# Standards of Learning Alignment
# *Virginia Public Schools*
## 2023 Math

**FIRST EDUCATION**

## Legend

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| ● | The standard is clearly addressed by program activities. | *FIRST LEGO LEAGUE* |
| **-** | This standard potentially could be addressed as part of a *FIRST*® program either by actions that the coach or teacher takes when working with the students or by conditions established by the program. | |

| Topic | Number | Standard | Discover | Explore | Challenge |
|---|---|---|---|---|---|
| | | **Kindergarten** | | | |
| Number & Number Sense | K.NS.1 | The student will utilize flexible counting strategies to determine and describe quantities up to 100. | | | |
| | K.NS.1.a | Use one-to-one correspondence to determine how many are in a given set containing 30 or fewer concrete objects (e.g., cubes, pennies, balls), and describe the last number named as the total number of objects counted. | - | | |
| | K.NS.1.b | Recognize and explain that the number of objects remains the same regardless of the arrangement or the order in which the objects are counted. | - | | |
| | K.NS.1.c | Represent forward counting by ones using a variety of tools, including five-frames, ten frames, and number paths (a prelude to number lines). | - | | |
| | K.NS.1.d | Count forward orally by ones from 0 to 100. | - | | |
| | K.NS.1.e | Count forward orally by ones, within 100, starting at any given number. | - | | |
| | K.NS.1.f | Count backward orally by ones when given any number between 1 and 20. | - | | |
| | K.NS.1.g | State the number after, without counting, when given any number between 0 and 30. | | | |
| | K.NS.1.h | State the number before, without counting, when given any number between 1 and 20. | | | |
| | K.NS.1.i | Use objects, drawings, words, or numbers to compose and decompose numbers 11-19 into a ten and some ones. | - | | |
| | K.NS.1.j | Group a collection of up to 100 objects (e.g., counters, pennies, cubes) into sets of ten and count by tens to determine the total (e.g., there are 3 groups of ten and 6 leftovers, 36 total objects). | - | | |
| | K.NS.2 | The student will identify, represent, and compare quantities up to 30. | - | | |
| | K.NS.2.a | Read, write, and identify the numerals 0 through 30. | | | |
| | K.NS.2.b | Construct a set of objects that corresponds to a given numeral within 30, including an empty set. | - | | |
| | K.NS.2.c | Determine and write the numeral that corresponds to the total number of objects in a given set of 30 or fewer concrete objects or pictorial models. | - | | |
| | K.NS.2.d | Given a set of up to 30 objects, construct another set which has more, fewer, or the same number of objects using concrete or pictorial models | - | | |
| | K.NS.2.e | Given a numeral up to 30, construct a set which has more, fewer, or the same number of objects using concrete or pictorial models. | - | | |
| | K.NS.2.f | Compare two sets containing up to 30 concrete objects or pictorial models, using the terms more, fewer, or the same as (equal to). | - | | |
| | K.NS.2.g | Compare numbers up to 30, to the benchmarks of 5 and 10 using various models (e.g., five frames, ten frames, number paths [a prelude to number lines], beaded racks, hands) using the terms greater than, less than, or the same as (equal to). | | | |
| Computation & Estimation | K.CE.1 | The student will model and solve single-step contextual problems using addition and subtraction with whole numbers within 10. | | | |
| | K.CE.1.a | Use objects, drawings, words, or numbers to compose and decompose numbers less than or equal to 5 in multiple ways. | - | | |
| | K.CE.1.b | Recognize and describe with fluency part-part-whole relationships for numbers up to 5 in a variety of configurations. | | | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| Measurement & Geometry | K.CE.1.c | Model and identify the number that makes 5 when added to a given number less than or equal to 5. | - | | |
| | K.CE.1.d | Use objects, drawings, words, or numbers to compose and decompose numbers less than or equal to 10 in multiple ways. | - | | |
| | K.CE.1.e | Model and identify the number that makes 10 when added to a given number less than or equal to 10. | - | | |
| | K.CE.1.f | Model and solve single-step contextual problems (join, separate, and part-part-whole) using 10 or fewer concrete objects. | | | |
| | K.MG.1 | The student will reason mathematically by making direct comparisons between two objects or events using the attributes of length, height, weight, volume, and time. | - | | |
| | K.MG.1.a | Use direct comparisons to compare, describe, and justify the: | - | | |
| | K.MG.1.a.i | lengths of two objects using the terms longer or shorter | - | | |
| | K.MG.1.a.ii | heights of two objects using the terms taller or shorter | - | | |
| | K.MG.1.a.iii | weights of two objects using the terms heavier or lighter | - | | |
| | K.MG.1.a.iv | volumes of two containers using the terms more or less | - | | |
| | K.MG.1.a.v | amount of time spent on two events using the terms longer or shorter. | | | |
| | K.MG.2 | The student will identify, describe, name, compare, and construct plane figures (circles, triangles, squares, and rectangles). | - | | |
| | K.MG.2.a | Identify and name concrete and pictorial representations of circles, triangles, squares, and rectangles regardless of their orientation in space. | - | | |
| | K.MG.2.b | Describe triangles, squares, and rectangles to include the number of sides and number of vertices. | - | | |
| | K.MG.2.c | Describe a circle using terms such as round and curved. | | | |
| | K.MG.2.d | Distinguish between examples and nonexamples of identified plane figures (circles, triangles, squares, and rectangles). | - | | |
| | K.MG.2.e | Compare and contrast two plane figures using characteristics to describe similarities and differences. | - | | |
| | K.MG.2.f | Construct plane figures (circles, triangles, squares, and rectangles) using a variety of materials (e.g., straws, sticks, pipe cleaners). | - | | |
| | K.MG.3 | The student will describe the units of time represented in a calendar. | | | |
