Grade 6 Accelerated Mathematics

Version Description

In Grade 6 Accelerated Mathematics, instructional time will emphasize five areas:

(1) performing all four operations with rational numbers with procedural fluency;
(2) exploring and applying concepts of ratios, rates, percent and proportions to solve problems;
(3) creating, interpreting and using expressions, equations and inequalities;
(4) extending geometric reasoning to plotting points on the coordinate plane, area and volume of geometric figures and
(5) extending understanding of statistical thinking to represent and compare categorical and numerical data.

Curricular content for all subjects must integrate critical-thinking, problem-solving, and workforce-literacy skills; communication, reading, and writing skills; mathematics skills; collaboration skills; contextual and applied-learning skills; technology-literacy skills; information and media-literacy skills; and civic-engagement skills.

All clarifications stated, whether general or specific to Grade 6 Accelerated Mathematics, are expectations for instruction of that benchmark.

General Notes

Honors and Accelerated Level Course Note: Accelerated courses require a greater demand on students through increased academic rigor. Academic rigor is obtained through the application, analysis, evaluation, and creation of complex ideas that are often abstract and multi-faceted. Students are challenged to think and collaborate critically on the content they are learning. Honors level rigor will be achieved by increasing text complexity through text selection, focus on high-level qualitative measures, and complexity of task. Instruction will be structured to give students a deeper understanding of conceptual themes and organization within and across disciplines. Academic rigor is more than simply assigning to students a greater quantity of work.

Florida's Benchmarks for Excellent Student Thinking (B.E.S.T.) Standards: This course includes Florida's B.E.S.T. ELA Expectations (EE) and Mathematical Thinking and Reasoning Standards (MTRs) for students. Florida educators should intentionally embed these standards within the content and their instruction as applicable. For guidance on the implementation of the EEs and MTRs, please visit https://www.cpalms.org/Standards/BEST_Standards.aspx and select the appropriate B.E.S.T. Standards package.

English Language Development ELD Standards Special Notes Section: Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Mathematics. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers

and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link: http://www.cpalms.org/uploads/docs/standards/eld/MA.pdf.

General Information

Course Number: 1205020	Course Type: Core Academic Course
Course Length: Year (Y)	Course Level: 3
Course Attributes: Honors, Class Size Core Required	Grade Level(s): 6, 7
Course Path: Section | Grades PreK to 12 Education Courses > Grade Group | Grades 6 to 8 Education Courses > Subject | Mathematics > SubSubject | General Mathematics > Abbreviated Title | M/J GR 6 ACCEL MATH	
Educator Certification: Mathematics (Grades 6-12) or Middles Grades Mathematics (Middle Grades 5-9)	

Course Standards and Benchmarks

Mathematical Thinking and Reasoning

MA.K12.MTR.1.1 Actively participate in effortful learning both individually and collectively.

Mathematicians who participate in effortful learning both individually and with others:

- Analyze the problem in a way that makes sense given the task.
- Ask questions that will help with solving the task.
- Build perseverance by modifying methods as needed while solving a challenging task.
- Stay engaged and maintain a positive mindset when working to solve tasks.
- Help and support each other when attempting a new method or approach.

Clarifications:

Teachers who encourage students to participate actively in effortful learning both individually and with others:

- Cultivate a community of growth mindset learners.
- Foster perseverance in students by choosing tasks that are challenging.
- Develop students' ability to analyze and problem solve.
- Recognize students' effort when solving challenging problems.

MA.K12.MTR.2.1 Demonstrate understanding by representing problems in multiple ways.

Mathematicians who demonstrate understanding by representing problems in multiple ways:

- Build understanding through modeling and using manipulatives.
- Represent solutions to problems in multiple ways using objects, drawings, tables, graphs and equations.
- Progress from modeling problems with objects and drawings to using algorithms and equations.
- Express connections between concepts and representations.
- Choose a representation based on the given context or purpose.

Clarifications:

Teachers who encourage students to demonstrate understanding by representing problems in multiple ways:

- Help students make connections between concepts and representations.
- Provide opportunities for students to use manipulatives when investigating concepts.
- Guide students from concrete to pictorial to abstract representations as understanding progresses.
- Show students that various representations can have different purposes and can be useful in different situations.

