication)
Self-Assessment/peer assessment
Spiral Review
SMART response (clickers)
Task Cards
  Benchmarks

  Chapter tests

  Performance tasks

  Extended projects

PARCC

Renaissance Learning Assessments

Study Island

Georgia Department of Education Performance and Summative Assessments
https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-1.pdf
https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-2.pdf

Benchmark Assessment *Alternative Assessment*

Renaissance/STAR

MAP Testing

DRA Assessment

Benchmark Assessment within Envision/Go Math/Eurek/iReady

State Testing Results

Teacher Created Assessments Performance Based Assessments

Extension Projects

Key:
Focus Mathematical Concepts- Operations and Reasoning

About Ratios

 Prerequisite skills:
5.NF.B.4
5.NF.B.7
5.NF.B.6
4.MD.A.1
4.OA.A.2
5.NF.B.3
5.NF.B.5
5.OA.B.3
5.G.A.2
5.G.A.1

4.OA.B.4
5.OA.A.2

Common Misconceptions:
Students may believe that dividing by 1 2 is the same as dividing in half. Dividing by half means to find how many 1 2 s there are in a quantity, whereas, dividing in half means to take a quantity and split it into two equal parts. Thus 7 divided by ½ = 14 and 7 divided in half equals 3 ½.

Students may incorrectly model division of fractions.

Students may not understand that larger negative numbers are smaller in value.

Students may confuse the absolute value symbol with the number one.

Students often confuse the concepts of factors and multiples. One effective way to avoid this confusion is to consistently use the vocabulary of factors and multiples each and every time students work on multiplication and division (i.e. the numbers being multiplied are the factors; the product is the multiple)

Fractions and ratios may represent different comparisons. Fractions can express a part-to- whole comparison, but ratios can express a part-to-whole comparison or a part-to-part comparison which can be written as: a to b, �� ��, or a: b. Even though ratios and fractions express a part-to-whole comparison, the addition of ratios and the addition of fractions are distinctly different procedures. When adding ratios, the parts are added, the wholes are added and then the total part is compared to the total whole. For example, (2 out of 3 parts) + (4 out of 5 parts) is equal to 6 parts out of 8 total parts (6 out of 8) if the parts are equal. When dealing with fractions, the procedure for addition is based on a common denominator: (2 ,3) + (4, 5) = (10 15) + (12 15) which is equal to (22 15). Therefore, the addition process for ratios and for fractions is distinctly different.

Key:
Often there is a misunderstanding that a percent is always a natural number less than or equal to 100. Provide examples of percent amounts that are greater than 100%, and percent amounts that are less 1%.

Students may confuse mathematical terms such as ratio, rate, unit rate and percent. Students may not understand the difference between an additive relationship and a multiplicative relationship.

Although algorithms provide efficient means for finding solutions, the cross-product algorithm commonly used for solving proportions will not aid in the development of proportional reasoning. Delaying the introduction of rules and algorithms will encourage thinking about multiplicative situations instead of indiscriminately applying rules.

Fluency Expectations:
6.NS.B.4 Compute fluently with multidigit numbers and find common factors and multiples.

6.NS.2 Students fluently divide multi-digit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

6.NS.3 Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. This is the culminating standard for several years' worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations—Fractions. 6.NS.1 Students interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. This completes the extension of operations to fractions.

District/School Tasks District/School Primary and Supplementary Resources

PARCC released items
https://prc.parcconline.org/assessments/parcc-released-items

http://www.p21.org/our-work/p21-framework

NJDOE-21st Century Life and Careers

PARCC practice tests
https://parcc.pearson.com/practice-tests/math/

http://www.state.nj.us/education/aps/cccs/career/

Math release set folder- contains two Word docs
https://sites.google.com/site/releaseditemsets/home/math-release-1

The following online games encourage mental math/estimation with simple decimal addition and subtraction problems:
http://www.decimalsquares.com/dsGames/games/laserbeam.html

NC CCSS Gr 6 Math Tasks
http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade6_smaller.pdf/593180214/CCSSMathTasks-Grade6_smaller.pdf

http://www.decimalsquares.com/dsGames/games/blackjack.html

Framework for 21st Century Learning

http://www.decimalsquares.com/dsGames/games/tugowar.html

TECHNOLOGY CONNECTION:

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

https://www.illustrativemathematics.org/content-standards

6.RP.A.1

http://nzmaths.co.nz/resource/ratios-and-rates

http://www.bbc.co.uk/schools/mathsfile/shockwave/games/fish.html

http://mathsnacks.com/baddate-en.html

6.RP.2

Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0 (b not equal
to zero), and use rate language in the context of a ratio relationship.
https://www.illustrativemathematics.org/content-standards

6.RP.A.2

http://illuminations.nctm.org/Lesson.aspx?id=1110

http://nzmaths.co.nz/resource/ratios-and-rates

http://mathsnacks.com/baddate-en.html

6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems
utilizing strategies such as tables of equivalent ratios, tape diagrams (bar models), double
number line diagrams, and/or equations.
http://www.learner.org/courses/learningmath/number/support/lmg8.pdf
https://www.illustrativemathematics.org/content-standards/6/RP/A/3/tasks

Key:

http://illuminations.nctm.org/Lesson.aspx?id=2534 Understanding Tape Diagrams and
Double Number Lines (Teacher Link) Understanding Tape Diagrams (Teacher Link)
http://mathsnacks.com/baddate-en.html

www.studyisland.com

www.math-drills.com/
www.mathgoodies.com/worksheets
www.math-aids.com
www.commoncoresheets.com
www.worksheetworks.com
www.superteacherworksheets.com
www.SumDog.com
www.IXL.com
www.GoGetWaggle.com
www.IXL.com
www.Edulastic.com

www.MobyMax.com
www.Prodigy.com
www.TenMarks.com
www.mathplayground.com
www.Mathsnacks.com
www.math-play.com
www.go.math.com

Engage NY

https://www.engageny.org/sites/default/files/resource/attachments/g6-m3-teacher-materials
.pdf

Arizona flip book

http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf

North Carolina wikispaces

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Georgia Department of Education Grade 6-8

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Essential Questions

Why would it be useful to know the greatest common factor of a set of numbers?

Why would it be useful to know the least common multiple of a set of numbers?

How can the distributive property help me with computation?

Why does the process of invert and multiply work when dividing fractions?

When I divide one number by another number, do I always get a quotient smaller than my original number?

When I divide a fraction by a fraction what do the dividend, quotient and divisor represent?

What kind of models can I use to show solutions to word problems involving fractions? Which strategies are helpful when dividing multi-digit numbers? Which

strategies are helpful when performing operations on multi-digit decimals?

What kinds of problems can I solve by using ratios?

How can I tell if a relationship is multiplicative?

What is the difference between a multiplicative and an additive relationship?

What are equivalent ratios?

What are rates?

How are unit rates helpful in solving real-world problems?

How are ratios and rates similar and different?

What are percentages?

What information do I get when I compare two numbers using a ratio?

Special Education Students English Language Learners Students at Risk of School Failure Gifted and Talented Students Students with 504 Plans

Special Education Students	English Language Learners	Students at Risk of School Failure	Gifted and Talented Students	Students with 504 Plans
● Provide a checklist for long, detailed tasks ● Use concrete examples of concepts before teaching the abstract ● Highlight important concepts to be learned in text of material ● Provide concrete examples for homework/class work assignments ● Give additional presentations by varying the methods using repetition, simpler explanations and modeling ● Give written directions to supplement verbal directions ● Familiarize student with new vocabulary before beginning lesson ● Utilize visual aids and graphic	organizers ● Utilize manipulative, hands-on activities ● Use enVision Spanish Resources ● Provide text to speech for math problems ● Use of translation dictionary or software ● Confer frequently ● Adapt a Strategy-Adjusting strategies for ESL students: http://www.teachersfirst.com/ content/esl/adaptstrat.cfm ● Familiarize student with new vocabulary before beginning lesson ● Utilize visual aids and graphic organizers ● Utilize manipulative,	hands-on activities ● Additional Support Materials/ Online resources ● Guided Notes or copy of teacher notes ● Review prerequisite skills ● Tiered interventions following RTI framework ● RTI Intervention Bank ● NJDOE resources ● Utilize online resources such as www.tenmarks.com ● EnVision K-5 intervention supports ● Modify activities/assignments/projects/assessments ● Provide an option for alternative activities/assignments/projects/assessments	● Provide higher-order questioning and discussion opportunities ● Utilize exploratory connections to higher grade concepts ● Modify Content ● Adjust Pacing of Content ● Small Group Enrichment ● Individual Enrichment ● Higher-Level Text ● Provide whole group enrichment explorations ● Teach cognitive and methodological skills ● Use center, stations, or contracts ● Organize integrated problem-solving simulations ● Provide a checklist for long, detailed tasks ● Use concrete examples of concepts before teaching the abstract	● Highlight important concepts to be learned in text of material ● Provide concrete examples for homework/class work assignments ● Give additional presentations by varying the methods using repetition, simpler explanations and modeling ● Give written directions to supplement verbal directions ● Familiarize student with new vocabulary before beginning lesson ● Utilize visual aids and graphic organizers ● Utilize manipulative, hands-on activities ● Provide graph paper for computation