| | K.MG.3.a | Identify a calendar as a tool used to measure time. | | | |
| | K.MG.3.b | Name the days of the week and state that there are seven days in one week. | | | |
| | K.MG.3.c | Determine the day before and after a given day (e.g., yesterday, today, tomorrow) | | | |
| | K.MG.3.d | Name the twelve months of the year and state that there are twelve months in one year. | | | |
| | K.MG.3.e | Distinguish between days of the week and months of the year. | | | |
| Probability & Statistics | K.PS.1 | The student will apply the data cycle (pose questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on object graphs and picture graphs. | ● | | |
| | K.PS.1.a | Sort and classify concrete objects into appropriate subsets (categories) based on one attribute (e.g., size, shape, color, thickness). | ● | | |
| | K.PS.1.b | Describe and label attributes (e.g., size, color, shape) of a set of objects (e.g., coins, counters, buttons) that has been sorted. | ● | | |
| | K.PS.1.c | Pose questions, given a predetermined context, that require the collection of data (limited to 25 or fewer data points for no more than four categories). | - | | |
| | K.PS.1.d | Determine the data needed to answer a posed question, and collect the data using various methods (e.g., counting objects, drawing pictures). | - | | |
| | K.PS.1.e | Organize and represent a data set (vertically or horizontally) by sorting concrete objects into organized groups to form a simple object graph. | - | | |
| | K.PS.1.f | Organize and represent a data set (vertically or horizontally) using pictures to form a simple picture graph. | - | | |
| | K.PS.1.g | Analyze data represented in object graphs and picture graphs and communicate results: | - | | |
| | K.PS.1.g.i | ask and answer questions about the data represented in object graphs and picture graphs (e.g., how many in each category, which categories have the greatest, least, or the same amount of data) | - | | |
| | K.PS.1.g.ii | draw conclusions about the data and make predictions based on the data | - | | |

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| **Patterns, Functions,& Algebra** | K.PFA.1 | The student will identify, describe, extend, and create simple repeating patterns using various representations. | - | | |
| | K.PFA.1.a | Identify and describe the core found in repeating patterns. | - | | |
| | K.PFA.1.b | Extend a repeating pattern by adding at least two complete repetitions of the core to the pattern. | - | | |
| | K.PFA.1.c | Create and describe a repeating pattern using objects, colors, sounds, movements, or pictures | - | | |
| **Grade 1** | | | | |
| **Number & Number Sense** | 1.NS.1 | The student will utilize flexible counting strategies to determine and describe quantities up to 120. | - | | |
| | 1.NS.1.a | Count forward orally by ones from 0 to 120 starting at any number between 0 and 120. | - | | |
| | 1.NS.1.b | Count backward orally by ones when given any number between 1 and 30. | | | |
| | 1.NS.1.c | Represent forward counting patterns when counting by groups of 5 and groups of 10 up to 120 using a variety of tools (e.g., objects, coins, 120 chart). | | | |
| | 1.NS.1.d | Represent forward counting patterns when counting by groups of 2 up to at least 30 using a variety of tools (e.g., beaded number strings, number paths [a prelude to number lines], 120 chart). | | | |
| | 1.NS.1.e | Group a collection of up to 120 objects into tens and ones, and count to determine the total (e.g., 5 groups of ten and 6 ones is equal to 56 total objects). | - | | |
| | 1.NS.1.f | Identify a penny, nickel, and dime by their attributes and describe the number of pennies equivalent to a nickel and a dime. | | | |
| | 1.NS.1.g | Count by ones, fives, or tens to determine the value of a collection of like coins (pennies, nickels, or dimes), whose total value is 100 cents or less. | | | |
| | 1.NS.2 | The student will represent, compare, and order quantities up to 120. | - | | |
| | 1.NS.2.a | Read and write numerals 0-120 in sequence and out of sequence. | | | |
| | 1.NS.2.b | Estimate the number of objects (up to 120) in a given collection and justify the reasonableness of an answer. | - | | |
| | 1.NS.2.c | Create a concrete or pictorial representation of a number using tens and ones and write the corresponding numeral up to 120 (e.g., 47 can be represented as 47 ones or it can be grouped into 4 tens with 7 ones left over). | - | | |
| | 1.NS.2.d | Describe the number of groups of tens and ones when given a two-digit number and justify reasoning. | | | |
| | 1.NS.2.e | Compare two numbers between 0 and 120 represented pictorially or with concrete objects using the terms greater than, less than, or equal to. | | | |
| | 1.NS.2.f | Order three sets, each set containing up to 120 objects, from least to greatest, and greatest to least. | | | |
| | 1.NS.3 | The student will use mathematical reasoning and justification to solve contextual problems that involve partitioning models into two and four equal-sized parts. | | | |
| | 1.NS.3.a | Represent equal shares of a whole with two or four sharers, when given a contextual problem. | | | |
| | 1.NS.3.b | Represent and name halves and fourths of a whole, using a region/area model (e.g., pie pieces, pattern blocks, paper folding, drawings) and a set model (e.g., eggs, marbles, counters) limited to two or four items. | | | |
| | 1.NS.3.c | Describe and justify how shares are equal pieces or equal parts of the whole (limited to halves, fourths) when given a contextual problem. | | | |
| **Computation & Estimation** | 1.CE.1 | The student will recall with automaticity addition and subtraction facts within 10 and represent, solve, and justify solutions to single-step problems, including those in context, using addition and subtraction with whole numbers within 20. | | | |
| | 1.CE.1.a | Recognize and describe with fluency part-part-whole relationships for numbers up to 10 in a variety of configurations. | | | |
| | 1.CE.1.b | Demonstrate fluency with addition and subtraction within 10 by applying reasoning strategies (e.g., count on/count back, one more/one less, doubles, make ten). | | | |