MA.K12.MTR.3.1 Complete tasks with mathematical fluency.

Mathematicians who complete tasks with mathematical fluency:

- Select efficient and appropriate methods for solving problems within the given context.
- Maintain flexibility and accuracy while performing procedures and mental calculations.
- Complete tasks accurately and with confidence.
- Adapt procedures to apply them to a new context.
- Use feedback to improve efficiency when performing calculations.

Clarifications:

Teachers who encourage students to complete tasks with mathematical fluency:

- Provide students with the flexibility to solve problems by selecting a procedure that allows them to solve efficiently and accurately.
- Offer multiple opportunities for students to practice efficient and generalizable methods.
- Provide opportunities for students to reflect on the method they used and determine if a more efficient method could have been used.

MA.K12.MTR.4.1 Engage in discussions that reflect on the mathematical thinking of self and others.

Mathematicians who engage in discussions that reflect on the mathematical thinking of self and others:

- Communicate mathematical ideas, vocabulary and methods effectively.
- Analyze the mathematical thinking of others.
- Compare the efficiency of a method to those expressed by others.
- Recognize errors and suggest how to correctly solve the task.
- Justify results by explaining methods and processes.
- Construct possible arguments based on evidence.

Clarifications:
Teachers who encourage students to engage in discussions that reflect on the mathematical thinking of self and others:

- Establish a culture in which students ask questions of the teacher and their peers, and error is an opportunity for learning.
- Create opportunities for students to discuss their thinking with peers.
- Select, sequence and present student work to advance and deepen understanding of correct and increasingly efficient methods.
- Develop students' ability to justify methods and compare their responses to the responses of their peers.

MA.K12.MTR.5.1 Use patterns and structure to help understand and connect mathematical concepts.

Mathematicians who use patterns and structure to help understand and connect mathematical concepts:

- Focus on relevant details within a problem.
- Create plans and procedures to logically order events, steps or ideas to solve problems.
- Decompose a complex problem into manageable parts.
- Relate previously learned concepts to new concepts.
- Look for similarities among problems.
- Connect solutions of problems to more complicated large-scale situations.

Clarifications:
Teachers who encourage students to use patterns and structure to help understand and connect mathematical concepts:

- Help students recognize the patterns in the world around them and connect these patterns to mathematical concepts.
- Support students to develop generalizations based on the similarities found among problems.
- Provide opportunities for students to create plans and procedures to solve problems.
- Develop students' ability to construct relationships between their current understanding and more sophisticated ways of thinking.

MA.K12.MTR.6.1 Assess the reasonableness of solutions.

Mathematicians who assess the reasonableness of solutions:

- Estimate to discover possible solutions.
- Use benchmark quantities to determine if a solution makes sense.
- Check calculations when solving problems.
- Verify possible solutions by explaining the methods used.
- Evaluate results based on the given context.

Clarifications:

Teachers who encourage students to assess the reasonableness of solutions:

- Have students estimate or predict solutions prior to solving.
- Prompt students to continually ask, "Does this solution make sense? How do you know?"
- Reinforce that students check their work as they progress within and after a task.
- Strengthen students' ability to verify solutions through justifications.

MA.K12.MTR.7.1 Apply mathematics to real-world contexts.

Mathematicians who apply mathematics to real-world contexts:

- Connect mathematical concepts to everyday experiences.
- Use models and methods to understand, represent and solve problems.
- Perform investigations to gather data or determine if a method is appropriate.
- Redesign models and methods to improve accuracy or efficiency.

Clarifications:

Teachers who encourage students to apply mathematics to real-world contexts:

- Provide opportunities for students to create models, both concrete and abstract, and perform investigations.
- Challenge students to question the accuracy of their models and methods.
- Support students as they validate conclusions by comparing them to the given situation.
- Indicate how various concepts can be applied to other disciplines.

English Language Arts Expectations

ELA.K12.EE.1.1 Cite evidence to explain and justify reasoning.

ELA.K12.EE.2.1 Read and comprehend grade-level complex texts proficiently.

ELA.K12.EE.3.1 Make inferences to support comprehension.

ELA.K12.EE.4.1 Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.

ELA.K12.EE.5.1 Use the accepted rules governing a specific format to create quality work.