●Providegraphpaperfor computation ●Additionaltimetocomplete	activities/assignments/projects/assessments ●Modifyorprovideanoptionfor	alternative activities/assignments/projects/assessments	●SmallGroup Instruction/Intervention/Remediation

- Individual Intervention/Remediation
  - Additional Support Materials/ Online resources
- Guided Notes or copy of teacher notes
- Review prerequisite skills
- After School Tutoring
- Chunk activities/assignments/projects/assessments into manageable units
- Allow student to receive reading text in various forms (written, verbal, audio) r on a lower reading level
- Allow student to make test corrections or retake assessment
- Adjust Pacing of Content
- See IEPs of students for specific

modifications
- http://www.wida.us/standards/ elp.aspx
  - Propose interest-based extension activities
  - Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles
  - Provide options, alternatives and choices to differentiate and broaden the curriculum
  - Propose independent projects based on individual interests
  - Additional Support Materials/ Online resources

  - After school clubs
  - Tiered centers
  - Tiered assignments
- Additional time to complete activities/assignments/projects/assessments
- Modify or provide an option for alternative activities/assignments/projects/assessments
- Small Group Instruction/Intervention/Remediation
- Individual Intervention/Remediation
  - Additional Support Materials/ Online resources

- Guided Notes or copy of teacher notes
- Review prerequisite skills
- After School Tutoring
- Chunk activities/assignments/projects/assessments into manageable units
- Allow student to receive reading text in various forms (written, verbal, audio) r on a lower reading level
- Allow student to make test corrections or retake assessment
- Adjust Pacing of Content
- See 504 plan for specific accommodations

Key:

Vocabulary Ongoing Modifications

Building the language of mathematics

http://maccss.ncdpi.wikispaces.net/file/view/CCSSM%20Vocabulary%20for%20Middle%20School.doc/459691144/CCSSM%20Vocabulary%20for%20Middle%20School.do c

Instructional Best Practices and Exemplars
Georgia Department of Education: Grade 6 Support Materials for Remediation:

Differentiated centers

Extra time on task

Limited # of items

NJ Model Curriculum:

INTERVENTION:

Achieve the Core:

https://illuminations.nctm.org/Activity.aspx?id=3511 Provides an applet for creating and representing array models of factors of numbers. Students who struggle with identifying lists of factors may use this tool as a scaffold.

Key:

Greatest common factor and least common multiple are usually taught as a means of combining fractions with unlike denominators. This cluster builds upon the previous learning of the multiplicative structure of whole numbers, as well as prime and composite numbers in Grade 4. Although the process is the same, the point is to become aware of the relationships between numbers and their multiples. For example, consider answering the question: "If two numbers are multiples of four, will the sum of the two numbers also be a multiple of four?"

Being able to see and write the relationships between numbers will be beneficial as further algebraic understandings are developed. Another focus is to be able to see how the GCF is useful in expressing the numbers using the distributive property, $(36 + 24) = 12(3+2)$, where 12 is the GCF of 36 and 24. This concept will be extended in Expressions and Equations as work progresses from understanding the number system and solving equations to simplifying and solving algebraic equations in Grade 7.

Proportional reasoning is a process that requires instruction and practice. It does not develop over time on its own. Grade 6 is the first of several years in which students develop this multiplicative thinking. Examples with ratio and proportion must involve measurements, prices and geometric contexts, as well as rates of miles per hour or portions per person within contexts that are relevant to sixth graders.

Experience with proportional and non-proportional relationships, comparing and predicting ratios, and relating unit rates to previously learned unit fractions will facilitate the development of proportional reasoning.

Interdisciplinary Connections Technology Integration

- Language Arts - Students must use close-reading skills in order to understand and solve complex word problems. Students also write mathematical reflections after each unit.

- Language Arts - Interactive Student Notebook
- Language Arts - Reading Strategies: students will utilize reading comprehension skills by acting out or drawing the order of important events in a story problem. Reading and writing stories to

represent addition and subtraction
● Social Studies- understand how to read dates properly ●
Science: temperatures
● Geography/Maps: Above/below sea level
● Business: Income/Cost/Profit
   ● **8.1.8.A.1** Demonstrate knowledge of a real world problem using
      digital tools.
   ● **8.1.8.A.3** Use and/or develop a simulation that provides an

environment to solve a real world problem or theory. ● **8.1.8.D.1**
Understand and model appropriate online behaviors related to cyber
safety, cyber bullying, cyber security, and cyber ethics including
appropriate use of social media.
● **8.1.8.D.4** Assess the credibility and accuracy of digital content. ●
8.2.8.E.1 Identify ways computers are used that have had an impact
across the range of human activity and within different careers where
they are used.

Grade 6: Interdisciplinary Connections
____ **Language Arts** ____ **Science** ____ **Social Studies** ____ **World Languages** ____ **Arts**

21st Century Themes
___ **Global Awareness** ___ **Financial, Economic, Business and Entrepreneurial Literacy** ___ **Civic Literacy** ___ **Health Literacy** ___ **Environmental Literacy**

21st Century Life and Careers Standards

Career Ready Practices:
- 9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors
- 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education
- 9.1.8.EG.8: Analyze the impact of currency rates over a period of time and the impact on trade, employment, and income
- 9.1.8.FP.1: Describe the impact of personal values on various financial scenarios
- 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish
- 9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest

- 9.2.8.CAP.2: Develop a plan that includes information about career areas of interest
- 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
- 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.
- 9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.
- 9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.
- 9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
- 9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.

- 9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.
- 9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills

- 9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
- 9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level

Unit 2 Grade 6- Expressions and 3D Geometry		
Content Standards	**Suggested Standards for Mathematical Practice and P21 Skills**	**Critical Knowledge & Skills**

● 6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● write numerical expressions (involving whole number exponents) from verbal descriptions.
		       ● evaluate numerical expressions involving whole number exponents.
		
		Learning Goal 1: Write and evaluate numerical expressions involving whole number exponents.

● 6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers
    6.EE.A.2a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation*
	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● write algebraic expressions from verbal descriptions.
		    ● use mathematical terms (sum, term, product, factor, quotient, coefficient) to identify the parts of an expression.
		    ● evaluate algebraic expressions and formulas, including those involving exponents.

"Subtract y from 5" as 5 - y. 6.EE.A.2b. 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* 6.EE.A.2c. 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). *For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length s = ½*		Learning Goal 2: Use mathematical language to identify parts of an expression. Learning Goal 3: Write and evaluate algebraic expressions involving exponents (include evaluating formulas).

● 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
	MP.2 Reason abstractly and quantitatively.
	MP.7 Look for and make use of structure.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s):
		    ● Properties of operations: distributive property, combining like terms
		Students are able to:
		    ● combine like terms to generate an equivalent expression.
		    ● factor to generate an equivalent expression.
		    ● multiply (apply the distributive property) to generate an equivalent expression.
		
		Learning Goal 4: Apply properties of operations (factor, distribute, and combine like terms) to generate equivalent expressions and to identify when two expressions are equivalent.

25 | Page Key:

● 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 number regardless of which number y stands for*		

● 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.	MP.2 Reason abstractly and quantitatively.
	MP.6 Attend to precision.
	MP.7 Look for and make use of structure.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s):
		    ● A variable can represent an unknown number or any number in a set of numbers.
		Students are able to:
		    ● write expressions for solving real-world problems.
		
		Learning Goal 5: Use variables to represent numbers and write expressions when solving real world or 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.	MP. 2 Reason abstractly and quantitatively.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● pack a right rectangular prism with fractional edge lengths with unit fraction cubes.
		    ● show that the volume found by packing is the same as would be found by multiplying the edge lengths of the prism.
		    ● apply volume formulas, $V = l\,w\,h$ and $V = b\,h,$ to right rectangular prisms with fractional edge lengths.
		
		Learning Goal 6: Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes and show that the volume is the same as it would be if found by multiplying the edge lengths; apply volume formulas to right rectangular prisms with fractional edge lengths.

● 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	MP.1 Make sense of problems and persevere in solving them.
	MP.4 Model with mathematics.
	MP.5 Use appropriate tools strategically
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● represent three dimensional objects with nets made up of rectangles and triangles.
		    ● find surface area of three-dimensional objects using nets.
		    ● solve real world and mathematical problems involving surface area using nets.

real-world and mathematical problems.	ICT Literacy	Learning Goal 7: Represent three dimensional figures objects with nets made of rectangles and triangles and use the nets to find the surface area of the figures in order to solve real world and mathematical problems.