| | 1.CE.1.c | Recall with automaticity addition and subtraction facts within 10. | | | |
| | 1.CE.1.d | Investigate, recognize, and describe part-part-whole relationships for numbers up to 20 in a variety of configurations (e.g., beaded racks, double ten frames). | | | |
| | 1.CE.1.e | Solve addition and subtraction problems within 20 using various strategies (e.g., inverse relationships: if 9 + 3 = 12 then 12 - 3 = 9; decomposition using known sums/differences: 9 + 7 can | | | |

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| | | be thought of as 9 decomposed into 2 and 7, then use doubles, 7 + 7 = 14; 14 + 2 = 16 or decompose the 7 into 1 and 6; make a ten: 1 + 9 = 10; 10 + 6 = 16). | | | |
| | 1.CE.1.f | Represent, solve, and justify solutions to single-step addition and subtraction problems (join, separate, and part-part-whole) within 20, including those in context, using words, objects, drawings, or numbers. | | | |
| | 1.CE.1.g | Determine the unknown whole number that will result in a sum or difference of 10 or 20  (e.g., 14 - __ = 10 or 15 + __ = 20). | | | |
| | 1.CE.1.h | Identify and use (+) as a symbol for addition and (-) as a symbol for subtraction. | | | |
| | 1.CE.1.i | Describe the equal symbol (=) as a balance representing an equivalent relationship between expressions on either side of the equal symbol (e.g., 6 and 1 is the same as 4 and 3; 6 + 1 is balanced with 4 + 3; 6 + 1 = 4 + 3). | | | |
| | 1.CE.1.j | Use concrete materials to model, identify, and justify when two expressions are not equal (e.g., 10 - 3 is not equal to 3 + 5). | | | |
| | 1.CE.1.k | Use concrete materials to model an equation that represents the relationship of two expressions of equal value. | | | |
| | 1.CE.1.l | Write an equation that could be used to represent the solution to an oral, written, or picture problem. | | | |
| Measurement & Geometry | 1.MG.1 | The student will reason mathematically using nonstandard units to measure and compare objects by length, weight, and volume. | | | |
| | 1.MG.1.a | Use nonstandard units to measure the: | | | |
| | 1.MG.1.a.i | lengths of two objects (units laid end to end with no gaps or overlaps) and compare the measurements using the terms longer/shorter, taller/shorter, or the same as | | | |
| | 1.MG.1.a.ii | weights of two objects (using a balance scale or a pan scale) and compare the measurements using the terms lighter, heavier, or the same as | | | |
| | 1.MG.1.a.iii | volumes of two containers and compare the measurements using the terms more, less, or the same as | | | |
| | 1.MG.1.b | Measure the length, weight, or volume of the same object or container with two different units and describe how and why the measurements differ | | | |
| | 1.MG.2 | The student will describe, sort, draw, and name plane figures (circles, triangles, squares, and rectangles), and compose larger plane figures by combining simple plane figures. | - | | |
| | 1.MG.2.a | Describe triangles, squares, and rectangles using the terms sides, vertices, and angles. Describe a circle using terms such as round and curved. | - | | |
| | 1.MG.2.b | Sort plane figures based on their characteristics (e.g., number of sides, vertices, angles, curved). | - | | |
| | 1.MG.2.c | Draw and name the plane figure (circle, square, rectangle, triangle) when given information about the number of sides, vertices, and angles. | - | | |
| | 1.MG.2.d | Identify, name, and describe representations of circles, squares, rectangles, and triangles, regardless of orientation, in different environments and explain reasoning. | - | | |
| | 1.MG.2.e | Recognize and name the angles found in rectangles and squares as right angles. | - | | |
| | 1.MG.2.f | Compose larger plane figures by combining two or three simple plane figures (triangles, squares, and/or rectangles). | - | | |
| | 1.MG.3 | The student will demonstrate an understanding of the concept of passage of time (to the nearest hour and half-hour) and the calendar. | | | |
| | 1.MG.3.a | Identify different tools to measure time including clocks (analog and digital) and calendar. | | | |
| | 1.MG.3.b | Describe the units of time represented on a clock as minutes and hours. | | | |
| | 1.MG.3.c | Tell time to the hour and half-hour, using analog and digital clocks. | | | |
| | 1.MG.3.d | Describe the location of the hour hand relative to time to the hour and half-hour on an analog clock. | | | |
| | 1.MG.3.e | Describe the location of the minute hand relative to time to the hour and half-hour on an analog clock. | | | |
| | 1.MG.3.f | Match the time shown on a digital clock to an analog clock to the hour and half-hour. | | | |
| | 1.MG.3.g | Identify specific days/dates on a calendar (e.g., What date is Saturday? How many Fridays are in October?). | | | |
| | 1.MG.3.h | Use ordinal numbers first through tenth to describe the relative position of specific days/dates (e.g., What is the first Monday in October? What day of the week is May 6th?). | | | |
| | 1.MG.3.i | Determine the day/date before and after a given day/date (e.g., Today is the 8th, so yesterday was the ?), and a date that is a specific number of days/weeks in the past or future (e.g., Tim's birthday is in 10 days, what will be the date of his birthday?). | | | |

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| **Probability & Statistics** | 1.PS.1 | The student will apply the data cycle (pose questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on object graphs, picture graphs, and tables. | - | | |
| | 1.PS.1.a | Sort and classify concrete objects into appropriate subsets (categories) based on one or two attributes, such as size, shape, color, and/or thickness (e.g., sort a set of objects that are both red and thick). | - | | |
| | 1.PS.1.b | Describe and label attributes of a set of objects that has been sorted. | - | | |
| | 1.PS.1.c | Pose questions, given a predetermined context, that require the collection of data (limited to 25 or fewer data points for no more than four categories). | - | | |
| | 1.PS.1.d | Determine the data needed to answer a posed question and collect the data using various methods (e.g., counting objects, drawing pictures, tallying). | - | | |