ELA.K12.EE.6.1 Use appropriate voice and tone when speaking or writing.

English Language Development

ELD.K12.ELL.MA Language of Mathematics

ELD.K12.ELL.MA.1	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics.

Number Sense and Operations

MA.6.NSO.1 Extend knowledge of numbers to negative numbers and develop an understanding of absolute value.

MA.6.NSO.1.1	Extend previous understanding of numbers to define rational numbers. Plot, order and compare rational numbers.

Benchmark Clarifications:
Clarification 1: Within this benchmark, the expectation is to plot, order and compare positive and negative rational numbers when given in the same form and to plot, order and compare positive rational numbers when given in different forms (fraction, decimal, percentage).
Clarification 2: Within this benchmark, the expectation is to use symbols (<, > or =).

MA.6.NSO.1.2	Given a mathematical or real-world context, represent quantities that have opposite direction using rational numbers. Compare them on a number line and explain the meaning of zero within its context. *Example:* Jasmine is on a cruise and is going on a scuba diving excursion. Her elevations of 10 feet above sea level and 8 feet below sea level can be compared on a number line, where 0 represents sea level.

Benchmark Clarifications:
Clarification 1: Instruction includes vertical and horizontal number lines, context referring to distances, temperatures and finances and using informal verbal comparisons, such as, lower, warmer or more in debt.
Clarification 2: Within this benchmark, the expectation is to compare positive and negative rational numbers when given in the same form.

MA.6.NSO.1.3 Given a mathematical or real-world context, interpret the absolute value of a number as the distance from zero on a number line. Find the absolute value of rational numbers.

Benchmark Clarifications:
Clarification 1: Instruction includes the connection of absolute value to mirror images about zero and to opposites.
Clarification 2: Instruction includes vertical and horizontal number lines and context referring to distances, temperature and finances.

MA.6.NSO.1.4 Solve mathematical and real-world problems involving absolute value, including the comparison of absolute value.

Example: Michael has a lemonade stand which costs $10 to start up. If he makes $5 the first day, he can determine whether he made a profit so far by comparing $|-10|$ and $|5|$.

Benchmark Clarifications:
Clarification 1: Absolute value situations include distances, temperatures and finances.
Clarification 2: Problems involving calculations with absolute value are limited to two or fewer operations.
Clarification 3: Within this benchmark, the expectation is to use integers only.

MA.6.NSO.2 Add, subtract, multiply and divide positive rational numbers.

MA.6.NSO.2.1 Multiply and divide positive multi-digit numbers with decimals to the thousandths, including using a standard algorithm with procedural fluency.

Benchmark Clarifications:
Clarification 1: Multi-digit decimals are limited to no more than 5 total digits.

MA.6.NSO.2.2 Extend previous understanding of multiplication and division to compute products and quotients of positive fractions by positive fractions, including mixed numbers, with procedural fluency.

Benchmark Clarifications:
Clarification 1: Instruction focuses on making connections between visual models, the relationship between multiplication and division, reciprocals and algorithms.

MA.6.NSO.2.3 Solve multi-step real-world problems involving any of the four operations with positive multi-digit decimals or positive fractions, including mixed numbers.

Benchmark Clarifications:
Clarification 1: Within this benchmark, it is not the expectation to include both decimals and fractions within a single problem.

MA.6.NSO.3 Apply properties of operations to rewrite numbers in equivalent forms.

MA.6.NSO.3.1 Given a mathematical or real-world context, find the greatest common factor and least common multiple of two whole numbers.

Example: Middleton Middle School's band has an upcoming winter concert which will have several performances. The bandleader would like to divide the students into concert groups with the same number of flute players, the same number of clarinet players and the same number of violin players in each group. There are a total of 15 students who play the flute, 27 students who play the clarinet and 12 students who play the violin. How many separate groups can be formed?

Example: Adam works out every 8 days and Susan works out every 12 days. If both Adam and Susan work out today, how many days until they work out on the same day again?

Benchmark Clarifications:
Clarification 1: Within this benchmark, expectations include finding greatest common factor within 1,000 and least common multiple with factors to 25.
Clarification 2: Instruction includes finding the greatest common factor of the numerator and denominator of a fraction to simplify the fraction.