Unit 2 Grade 6 Expressions and 3D Geometry

District/School Formative Assessment Plan District/School Summative Assessment Plan

Homework practice
Exit tickets
Journal writing
Metacognitive activities (articulation/communication)
Self Assessment/peer assessment
Spiral Review
SMART response (clickers)
Task Cards

Georgia Department of Education Formative Assessment Tasks
https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-3.pdf
https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-5.pd

PARCC released items
https://prc.parcconline.org/assessments/parcc-released-items

PARCC practice tests

https://parcc.pearson.com/practice-tests/math/

Math release set folder- contains two Word docs
https://sites.google.com/site/releaseditemsets/home/math-release-1
  Georgia Department of Education Summative Assessment Performance Tasks
  https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-3.pdfhttps://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-5.pd

Benchmarks

Chapter tests

Performance tasks

Extended projects

PARCC

Key:
Benchmark Assessment Alternative Assessment
Renaissance/STAR

MAP Testing

DRA Assessment

Benchmark Assessment within Envision/Go Math/Eurek/iReady

State Testing Results

Teacher Created Assessments Performance Based Assessments

Extension Projects

Focus Mathematical Concepts- Expressions and 3D Geometry

Prerequisite skills:

4.OA.B.4

5.NBT.A.2

5.NBT.B.5

5.NBT.B.7

5.OA.A.2

5.OA.B.3

Common Misconceptions:

The mnemonic PEMDAS can mislead students into thinking that addition must come before subtraction and multiplication must come before division.

Students fail to see juxtaposition (side by side) as indicating multiplication. For example, evaluating 3x as 35 when x = 5 instead of 3 times 5 = 15. Also, students may rewrite 8 – 2a as 6a.

Students also miss the understood "1" in front of a lone variable like a or x or p. For example, not realizing that 4a + a is 5a.

Many of the misconceptions when dealing with expressions stem from the misunderstanding/reading of the expression. For example, knowing the operations that are being referenced with notation like x3 , 4x, 3(x + 2y) is critical. The fact that x3 means (x)(x)(x) which is x times x times x, not 3x or 3 times x; 4x means 4 times x or x + x + x + x, not forty-something.

Students may believe that the orientation of a figure changes the figure. In Grade 6, some students still struggle with recognizing common figures in different orientations. For example, a square rotated 45° is no longer seen as a square and instead is called a diamond. This impacts students' ability to decompose composite figures and to appropriately apply formulas for area. Providing multiple orientations of objects within classroom examples and work is essential for students to overcome this misconception.

Key:

Fluency Expectations:

6.NS.B.4 Compute fluently with multidigit numbers and find common factors and multiples.

6.NS.2 Students fluently divide multi-digit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

6.NS.3 Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. This is the culminating standard for several years' worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations—Fractions.

6.NS.1 Students interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. This completes the extension of operations to fractions

District/School Tasks District/School Primary and Supplementary Resources

Framework for 21st Century Learning

PARCC released items
https://prc.parcconline.org/assessments/parcc released-items

PARCC practice tests
https://parcc.pearson.com/practice-tests/math/

Math release set folder- contains two Word docs
https://sites.google.com/site/releaseditemsets/ home/math-release-1

NC CCSS Gr 6 Math Tasks
http://maccss.ncdpi.wikispaces.net/file/view/C CSSMathTasks-Grade6_smaller.pdf/5931802 14/CCSSMathTasks-Grade6_smaller.pdf
http://www.p21.org/our-work/p21-framework

NJDOE-21st Century Life and Careers

http://www.state.nj.us/education/aps/cccs/career/

Pearson textbook

Performance Coach book

TECHNOLOGY CONNECTIONS:
E6.EE.1 Write and evaluate expressions involving whole-number exponents. https://www.illustrativemathematics.org/content-standards 6.EE.A.1
https://www.illustrativemathematics.org/content-standards
6/E/A/1
https://www.illustrativemathematics.org/content-standards
6/EE/A/1
http://www.openmiddle.com/order-of-operations-3/

Key:

http://www.openmiddle.com/order-of-operations-2/
http://www.openmiddle.com/order-of-operations/
http://nzmaths.co.nz/resource/four-fours-challenge
E6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.
https://www.illustrativemathematics.org/content-standards
6/EE/A/2
https://www.illustrativemathematics.org/content-standards

www.studyisland.com
www.math-drills.com/
www.mathgoodies.com/worksheets
www.math-aids.com
www.commoncoresheets.com
www.worksheetworks.com
www.superteacherworksheets.com
ww.SumDog.com
www.IXL.com

www.GoGetWaggle.com
www.Edulastic.com
www.MobyMax.com
www.Prodigy.com
www.TenMarks.com
www.mathplayground.com
www.Mathsnacks.com
www.math-play.com
www.go.math.com

Engage NY

https://www.engageny.org/sites/default/files/resource/attachments/

g6-m3-teacher-materials.pdf Arizona flip book

http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf

North Carolina wikispaces

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Georgia Department of Education Grade 6-8

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Essential Questions

How are "standard form" and "exponential form" related?

What is the purpose of an exponent?

How are exponents used when evaluating expressions?

How is the order of operations used to evaluate expressions?

How are exponents useful in solving mathematical and real world problems?

How are properties of numbers helpful in evaluating expressions?

What strategies can I use to help me understand and represent real situations using algebraic expressions?

How are the properties (Identity, Associative and Commutative) used to evaluate, simplify and expand expressions?

How is the Distributive Property used to evaluate, simplify and expand expressions? How can I tell if two expressions are equivalent? How

can I use manipulatives and nets to help compute the surface areas of rectangular and triangular prisms?

What kinds of problems can be solved using surface areas of rectangular and triangular prisms?

How can I interpret and sketch views of rectangular and triangular prisms?

How can I use formulas to determine the volume of right rectangular prisms?

How can I determine the appropriate units of measure that should be used when computing the volume and surface area of prisms?

What kinds of problems can be solved using volumes of fundamental solid figures?

In what ways can I measure the volume of a rectangular prism with fractional edge lengths?

Special Education Students English Language Learners Students at Risk of School Failure Gifted and Talented Students

- Provide a checklist for long, detailed tasks
  - Use concrete examples of concepts before teaching the abstract
  - Highlight important concepts to be learned in text of material
- Provide concrete examples for homework/class work assignments ● Give additional presentations by varying the methods using repetition, simpler explanations and modeling ● Give written directions to supplement verbal directions
- Familiarize student with new vocabulary before beginning lesson ● Utilize visual aids and graphic organizers
- Utilize manipulative, hands-on activities
- Provide graph paper for computation ● Additional time to complete activities/assignments/projects/assess ments
- Modify or provide an option for alternative activities/assignments/projects/assess ments

- Small Group Instruction/Intervention/Remediation ● Individual Intervention/Remediation ● Additional Support Materials/ Online resources
  - Use enVision Spanish Resources
  - Provide text to speech for math problems
  - Use of translation dictionary or software
  - Confer frequently
    - Adapt a Strategy-Adjusting strategies for ESL students: http://www.teachersfirst.com/c on tent/esl/adaptstrat.cfm
  - Familiarize student with new vocabulary before beginning lesson
  - Utilize visual aids and graphic organizers
  - Utilize manipulative, hands-on activities
  - Additional Support Materials/

Online resources
- Guided Notes or copy of teacher notes
- Review prerequisite skills ● http://www.wida.us/standards/e lp.aspx
- Tiered interventions following RTI framework
- RTI Intervention Bank ● NJDOE resources
  - Utilize online resources such as www.tenmarks.com
- EnVision K-5 intervention supports
- Modify activities/assignments/projects/assess ments
- Provide an option for alternative activities/assignments/projects/assess ments
- Provide higher-order questioning and discussion opportunities
  - Utilize exploratory connections to higher grade concepts

- Modify Content
- Adjust Pacing of Content
- Small Group Enrichment
- Individual Enrichment
- Higher-Level Text
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts ● Organize integrated problem-solving simulations
- Propose interest-based extension activities
  - Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Propose independent projects based on individual interests

Key:

- GuidedNotesorcopyofteacher notes
- Reviewprerequisiteskills
- AfterSchoolTutoring
- Chunk activities/assignments/projects/assessmentsintomanageableunits
- Allowstudenttoreceivereadingtext invariousforms(written,verbal, audio)ronalowerreadinglevel
- Allowstudenttomaketest correctionsorretakeassessment
- AdjustPacingofContent
  - SeeIEPsand504sofstudentsfor specificmodifications

