Grade 4 Accelerated Mathematics

Version Description

In Grade 4 Accelerated Mathematics, instructional time will emphasize six areas:

(1) developing the relationship between fractions and decimals;
(2) multiplying and dividing multi-digit whole numbers, including using a standard algorithm;
(3) adding and subtracting fractions and decimals with procedural fluency, developing an understanding of multiplication and division of fractions and decimals;
(4) developing an understanding of the coordinate plane and plotting pairs of numbers in the first quadrant;
(5) extending geometric reasoning to include volume and
(6) developing an understanding for interpreting data to include mean, mode, median and range.

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 4 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: 5012065	Course Type: Core Academic Course
Course Length: Year (Y)	Course Level: 3
Course Attributes: Honors, Class Size Core Required	Grade Level(s): 4, 5
Course Path: Section | Grades PreK to 12 Education Courses > Grade Group | Grades PreK to 5 Education Courses > Subject | Mathematics > SubSubject | General Mathematics > Abbreviated Title | GR 4 ACCEL MATH	
Educator Certification: Elementary Education (Elementary Grades 1-6) or Elementary Education (Grades K-6) or Mathematics (Elementary Grades 1-6)	

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.

ELA 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.4.NSO.1 Understand place value for multi-digit numbers.

MA.4.NSO.1.1	Express how the value of a digit in a multi-digit whole number changes if the digit moves one place to the left or right.
MA.4.NSO.1.5	Plot, order and compare decimals up to the hundredths. *Example:* The numbers 3.2; 3.24 and 3.12 can be arranged in ascending order as 3.12; 3.2 and 3.24.

Benchmark Clarifications:
Clarification 1: When comparing numbers, instruction includes using an appropriately scaled number line and using place values of the ones, tenths and hundredths digits.
Clarification 2: Within the benchmark, the expectation is to explain the reasoning for the comparison and use symbols ($<$, $>$ or $=$).
Clarification 3: Scaled number lines must be provided and can be a representation of any range of numbers.

MA.4.NSO.2 Build an understanding of operations with multi-digit numbers including decimals.

MA.4.NSO.2.3	Multiply two whole numbers, each up to two digits, including using a standard algorithm with procedural fluency.

MA.4.NSO.2.4	Divide a whole number up to four digits by a one-digit whole number with procedural reliability. Represent remainders as fractional parts of the divisor.

Benchmark Clarifications:
Clarification 1: Instruction focuses on helping a student choose a method they can use reliably.
Clarification 2: Instruction includes the use of models based on place value, properties of operations or the relationship between multiplication and division.

MA.4.NSO.2.6	Identify the number that is one-tenth more, one-tenth less, one-hundredth more and one-hundredth less than a given number. *Example:* One-hundredth less than 1.10 is 1.09. *Example:* One-tenth more than 2.31 is 2.41.
MA.4.NSO.2.7	Explore the addition and subtraction of multi-digit numbers with decimals to the hundredths.

Benchmark Clarifications:
Clarification 1: Instruction includes the connection to money and the use of manipulatives and models based on place value.

MA.5.NSO.1 Understand the place value of multi-digit numbers with decimals to the thousandths place.

MA.5.NSO.1.1	Express how the value of a digit in a multi-digit number with decimals to the thousandths changes if the digit moves one or more places to the left or right.
MA.5.NSO.1.2	Read and write multi-digit numbers with decimals to the thousandths using standard form, word form and expanded form. *Example:* The number sixty-seven and three hundredths written in standard form is 67.03 and in expanded form is $60 + 7 + 0.03$ or $(6 \times 10) + (7 \times 1) + \left(3 \times \frac{1}{100}\right)$.
MA.5.NSO.1.3	Compose and decompose multi-digit numbers with decimals to the thousandths in multiple ways using the values of the digits in each place. Demonstrate the compositions or decompositions using objects, drawings and expressions or equations. *Example:* The number 20.107 can be expressed as $2\ tens\ +\ 1\ tenth +$ $7\ thousandths$ or as $20\ ones\ +\ 107\ thousandths$.

MA.5.NSO.1.4 Plot, order and compare multi-digit numbers with decimals up to the thousandths.

Example: The numbers 4.891; 4.918 and 4.198 can be arranged in ascending order as 4.198; 4.891 and 4.918.