MA.6.NSO.3.2 Rewrite the sum of two composite whole numbers having a common factor, as a common factor multiplied by the sum of two whole numbers.

Benchmark Clarifications:
Clarification 1: Instruction includes using the distributive property to generate equivalent expressions.

MA.6.NSO.3.3 Evaluate positive rational numbers and integers with natural number exponents.

Benchmark Clarifications:
Clarification 1: Within this benchmark, expectations include using natural number exponents up to 5.

MA.6.NSO.3.4 Express composite whole numbers as a product of prime factors with natural number exponents.

MA.6.NSO.3.5 Rewrite positive rational numbers in different but equivalent forms including fractions, terminating decimals and percentages.

Example: The number $1\frac{5}{8}$ can be written equivalently as 1.625 or 162.5%.

Benchmark Clarifications:
Clarification 1: Rational numbers include decimal equivalence up to the thousandths place.

MA.6.NSO.4 Extend understanding of operations with integers.

MA.6.NSO.4.1 Apply and extend previous understandings of operations with whole numbers to add and subtract integers with procedural fluency.

Benchmark Clarifications:
Clarification 1: Instruction begins with the use of manipulatives, models and number lines working towards becoming procedurally fluent by the end of grade 6.
Clarification 2: Instruction focuses on the inverse relationship between the operations of addition and subtraction. If p and q are integers, then $p - q = p + (-q)$ and $p + q = p - (-q)$.

MA.6.NSO.4.2 Apply and extend previous understandings of operations with whole numbers to multiply and divide integers with procedural fluency.

Benchmark Clarifications:
Clarification 1: Instruction includes the use of models and number lines and the inverse relationship between multiplication and division, working towards becoming procedurally fluent by the end of grade 6.
Clarification 2: Instruction focuses on the understanding that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers where $q \neq 0$, then $-\left(\frac{p}{q}\right) = \frac{-p}{q}$, $-\left(\frac{p}{q}\right) = \frac{p}{-q}$ and $\frac{p}{q} = \frac{-p}{-q}$.

MA.7.NSO.2 Add, subtract, multiply and divide positive rational numbers.

MA.7.NSO.2.1 Solve mathematical problems using multi-step order of operations with rational numbers including grouping symbols, whole-number exponents and absolute value.

Benchmark Clarifications:
Clarification 1: Multi-step expressions are limited to 6 or fewer steps.

MA.7.NSO.2.2 Add, subtract, multiply and divide rational numbers with procedural fluency.

MA.7.NSO.2.3 Solve real-world problems involving any of the four operations with rational numbers.

Benchmark Clarifications:
Clarification 1: Instruction includes using one or more operations to solve problems.

Algebraic Reasoning

MA.6.AR.1 Apply previous understanding of arithmetic expressions to algebraic expressions.

MA.6.AR.1.1 Given a mathematical or real-world context, translate written descriptions into algebraic expressions and translate algebraic expressions into written descriptions.

Example: The algebraic expression $7.2x - 20$ can be used to describe the daily profit of a company who makes \$7.20 per product sold with daily expenses of \$20.

MA.6.AR.1.2 Translate a real-world written description into an algebraic inequality in the form of $x > a$, $x < a$, $x \geq a$ or $x \leq a$. Represent the inequality on a number line.

Example: Mrs. Anna told her class that they will get a pizza if the class has an average of at least 83 out of 100 correct questions on the semester exam. The inequality $g \geq 83$ can be used to represent the situation where students receive a pizza and the inequality $g < 83$ can be used to represent the situation where students do not receive a pizza.

Benchmark Clarifications:
Clarification 1: Variables may be on the left or right side of the inequality symbol.

MA.6.AR.1.3 Evaluate algebraic expressions using substitution and order of operations.

Example: Evaluate the expression $2a^2 - \frac{b}{5}$, where $a = -1$ and $b = 15$.

Benchmark Clarifications:
Clarification 1: Within this benchmark, the expectation is to perform all operations with integers.
Clarification 2: Refer to Properties of Operations, Equality and Inequality (Appendix D).

MA.6.AR.1.4 Apply the properties of operations to generate equivalent algebraic expressions with integer coefficients.