| | 1.PS.1.e | Organize and represent a data set by sorting the collected data using various methods (e.g., tallying, T-charts). | - | | |
| | 1.PS.1.f | Represent a data set (vertically or horizontally) using object graphs, picture graphs, and tables. | - | | |
| | 1.PS.1.g | Analyze data represented in object graphs, picture graphs, and tables and communicate results: | - | | |
| | 1.PS.1.g.i | ask and answer questions about the data represented in object graphs, picture graphs, and tables (e.g., total number of data points represented, how many in each category, how many more or less are in one category than another); and | - | | |
| | 1.PS.1.g.ii | draw conclusions about the data and make predictions based on the data. | - | | |
| **Patterns, Functions,& Algebra** | 1.PFA.1 | The student will identify, describe, extend, create, and transfer repeating patterns and increasing patterns using various representations. | - | | |
| | 1.PFA.1.a | Identify and describe repeating and increasing patterns. | - | | |
| | 1.PFA.1.b | Analyze a repeating or increasing pattern and generalize the change to extend the pattern using objects, colors, movements, pictures, or geometric figures. | - | | |
| | 1.PFA.1.c | Create a repeating or increasing pattern using objects, pictures, movements, colors, or geometric figures. | - | | |
| | 1.PFA.1.d | Transfer a repeating or increasing pattern from one form to another. | - | | |
| **Grade 2** | | | | | |
| **Number & Number Sense** | 2.NS.1 | The student will utilize flexible counting strategies to determine and describe quantities up to 200. | | - | |
| | 2.NS.1.a | Represent forward counting patterns when counting by groups of 2 up to at least 50, starting at various multiples of 2 and using a variety of tools (e.g., objects, number lines, hundreds charts). | | - | |
| | 2.NS.1.b | Represent forward counting patterns created when counting by groups of 5s, 10s, and 25s starting at various multiples up to at least 200 using a variety of tools (e.g., objects, number lines, hundreds charts). | | - | |
| | 2.NS.1.c | Describe and use patterns in skip counting by multiples of 2 (to at least 50), and multiples of 5, 10, and 25 (to at least 200) to justify the next number in the counting sequence. | | | |
| | 2.NS.1.d | Represent forward counting patterns when counting by groups of 100 up to at least 1,000 starting at 0 using a variety of tools (e.g., objects, number lines, calculators, one thousand charts). | | | |
| | 2.NS.1.e | Represent backward counting patterns when counting by groups of 10 from 200 or less using a variety of tools including objects, number lines, calculators, and hundreds charts. | | | |
| | 2.NS.1.f | Describe and use patterns in skip counting backwards by 10s (from at least 200) to justify the next number in the counting sequence. | | | |
| | 2.NS.1.g | Choose a reasonable estimate up to 1,000 when given a contextual problem (e.g., What would be the best estimate for the number of students in our school – 5, 50, or 500?). | | | |
| | 2.NS.1.h | Represent even numbers (up to 50) with concrete objects, using two equal groups or two equal addends. | | - | |
| | 2.NS.1.i | Represent odd numbers (up to 50) with concrete objects, using two equal groups with one leftover or two equal addends plus 1. | | | |
| | 2.NS.1.j | Determine whether a number (up to 50) is even or odd using concrete objects and justify reasoning (e.g., dividing collections of objects into two equal groups, pairing objects). | | | |
| | 2.NS.2 | The student will demonstrate an understanding of the ten-to-one relationships of the base 10 number system to represent, compare, and order whole numbers up to 999. | | | |
| | 2.NS.2.a | Write the three-digit whole number represented by a given model (e.g., concrete objects, pictures of base 10 blocks). | | | |

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| | 2.NS.2.b | Read, write, and represent three-digit numbers in standard form, expanded form, and word form, using concrete or pictorial representations. | | | |
| | 2.NS.2.c | Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place (ones, tens, hundreds) and value of each digit in a three-digit whole number (e.g., in 352, the 5 represents 5 tens and its value is 50). | | | |
| | 2.NS.2.d | Investigate and explain the ten-to-one relationships among ones, tens, and hundreds, using models. | | | |
| | 2.NS.2.e | Compose and decompose whole numbers up to 200 by making connections between a variety of models (e.g., base 10 blocks, place value cards, presented orally, in expanded or standard form) and counting strategies (e.g., 156 can be 1 hundred, 5 tens, 6 ones; 1 hundred, 4 tens, 16 ones; 15 tens, 6 ones). | | | |
| | 2.NS.2.f | Plot and justify the position of a given number up to 100 on a number line with pre-marked benchmarks of 1s, 2s, 5s, 10s, or 25s. | | | |
| | 2.NS.2.g | Compare two whole numbers, each 999 or less, represented concretely, pictorially, or symbolically, using words (greater than, less than, or equal to) and symbols (>, <, or =). Justify reasoning orally, in writing, or with a model. | | | |
| | 2.NS.2.h | Order up to three whole numbers, each 999 or less, represented concretely, pictorially, or symbolically from least to greatest and greatest to least. | | | |
| | 2.NS.3 | The student will use mathematical reasoning and justification to solve contextual problems that involve partitioning models into equal-sized parts (halves, fourths, eighths, thirds, and sixths). | | | |
| | 2.NS.3.a | Model and describe fractions as representing equal-size parts of a whole. | | | |
| | 2.NS.3.b | Describe the relationship between the number of fractional parts needed to make a whole and the size of the parts (i.e., as the whole is divided into more parts, each part becomes smaller). | | | |
| | 2.NS.3.c | Compose the whole for a given fractional part and its value (in context) for halves, fourths, eighths, thirds, and sixths (e.g., when given 1/4 , determine how many pieces would be needed to make 4/4 ). | | | |