Example: $0.15 < 0.2$ because $fifteen\ hundredths$ is less than $twenty\ hundredths$, which is the same as $two\ tenths$.

Benchmark Clarifications:
Clarification 1: When comparing numbers, instruction includes using an appropriately scaled number line and using place values of digits.
Clarification 2: Scaled number lines must be provided and can be a representation of any range of numbers.
Clarification 3: Within this benchmark, the expectation is to use symbols ($<$, $>$ or $=$).

MA.5.NSO.1.5 Round multi-digit numbers with decimals to the thousandths to the nearest hundredth, tenth or whole number.

Example: The number 18.507 rounded to the nearest tenth is 18.5 and to the nearest hundredth is 18.51.

MA.5.NSO.2 Add, subtract, multiply and divide multi-digit numbers.

MA.5.NSO.2.1 Multiply multi-digit whole numbers including using a standard algorithm with procedural fluency.

MA.5.NSO.2.2 Divide multi-digit whole numbers, up to five digits by two digits, including using a standard algorithm with procedural fluency. Represent remainders as fractions.

Example: The quotient $27 \div 7$ gives 3 with remainder 6 which can be expressed as $3\frac{6}{7}$.

Benchmark Clarifications:
Clarification 1: Within this benchmark, the expectation is not to use simplest form for fractions.

MA.5.NSO.2.3 Add and subtract multi-digit numbers with decimals to the thousandths, including using a standard algorithm with procedural fluency.

MA.5.NSO.2.4 Explore the multiplication and division of multi-digit numbers with decimals to the hundredths using estimation, rounding and place value.

Example: The quotient of 23 and 0.42 can be estimated as a little bigger than 46 because 0.42 is less than one-half and 23 times 2 is 46.

Benchmark Clarifications:
Clarification 1: Estimating quotients builds the foundation for division using a standard algorithm.
Clarification 2: Instruction includes the use of models based on place value and the properties of operations.

MA.5.NSO.2.5	Multiply and divide a multi-digit number with decimals to the tenths by one-tenth and one-hundredth with procedural reliability. *Example:* The number 12.3 divided by 0.01 can be thought of as $? \times 0.01 = 12.3$ to determine the quotient is 1,230.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction focuses on the place value of the digit when multiplying or dividing.

Fractions

MA.4.FR.1 Develop an understanding of the relationship between different fractions and the relationship between fractions and decimals.

MA.4.FR.1.2	Use decimal notation to represent fractions with denominators of 10 or 100, including mixed numbers and fractions greater than 1, and use fractional notation with denominators of 10 or 100 to represent decimals.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction emphasizes conceptual understanding through the use of manipulatives visual models, number lines or equations.
Clarification 2: Instruction includes the understanding that a decimal and fraction that are equivalent represent the same point on the number line and that fractions with denominators of 10 or powers of 10 may be called decimal fractions.

MA.4.FR.2 Build a foundation of addition, subtraction and multiplication operations with fractions.

MA.4.FR.2.4 Extend previous understanding of multiplication to explore the multiplication of a fraction by a whole number or a whole number by a fraction.

Example: Shanice thinks about finding the product $\frac{1}{4} \times 8$ by imagining having 8 pizzas that she wants to split equally with three of her friends. She and each of her friends will get 2 pizzas since $\frac{1}{4} \times 8 = 2$.

Example: Lacey thinks about finding the product $8 \times \frac{1}{4}$ by imagining having 8 pizza boxes each with one-quarter slice of a pizza left. If she put them all together, she would have a total of 2 whole pizzas since $8 \times \frac{1}{4} = \frac{8}{4}$ which is equivalent to 2.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction includes the use of visual models or number lines and the connection to the commutative property of multiplication. Refer to Properties of Operation, Equality and Inequality (Appendix D).
Clarification 2: Within this benchmark, the expectation is not to simplify or use lowest terms.
Clarification 3: Fractions multiplied by a whole number are limited to less than 1. All denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 16, 100.

MA.5.FR.1 Interpret a fraction as an answer to a division problem.

MA.5.FR.1.1 Given a mathematical or real-world problem, represent the division of two whole numbers as a fraction.