Example: The expression $5(3x + 1)$ can be rewritten equivalently as $15x + 5$.
Example: If the expression $2x + 3x$ represents the profit the cheerleading team can make when selling the same number of cupcakes, sold for \$2 each, and brownies, sold for \$3 each. The expression $5x$ can express the total profit.

Benchmark Clarifications:
Clarification 1: Properties include associative, commutative and distributive.
Clarification 2: Refer to Properties of Operations, Equality and Inequality (Appendix D).

MA.6.AR.2 Develop an understanding for solving equations and inequalities. Write and solve one-step equations in one variable.

MA.6.AR.2.1 Given an equation or inequality and a specified set of integer values, determine which values make the equation or inequality true or false.

Example: Determine which of the following values make the inequality $x + 1 < 2$ true: $-4, -2, 0, 1$.

Benchmark Clarifications:
Clarification 1: Problems include the variable in multiple terms or on either side of the equal sign or inequality symbol.

MA.6.AR.2.2 Write and solve one-step equations in one variable within a mathematical or real-world context using addition and subtraction, where all terms and solutions are integers.

Example: The equations $-35 + x = 17$, $17 = -35 + x$ and $17 - x = -35$ can represent the question "How many units to the right is 17 from -35 on the number line?"

Benchmark Clarifications:
Clarification 1: Instruction includes using manipulatives, drawings, number lines and inverse operations.
Clarification 2: Instruction includes equations in the forms $x + p = q$ and $p + x = q$, where x, p and q are any integer.
Clarification 3: Problems include equations where the variable may be on either side of the equal sign.

MA.6.AR.2.3 Write and solve one-step equations in one variable within a mathematical or real-world context using multiplication and division, where all terms and solutions are integers.

Benchmark Clarifications:
Clarification 1: Instruction includes using manipulatives, drawings, number lines and inverse operations.
Clarification 2: Instruction includes equations in the forms $\frac{x}{p} = q$, where $p \neq 0$, and $px = q$.
Clarification 3: Problems include equations where the variable may be on either side of the equal sign.

MA.6.AR.2.4 Determine the unknown decimal or fraction in an equation involving any of the four operations, relating three numbers, with the unknown in any position.

Example: Given the equation $\frac{9}{8} = x - \frac{1}{8}$, x can be determined to be $\frac{10}{8}$ because $\frac{10}{8}$ is $\frac{1}{8}$ more than $\frac{9}{8}$.

Benchmark Clarifications:
Clarification 1: Instruction focuses on using algebraic reasoning, drawings, and mental math to determine unknowns.
Clarification 2: Problems include the unknown and different operations on either side of the equal sign. All terms and solutions are limited to positive rational numbers.

MA.6.AR.3 Understand ratio and unit rate concepts and use them to solve problems.

MA.6.AR.3.1 Given a real-world context, write and interpret ratios to show the relative sizes of two quantities using appropriate notation: $\frac{a}{b}$, a to b, or $a:b$ where $b \neq 0$.

Benchmark Clarifications:
Clarification 1: Instruction focuses on the understanding that a ratio can be described as a comparison of two quantities in either the same or different units.
Clarification 2: Instruction includes using manipulatives, drawings, models and words to interpret part-to-part ratios and part-to-whole ratios.
Clarification 3: The values of a and b are limited to whole numbers.

MA.6.AR.3.2 Given a real-world context, determine a rate for a ratio of quantities with different units. Calculate and interpret the corresponding unit rate.

Example: Tamika can read 500 words in 3 minutes. Her reading rate can be described as $\frac{500\ words}{3\ minutes}$ which is equivalent to the unit rate of $166\frac{2}{3}$ words per minute.

Benchmark Clarifications:
Clarification 1: Instruction includes using manipulatives, drawings, models and words and making connections between ratios, rates and unit rates.
Clarification 2: Problems will not include conversions between customary and metric systems.

MA.6.AR.3.3 Extend previous understanding of fractions and numerical patterns to generate or complete a two- or three-column table to display equivalent part-to-part ratios and part-to-part-to-whole ratios.

Example: The table below expresses the relationship between the number of ounces of yellow and blue paints used to create a new color. Determine the ratios and complete the table.

Yellow (part)	1.5	3		9
Blue (part)	2	4		
New color (whole)			12	21

Benchmark Clarifications:
Clarification 1: Instruction includes using two-column tables (e.g., a relationship between two variables) and three-column tables (e.g., part-to-part-to-whole relationship) to generate conversion charts and mixture charts.