| | 2.NS.3.d | Using same-size fraction pieces, from a region/area model, count by unit fractions up to two wholes (e.g., zero one-fourths, one one-fourth, two one-fourths, three one-fourths, four one-fourths, five one-fourths; or zero-fourths, one-fourth, two-fourths, three-fourths, four-fourths, five-fourths). | | | |
| | 2.NS.3.e | Given a context, represent, name, and write fractional parts of a whole for halves, fourths, eighths, thirds, and sixths using: | | | |
| | 2.NS.3.e.i | region/area models (e.g., pie pieces, pattern blocks, geoboards); | | | |
| | 2.NS.3.e.ii | length models (e.g., paper fraction strips, fraction bars, rods, number lines); | | | |
| | 2.NS.3.e.iii | set models (e.g., chips, counters, cubes). | | | |
| | 2.NS.3.f | Compare unit fractions for halves, fourths, eighths, thirds, and sixths using words (greater than, less than or equal to) and symbols (>, <, =), with region/area and length models | | | |
| | 2.NS.4 | The student will solve problems that involve counting and representing money amounts up to $2.00. | | | |
| | 2.NS.4.a | Identify a quarter and its value and determine multiple ways to represent the value of a quarter using pennies, nickels, and/or dimes. | | | |
| | 2.NS.4.b | Count by ones, fives, tens, and twenty-fives to determine the value of a collection of mixed coins and one-dollar bills whose total value is $2.00 or less. | | | |
| | 2.NS.4.c | Construct a set of coins and/or bills to total a given amount of money whose value is $2.00 or less. | | | |
| | 2.NS.4.d | Construct a set of coins and/or bills to total a given amount of money whose value is $2.00 or less. | | | |
| Computation & Estimation | 2.CE.1 | The student will recall with automaticity addition and subtraction facts within 20 and estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction with whole numbers where addends or minuends do not exceed 100. | | | |
| | 2.CE.1.a | Apply strategies (e.g., rounding to the nearest 10, compatible numbers, other number relationships) to estimate a solution for single-step addition or subtraction problems, including those in context, where addends and minuends do not exceed 100. | | | |
| | 2.CE.1.b | Represent, solve, and justify solutions to single-step and multistep contextual problems (e.g., join, separate, part-part-whole, comparison) involving addition or subtraction of whole numbers where addends or minuends do not exceed 100. | | | |
| | 2.CE.1.c | Represent, solve, and justify solutions to single-step and multistep contextual problems (e.g., join, separate, part-part-whole, comparison) involving addition or subtraction of whole numbers where addends or minuends do not exceed 100. | | | |
| | 2.CE.1.d | Demonstrate fluency with addition and subtraction within 20 by applying reasoning strategies (e.g., doubles, near doubles, make-a-ten, compensations, inverse relationships). | | | |
| | 2.CE.1.e | Recall with automaticity addition and subtraction facts within 20. | | | |

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|---|---|---|---|---|---|
| Measurement & Geometry | 2.CE.1.f | Use patterns, models, and strategies to make generalizations about the algebraic properties for fluency (e.g., 4 + 3 is equal to 3 + 4; 0 + 8 = 8). | | | |
| | 2.CE.1.g | Determine the missing number in an equation (number sentence) through modeling and justification with addition and subtraction within 20 (e.g., 3 + ☐ = 5 or ☐ + 2 = 5; 5 − ☐ = 3 or 5 − 2 = ☐). | | | |
| | 2.CE.1.h | Use inverse relationships to write all related facts connected to a given addition or subtraction fact model within 20 (e.g., given a model for 3 + 4 = 7, write 4 + 3 = 7, 7 − 4 = 3, and 7 − 3 = 4). | | | |
| | 2.CE.1.i | Describe the not equal symbol (≠) as representing a relationship where expressions on either side of the not equal symbol represent different values and justify reasoning. | | | |
| | 2.CE.1.j | Represent and justify the relationship between values and expressions as equal or not equal using appropriate models and/or symbols (e.g., 9 + 24 = 10 + 23; 45 - 9 = 46 - 10; 15 +16 ≠ 31 +15). | | | |
| | 2.MG.1 | The student will reason mathematically using standard units (U.S. Customary) with appropriate tools to estimate, measure, and compare objects by length, weight, and liquid volume to the nearest whole unit. | | - | |
| | 2.MG.1.a | Explain the purpose of various measurement tools and how to use them appropriately by | | - | |
| | 2.MG.1.a.i | identifying a ruler as an instrument to measure length | | - | |
| | 2.MG.1.a.ii | identifying different types of scales as instruments to measure weight | | | |
| | 2.MG.1.a.iii | identifying different types of measuring cups as instruments to measure liquid volume | | | |
| | 2.MG.1.b | Use U.S. Customary units to estimate, measure, and compare the two for reasonableness | | - | |
| | 2.MG.1.b.i | the length of an object to the nearest inch, using a ruler | | - | |
| | 2.MG.1.b.ii | the weight of an object to the nearest pound, using a scale; | | | |
| | 2.MG.1.b.iii | the liquid volume of a container to the nearest cup, using a measuring cup. | | | |
| | 2.MG.2 | The student will demonstrate an understanding of the concept of time to the nearest five minutes, using analog and digital clocks. | | | |
| | 2.MG.2.a | Identify the number of minutes in an hour (60 minutes) and the number of hours in a day (24 hours). | | | |
| | 2.MG.2.b | Determine the unit of time (minutes, hours, days, or weeks) that is most appropriate when measuring a given activity or context and explain reasoning (e.g., Would you measure the time it takes to brush your teeth in minutes or hours?). | | | |
| | 2.MG.2.c | Show, tell, and write time to the nearest five minutes, using analog and digital clocks. | | | |
| | 2.MG.2.d | Match a written time (e.g., 1:35, 6:20, 9:05) to the time shown on an analog clock to the nearest five minutes. | | | |
| | 2.MG.3 | The student will identify, describe, and create plane figures (including circles, triangles, squares, and rectangles) that have at least one line of symmetry and explain its relationship with congruency. | | - | |