Studentswith504Plans

- Provideachecklistforlong,detailed tasks
  - Useconcreteexamplesofconcepts

beforeteachingtheabstract
- Highlightimportantconceptstobe learnedintextofmaterial
- Provideconcreteexamplesfor homework/classworkassignments
- Giveadditionalpresentationsby varyingthemethodsusingrepetition, simplerexplanationsandmodeling
- Givewrittendirectionstosupplement verbaldirections
- Familiarizestudentwithnew vocabularybeforebeginninglesson

- AdditionalSupportMaterials/Online resources
  - Afterschoolclubs
  - Tieredcenters
  - Tieredassignments

Key:

- Utilize visual aids and graphic organizers
- Utilize manipulative, hands-on activities
- Provide graph paper for computation
- Additional time to complete

- activities/assignments/projects/assessments
- ●Modifyorprovideanoptionfor alternative activities/assignments/projects/assessments
- ●SmallGroup Instruction/Intervention/Remediation
- ●IndividualIntervention/Remediation
- ●AdditionalSupportMaterials/Online resources
- ●GuidedNotesorcopyofteacher notes
- ●Reviewprerequisiteskills
- ●AfterSchoolTutoring
- ●Chunk activities/assignments/projects/assessmentsintomanageableunits
- ●Allowstudenttoreceivereadingtext invariousforms(written,verbal, audio)ronalowerreadinglevel
- ●Allowstudenttomaketest correctionsorretakeassessment
- ●AdjustPacingofContent
- ●See504planforspecific accommodations

VocabularyOngoingModifications

Building the language of mathematics

Instructional Best Practices and Exemplars
Georgia Department of Education: Grade 6 Support Materials for Remediation:

https://www.georgiastandards.org/Georgia-Standards/Documents/6th-Math-Connections-Support.pdf

Engage NY Fluency Support

file:///C:/Users/Owner/Downloads/math-grades-6-8-fluency-support.pdf

Differentiated centers

Extra time on task

Limited # of items

NJ Model Curriculum: https://www.state.nj.us/education/bilingual/curriculum/

Achieve the Core:

https://achievethecore.org/aligned/ccss-aligned-materials-for-ell-students/

Computation with fractions is best understood when it builds upon the familiar understandings of whole numbers and is paired with visual representations. Solve a simpler problem with whole numbers, and then use the same steps to solve a fraction divided by a fraction. Looking at the problem through the lens of "How many groups?" or "How many in each group?" helps visualize what is being sought.

As students study whole numbers in the elementary grades, a foundation is laid in the conceptual understanding of each operation. Discovering and applying multiple strategies for computing creates connections which evolve into the proficient use of standard algorithms.

Fluency with an algorithm denotes an ability that is efficient, accurate, appropriate and flexible. Division was introduced in Grade 3 conceptually, as the inverse of multiplication. In Grade 4, division continues using place-value strategies, properties of operations, the relationship with multiplication, area models, and rectangular arrays to solve problems with one digit divisors. In Grade 6, fluency with the algorithms for division and all operations with decimals is developed. Fluency is something that develops over time; practice should be given over the course of the year as students solve problems related to other mathematical studies. Opportunities to determine when to use paper pencil algorithms, mental math or a computing tool is also a necessary skill and should be provided in problem solving situations.

It is very important for students to continue to physically manipulate materials and make connections to the symbolic and more abstract aspects of geometry. Exploring possible nets should be done by taking apart (unfolding) three-dimensional objects. This process is also foundational for the study of surface area of prisms. Building upon the understanding that a net is the two-dimensional representation of the object, students can apply the concept of area to find surface area. The surface area of a prism is the sum of the areas for each face. .

Interdisciplinary Connections Technology Integration

- Language Arts - Students must use close-reading skills in order to understand and solve complex word problems. Students also write mathematical reflections after each unit.

- Language Arts - Interactive Student Notebook
- Language Arts - Reading Strategies: students will utilize reading comprehension skills by acting out or drawing the order of important events in a story problem. Reading and writing stories to represent

addition and subtraction
- Social Studies- understand how to read dates properly ●
Science: temperatures
- Geography/Maps: Above/below sea level
- Business: Income/Cost/Profit
  - **8.1.8.A.1** Demonstrate knowledge of a real world problem using digital tools.
  - **8.1.8.A.3** Use and/or develop a simulation that provides an

environment to solve a real world problem or theory. ● **8.1.8.D.1** Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
- **8.1.8.D.4** Assess the credibility and accuracy of digital content. ●
8.2.8.E.1 Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.

Grade 6: Interdisciplinary Connections

_____ **Language Arts** _____ **Science** _____ **Social Studies** _____ **World Languages** _____ **Arts**

21st Century Themes

___ **Global Awareness** ___ **Financial, Economic, Business and Entrepreneurial Literacy** ___ **Civic Literacy** ___ **Health Literacy** ___ **Environmental Literacy**

21st Century Life and Careers Standards

Career Ready Practices:
- 9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors
- 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education
- 9.1.8.EG.8: Analyze the impact of currency rates over a period of time and the impact on trade, employment, and income
- 9.1.8.FP.1: Describe the impact of personal values on various financial scenarios

- 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are trying to accomplish
- 9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest
- 9.2.8.CAP.2: Develop a plan that includes information about career areas of interest
- 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
- 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking,

photo exchanges, video postings) may impact opportunities for employment or advancement.
- 9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.
- 9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.
- 9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
- 9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job

search, scholarships) impacts postsecondary options.
- 9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.
- 9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills
- 9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
- 9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level

Unit 3 Grade 6- Equations, the Rational Number System, and 2D Geometry		
Content Standards	**Suggested Standards for Mathematical Practice and P21 Skills**	**Critical Knowledge & Skills**

● 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.	MP.5 Use appropriate tools strategically. MP.6 Attend to precision. Communication Information Literacy Creativity and Innovation	Concept(s): 　● Solving an equation or inequality is a process of answering the question: determine which values from a specified set, if any, make the equation or inequality true. Students are able to: 　● substitute a number into an equation to determine whether it makes an equation true. 　● substitute a number into an inequality to determine whether it makes the inequality true. Learning Goal 1: Use substitution to determine whether a given number makes an equation or inequality true.
● 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.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure. Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration	Concept(s): 　● An equation is defined by two expressions that are equivalent to one another. Students will be able to: 　● solve real world problems by writing and solving equations of the form $x + p = q$ (p, q, and x are non-negative and rational). 　● solve real world problems by writing and solving equations of the form $px = q$ (p, q, and x are non-negative and rational). Learning Goal 2: Solve real world problems by writing and solving equations of the form $x + p = q$ and $px = q$ (p, q, and x are non-negative rational numbers).
● 6.NS.C.5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts,	MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically Critical Thinking and Problem Solving Creativity and Innovation ICT Literacy	Concept(s): 　● Positive and negative numbers, used together, describe quantities having opposite directions or opposite values. Students are able to: 　● represent quantities with positive and negative numbers in real-world contexts. 　● interpret positive and negative numbers in real-world contexts. 　● explain the meaning of zero, in context, in each real-world situation.

explaining the meaning of 0 in each situation.		Learning Goal 3: Use positive and negative numbers to represent quantities in real-world situations, explaining the meaning of zero in the context of the real-world situation.

● 6.NS.C.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.
6.NS.C.6a. 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, e.g., –(–3) = 3, and that 0 is its own opposite.
6.NS.C.6b. 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.6c. 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.
	MP.5 Use appropriate tools strategically. MP.8 Look for and express regularity in repeated reasoning.
	
	ICT Literacy
		Concept(s):
		    ● Opposite signs of numbers indicate locations on opposite sides of 0 on the number line.
		    ● The opposite of the opposite of a number is the number itself (e.g. the opposite of three is -3. The opposite of the opposite of three, -(-3), is equal to the original number, 3).
		    ● Signs of numbers in ordered pairs indicate their locations in quadrants of the coordinate plane.
		    ● When two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
		Students are able to:
		    ● position rational numbers on horizontal and vertical number lines.
		    ● position pairs of rational numbers on a coordinate plane.
		    ● explain the conditions for which pairs of points are reflections across an axes in the coordinate plane.
		    ● locate numbers and their opposites on the number line and explain their relation to 0.
		
		Learning Goal 4: Locate rational numbers and their opposites on horizontal and vertical number line; explain their relation of the opposites to zero.
		Learning Goal 5: Plot pairs of positive and negative rational numbers in the coordinate plane; describe two ordered pairs that differ only by signs as reflections across one or both axes.