MA.6.AR.3.4 Apply ratio relationships to solve mathematical and real-world problems involving percentages using the relationship between two quantities.

Example: Gerald is trying to gain muscle and needs to consume more protein every day. If he has a protein shake that contain 32 grams and the entire shake is 340 grams, what percentage of the entire shake is protein? What is the ratio between grams of protein and grams of non-protein?

Benchmark Clarifications:
Clarification 1: Instruction includes the comparison of $\frac{part}{whole}$ to $\frac{percent}{100}$ in order to determine the percent, the part or the whole.

MA.6.AR.3.5 Solve mathematical and real-world problems involving ratios, rates and unit rates, including comparisons, mixtures, ratios of lengths and conversions within the same measurement system.

Benchmark Clarifications:
Clarification 1: Instruction includes the use of tables, tape diagrams and number lines.

MA.7.AR.1 Rewrite algebraic expressions in equivalent forms.

MA.7.AR.1.1 Apply properties of operations to add and subtract linear expressions with rational coefficients.

Example: $(7x - 4) - \left(2 - \frac{1}{2}x\right)$ is equivalent to $\frac{15}{2}x - 6$.

Benchmark Clarifications:
Clarification 1: Instruction includes linear expressions in the form $ax \pm b$ or $b \pm ax$, where a and b are rational numbers.
Clarification 2: Refer to Properties of Operations, Equality and Inequality (Appendix D).

MA.7.AR.1.2 Determine whether two linear expressions are equivalent.

Example: Are the expressions $\frac{4}{3}(6-x)-3x$ and $8-\frac{5}{3}x$ equivalent?

Benchmark Clarifications:
Clarification 1: Instruction includes using properties of operations accurately and efficiently.
Clarification 2: Instruction includes linear expressions in any form with rational coefficients.
Clarification 3: Refer to Properties of Operations, Equality and Inequality (Appendix D).

MA.7.AR.2 Write and solve equations and inequalities in one variable

MA.7.AR.2.1 Write and solve one-step inequalities in one variable within a mathematical context and represent solutions algebraically or graphically.

Benchmark Clarifications:
Clarification 1: Instruction focuses on the properties of inequality. Refer to Properties of Operations, Equality and Inequality (Appendix D).
Clarification 2: Instruction includes inequalities in the forms $px > q$; $\frac{x}{p} > q$; $x \pm p > q$ and $p \pm x > q$, where p and q are specific rational numbers and any inequality symbol can be represented.
Clarification 3: Problems include inequalities where the variable may be on either side of the inequality symbol.

MA.7.AR.3 Use percentages and proportional reasoning to solve problems.

MA.7.AR.3.1 Apply previous understanding of percentages and ratios to solve multi-step real-world percent problems.

Example: 23% of the junior population are taking an art class this year. What is the ratio of juniors taking an art class to juniors not taking an art class?
Example: The ratio of boys to girls in a class is $3:2$. What percentage of the students are boys in the class?

Benchmark Clarifications:
Clarification 1: Instruction includes discounts, markups, simple interest, tax, tips, fees, percent increase, percent decrease and percent error.

MA.7.AR.3.2	Apply previous understanding of ratios to solve real-world problems involving proportions.

Example: Scott is mowing lawns to earn money to buy a new gaming system and knows he needs to mow 35 lawns to earn enough money. If he can mow 4 lawns in 3 hours and 45 minutes, how long will it take him to mow 35 lawns? Assume that he can mow each lawn in the same amount of time.

Example: Ashley normally runs 10-kilometer races which is about 6.2 miles. She wants to start training for a half-marathon which is 13.1 miles. How many kilometers will she run in the half-marathon? How does that compare to her normal 10K race distance?

Geometric Reasoning

MA.6.GR.1 Apply previous understanding of the coordinate plane to solve problems.

MA.6.GR.1.1	Extend previous understanding of the coordinate plane to plot rational number ordered pairs in all four quadrants and on both axes. Identify the x- or y-axis as the line of reflection when two ordered pairs have an opposite x- or y-coordinate.
MA.6.GR.1.2	Find distances between ordered pairs, limited to the same x-coordinate or the same y-coordinate, represented on the coordinate plane.
MA.6.GR.1.3	Solve mathematical and real-world problems by plotting points on a coordinate plane, including finding the perimeter or area of a rectangle.

