Content Area: Math

Grade Level: Kindergarten

<u>Critical standards</u> represent the basics a student must learn to be able to reach high levels of learning, allow teachers and schools to target 'must know' skills to support individual students (non-negotiable skills), but do not represent all that we are going to teach.

<u>Topic: Counting and Cardinality (CC)</u>

MA.K.CC.1 Count to 100 by ones and by tens (CC.K.CC.1). (Retrieval)

MA.K.CC.2 Count forward beginning from a given number within the known sequence (CC.K.CC.2). (Retrieval)

MA.K.CC.3 Write numbers from 0 to 20; represent a number of objects with a written numeral 0 - 20 (with 0 representing a count of no objects) (CC.K.CC.3). (Retrieval)

MA.K.CC.4 Understand the relationship between numbers and quantities; connect counting to cardinality (CC.K.CC.4). (Comprehension)

a. When counting objects, say the number names in standard order, pairing each object with one and only one number name and each number name with one and only one object.

b. Understand that the last number name said tells the number of objects counted; the number of objects is the same regardless of their arrangement or the order in which they were counted.

c. Understand that each successive number name refers to a quantity that is one larger.

MA.K.CC.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group (e.g., by using matching, counting, or estimating strategies) (CC.K.CC.6). (Analysis)

MA.K.CC.7 Compare and order two numbers between 1 and 10 presented as written numerals (CC.K.CC.7). (Analysis)

6/1/20 created
5/17/24 reviewed

Topic: Operations and Algebraic Thinking (OA)

MA.K.OA.1 Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps) acting out situations, verbal explanations, expressions, or equations (CC.K.OA.1). (Comprehension)

MA.K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way (e.g., by using objects or drawings, and record each decomposition by a drawing or equation) (CC.K.OA.3). (Comprehension)

MA.K.OA.4 For any number from 1 - 4, find the number that makes 5 when added to the given number and, for any number from 1 - 9, find the number that makes 10 when added to the given number (e.g., by using objects, drawings or 10 frames) and record the answer with a drawing or equation (CC.K.OA.4). (Comprehension)

MA.K.OA.5 Fluently add and subtract numbers up to 5 (CC.K.OA.5). (Retrieval)

Topic: Measurement and Data (MD)

MA.K.MD.4 Name in sequence the days of the week (AK). (Retrieval)

Topic: Geometry (G)

MA.K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices), and other attributes (e.g., having sides of equal lengths) (CC.K.G.4). (Analysis)

Math Practice Standards (MP)

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MP. 1 Make sense of problems and persevere in solving them.

- focus on the problem and check for alternate methods
- check if the solution makes sense

MP.2 Reason abstractly and quantitatively.

- represent a situation symbolically and/or with manipulatives
- create a coherent representation of the problem
- use units of measurement consistently

MP.3 Construct viable arguments and critique the reasoning of others.

- construct arguments using concrete referents such as objects, drawings, diagrams, and actions
- justify conclusions, communicate conclusions
- listen to arguments and decide whether the arguments make sense

MP.4 Model with Mathematics.

- apply mathematics to solve problems in everyday life
- identify important quantities in a practical situation and model the situation with manipulatives or pictures
- interpret mathematical results in the context of the situation and reflect on whether the results make sense

MP.5 Use appropriate tools strategically.

- select the available tools (such as pencil and paper, manipulatives, rulers, and available technology) when solving a mathematical problem
- be familiar with tools appropriate for the grade level to make sound decisions about when each of these tools might be helpful
- identify relevant external mathematical resources and use them to pose or solve problems
- use technological tools to explore and deepen their understanding of concepts

MP.6 Attend to precision.

- give thoughtful explanations to each other
- use clear definitions and reasoning in discussion with others
- state the meaning of symbols they choose, including using the equal sign consistently and appropriately

MP.7 Look for and make use of structure.