Example: At Shawn's birthday party, a two-gallon container of lemonade is shared equally among 20 friends. Each friend will have $\frac{2}{20}$ of a gallon of lemonade which is equivalent to one-tenth of a gallon which is a little more than 12 ounces.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction includes making a connection between fractions and division by understanding that fractions can also represent division of a numerator by a denominator.
Clarification 2: Within this benchmark, the expectation is not to simplify or use lowest terms.
Clarification 3: Fractions can include fractions greater than one.

MA.5.FR.2 Perform operations with fractions.

MA.5.FR.2.1 Add and subtract fractions with unlike denominators, including mixed numbers and fractions greater than 1, with procedural reliability.

Example: The sum of $\frac{1}{12}$ and $\frac{1}{24}$ can be determined as $\frac{1}{8}, \frac{3}{24}, \frac{6}{48}$ or $\frac{36}{288}$ by using different common denominators or equivalent fractions.

Benchmark Clarifications:
Clarification 1: Instruction includes the use of estimation, manipulatives, drawings or the properties of operations.
Clarification 2: Instruction builds on the understanding from previous grades of factors up to 12 and their multiples.

MA.5.FR.2.2 Extend previous understanding of multiplication to multiply a fraction by a fraction, including mixed numbers and fractions greater than 1, with procedural reliability.

Benchmark Clarifications:
Clarification 1: Instruction includes the use of manipulatives, drawings or the properties of operations.
Clarification 2: Denominators limited to whole numbers up to 20.

MA.5.FR.2.3 When multiplying a given number by a fraction less than 1 or a fraction greater than 1, predict and explain the relative size of the product to the given number without calculating.

Benchmark Clarifications:
Clarification 1: Instruction focuses on the connection to decimals, estimation and assessing the reasonableness of an answer.

MA.5.FR.2.4 Extend previous understanding of division to explore the division of a unit fraction by a whole number and a whole number by a unit fraction.

Benchmark Clarifications:
Clarification 1: Instruction includes the use of manipulatives, drawings or the properties of operations.
Clarification 2: Refer to Situations Involving Operations with Numbers (Appendix A).

Algebraic Reasoning

MA.4.AR.1 Represent and solve problems involving the four operations with whole numbers and fractions.

MA.4.AR.1.1	Solve real-world problems involving multiplication and division of whole numbers including problems in which remainders must be interpreted within the context. *Example:* A group of 243 students is taking a field trip and traveling in vans. If each van can hold 8 students, then the group would need 31 vans for their field trip because 243 divided by 8 gives 30 with a remainder of 3.

Benchmark Clarifications:
Clarification 1: Problems involving multiplication include multiplicative comparisons. Refer to Situations Involving Operations with Numbers (Appendix A).
Clarification 2: Depending on the context, the solution of a division problem with a remainder may be the whole number part of the quotient, the whole number part of the quotient with the remainder, the whole number part of the quotient plus 1, or the remainder.
Clarification 3: Multiplication is limited to products of up to 3 digits by 2 digits. Division is limited to up to 4 digits divided by 1 digit.

MA.4.AR.1.3	Solve real-world problems involving multiplication of a fraction by a whole number or a whole number by a fraction. *Example:* Ken is filling his garden containers with a cup that holds $\frac{2}{5}$ pounds of soil. If he uses 8 cups to fill his garden containers, how many pounds of soil did Ken use?

Benchmark Clarifications:
Clarification 1: Problems include creating real-world situations based on an equation or representing a real-world problem with a visual model or equation.
Clarification 2: Fractions within problems must reference the same whole.
Clarification 3: Within this benchmark, the expectation is not to simplify or use lowest terms.
Clarification 4: Fractions limited to fractions less than one with denominators of 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.

MA.5.AR.1 Solve problems involving the four operations with whole numbers and fractions.

MA.5.AR.1.1	Solve multi-step real-world problems involving any combination of the four operations with whole numbers, including problems in which remainders must be interpreted within the context.

Benchmark Clarifications:
Clarification 1: Depending on the context, the solution of a division problem with a remainder may be the whole number part of the quotient, the whole number part of the quotient with the remainder, the whole number part of the quotient plus 1, or the remainder.

MA.5.AR.1.2 Solve real-world problems involving the addition, subtraction or multiplication of fractions, including mixed numbers and fractions greater than 1.

Example: Shanice had a sleepover and her mom is making French toast in the morning. If her mom had $2\frac{1}{4}$ loaves of bread and used $1\frac{1}{2}$ loaves for the French toast, how much bread does she have left?