● 6.NS.C.7. Understand ordering and absolute value of rational numbers.
6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For*
	MP.2 Reason abstractly and quantitatively.
	MP.3 Construct viable arguments and critique the reasoning of others.
	MP.5 Use appropriate tools strategically
		Concept(s):
		    ● The absolute value of a rational number is its distance from 0 on the number line.
		Students are able to:
		    ● given an inequality, determine the position of one rational number relative to another.

example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right. 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3ºC > –7ºC to express the fact that –3 ºC is warmer than –7ºC.* 6.NS.C.7c. 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. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.* 6.NS.C.7d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration ICT Literacy	● write a inequality and explain statements of order for rational numbers in real world situations. Learning Goal 6: Use statements of inequality to determine relative positions of two rational numbers on a number line; write and explain statements of order for rational numbers in real-world contexts. Learning Goal 7: Explain the meaning of absolute value of a rational number as distance from zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.

● 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	MP.2 Reason abstractly and quantitatively. MP.6 Attend to precision. MP.7 Look for and make use of structure.
	
	Critical Thinking and Problem Solving Creativity and Innovation
		Concept(s):
		    ● An inequality may represent a constraint (or a condition) in a real-world problem.
		    ● Infinity ($x > c$ and $x < c$ have an infinite number of solutions).
		Students are able to:
		    ● represent real-world constraint or condition by writing an inequality of the form $x > c$ or $x < c$.
		    ● graph inequalities of the form $x > c$ or $x < c$ on number lines.

		Learning Goal 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 and represent them on a number line.

● 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.
*(benchmarked)
● 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.
	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration ICT Literacy
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems.
		    ● draw polygons in the coordinate plane.
		    ● use absolute value to find distances between points with the same first coordinate or the same second coordinate.
		    ● use coordinates to solve real-world distance, perimeter, and area problems.
		
		Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.

● 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.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure. Critical Thinking and Problem Solving Creativity and Innovation ICT Literacy	Concept(s): No new concept(s) introduced Students are able to: 　　　● compose rectangles in order to find the area of triangles, special quadrilaterals and polygons. 　　　● decompose triangles, special quadrilaterals, and polygons into triangles and other shapes in order to find their area. 　　　● compose rectangles and decompose into triangles in order to solve real-world problems. Learning Goal 10: Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles and other shapes to solve real world or mathematical problems.

Unit 3 Grade 6- Equations, the Rational Number System, and 2D Geometry

District/School Formative Assessment Plan District/School Summative Assessment Plan

Georgia Department of Education Formative Assessment Tasks
https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-5.pd
https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-7.pdf

Homework practice

Exit tickets

Journal writing

Metacognitive activities (articulation/communication)

Self-Assessment/peer assessment

Spiral Review

SMART response (clickers)

Task Cards
　Georgia Department of Education Summative Performance Assessment Tasks
　https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-5.pd

　https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-7.pd f

Benchmarks

Chapter tests

Performance tasks

Extended projects

PARCC

Benchmark Assessment Alternative Assessment

Renaissance/STAR

MAP Testing

DRA Assessment

Benchmark Assessment within Envision/Go Math/Eurek/iReady

State Testing Results

Teacher Created Assessments Performance Based Assessments

Extension Projects

Key:
Focus Mathematical Concepts Equations, the Rational

Number System, and 2D Geometry -

Prerequisite skills:
5.NF.A.1
5.NF.B.3
5.NF.B.4
5.NF.B.6
5.G.A.2
5.G.A.1
3.MD.B.4
6.NS.C.6

Common Misconceptions:
Students need practice translating verbal expressions into expressions and equations, and also translating expressions and equations into verbal expressions. The wording must dictate the order of the terms. For example, "three more than a number" is transcribed "x + 3", not "3 + x" even though those expressions are equivalent. In the example, "three less than a number", it is imperative that the order be "x – 3". Students often confuse the statement "five less than a number" ("x – 5") with the inequality, "five is less than a number" (5 < x). The difference between an expression and an inequality needs to be clearly distinguished. Remind students to utilize a number line to help support.

Students may drop the negative sign when converting negative rational numbers.

Some students ignore the negative sign when looking for what appears to be the smallest number

Students may have trouble identifying the height of triangles and parallelograms. They confuse the height with always being a side length. Height is the altitude and must perpendicular to the base (form a right angle).

The height of a triangle can be one of the sides of the right angle in a right triangle. The height is an interior segment in an acute triangle, and it is an exterior segment (the base) in an obtuse triangle.

Fluency Expectations:
6.NS.B.4 Compute fluently with multidigit numbers and find common factors and multiples.

6.NS.2 Students fluently divide multi-digit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

6.NS.3 Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. This is the culminating standard for several years' worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations—Fractions.

6.NS.1 Students interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. This completes the extension of operations to fractions

District/School Tasks District/School Primary and Supplementary Resources Framework for 21st Century Learning

PARCC released items
https://prc.parcconline.org/assessments/parcc-released-items

NJDOE-21st Century Life and Careers

PARCC practice tests
https://parcc.pearson.com/practice-tests/math/

http://www.state.nj.us/education/aps/cccs/career/

Pearson textbook

Math release set folder- contains two Word docs
https://sites.google.com/site/releaseditemsets/home/math-release-1

Performance Coach book

NC CCSS Gr 6 Math Tasks
http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade6_smaller.pdf/593180214/CCSSMathTasks-Grade6_smaller.pdf
http://www.p21.org/our-work/p21-framework

EE/B/6/
https://www.illustrativemathematics.org/content-standards
EE/B/6/
http://www.visualpatterns.

http://threeacts.mrmeyer.com/bubblewrap/
http://illuminations.nctm.org/ActivityDetail.aspx?ID=108
http://www.geogebra.org/en/upload/files/english/Victoria/TriangleArea.html
http://www.geogebra.org/en/upload/files/english/Knote/Area/parallelograms.html
http://www.geogebra.org/en/upload/files/english/Knote/Area/Parallelogram2.html
http://illuminations.nctm.org/LessonDetail.aspx?ID=L583
http://illuminations.nctm.org/LessonDetail.aspx?ID=U160
http://www.shodor.org/interactivate/activities/AreaExplorer
http://nlvm.usu.edu/en/nav/frames_asid_129_g_3_t_3

6.G.2https://www.illustrativemathematics.org/content-standards/6/G/A/2/tasks/534
https://www.illustrativemathematics.org/content-standards/6/G/A/2/tasks/535
https://www.illustrativemathematics.org/content-standards/6/G/A/2/tasks/536
https://www.illustrativemathematics.org/content-standards/6/G/A/2/tasks/537
http://www.shodor.org/interactivate/activities/SurfaceAreaAndVolume/
http://illuminations.nctm.org/ActivityDetail.aspx?ID=6

6.G.4. https://www.illustrativemathematics.org/content-standards/
6/G/A/4/tasks/1985
http://www.101qs.com/3038
http://www.estimation180.com/
filecabinet.htmlhttp://mr-stadel.blogspot.com/2014/05/fun-with-sticky.html
http://www.openmiddle.com/maximizing-rectangular-prism-surface-area/

www.studyisland.com

www.math-drills.com/
www.mathgoodies.com/worksheets
www.math-aids.com
www.commoncoresheets.com
www.worksheetworks.com
www.superteacherworksheets.com
ww.SumDog.com
www.IXL.com
www.GoGetWaggle.com
www.IXL.com
www.Edulastic.com

https://www.illustrativemathematics.org/content-standards/6/G/A/1/tasks/1993

www.MobyMax.com
www.Prodigy.com
www.TenMarks.com
www.mathplayground.com
www.Mathsnacks.com
www.math-play.com
www.go.math.com

Arizona flip book

http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf

North Carolina wikispaces

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Georgia Department of Education Grade 6-8

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Engage NY
https://www.engageny.org/sites/default/files/resource/attachments/g6-m3-teacher-materials.pdf

Essential Questions

When are negative numbers used and why are they important?

Why is it useful for me to know the absolute value of a number?

When is graphing on the coordinate plane helpful?

Key:

How do I use positive and negative numbers in everyday life?

Where do I place positive and negative rational numbers on the number line?

How do I use positive and negative numbers to represent quantities in real-world contexts?

What are opposites, and how are opposites shown on a number line?

How do statements of inequality help me place numbers on a number line?

How can I use coordinates to find the distances between points?

How can I use number lines to find the distances between points?

How can I use absolute value to find the lengths of the sides of polygons on the coordinate plane?

How can we find the area of figures?

How can we cut and rearrange irregular polygons in order to find their area?

How can we use one figure to determine the area of another?

How do we measure the area of a shape without a formula for that shape?

How are the areas of geometric figures related to each other?