- discern a pattern or structure
- understand complex structures as single objects or as being composed of several objects
- check if the answer is reasonable

MP.8 Look for and express regularity in repeated reasoning.

- identify if calculations or processes are repeated
- use alternative and traditional methods to solve problems
- evaluate the reasonableness of their intermediate results, while attending to the details

Content Area: Math

Grade Level: 1st Grade

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Topic: Operations and Algebraic Thinking (OA)

MA.1.OA.1 Use addition and subtraction strategies to solve word problems (using numbers up to 20), involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, using a number line (e.g., by using objects, drawings and equations); record and explain using equation symbols and a symbol for the unknown number to represent the problem (CC.1.OA.1). (Analysis)

MA.1.OA.6 Add and subtract using numbers up to 20, demonstrating fluency for addition and subtraction up to 10; use strategies such as: counting on; making ten (8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (13 - 4 = 13 - 3 - 1 = 10 - 1 = 9); using the relationship between addition and subtraction, such as fact families, (8 + 4 = 12 and 12 - 8 = 4); creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13) (CC.1.OA.6). (Comprehension)

Topic: Number and Operations in Base Ten (NBT)

MA.1.NBT.1 Count to 120; in this range, read, write and order numerals and represent a number of objects with a written numeral (forward and backward) (CC.1.NBT.1). (Retrieval)

MA.1.NBT.2 Model and identify place value positions of two-digit numbers (CC.1.NBT.2). (Analysis)

a. 10 can be thought of as a bundle of ten ones, called a "ten".
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight or nine ones.
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90, refer to one, two, three, four, five, six, seven, eight or nine tens (and 0 ones).

MA.1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used (CC.1.NBT.5). (Retrieval)

6/1/20 created
5/17/24 reviewed

Topic: Measurement and Data (MD)

MA.1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps (CC.1.MD.2). (Comprehension)

MA.1.MD.3 Tell and write time in half hours using both analog and digital clocks (CC.1.MD.3). (Retrieval)

MA.1.MD.4 Read a calendar distinguishing yesterday, today and tomorrow; read and write a date (AK). (Retrieval)

MA.1.MD.6 Identify values of coins (e.g., nickel = 5 cents, quarter = 25 cents); identify equivalent values of coins up to $1 (e.g., 5 pennies = 1 nickel, 5 nickels = 1 quarter) (AK). (Retrieval)

Topic: Geometry (G)

MA.1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes; identify shapes that have non-defining attributes (e.g., color, orientation, overall size); build and draw shapes given specified attributes (CC.1.G.1). (Retrieval)

Math Practice Standards (MP)

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MP. 1 Make sense of problems and persevere in solving them.

- focus on the problem and check for alternate methods
- check if the solution makes sense

MP.2 Reason abstractly and quantitatively.

- represent a situation symbolically and/or with manipulatives
- create a coherent representation of the problem
- use units of measurement consistently

MP.3 Construct viable arguments and critique the reasoning of others.

- construct arguments using concrete referents such as objects, drawings, diagrams, and actions
- justify conclusions, communicate conclusions
- listen to arguments and decide whether the arguments make sense

MP.4 Model with Mathematics.

- apply mathematics to solve problems in everyday life
- identify important quantities in a practical situation and model the situation with manipulatives or pictures
- interpret mathematical results in the context of the situation and reflect on whether the results make sense

MP.5 Use appropriate tools strategically.

- select the available tools (such as pencil and paper, manipulatives, rulers, and available technology) when solving a mathematical problem
- be familiar with tools appropriate for the grade level to make sound decisions about when each of these tools might be helpful
- identify relevant external mathematical resources and use them to pose or solve problems
- use technological tools to explore and deepen their understanding of concepts

MP.6 Attend to precision.

- give thoughtful explanations to each other
- use clear definitions and reasoning in discussion with others
- state the meaning of symbols they choose, including using the equal sign consistently and appropriately

MP.7 Look for and make use of structure.