Benchmark Clarifications:
Clarification 1: Instruction includes finding distances between points, computing dimensions of a rectangle or determining a fourth vertex of a rectangle.
Clarification 2: Problems involving rectangles are limited to cases where the sides are parallel to the axes.

MA.6.GR.2 Model and solve problems involving two-dimensional figures and three-dimensional figures.

MA.6.GR.2.1	Derive a formula for the area of a right triangle using a rectangle. Apply a formula to find the area of a triangle.

Benchmark Clarifications:
Clarification 1: Instruction focuses on the relationship between the area of a rectangle and the area of a right triangle.
Clarification 2: Within this benchmark, the expectation is to know from memory a formula for the area of a triangle.

MA.6.GR.2.2 Solve mathematical and real-world problems involving the area of quadrilaterals and composite figures by decomposing them into triangles or rectangles.

Benchmark Clarifications:
Clarification 1: Problem types include finding area of composite shapes and determining missing dimensions.
Clarification 2: Within this benchmark, the expectation is to know from memory a formula for the area of a rectangle and triangle.
Clarification 3: Dimensions are limited to positive rational numbers.

MA.6.GR.2.3 Solve mathematical and real-world problems involving the volume of right rectangular prisms with positive rational number edge lengths using a visual model and a formula.

Benchmark Clarifications:
Clarification 1: Problem types include finding the volume or a missing dimension of a rectangular prism.

MA.6.GR.2.4 Given a mathematical or real-world context, find the surface area of right rectangular prisms and right rectangular pyramids using the figure's net.

Benchmark Clarifications:
Clarification 1: Instruction focuses on representing a right rectangular prism and right rectangular pyramid with its net and on the connection between the surface area of a figure and its net.
Clarification 2: Within this benchmark, the expectation is to find the surface area when given a net or when given a three-dimensional figure.
Clarification 3: Problems involving right rectangular pyramids are limited to cases where the heights of triangles are given.
Clarification 4: Dimensions are limited to positive rational numbers.

MA.7.GR.1 Solve problems involving two-dimensional figures, including circles.

MA.7.GR.1.1 Apply formulas to find the areas of trapezoids, parallelograms and rhombi.

Benchmark Clarifications:
Clarification 1: Instruction focuses on the connection from the areas of trapezoids, parallelograms and rhombi to the areas of rectangles or triangles.
Clarification 2: Within this benchmark, the expectation is not to memorize area formulas for trapezoids, parallelograms and rhombi.

MA.7.GR.1.2 Solve mathematical or real-world problems involving the area of polygons or composite figures by decomposing them into triangles or quadrilaterals.

Benchmark Clarifications:
Clarification 1: Within this benchmark, the expectation is not to find areas of figures on the coordinate plane or to find missing dimensions.

Data Analysis and Probability

MA.6.DP.1 Develop an understanding of statistics and determine measures of center and measures of variability. Summarize statistical distributions graphically and numerically.

MA.6.DP.1.1 Recognize and formulate a statistical question that would generate numerical data.

Example: The question "How many minutes did you spend on mathematics homework last night?" can be used to generate numerical data in one variable.

MA.6.DP.1.2 Given a numerical data set within a real-world context, find and interpret mean, median, mode and range.

Example: The data set $\{15, 0, 32, 24, 0, 17, 42, 0, 29, 120, 0, 20\}$, collected based on minutes spent on homework, has a mode of 0.

Benchmark Clarifications:
Clarification 1: Numerical data is limited to positive rational numbers.

MA.6.DP.1.3 Given a box plot within a real-world context, determine the minimum, the lower quartile, the median, the upper quartile and the maximum. Use this summary of the data to describe the spread and distribution of the data.

Example: The middle 50% of the population can be determined by finding the interval between the upper quartile and the lower quartile.

Benchmark Clarifications:
Clarification 1: Instruction includes describing range, interquartile range, halves and quarters of the data.

MA.6.DP.1.4 Given a histogram or line plot within a real-world context, qualitatively describe and interpret the spread and distribution of the data, including any symmetry, skewness, gaps, clusters, outliers and the range.