Benchmark Clarifications:
Clarification 1: Instruction includes the use of visual models and equations to represent the problem.

MA.5.AR.1.3 Solve real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction.

Example: A property has a total of $\frac{1}{2}$ acre and needs to be divided equally among 3 sisters. Each sister will receive $\frac{1}{6}$ of an acre.

Example: Kiki has 10 candy bars and plans to give $\frac{1}{4}$ of a candy bar to her classmates at school. How many classmates will receive a piece of a candy bar?

Benchmark Clarifications:
Clarification 1: Instruction includes the use of visual models and equations to represent the problem.

MA.5.AR.2 Demonstrate an understanding of equality, the order of operations and equivalent numerical expressions.

MA.5.AR.2.1 Translate written real-world and mathematical descriptions into numerical expressions and numerical expressions into written mathematical descriptions.

Example: The expression $4.5 + (3 \times 2)$ in word form is $four\ and\ five\ tenths$ plus the quantity 3 times 2.

Benchmark Clarifications:
Clarification 1: Expressions are limited to any combination of the arithmetic operations, including parentheses, with whole numbers, decimals and fractions.
Clarification 2: Within this benchmark, the expectation is not to include exponents or nested grouping symbols.

MA.5.AR.2.2 Evaluate multi-step numerical expressions using order of operations.

Example: Patti says the expression $12 \div 2 \times 3$ is equivalent to 18 because she works each operation from left to right. Gladys says the expression $12 \div 2 \times 3$ is equivalent to 2 because first multiplies 2×3 then divides 6 into 12. David says that Patti is correctly using order of operations and suggests that if parentheses were added, it would give more clarity.

Benchmark Clarifications:
Clarification 1: Multi-step expressions are limited to any combination of arithmetic operations, including parentheses, with whole numbers, decimals and fractions.
Clarification 2: Within this benchmark, the expectation is not to include exponents or nested grouping symbols.
Clarification 3: Decimals are limited to hundredths. Expressions cannot include division of a fraction by a fraction.

MA.5.AR.2.3 Determine and explain whether an equation involving any of the four operations is true or false.

Example: The equation $2.5 + (6 \times 2) = 16 - 1.5$ can be determined to be true because the expression on both sides of the equal sign are equivalent to 14.5.

Benchmark Clarifications:
Clarification 1: Problem types include equations that include parenthesis but not nested parentheses.
Clarification 2: Instruction focuses on the connection between properties of equality and order of operations.

MA.5.AR.2.4 Given a mathematical or real-world context, write an equation involving any of the four operations to determine the unknown whole number with the unknown in any position.

Example: The equation $250 - (5 \times s) = 15$ can be used to represent that 5 sheets of paper are given to s students from a pack of paper containing 250 sheets with 15 sheets left over.

Benchmark Clarifications:
Clarification 1: Instruction extends the development of algebraic thinking where the unknown letter is recognized as a variable.
Clarification 2: Problems include the unknown and different operations on either side of the equal sign.

MA.5.AR.3 Analyze patterns and relationships between inputs and outputs.

MA.5.AR.3.1 Given a numerical pattern, identify and write a rule that can describe the pattern as an expression.

Example: The given pattern $6, 8, 10, 12$ ... can be describe using the expression $4 + 2x$, where $x = 1, 2, 3, 4$ ... ; the expression $6 + 2x$, where $x = 0, 1, 2, 3$ ... or the expression $2x$, where $x = 3, 4, 5, 6$ ....

Benchmark Clarifications:
Clarification 1: Rules are limited to one or two operations using whole numbers.

MA.5.AR.3.2 Given a rule for a numerical pattern, use a two-column table to record the inputs and outputs.

Example: The expression $6 + 2x$, where x represents any whole number, can be represented in a two-column table as shown below.

Input (x)	0	1	2	3
Output	6	8	10	12

Benchmark Clarifications:
Clarification 1: Instruction builds a foundation for proportional and linear relationships in later grades.
Clarification 2: Rules are limited to one or two operations using whole numbers.

Measurement

MA.4.M.1 Measure the length of objects and solve problems involving measurement.

MA.4.M.1.1 Select and use appropriate tools to measure attributes of objects.