- discern a pattern or structure
- understand complex structures as single objects or as being composed of several objects
- check if the answer is reasonable

MP.8 Look for and express regularity in repeated reasoning.

- identify if calculations or processes are repeated
- use alternative and traditional methods to solve problems
- evaluate the reasonableness of their intermediate results, while attending to the details

Content Area: Math

Grade Level: 2nd Grade

<u>Critical standards</u> represent the basics a student must learn to be able to reach high levels of learning, allow teachers and schools to target 'must know' skills to support individual students (non-negotiable skills), but do not represent all that we are going to teach.

Topic: Operations and Algebraic Thinking (OA)

MA.2.OA.1 Use addition and subtraction strategies to estimate, then solve one- and two-step word problems (using numbers up to 100) involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions (e.g., by using objects, drawings and equations); record and explain using equation symbols and a symbol for the unknown number to represent the problem (CC.2.OA.1). (Analysis)

MA.2.OA.2 Fluently add and subtract using numbers up to 20 using mental strategies; know from memory all sums of two one-digit numbers (CC.2.OA.2). (Retrieval)

Topic: Number and Operations in Base Ten (NBT)

MA.2.NBT.1 Model and identify place value positions of three digit numbers (CC.2.NBT.1). (Analysis)

a. 100 can be thought of as a bundle of ten tens --called a "hundred".
b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

MA.2.NBT.2 Count up to 1000, skip-count by 5s, 10s and 100s (CC.2.NBT.2). (Retrieval)

MA.2.NBT.5 Fluently add and subtract using numbers up to 100; use strategies based on place value, properties of operations, and/or the relationship between addition and subtraction (CC.2.NBT.5). (Comprehension)

MA.2.NBT.8 Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number (CC.2.NBT.8). (Retrieval)

6/1/20 created
5/17/24 reviewed

Topic: Measurement and Data (MD)

MA.2.MD.3 Estimate, measure and draw lengths using whole units of inches, feet, yards, centimeters and meters (CC.2.MD.3). (Comprehension)

MA.2.MD.7 Tell and write time to the nearest five minutes using a.m. and p.m. from analog and digital clocks (CC.2.MD.7). (Retrieval)

MA.2.MD.8 Solve word problems involving dollar bills and coins using the $ and ¢ symbols appropriately (CC.2.MD.8). (Analysis)

MA.2.MD.9 Collect, record, interpret, represent, and describe data in a table, graph or line plot (CC.2.MD.9). (Analysis)

Topic: Geometry (G)

MA.2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them (CC.2.G.2). (Comprehension)

Math Practice Standards (MP)

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- check if the solution makes sense

MP.2 Reason abstractly and quantitatively.

- represent a situation symbolically and/or with manipulatives
- create a coherent representation of the problem
- use units of measurement consistently

MP.3 Construct viable arguments and critique the reasoning of others.

- construct arguments using concrete referents such as objects, drawings, diagrams, and actions
- justify conclusions, communicate conclusions
- listen to arguments and decide whether the arguments make sense

MP.4 Model with Mathematics.

- apply mathematics to solve problems in everyday life
- identify important quantities in a practical situation and model the situation with manipulatives or pictures
- interpret mathematical results in the context of the situation and reflect on whether the results make sense

MP.5 Use appropriate tools strategically.

- select the available tools (such as pencil and paper, manipulatives, rulers, and available technology) when solving a mathematical problem
- be familiar with tools appropriate for the grade level to make sound decisions about when each of these tools might be helpful
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MP.7 Look for and make use of structure.

- discern a pattern or structure
- understand complex structures as single objects or as being composed of several objects
- check if the answer is reasonable

MP.8 Look for and express regularity in repeated reasoning.

- identify if calculations or processes are repeated
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- evaluate the reasonableness of their intermediate results, while attending to the details

Content Area: Math
Grade Level: 3rd Grade

<u>Critical standards</u> represent the basics a student must learn to be able to reach high levels of learning, allow teachers and schools to target 'must know' skills to support individual students (non-negotiable skills), but do not represent all that we are going to teach.