| | 2.MG.3.a | Explore a figure using a variety of tools (e.g., paper folding, geoboards, drawings) to show and justify a line of symmetry, if one exists. | | | |
| | 2.MG.3.b | Create figures with at least one line of symmetry using various concrete and pictorial representations. | | | |
| | 2.MG.3.c | Describe the two resulting figures formed by a line of symmetry as being congruent (having the same shape and size). | | | |
| | 2.MG.4 | The student will describe, name, compare, and contrast plane and solid figures (circles/spheres, squares/cubes, and rectangles/rectangular prisms). | | - | |
| | 2.MG.4.a | Trace faces of solid figures (cubes and rectangular prisms) to create the set of plane figures related to the solid figure | | - | |
| | 2.MG.4.b | Compare and contrast models and nets (cutouts) of cubes and rectangular prisms (e.g., number and shapes of faces, edges, vertices). | | | |
| | 2.MG.4.c | Given a concrete or pictorial model, name and describe the solid figure (sphere, cube, and rectangular prism) by its characteristics (e.g., number of edges, number of vertices, shapes of faces). | | | |
| | 2.MG.4.d | Compare and contrast plane and solid figures (circles/spheres, squares/cubes, and rectangles/rectangular prisms) according to their characteristics (e.g., number and shapes of their faces, edges, vertices). | | | |
| Probability & Statistics | 2.PS.1 | The student will apply the data cycle (pose questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on pictographs and bar graphs. | | - | |
| | 2.PS.1.a | Pose questions, given a predetermined context, that require the collection of data (limited to 25 or fewer data points for no more than six categories). | | - | |
| | 2.PS.1.b | Determine the data needed to answer a posed question and collect the data using various methods (e.g., voting; creating lists, tables, or charts; tallying). | | - | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| **Patterns, Functions,& Algebra** | 2.PS.1.c | Organize and represent a data set using a pictograph where each symbol represents up to 2 data points. Determine and use a key to assist in the analysis of the data. | | - | |
| | 2.PS.1.d | Organize and represent a data set using a bar graph with a title and labeled axes (limited to 25 or fewer data points for up to six categories, and limit increments of scale to multiples of 1 or 2) | | - | |
| | 2.PS.1.e | Analyze data represented in pictographs and bar graphs and communicate results | | - | |
| | 2.PS.1.e.i | ask and answer questions about the data represented in pictographs and bar graphs (e.g., total number of data points represented, how many in each category, how many more or less are in one category than another). Pictograph keys will be limited to symbols representing 1, 2, 5, or 10 pieces of data and bar graphs will be limited to scales with increments in multiples of 1, 2, 5, or 10; and | | - | |
| | 2.PS.1.e.ii | draw conclusions about the data and make predictions based on the data | | - | |
| | 2.PFA.1 | The student will describe, extend, create, and transfer repeating and increasing patterns (limited to addition of whole numbers) using various representations. | | - | |
| | 2.PFA.1.a | Identify and describe repeating and increasing patterns. | | - | |
| | 2.PFA.1.b | Analyze a repeating or increasing pattern and generalize the change to extend the pattern using objects, pictures, and numbers. | | - | |
| | 2.PFA.1.c | Create a repeating or increasing pattern using various representations (e.g., objects, pictures, numbers). | | - | |
| | 2.PFA.1.d | Transfer a given repeating or increasing pattern from one form to another (e.g., objects, pictures, numbers) and explain the connection between the two patterns. | | - | |
| **Grade 3** | | | | | |
| **Number & Number Sense** | 3.NS.1 | The student will use place value understanding to read, write, and determine the place and value of each digit in a whole number, up to six digits, with and without models. | | - | |
| | 3.NS.1.a | Read and write six-digit whole numbers in standard form, expanded form, and word form. | | - | |
| | 3.NS.1.b | Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place and value of each digit in a six-digit whole number (e.g., in 165,724, the 5 represents 5 thousands and its value is 5,000). | | | |
| | 3.NS.1.c | Compose, decompose, and represent numbers up to 9,999 in multiple ways, according to place value (e.g., 256 can be 1 hundred, 14 tens, 16 ones, but also 25 tens, 6 ones), with and without models. | | | |
| | 3.NS.2 | The student will demonstrate an understanding of the base 10 system to compare and order whole numbers up to 9,999. | | - | |
| | 3.NS.2.a | Compare two whole numbers, each 9,999 or less, using symbols (>, <, =, ≠) and/or words (greater than, less than, equal to, not equal to), with and without models. | | | |
| | 3.NS.2.b | Order up to three whole numbers, each 9,999 or less, represented with and without models, from least to greatest and greatest to least. | | | |
| | 3.NS.3 | The student will use mathematical reasoning and justification to represent and compare fractions (proper and improper) and mixed numbers with denominators of 2, 3, 4, 5, 6, 8, and 10), including those in context. | | | |
| | 3.NS.3.a | Represent, name, and write a given fraction (proper or improper) or mixed number with denominators of 2, 3, 4, 5, 6, 8, and 10 using: | | | |
| | 3.NS.3.a.i | region/area models (e.g., pie pieces, pattern blocks, geoboards) | | | |
| | 3.NS.3.a.ii | length models (e.g., paper fraction strips, fraction bars, rods, number lines) | | | |
| | 3.NS.3.a.iii | set models (e.g., chips, counters, cubes) | | | |
| | 3.NS.3.b | Identify a fraction represented by a model as the sum of unit fractions | | | |
| | 3.NS.3.c | Use a model of a fraction greater than one to count the fractional parts to name and write it as an improper fraction and as a mixed number (e.g., 1/ 4 , 2/ 4 , 3/ 4 , 4/ 4 =1 5/ 4 ). | | | |
| | 3.NS.3.d | Compose and decompose fractions (proper and improper) with denominators of 2, 3, 4, 5, 6, 8, and 10 in multiple ways (e.g., 7/ 4 = 4/ 4 + 3/ 4 or 4/ 6 = 3/ 6 + 1/6 = 2/ 6 + 2/ 6) with models | | | |