Benchmark Clarifications:
Clarification 1: Attributes include length, volume, weight, mass and temperature.
Clarification 2: Instruction includes digital measurements and scales that are not linear in appearance.
Clarification 3: When recording measurements, use fractions and decimals where appropriate.

MA.4.M.1.2 Convert within a single system of measurement using the units: yards, feet, inches; kilometers, meters, centimeters, millimeters; pounds, ounces; kilograms, grams; gallons, quarts, pints, cups; liter, milliliter; and hours, minutes, seconds.

Example: If a ribbon is 11 yards 2 feet in length, how long is the ribbon in feet?
Example: A gallon contains 16 cups. How many cups are in $3\frac{1}{2}$ gallons?

Benchmark Clarifications:
Clarification 1: Instruction includes the understanding of how to convert from smaller to larger units or from larger to smaller units.
Clarification 2: Within the benchmark, the expectation is not to convert from grams to kilograms, meters to kilometers or milliliters to liters.
Clarification 3: Problems involving fractions are limited to denominators of 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.

MA.5.M.1 Convert measurement units to solve multi-step problems.

MA.5.M.1.1	Solve multi-step real-world problems that involve converting measurement units to equivalent measurements within a single system of measurement. *Example:* There are 60 minutes in 1 hour, 24 hours in 1 day and 7 days in 1 week. So, there are $60 \times 24 \times 7$ minutes in one week which is equivalent to 10,080 minutes.

Benchmark Clarifications:
Clarification 1: Within the benchmark, the expectation is not to memorize the conversions.
Clarification 2: Conversions include length, time, volume and capacity represented as whole numbers, fractions and decimals.

MA.5.M.2 Solve problems involving money.

MA.5.M.2.1	Solve multi-step real-world problems involving money using decimal notation. *Example:* Don is at the store and wants to buy soda. Which option would be cheaper: buying one 24-ounce can of soda for $1.39 or buying two 12-ounce cans of soda for 69¢ each?

Geometric Reasoning

MA.5.GR.1 Classify two-dimensional figures and three-dimensional figures based on defining attributes.

MA.5.GR.1.1	Classify triangles or quadrilaterals into different categories based on shared defining attributes. Explain why a triangle or quadrilateral would or would not belong to a category.

Benchmark Clarifications:
Clarification 1: Triangles include scalene, isosceles, equilateral, acute, obtuse and right; quadrilaterals include parallelograms, rhombi, rectangles, squares and trapezoids.

MA.5.GR.1.2	Identify and classify three-dimensional figures into categories based on their defining attributes. Figures are limited to right pyramids, right prisms, right circular cylinders, right circular cones and spheres.

Benchmark Clarifications:
Clarification 1: Defining attributes include the number and shape of faces, number and shape of bases, whether or not there is an apex, curved or straight edges and curved or flat faces.

MA.5.GR.2 Find the perimeter and area of rectangles with fractional or decimal side lengths.

MA.5.GR.2.1	Find the perimeter and area of a rectangle with fractional or decimal side lengths using visual models and formulas.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction includes finding the area of a rectangle with fractional side lengths by tiling it with squares having unit fraction side lengths and showing that the area is the same as would be found by multiplying the side lengths.
Clarification 2: Responses include the appropriate units in word form.

MA.5.GR.3 Solve problems involving the volume of right rectangular prisms.

MA.5.GR.3.1	Explore volume as an attribute of three-dimensional figures by packing them with unit cubes without gaps. Find the volume of a right rectangular prism with whole-number side lengths by counting unit cubes.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction emphasizes the conceptual understanding that volume is an attribute that can be measured for a three-dimensional figure. The measurement unit for volume is the volume of a unit cube, which is a cube with edge length of 1 unit.

MA.5.GR.3.2	Find the volume of a right rectangular prism with whole-number side lengths using a visual model and a formula.

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction includes finding the volume of right rectangular prisms by packing the figure with unit cubes, using a visual model or applying a multiplication formula.
Clarification 2: Right rectangular prisms cannot exceed two-digit edge lengths and responses include the appropriate units in word form.

MA.5.GR.3.3	Solve real-world problems involving the volume of right rectangular prisms, including problems with an unknown edge length, with whole-number edge lengths using a visual model or a formula. Write an equation with a variable for the unknown to represent the problem. *Example:* A hydroponic box, which is a rectangular prism, is used to grow a garden in wastewater rather than soil. It has a base of 2 feet by 3 feet. If the volume of the box is 12 cubic feet, what would be the depth of the box?