Topic: Operations and Algebraic Thinking (OA)

MA.3.OA.1 Interpret products of whole numbers (e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each). (Comprehension)

MA.3.OA.2 Interpret whole-number quotients of whole numbers (e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each). (Comprehension)

MA.3.OA.3 Use multiplication and division numbers up to 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem). (Analysis)

MA.3.OA.7 Fluently multiply and divide numbers up to 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 ×5 = 40, one knows 40 ÷ 5 = 8) or properties of operations; by the end of Grade 3, know from memory all products of two one-digit numbers. (Comprehension)

MA.3.OA.8 Solve and create two-step word problems using any of the four operations; represent these problems using equations with a symbol (box, circle, question mark) standing for the unknown quantity; assess the reasonableness of answers using mental computation and estimation strategies including rounding. (Analysis)

Topic: Number and Operations in Base Ten (NBT)

MA.3.NBT.2 Use strategies and/or algorithms to fluently add and subtract with numbers up to 1000, demonstrating understanding of place value, properties of operations, and/or the relationship between addition and subtraction. (Comprehension)

Created 6/1/20
Reviewed 6/3/24

Topic: Number and Operations – Fractions (NF)

MA.3.NF.1 Understand a fraction 1/b (e.g., 1/4) as the quantity formed by 1 part when a whole is partitioned into b (e.g., 4) equal parts; understand a fraction a/b (e.g., 2/4) as the quantity formed by a (e.g., 2) parts of size 1/b (e.g., 1/4). (Comprehension)

MA.3.NF.3 Explain equivalence of fractions in special cases and compare fractions by reasoning about their size (CC.3.NF.3). (Analysis)

a. Understand two fractions as equivalent if they are the same size (modeled) or the same point on a number line.

b. Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3); explain why the fractions are equivalent (e.g., by using a visual fraction model).

c. Express and model whole numbers as fractions, and recognize and construct fractions that are equivalent to whole numbers.

Topic: Measurement and Data (MD)

MA.3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes; solve word problems involving addition and subtraction of time intervals in minutes or hours (e.g., by representing the problem on a number line diagram or clock) (CC.3.MD.1). (Analysis)

MA.3.MD.5 Measure and record lengths using rulers marked with halves and fourths of an inch; make a line plot with the data, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (Comprehension)

MA.3.MD.7 Recognize area as an attribute of plane figures and understand concepts of area measurement. (Comprehension)

a. A square with side length 1 unit is said to have “one square unit” and can be used to measure area.
b. Demonstrate that a plane figure which can be covered without gaps or overlaps by n (e.g., 6) unit squares is said to have an area of n (e.g., 6) square units.

MA.3.MD.9 Relate area to the operations of multiplication and addition . (Analysis)

a. Find the area of a rectangle with whole-number side lengths by tiling it and show that the area is the same as would be found by multiplying the side lengths.
b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real-world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.
c. Use area models (rectangular arrays) to represent the distributive property in mathematical reasoning; use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c; d; recognize area as additive; find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.

Math Practice Standards (MP)

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- create a coherent representation of the problem
- use units of measurement consistently

MP.3 Construct viable arguments and critique the reasoning of others.

- construct arguments using concrete referents such as objects, drawings, diagrams, and actions
- justify conclusions, communicate conclusions
- listen to arguments and decide whether the arguments make sense

MP.4 Model with Mathematics.

- apply mathematics to solve problems in everyday life
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MP.5 Use appropriate tools strategically.

- select the available tools (such as pencil and paper, manipulatives, rulers, and available technology) when solving a mathematical problem
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MP.6 Attend to precision.

- give thoughtful explanations to each other
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- state the meaning of symbols they choose, including using the equal sign consistently and appropriately

MP.7 Look for and make use of structure.