Special Education Students English Language Learners Students at Risk of School Failure Gifted and Talented Students

directions
● Provide a checklist for long, detailed tasks ● Use concrete examples of concepts before teaching the abstract
  ● Highlight important concepts to be learned in text of material
  ● Provide concrete examples for homework/class work assignments
  ● Give additional presentations by varying the methods using repetition, simpler explanations and modeling
  ● Give written directions to supplement verbal

● Familiarize student with new vocabulary before beginning lesson
    ● Use enVision Spanish Resources ● Provide text to speech for math problems ● Use of translation dictionary or software ● Confer frequently
    ● Adapt a Strategy-Adjusting strategies for ESL students:
        http://www.teachersfirst.com/con tent/esl/adaptstrat.cfm
    ● Familiarize student with new vocabulary

before beginning lesson
    ● Utilize visual aids and graphic organizers ● Utilize manipulative, hands-on activities ● Additional Support Materials/ Online resources
    ● Tiered interventions following RTI framework
    ● RTI Intervention Bank
    ● NJDOE resources
        ● Utilize online resources such as
            www.tenmarks.com
        ● EnVision K-5 intervention supports
    ● Modify

activities/assignments/projects/assessment s
  ● Provide an option for alternative activities/assignments/projects/assessment s
  ● Provide higher-order questioning and discussion opportunities
  ● Utilize exploratory connections to higher grade concepts
  ● Modify Content
  ● Adjust Pacing of Content
  ● Small Group Enrichment
  ● Individual Enrichment

● Utilize visual aids and graphic organizers ● Utilize manipulative, hands-on activities ● Provide graph paper for computation ● Additional time to complete
    activities/assignments/projects/assessments ● Modify or provide an option for alternative

activities/assignments/projects/assessments ● Small Group
    Instruction/Intervention/Remediation
  ● Individual Intervention/Remediation ● Additional Support Materials/ Online resources ● Guided Notes or copy of teacher notes ● Review prerequisite skills

● After School Tutoring
● Chunk
    activities/assignments/projects/assessments into manageable units
● Allow student to receive reading text in various forms (written, verbal, audio) r on a lower reading level

- Allow student to make test corrections or retake assessment
- Adjust Pacing of Content
- See IEPs of students for specific modifications

Students with 504 Plans

- Provide a checklist for long, detailed tasks ● Use concrete examples of concepts before teaching the abstract
- Highlight important concepts to be learned in text of material

● Guided

Notes or copy of teacher notes ● Review prerequisite skills
- ● http://www.wida.us/standards/elp.aspx
- ● Higher-Level Text
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills ● Use center, stations, or contracts ● Organize integrated problem-solving simulations
- ● Propose interest-based extension activities ●

Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Propose independent projects based on individual interests
- Additional Support Materials/ Online resources
- ● After school clubs
- Tiered centers
  - ● Tiered assignments

Key:
- Provide concrete examples for homework/class work assignments
- Give additional presentations by varying the methods using repetition, simpler explanations and modeling
- Give written directions to supplement verbal directions
- Familiarize student with new vocabulary before beginning lesson

- Utilize visual aids and graphic organizers ● Utilize manipulative, hands-on activities ● Provide graph paper for computation ● Additional time to complete
      activities/assignments/projects/assessments ● Modify or provide an option for alternative activities/assignments/projects/assessments ● Small Group
      Instruction/Intervention/Remediation
- Individual Intervention/Remediation ● Additional Support Materials/ Online resources ● Guided Notes or copy of teacher notes ● Review prerequisite skills
- After School Tutoring
- Chunk
      activities/assignments/projects/assessments into
      manageable units
- Allow student to receive reading text in various forms
      (written, verbal, audio) r on a lower reading level
- Allow student to make test corrections or retake
      assessment
- Adjust Pacing of Content
- See 504 plan for specific accommodations

Vocabulary Ongoing Modifications

Building the language of mathematics

http://maccss.ncdpi.wikispaces.net/file/view/CCSSM%20Vocabulary%20for%20Middle%20School.doc/459691 144/CCSSM%20Vocabulary%20for%20Middle%20School.doc

Instructional Best Practices and Exemplars

Georgia Department of Education: Grade 6 Support Materials for Remediation:

https://www.georgiastandards.org/Georgia-Standards/Documents/6th-Math-Connections-Suppor t.pdf

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Differentiated centers

Extra time on task

Limited # of items

ELL:

http://www.wida.us/standards/elp.aspx

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https://www.state.nj.us/education/bilingual/curriculum/

Achieve the Core:

https://achievethecore.org/aligned/ccss-aligned-materials-for-ell-students/

The purpose of this unit is to begin the study of the existence of negative numbers, their relationship to positive numbers, and the meaning and uses of absolute value. Starting with examples of having/owing and above/below zero sets the state of understanding that there is a mathematical way to describe opposites. Students should already be familiar with the counting numbers (positive whole numbers and zero), as well as with fractions and decimals (also positive). The students are now ready to understand that all numbers have an opposite. These special numbers can be shown on vertical or horizontal number lines, which then can be used to solve simple word problems.

Key:

Demonstration of understanding of positives and negatives involves translating among words, numbers and models: give the words "7 degrees below zero," showing it on a thermometer and writing -7; give -4 on a number line, writing a real-life example and mathematically as -4.

Number lines also give the opportunity to model absolute value as the distance from zero. Simple comparisons can be made and order determined. Or they can also be established and written mathematically: -3° C > -5° C OR -5° C < -3°C. Finally, absolute values should be used to relate contextual problems to their meanings and solutions. Using number lines to model negative numbers, prove the distance between opposites, and understand the meaning of absolute value easily transfers to the creation and usage of four quadrant coordinate grids. Points can now be plotted in all four quadrants of a coordinate grid. Distances between numbers can be found by counting the distance between numbers on the grid. Computation (operations) with negative and positives is addressed in grade 7

Multiple strategies can be used to aid in the skill of determining the area of simple two-dimensional composite shapes. A beginning strategy should be to use rectangles and triangles, building upon shapes for which they can already determine area to create composite shapes. This process will reinforce the concept that composite shapes are created by joining together other shapes, and that the total area of the two-dimensional composite shape is the sum of the areas of all the parts. A follow-up strategy is to place a composite shape on grid or dot paper. This aids in the decomposition of a shape into its foundational parts. Once the composite shape is decomposed, the area of each part can be determined and the sum of the area of each part is the total area.

Interdisciplinary Connections Technology Integration

- Language Arts - Students must use close-reading skills in order to understand and solve complex word problems. Students also write mathematical reflections after each unit.
- Language Arts - Interactive Student Notebook
- Language Arts - Reading Strategies: students will utilize reading comprehension skills by acting out or drawing the order of important events in a story problem. Reading and writing stories to represent addition and subtraction
- Social Studies- understand how to read dates properly ●
Science: temperatures
- Geography/Maps: Above/below sea level

- Business: Income/Cost/Profit
  - **8.1.8.A.1** Demonstrate knowledge of a real world problem using digital tools.
    - **8.1.8.A.3** Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
  - **8.1.8.D.1** Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
  - **8.1.8.D.4** Assess the credibility and accuracy of digital content. ● **8.2.8.E.1** Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.

Grade 6: Interdisciplinary Connections

____ Language Arts ____ Science ____ Social Studies ____ World Languages ____ Arts

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21st Century Themes

___ Global Awareness ___ Financial, Economic, Business and Entrepreneurial Literacy ___ Civic Literacy ___ Health Literacy ___ Environmental Literacy

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21st Century Life and Careers Standards

Career Ready Practices:
- 9.1.8.CR.2: Compare various ways to give back through strengths, passions, goals, and other personal factors
- 9.1.8.EG.5: Interpret how changing economic and societal needs influence employment trends and future education
- 9.1.8.EG.8: Analyze the impact of currency rates over a period of time and the impact on trade, employment, and income
- 9.1.8.FP.1: Describe the impact of personal values on various financial scenarios
- 9.1.8.FP.6: Compare and contrast advertising messages to understand what they are

trying to accomplish
- 9.2.8.CAP.1: Identify offerings such as high school and county career and technical school courses, apprenticeships, military programs, and dual enrollment courses that support career or occupational areas of interest
- 9.2.8.CAP.2: Develop a plan that includes information about career areas of interest
- 9.2.8.CAP.3: Explain how career choices, educational choices, skills, economic conditions, and personal behavior affect income.
- 9.2.8.CAP.4: Explain how an individual's online behavior (e.g., social networking, photo exchanges, video postings) may impact opportunities for employment or advancement.

- 9.2.8.CAP.6: Compare the costs of postsecondary education with the potential increase in income from a career of choice.
- 9.2.8.CAP.7: Devise a strategy to minimize costs of postsecondary education.
- 9.2.8.CAP.8: Compare education and training requirements, income potential, and primary duties of at least two jobs of interest.
- 9.2.8.CAP.9: Analyze how a variety of activities related to career preparation (e.g., volunteering, apprenticeships, structured learning experiences, dual enrollment, job search, scholarships) impacts postsecondary options.