| | 3.NS.3.e | Compare a fraction, less than or equal to one, to the benchmarks of 0, ½, and 1 using area/region models, length models, and without models | | | |
| | 3.NS.3.f | Compare two fractions (proper or improper) and/or mixed numbers with like numerators of 2, 3, 4, 5, 6, 8, and 10 (e.g., 2 3 ) using words (greater than, less than, equal to) and/or symbols (>, <, =), using area/region models, length models, and without models. | | | |
| | 3.NS.3.g | Compare two fractions (proper or improper) and/or mixed numbers with like denominators of 2, 3, 4, 5, 6, 8, and 10 (e.g., 3/ 6 < 4/ 6 ) using words (greater than, less than, equal to) and/or symbols (>, <, =), using area/region models, length models, and without models. | | | |

| Topic | Number | Standard | Discover | Explore | Challenge |
|---|---|---|---|---|---|
| **Computation & Estimation** | 3.NS.3.h | Represent equivalent fractions with denominators of 2, 3, 4, 5, 6, 8, or 10, using region/area models and length models. | | | |
| | 3.NS.4 | The student will solve problems, including those in context, that involve counting, comparing, representing, and making change for money amounts up to $5.00. | | | |
| | 3.NS.4.a | Determine the value of a collection of bills and coins whose total is $5.00 or less. | | | |
| | 3.NS.4.b | Construct a set of bills and coins to total a given amount of money whose value is $5.00 or less. | | | |
| | 3.NS.4.c | Compare the values of two sets of coins or two sets of bills and coins, up to $5.00, with words (greater than, less than, equal to) and/or symbols (>, <, =) using concrete or pictorial models. | | | |
| | 3.NS.4.d | Solve contextual problems to make change from $5.00 or less by using counting on or counting back strategies with concrete or pictorial models. | | | |
| | 3.CE.1 | The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction with whole numbers where addends and minuends do not exceed 1,000. | | | |
| | 3.CE.1.a | Determine and justify whether an estimate or an exact answer is appropriate when solving single-step and multistep contextual problems involving addition and subtraction, where addends and minuends do not exceed 1,000. | | | |
| | 3.CE.1.b | Apply strategies (e.g., rounding to the nearest 10 or 100, using compatible numbers, using other number relationships) to estimate a solution for single-step or multistep addition or subtraction problems, including those in context, where addends or minuends do not exceed 1,000. | | | |
| | 3.CE.1.c | Apply strategies (e.g., place value, properties of addition, other number relationships) and algorithms, including the standard algorithm, to determine the sum or difference of two whole numbers where addends and minuends do not exceed 1,000. | | | |
| | 3.CE.1.d | Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal (e.g., 256 - 13 = 220 + 23; 457 + 100 ≠ 557 + 100) | | | |
| | 3.CE.1.e | Represent, solve, and justify solutions to single-step and multistep contextual problems involving addition and subtraction with whole numbers where addends and minuends do not exceed 1,000. | | | |
| | 3.CE.2 | The student will recall with automaticity multiplication and division facts through 10 × 10; and represent, solve, and justify solutions to single-step contextual problems using multiplication and division with whole numbers. | | | |
| | 3.CE.2.a | Represent multiplication and division of whole numbers through 10 × 10, including in a contextual situation, using a variety of approaches and models (e.g., repeated addition/subtraction, equal-sized groups/sharing, arrays, equal jumps on a number line, using multiples to skip count). | | | |
| | 3.CE.2.b | Use inverse relationships to write the related facts connected to a given model for multiplication and division of whole numbers through 10 × 10. | | | |
| | 3.CE.2.c | Apply strategies (e.g., place value, the properties of multiplication and/or addition) when multiplying and dividing whole numbers. | | | |
| | 3.CE.2.d | Demonstrate fluency with multiplication facts through 10 × 10 by applying reasoning strategies (e.g., doubling, add-a-group, subtract-a-group, near squares, and inverse relationships). | | | |
| | 3.CE.2.e | Represent, solve, and justify solutions to single-step contextual problems that involve multiplication and division of whole numbers through 10 × 10. | | | |
| | 3.CE.2.f | Recall with automaticity the multiplication facts through 10 × 10 and the corresponding division facts. | | | |
| | 3.CE.2.g | Create an equation to represent the mathematical relationship between equivalent expressions using multiplication and/or division facts through 10 × 10 (e.g., 4 × 3 = 14 - 2, 35 ÷ 5 = 1 × 7). | | | |
| **Measurement & Geometry** | 3.MG.1 | The student will reason mathematically using standard units (U.S. Customary and metric) with appropriate tools to estimate and measure objects by length, weight/mass, and liquid volume to the nearest half or whole unit. | | - | |
| | 3.MG.1.a | Justify whether an estimate or an exact measurement is needed for a contextual situation and choose an appropriate unit. | | - | |
| | 3.MG.1.b | Estimate and measure | | - | |
| | 3.MG.1.b.i | length of an object to the nearest U.S. Customary unit (1 2 inch, inch, foot, yard) and metric unit (centimeter, meter) | | - | |
| | 3.MG.1.b.ii | weight/mass of an object to the nearest U.S. Customary unit (pound) and metric unit (kilogram); | | | |
| | 3.MG.1.b.iii | liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and metric unit (liter). | | | |
| | 3.MG.1.c | Compare estimates of length, weight/mass, or liquid volume with the actual measurements | | | |
| | 3.MG.2 | The student will use multiple representations to estimate and solve problems, including those in context, involving area and perimeter (in both U.S. Customary and metric units). | | - | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| | 3.MG.2.a | Solve problems, including those in context, involving area | | - | |
| | 3.MG.2.a.i | describe and give examples of area as a measurement in contextual situations | | - | |