Benchmark Clarifications:
Clarification 1: Refer to K-12 Mathematics Glossary (Appendix C).

MA.6.DP.1.5 Create box plots and histograms to represent sets of numerical data within real-world contexts.

Example: The numerical data set $\{15, 0, 32, 24, 0, 17, 42, 0, 29, 120, 0, 20\}$, collected based on minutes spent on homework, can be represented graphically using a box plot.

Benchmark Clarifications:
Clarification 1: Instruction includes collecting data and discussing ways to collect truthful data to construct graphical representations.
Clarification 2: Within this benchmark, it is the expectation to use appropriate titles, labels, scales and units when constructing graphical representations.
Clarification 3: Numerical data is limited to positive rational numbers.

MA.6.DP.1.6 Given a real-world scenario, determine and describe how changes in data values impact measures of center and variation.

Benchmark Clarifications:
Clarification 1: Instruction includes choosing the measure of center or measure of variation depending on the scenario.
Clarification 2: The measures of center are limited to mean and median. The measures of variation are limited to range and interquartile range.
Clarification 3: Numerical data is limited to positive rational numbers.

MA.7.DP.1 Represent and interpret numerical and categorical data.

MA.7.DP.1.1 Determine an appropriate measure of center or measure of variation to summarize numerical data, represented numerically or graphically, taking into consideration the context and any outliers.

Benchmark Clarifications:
Clarification 1: Instruction includes recognizing whether a measure of center or measure of variation is appropriate and can be justified based on the given context or the statistical purpose.
Clarification 2: Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots.
Clarification 3: The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.

MA.7.DP.1.2 Given two numerical or graphical representations of data, use the measure(s) of center and measure(s) of variability to make comparisons, interpret results and draw conclusions about the two populations.

Benchmark Clarifications:
Clarification 1: Graphical representations are limited to histograms, line plots, box plots and stem-and-leaf plots.
Clarification 2: The measure of center is limited to mean and median. The measure of variation is limited to range and interquartile range.

MA.7.DP.1.3 Given categorical data from a random sample, use proportional relationships to make predictions about a population.

Example: O'Neill's Pillow Store made 600 pillows yesterday and found that 6 were defective. If they plan to make 4,300 pillows this week, predict approximately how many pillows will be defective.

Example: A school district polled 400 people to determine if it was a good idea to not have school on Friday. 30% of people responded that it was not a good idea to have school on Friday. Predict the approximate percentage of people who think it would be a good idea to have school on Friday from a population of 6,228 people.

MA.7.DP.2 Develop an understanding of probability. Find and compare experimental and theoretical probabilities.

MA.7.DP.2.1 Determine the sample space for a simple experiment.

Benchmark Clarifications:
Clarification 1: Simple experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.

MA.7.DP.2.2 Given the probability of a chance event, interpret the likelihood of it occurring. Compare the probabilities of chance events.

Benchmark Clarifications:
Clarification 1: Instruction includes representing probability as a fraction, percentage or decimal between 0 and 1 with probabilities close to 1 corresponding to highly likely events and probabilities close to 0 corresponding to highly unlikely events.
Clarification 2: Instruction includes $P(event)$ notation.
Clarification 3: Instruction includes representing probability as a fraction, percentage or decimal.

MA.7.DP.2.3 Find the theoretical probability of an event related to a simple experiment.

Benchmark Clarifications:
Clarification 1: Instruction includes representing probability as a fraction, percentage or decimal.
Clarification 2: Simple experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.

MA.7.DP.2.4 Use a simulation of a simple experiment to find experimental probabilities and compare them to theoretical probabilities.

Example: Investigate whether a coin is fair by tossing it 1,000 times and comparing the percentage of heads to the theoretical probability 0.5.

Benchmark Clarifications:
Clarification 1: Instruction includes representing probability as a fraction, percentage or decimal.
Clarification 2: Instruction includes recognizing that experimental probabilities may differ from theoretical probabilities due to random variation. As the number of repetitions increases experimental probabilities will typically better approximate the theoretical probabilities.
Clarification 3: Experiments include tossing a fair coin, rolling a fair die, picking a card randomly from a deck, picking marbles randomly from a bag and spinning a fair spinner.