- discern a pattern or structure
- understand complex structures as single objects or as being composed of several objects
- check if the answer is reasonable

MP.8 Look for and express regularity in repeated reasoning.

- identify if calculations or processes are repeated
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Content Area: Math

Grade Level: 4th Grade

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Topic: Operations and Algebraic Thinking (OA)

MA.4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem or missing numbers in an array); distinguish multiplicative comparison from additive comparison (CC.4.OA.2). (Analysis)

MA.4.OA.4 Find all factor pairs for a whole number in the range 1–100; explain the correlation/differences between multiples and factors; determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number; determine whether a given whole number in the range 1–100 is prime or composite (CC.4.OA.4). (Analysis)

Topic: Number and Operations in Base Ten (NBT)

MA.4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form; compare two multi-digit numbers based on the value of the digits in each place, using >, =, and < symbols to record the results of comparisons (CC.4.NBT.2). (Analysis)

MA.4.NBT.4 Fluently add and subtract multi-digit whole numbers using any algorithm; verify the reasonableness of the results (CC.4.NBT.4). (Comprehension)

MA.4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations; illustrate and explain the calculation by using equations, rectangular arrays, and/or area models (CC.4.NBT.5). (Comprehension)

MA.4.NBT.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division; illustrate and explain the calculation by using equations, rectangular arrays, and/or area models (CC.4.NBT.6). (Comprehension)

Topic: Number and Operations – Fractions (NF)

MA.4.NF.2 Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2); recognize that comparisons are valid only when the two fractions refer to the same whole; record the results of comparisons with symbols >, =, or <, and justify the conclusions (e.g., by using a visual fraction model) (CC.4.NF.2). (Analysis)

MA.4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number (CC.4.NF.4). (Analysis)

a. Understand a fraction a/b as a multiple of 1/b.
b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number.
c. Solve word problems involving multiplication of a fraction by a whole number (e.g., by using visual fraction models and equations to represent the problem); check for the reasonableness of the answer.

MA.4.NF.7 Compare two decimals to hundredths by reasoning about their size; recognize that comparisons are valid only when the two decimals refer to the same whole; record the results of comparisons with the symbols >, =, or <, and justify the conclusions (e.g., by using a visual model) (CC.4.NF.7). (Analysis)

Topic: Measurement and Data (MD)

MA.4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit; represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale (CC.4.MD.2). (Analysis)

MA.4.MD.8 Measure and draw angles in whole-number degrees using a protractor; estimate and sketch angles of specified measure (CC.4.MD.6). (Comprehension)

Topic: Geometry (G)

MA.4.G.2 Classify two-dimensional (plane) figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size; recognize right triangles as a category, and identify right triangles (CC.4.G.2). (Comprehension)

Math Practice Standards (MP)

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MP.3 Construct viable arguments and critique the reasoning of others.

- construct arguments using concrete referents such as objects, drawings, diagrams, and actions
- justify conclusions, communicate conclusions
- listen to arguments and decide whether the arguments make sense

MP.4 Model with Mathematics.

- apply mathematics to solve problems in everyday life
- identify important quantities in a practical situation and model the situation with manipulatives or pictures
- interpret mathematical results in the context of the situation and reflect on whether the results make sense

MP.5 Use appropriate tools strategically.

- select the available tools (such as pencil and paper, manipulatives, rulers, and available technology) when solving a mathematical problem
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MP.6 Attend to precision.

- give thoughtful explanations to each other
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MP.7 Look for and make use of structure.

- discern a pattern or structure
- understand complex structures as single objects or as being composed of several objects
- check if the answer is reasonable

MP.8 Look for and express regularity in repeated reasoning.