<u>Benchmark Clarifications:</u>
Clarification 1: Instruction progresses from right rectangular prisms to composite figures composed of right rectangular prisms.
Clarification 2: When finding the volume of composite figures composed of right rectangular prisms, recognize volume as additive by adding the volume of non-overlapping parts.
Clarification 3: Responses include the appropriate units in word form.

MA.5.GR.4 Plot points and represent problems on the coordinate plane.

MA.5.GR.4.1	Identify the origin and axes in the coordinate system. Plot and label ordered pairs in the first quadrant of the coordinate plane.

Benchmark Clarifications:
Clarification 1: Instruction includes the connection between two-column tables and coordinates on a coordinate plane.
Clarification 2: Instruction focuses on the connection of the number line to the x- and y-axis.
Clarification 3: Coordinate planes include axes scaled by whole numbers. Ordered pairs contain only whole numbers.

MA.5.GR.4.2	Represent mathematical and real-world problems by plotting points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation. *Example:* For Kevin's science fair project, he is growing plants with different soils. He plotted the point $(5, 7)$ for one of his plants to indicate that the plant grew 7 inches by the end of week 5.

Benchmark Clarifications:
Clarification 1: Coordinate planes include axes scaled by whole numbers. Ordered pairs contain only whole numbers.

Data Analysis and Probability

MA.4.DP.1 Collect, represent and interpret data and find the mode, median and range of a data set.

MA.4.DP.1.1	Collect and represent numerical data, including fractional values, using tables, stem-and-leaf plots or line plots. *Example:* A softball team is measuring their hat size. Each player measures the distance around their head to the nearest half inch. The data is collected and represented on a line plot.

Benchmark Clarifications:
Clarification 1: Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.

MA.4.DP.1.2 Determine the mode, median or range to interpret numerical data including fractional values, represented with tables, stem-and-leaf plots or line plots.

Example: Given the data of the softball team's hat size represented on a line plot, determine the most common size and the difference between the largest and the smallest sizes.

Benchmark Clarifications:
Clarification 1: Instruction includes interpreting data within a real-world context.
Clarification 2: Instruction includes recognizing that data sets can have one mode, no mode or more than one mode.
Clarification 3: Within this benchmark, data sets are limited to an odd number when calculating the median.
Clarification 4: Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.

MA.4.DP.1.3 Solve real-world problems involving numerical data.

Example: Given the data of the softball team's hat size represented on a line plot, determine the fraction of the team that has a head size smaller than 20 inches.

Benchmark Clarifications:
Clarification 1: Instruction includes using any of the four operations to solve problems.
Clarification 2: Data involving fractions with like denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100. Fractions can be greater than one.
Clarification 3: Data involving decimals are limited to hundredths.

MA.5.DP.1 Collect, represent and interpret data and find the mean, mode, median or range of a data set.

MA.5.DP.1.1 Collect and represent numerical data, including fractional and decimal values, using tables, line graphs or line plots.

Example: Gloria is keeping track of her money every week. She starts with $10.00, after one week she has $7.50, after two weeks she has $12.00 and after three weeks she has $6.25. Represent the amount of money she has using a line graph.

Benchmark Clarifications:
Clarification 1: Within this benchmark, the expectation is for an estimation of fractional and decimal heights on line graphs.
Clarification 2: Decimal values are limited to hundredths. Denominators are limited to 1, 2, 3 and 4. Fractions can be greater than one.

MA.5.DP.1.2 Interpret numerical data, with whole-number values, represented with tables or line plots by determining the mean, mode, median or range.

Example: Rain was collected and measured daily to the nearest inch for the past week. The recorded amounts are $1, 0, 3, 1, 0, 0$ and 1. The range is 3 inches, the modes are 0 and 1 inches and the mean value can be determined as $\frac{(1+0+3+1+0+0+1)}{7}$ which is equivalent to $\frac{6}{7}$ of an inch. This mean would be the same if it rained $\frac{6}{7}$ of an inch each day.

Benchmark Clarifications:
Clarification 1: Instruction includes interpreting the mean in real-world problems as a leveling out, a balance point or an equal share.