- 9.2.8.CAP.15: Present how the demand for certain skills, the job market, and credentials can determine an individual's earning power.
- 9.2.8.CAP.16: Research different ways workers/ employees improve their earning power through education and the acquisition of new knowledge and skills
- 9.2.8.CAP.18: Explain how personal behavior, appearance, attitudes, and other choices may impact the job application process.
- 9.2.8.CAP.19: Relate academic achievement, as represented by high school diplomas, college degrees, and industry credentials, to employability and to potential level

Unit 4 Grade 6- Variability, Distribution and Relationships Between Quantities		
Content Standards	**Suggested Standards for Mathematical Practice and P21 Skills**	**Critical Knowledge & Skills**
● 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.*	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision. Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration	Concept(s): ● Two quantities that change in relationship to one another may be represented with an equation in two variables, with a graph, and with a table of values. Students are able to: ● represent two quantities that related to one another, with variables. ● write an equation in two variables. ● distinguish the dependent variable from the independent variable. ● analyze a given graph and table of values, and relate them to the equation. Learning Goal 1: Write an equation using two variables (independent and dependent) to represent two quantities that change in relationship to one another in a real-world problem. Learning Goal 2: Analyze the relationship between the dependent and independent variables and relate the equation to a given graph and to its table of values.

● 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
	MP.2 Reason abstractly and quantitatively.
	MP.6 Attend to precision
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication
	Information Literacy
		Concept(s):
		      ● Variability/Variation
		      ● A statistical question is one that anticipates variability in the data that is related to the question.
		Students are able to:
		      ● distinguish questions that are statistical (anticipate variability in data) from those that are not.

anticipates variability in students' ages.		Learning Goal 3: Distinguish questions that are statistical (anticipate variability in data) from those that are not.

● 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.
	MP.4 Model with mathematics.
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration
		Concept(s):
		    ● A data set has a distribution which can be described by its center, spread, and overall shape.
		    ● A measure of center summarizes, with a single number, the values of an entire data set.
		    ● A measure of variation describes, with a single number, how the values of a data set vary.
		Students are able to:
		    ● distinguish center from variation.
		    ● display numerical data in dot plots on a number line.
		    ● display numerical data in histograms on a number line.
		    ● display numerical data in box plots on a number line.
		
		Learning Goal 4: Display numerical data in plots on the number line (including dot plots, histograms, and box plots) and summarize in relation to their context.

● 6.SP.B.5. Summarize numerical data sets in relation to their context, such as by:
  6.SP.B.5a. Reporting the number of observations.
  6.SP.B.5b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
  6.SP.B.5c. Giving quantitative measures of center (median and/or mean) and variability (interquartile
	MP.2 Reason abstractly and quantitatively.
	MP.4 Model with mathematics.
	MP.5 Use appropriate tools strategically.
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration ICT Literacy
		Concept(s): No new concept(s) introduced
		Students are able to:
		    ● determine the number of observations of a data set.
		    ● describe the data in context, including how it was measured and the units of measurement.
		    ● calculate measures of center, mean and median.
		    ● calculate measures of spread, interquartile range and mean absolute deviation.
		    ● describe the overall shape of a distribution (skewed left, skewed right, etc).
		    ● identify striking deviations (outliers).

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.5d. 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.		● choose measures of center and variability appropriate to the shape of the distribution and context. Learning Goal 5: Summarize numerical data in relation to their context by identifying the number of observations and describing how the data was measured. Learning Goal 6: Calculate, and interpret measures of center (mean and median) and variability (interquartile range and mean absolute deviation); report measures of center and variability appropriate to the shape of the distribution and context.

● 6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
 	
*(benchmarked)
 	
6.RP.A.3a. 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.3b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow*
	MP.2 Reason abstractly and quantitatively.
	MP.4 Model with mathematics.
	MP.5 Use appropriate tools strategically MP.6 Attend to precision.
	MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning
	
	Critical Thinking and Problem Solving Creativity and Innovation Communication and Collaboration Information Literacy
	ICT Literacy
		Concept(s): No new concept(s) introduced
		Students are able to:
		      ● use ratio and rate reasoning to create tables of equivalent ratios relating quantities with *whole number* measurements, find missing values in tables and plot pairs of values.
		    ● compare ratios using tables of equivalent ratios.
		     ● solve real world and mathematical problems involving unit rate (including unit price and constant speed).
		    ● calculate a percent of a quantity and solve problems by finding the whole when given the part and the percent.
		    ● convert measurement units using ratio reasoning.
		     ● transform units appropriately when multiplying and dividing quantities.
		
		Learning Goal 7*:* Create and complete tables of equivalent ratios to sole real world and mathematical problems using ratio and rate reasoning that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.

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.3c. 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.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		Learning Goal 8: Use ratio and rate reasoning to convert measurement units and to transform units appropriately when multiplying or dividing quantities.
● 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.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically. Critical Thinking and Problem Solving Creativity and Innovation ICT Literacy	Concept(s): No new concept(s) introduced Students are able to: ● graph points in all four quadrants of the coordinate plane in order to solve real-world and mathematical problems. ● draw polygons in the coordinate plane. ● use absolute value to find distances between points with the same first coordinate or the same second coordinate. ● use coordinates to solve real-world distance, perimeter, and area problems. Learning Goal 9: Solve real world and mathematical problems by graphing points in all four quadrants of the coordinate plane; use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate

Unit 4 Grade 6- Variability, Distribution and Relationships Between Quantities

District/School Formative Assessment Plan District/School Summative Assessment Plan

Georgia Department of Education Formative Assessment Tasks

https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-6.pd f

https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-6.pd f

Homework practice

Exit tickets

Journal writing

Metacognitive activities (articulation/communication)

Self Assessment/peer assessment

Spiral Review

SMART response (clickers)

Task Cards
  Georgia Department of Education Summative Assessment Tasks
  https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-6.pdf

  https://www.georgiastandards.org/Georgia-Standards/Frameworks/6th-Math-Unit-6.pdf

Benchmarks

Chapter tests

Performance tasks

Extended projects

PARCC

Benchmark Assessment Alternative Assessment

Renaissance/STAR

MAP Testing

DRA Assessment

Benchmark Assessment within Envision/Go Math/Eurek/iReady

State Testing Results

Teacher Created Assessments Performance Based Assessments

Extension Projects

Focus Mathematical Concepts- Variability, Distribution and Relationships Between Quantities

Prerequisite skills:

5.OA.B.3

5.MD.B.2

5.G.A.2

5.G.A.1

Common Misconceptions:

Students may believe all graphical displays are symmetrical. Exposing students to graphs of various shapes will show this to be false.

Mode is remembered as the "most" and often students think this means the largest value, not "most frequent".

Students do not remember to put the numbers in order before finding median.

Students assume that mean is always the best way to describe a set of data, regardless of the context (McGatha, Cobb, & McClain, 1998; cited in Van de Walle, Karp, & BayWilliams, 2013)

Students need to understand that mean is a redistribution of the data, whereas mode and median are not.

Students may think that when data is "skewed to the left" that most of the data is on the left. In fact, the tail of the data is on the left and most of the data is on the right. Students confuse and skewing.

Students may misunderstand what the graph represents in context. For example, that moving up or down on a graph does not necessarily mean that a person is moving up or down.

Fluency Expectations:

6.NS.B.4 Compute fluently with multidigit numbers and find common factors and multiples.

6.NS.2 Students fluently divide multi-digit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

Key:

6.NS.3 Students fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. This is the culminating standard for several years' worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations—Fractions.

6.NS.1 Students interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. This completes the extension of operations to fractions

District/School Tasks District/School Primary and Supplementary Resources Framework for 21st Century Learning

PARCC released items
https://prc.parcconline.org/assessments/parcc-released-items

PARCC practice tests
https://parcc.pearson.com/practice-tests/math/

Math release set folder- contains two Word docs
https://sites.google.com/site/releaseditemsets/home/math-release-1

NC CCSS Gr 6 Math Tasks
http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade6_smaller.pdf/593180214/CCSSMathTasks-Grade6_smaller.pdf

http://www.p21.org/our-work/p21-framework

NJDOE-21st Century Life and Careers

http://www.state.nj.us/education/aps/cccs/career/

Pearson textbook

TECHNOLOGY CONNECTION:

6.SP.5

https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/877

https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/2043

https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/2047

https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/2054

http://www.openmiddle.com/lower-and-upper-quartiles-with-constraints/

http://www.openmiddle.com/median-with-constraints

http://www.openmiddle.com/mean-median-and-range/

distribution and the context in which the data was gathered.

https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/1199
https://www.illustrativemathematics.org/content-standards/6/SP/B/5/tasks/2048

Performance Coach book

www.studyisland.com

www.math-drills.com/
www.mathgoodies.com/worksheets
www.math-aids.com
www.commoncoresheets.com
www.worksheetworks.com
www.superteacherworksheets.com
www.SumDog.com
www.IXL.com
www.GoGetWaggle.com
www.IXL.com
www.Edulastic.com
www.MobyMax.com
www.Prodigy.com
www.TenMarks.com
www.mathplayground.com
www.Mathsnacks.com
www.math-play.com
www.go.math.com

Engage NY

https://www.engageny.org/sites/default/files/resource/attachments/g6-m3-teacher-
material
s.pdf

Arizona flip book

d. Relating the choice of measures of center and variability to the shape of the data

Key: http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf

North Carolina wikispaces

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Georgia Department of Education Grade 6-8

https://www.georgiastandards.org/Georgia-Standards/Pages/Math-6-8.aspx

Essential Questions

What is the best way to organize a set of data?