- identify if calculations or processes are repeated
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Content Area: Math

Grade Level: 5th Grade

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Topic: Operations and Algebraic Thinking (OA)

MA.5.OA.2 Write simple expressions that record calculations with numbers and interpret numerical expressions without evaluating them (CC.5.OA.2). (Comprehension)

Topic: Number and Operations in Base Ten (NBT)

MA.5.NBT.3 Read, write, and compare decimals to thousandths (CC.5.NBT.3). (Analysis)

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form [e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 (1/10) + 9 (1/100) + 2 (1/1000)].
b. Compare two decimals to thousandths place based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

MA.5.NBT.4 Use place values understanding to round decimals to any place (CC.5.NBT.4). (Retrieval)

5.NBT.5 Fluently multiply multi-digit whole numbers using a standard algorithm (CC.5.NBT.5). (Retrieval)

MA.5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division; illustrate and explain the calculation by using equations, rectangular arrays, number lines, real-life situations, and/or area models (CC.5.NBT.6). (Comprehension)

MA.5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between the operations; relate the strategy to a written method and explain their reasoning in getting their answers (CC.5.NBT.7). (Comprehension)

Created 6/1/20
Reviewed 5/29/24

Topic: Number and Operations – Fractions (NF)

MA.5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators (e.g., by using visual fraction models or equations to represent the problem); use benchmark fractions and number sense of fractions to estimate mentally and check the reasonableness of answers (CC.5.NF.2). (Analysis)

MA.5.NF.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b); solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers (e.g., by using visual fraction models or equations to represent the problem) (CC.5.NF.3). (Analysis)

MA.5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction (CC.5.NF.4). (Comprehension)

a. Interpret the product (a/b) × q as a part of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b.
b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths; multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

Topic: Measurement and Data (MD)

MA.5.MD.7 Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume (CC.5.MD.5). (Analysis)

a. Estimate and find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base; demonstrate the associative property of multiplication by using the product of three whole numbers to find volumes (length x width x height).
b. Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real-world and mathematical problems.
c. Recognize volume as additive; find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.

Topic: Geometry (G)

MA.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates; understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate) (CC.5.G.1). (Comprehension)

Math Practice Standards (MP)

The Standards for Mathematical Practice apply to all grade levels and conceptual categories. These practices can be applied individually or together in mathematics lessons, in no particular order. Often two or more practice standards are present in well-designed lessons that are aligned to the mathematics content standards. These standards define experiences that build understanding of mathematics and ways of thinking through which students develop, apply, and assess their knowledge.

MP. 1 Make sense of problems and persevere in solving them.

- focus on the problem and check for alternate methods
- check if the solution makes sense

MP.2 Reason abstractly and quantitatively.

- represent a situation symbolically and/or with manipulatives
- create a coherent representation of the problem
- use units of measurement consistently

MP.3 Construct viable arguments and critique the reasoning of others.

- construct arguments using concrete referents such as objects, drawings, diagrams, and actions
- justify conclusions, communicate conclusions
- listen to arguments and decide whether the arguments make sense

MP.4 Model with Mathematics.

- apply mathematics to solve problems in everyday life
- identify important quantities in a practical situation and model the situation with manipulatives or pictures
- interpret mathematical results in the context of the situation and reflect on whether the results make sense

MP.5 Use appropriate tools strategically.

- select the available tools (such as pencil and paper, manipulatives, rulers, and available technology) when solving a mathematical problem
- be familiar with tools appropriate for the grade level to make sound decisions about when each of these tools might be helpful
- identify relevant external mathematical resources and use them to pose or solve problems
- use technological tools to explore and deepen their understanding of concepts

MP.6 Attend to precision.

- give thoughtful explanations to each other
- use clear definitions and reasoning in discussion with others
- state the meaning of symbols they choose, including using the equal sign consistently and appropriately

MP.7 Look for and make use of structure.

- discern a pattern or structure
- understand complex structures as single objects or as being composed of several objects
- check if the answer is reasonable

MP.8 Look for and express regularity in repeated reasoning.

- identify if calculations or processes are repeated
- use alternative and traditional methods to solve problems
- evaluate the reasonableness of their intermediate results, while attending to the details