What kinds of graphs will best represent a given set of data?

How can I describe the center of a set of data?

How can I decide which measure of center (i.e., mean or median) best describes the data?

How can I describe the spread of a set of data?

How can I use data to compare different groups?

How do I choose and create appropriate graphs to represent data?

What conclusions can be drawn from data?

How can I recognize when a question is statistical and when it is not?

What is the difference in a measure of center and a measure of variation?

Special Education Students English Language Learners Students at Risk of School Failure Gifted and Talented Students

Special Education Students	English Language Learners	Students at Risk of School Failure	Gifted and Talented Students
● Provide a checklist for long, detailed tasks ● Use concrete examples of concepts before teaching the abstract ● Highlight important concepts to be learned in text of material ● Provide concrete examples for homework/class work assignments ● Give additional presentations by varying the methods using repetition, simpler explanations and modeling ● Give written directions to supplement verbal directions	● Familiarize student with new vocabulary before beginning lesson ● Utilize visual aids and graphic organizers ● Utilize manipulative, hands-on activities ● Use enVision Spanish Resources ● Provide text to speech for math problems ● Use of translation dictionary or software ● Confer frequently ● Adapt a Strategy-Adjusting strategies for ESL students: http://www.teachersfirst.com/content/esl/adaptstrat.cfm ● Familiarize student with new vocabulary	before beginning lesson ● Utilize visual aids and graphic organizers ● Utilize manipulative, hands-on activities ● Additional Support Materials/ Online resources ● Guided Notes or copy of teacher notes ● Review prerequisite skills ● Tiered interventions following RTI framework ● RTI Intervention Bank ● NJDOE resources ● Utilize online resources such as www.tenmarks.com ● EnVision K-5 intervention supports	● Modify activities/assignments/projects/assessments ● Provide an option for alternative activities/assignments/projects/assessments ● Provide higher-order questioning and discussion opportunities ● Utilize exploratory connections to higher grade concepts ● Modify Content ● Adjust Pacing of Content ● Small Group Enrichment ● Individual Enrichment ● Higher-Level Text

● Provide whole group enrichment   explorations   ● Teach cognitive and methodological skills

● Provide graph paper for computation ● Additional time to complete
activities/assignments/projects/assessment s
● Modify or provide an option for alternative
activities/assignments/projects/assessment s
● Small Group
Instruction/Intervention/Remediation ● Individual Intervention/Remediation ● Additional Support Materials/
Online resources
● Guided Notes or copy of teacher notes ● Review prerequisite skills
● After School Tutoring
● Chunk
activities/assignments/projects/assessment s into manageable units
● Allow student to receive reading text in various forms (written, verbal, audio) r on a lower reading level
● Allow student to make test corrections or retake assessment
● Adjust Pacing of Content
● See IEPs of students for specific modifications
● http://www.wida.us/standards/elp.aspx ● Use center, stations, or contracts ● Organize integrated problem-

solving
simulations
● Propose interest-based extension activities
● Create an enhanced set of introductory
activities (e.g. advance organizers, concept
maps, concept puzzles
● Provide options, alternatives and choices to
differentiate and broaden the curriculum
● Propose independent projects based on
individual interests
● Additional Support Materials/ Online
resources
● After school clubs
● Tiered centers
● Tiered assignments

Key:
Students with 504 Plans

● Provide a checklist for long, detailed tasks ●
Use concrete examples of concepts before
teaching the abstract
- ● Highlight important concepts to be
  learned in text of material
- ● Provide concrete examples for
  homework/class work assignments
- ● Give additional presentations by varying the
  methods using repetition, simpler
  explanations and modeling
- ● Give written directions to supplement
  verbal directions
- ● Familiarize student with new vocabulary
  before beginning lesson
- ● Utilize visual aids and graphic organizers ●
Utilize manipulative, hands-on activities ●

Provide graph paper for computation ●
Additional time to complete
    activities/assignments/projects/assessment s
● Modify or provide an option for
    alternative
    activities/assignments/projects/assessment s
● Small Group
    Instruction/Intervention/Remediation ●
Individual Intervention/Remediation ●
Additional Support Materials/ Online
resources
● Guided Notes or copy of teacher notes ●
Review prerequisite skills

Key:

● After School Tutoring
● Chunk
    activities/assignments/projects/assessment
    s into manageable units
● Allow student to receive reading text in
    various forms (written, verbal, audio) r on
    a lower reading level
● Allow student to make test corrections or
    retake assessment
● Adjust Pacing of Content
● See 504 plan for specific accommodations

Vocabular*y* Ongoing Modifications

Building the language of mathematics

http://maccss.ncdpi.wikispaces.net/file/view/CCSSM%20Vocabulary%20for%20Middle%20School.doc/45 9691144/CCSSM%20Vocabulary%20for%20Middle%20School.doc
Georgia Department of Education: Grade 6 Support Materials for Remediation:

 https://www.georgiastandards.org/Georgia-Standards/Documents/6th-Math-Connections-Support.pdf

Georgia Department of Education: Grade 6/7 Accelerated course guide:

https://www.georgiastandards.org/Georgia-Standards/Frameworks/6-7A-Math-C

Engage NY Fluency Support

file:///C:/Users/Owner/Downloads/math-grades-6-8-fluency-support.pdfomprehensive-Course-overvi ew.pdf

Differentiated centers

Extra time on task

Limited # of items

Key:

Instructional Best Practices and Exemplars

Grade 6 is the introduction to the formal study of statistics for students. Students need multiple opportunities to look at data to determine and word statistical questions. Data should be analyzed from many sources, such as organized lists, box-plots, bar graphs and stem-and-leaf plots. This will help students begin to understand that responses to a statistical question will vary, and that this variability is described in terms of spread and overall shape.

At the same time, students should begin to relate their informal knowledge of mean, mode and median to understand that data can also be described by single numbers. The single value for each of the measures of center (mean, median or mode) and measures of spread (range, interquartile range, mean absolute deviation) is used to summarize the data. Given measures of center for a set of data, students should use the value to describe the data in words.

The important purpose of the number is not the value itself, but the interpretation it provides for the variation of the data. Interpreting different measures of center for the same data develops the understanding of how each measure sheds a different light on the data. The use of a similarity and difference matrix to compare mean, median, mode and range may facilitate understanding the distinctions of purpose between and among the measures of center and spread.

Include activities that require students to match graphs and explanations, or measures of center and explanations prior to interpreting graphs based upon the computation measures of center or spread. The determination of the measures of center and the process for developing graphical representation is the focus of the cluster "Summarize and describe distributions" in the Statistics and Probability domain for Grade 6. Classroom instruction should integrate the two clusters.

The goal is to help students connect the pieces together. This can be done by having students use multiple representations for the mathematical relationship. Students need to be able to translate freely among the story, words (mathematical phrases), models, tables, graphs and equations. They also need to be able to start with any of the representations and develop the others. Provide multiple situations for the student to analyze and determine what unknown is dependent on the other components. For example, how far I travel is dependent on the time and rate that I am traveling.

Throughout the expressions and equations domain in Grade 6, students need to have an understanding of how the expressions or equations relate to situations presented, as well as the process of solving them.

Interdisciplinary Connections Technology Integration

- Language Arts - Students must use close-reading skills in order to understand and solve complex word problems. Students also write mathematical reflections after each unit.
    - **8.1.8.A.1** Demonstrate knowledge of a real world problem using
- Language Arts - Interactive Student Notebook
- Language Arts - Reading Strategies: students will utilize reading comprehension skills by acting out or drawing the order of important events in a story problem. Reading and writing stories to represent addition and subtraction
- Social Studies- understand how to read dates properly ●
Science: temperatures
- Geography/Maps: Above/below sea level
- Business: Income/Cost/Profit
    environment to solve a real world problem or theory.
    - **8.1.8.D.1** Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
    - **8.1.8.D.4** Assess the credibility and accuracy of digital content. ●
    8.2.8.E.1 Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.

digital tools.
- **8.1.8.A.3** Use and/or develop a simulation that provides an