| | 3.MG.2.a.ii | estimate and determine the area of a given surface by counting the number of square units, describe the measurement (using the number and unit) and justify the measurement | | - | |
| | 3.MG.2.b | Solve problems, including those in context, involving perimeter | | - | |
| | 3.MG.2.b.i | describe and give examples of perimeter as a measurement in contextual situations | | - | |
| | 3.MG.2.b.ii | estimate and measure the distance around a polygon (with no more than six sides) to determine the perimeter and justify the measurement | | - | |
| | 3.MG.2.b.iii | given the lengths of all sides of a polygon (with no more than six sides), determine its perimeter and justify the measurement | | - | |
| | 3.MG.3 | The student will demonstrate an understanding of the concept of time to the nearest minute and solve single-step contextual problems involving elapsed time in one-hour increments within a 12-hour period. | | - | |
| | 3.MG.3.a | Tell and write time to the nearest minute, using analog and digital clocks. | | | |
| | 3.MG.3.b | Match a written time (e.g., 4:38, 7:09, 12:51) to the time shown on analog and digital clocks to the nearest minute. | | | |
| | 3.MG.3.c | Solve single-step contextual problems involving elapsed time in one-hour increments, within a 12-hour period (within a.m. or within p.m.) when given: | | | |
| | 3.MG.3.c.i | the starting time and the ending time, determine the amount of time that has elapsed; | | | |
| | 3.MG.3.c.ii | the starting time and amount of elapsed time in one-hour increments, determine the ending time | | | |
| | 3.MG.3.c.iii | the ending time and the amount of elapsed time in one-hour increments, determine the starting time | | | |
| | 3.MG.4 | The student will identify, describe, classify, compare, combine, and subdivide polygons. | | - | |
| | 3.MG.4.a | Describe a polygon as a closed plane figure composed of at least three line segments that do not cross. | | - | |
| | 3.MG.4.b | Classify figures as polygons or not polygons and justify reasoning. | | - | |
| | 3.MG.4.c | Identify and describe triangles, quadrilaterals, pentagons, hexagons, and octagons in various orientations, with and without contexts. | | - | |
| | 3.MG.4.d | Identify and name examples of polygons (triangles, quadrilaterals, pentagons, hexagons, octagons) in the environment. | | - | |
| | 3.MG.4.e | Classify and compare polygons (triangles, quadrilaterals, pentagons, hexagons, octagons). | | - | |
| | 3.MG.4.f | Combine no more than three polygons, where each has three or four sides, and name the resulting polygon (triangles, quadrilaterals, pentagons, hexagons, octagons). | | | |
| | 3.MG.4.g | Subdivide a three-sided or four-sided polygon into no more than three parts and name the resulting polygons. | | | |
| Probability & Statistics | 3.PS.1 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on pictographs and bar graphs. | | - | |
| | 3.PS.1.a | Formulate questions that require the collection or acquisition of data. | | - | |
| | 3.PS.1.b | Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 30 or fewer data points for no more than eight categories) using various methods (e.g., polls, observations, tallies). | | - | |
| | 3.PS.1.c | Organize and represent a data set using pictographs that include an appropriate title, labeled axes, and key. Each pictograph symbol should represent 1, 2, 5 or 10 data points. | | - | |
| | 3.PS.1.d | Organize and represent a data set using bar graphs with a title and labeled axes, with and without the use of technology tools. Determine and use an appropriate scale (increments limited to multiples of 1, 2, 5 or 10). | | - | |
| | 3.PS.1.e | Analyze data represented in pictographs and bar graphs, and communicate results orally and in writing: | | - | |
| | 3.PS.1.e.i | describe the categories of data and the data as a whole (e.g., data were collected on preferred ways to cook or prepare eggs - scrambled, fried, hard boiled, and egg salad); | | - | |
| | 3.PS.1.e.ii | identify parts of the data that have special characteristics, including categories with the greatest, the least, or the same (e.g., most students prefer scrambled eggs) | | - | |
| | 3.PS.1.e.iii | make inferences about data represented in pictographs and bar graphs | | - | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| | 3.PS.1.e.iv | use characteristics of the data to draw conclusions about the data and make predictions based on the data (e.g., it is unlikely that a third grader would like hard boiled eggs) | | - | |
| | 3.PS.1.e.v | solve one- and two-step addition and subtraction problems using data from pictographs and bar graphs | | - | |
| Patterns, Functions,& Algebra | 3.PFA.1 | The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition and subtraction of whole numbers), including those in context, using various representations. | | - | |
| | 3.PFA.1.a | Identify and describe increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines). | | - | |
| | 3.PFA.1.b | Analyze an increasing or decreasing pattern and generalize the change to extend the pattern or identify missing terms using various representations. | | - | |
| | 3.PFA.1.c | Solve contextual problems that involve identifying, describing, and extending patterns. | | - | |
| | 3.PFA.1.d | Create increasing and decreasing patterns using objects, pictures, numbers, and number lines. | | - | |
| | 3.PFA.1.e | Investigate and explain the connection between two different representations of the same increasing or decreasing pattern. | | - | |
| Grade 4 | | | | | |
| Number & Number Sense | 4.NS.1 | The student will use place value understanding to read, write, and identify the place and value of each digit in a nine-digit whole number. | | - | - |
| | 4.NS.1.a | Read nine-digit whole numbers, presented in standard form, and represent the same number in written form. | | | |
| | 4.NS.1.b | Write nine-digit whole numbers in standard form when the numbers are presented orally or in written form. | | | |
| | 4.NS.1.c | Apply patterns within the base 10 system to determine and communicate, orally and in written form, the place and value of each digit in a nine-digit whole number (e.g., in 568,165,724, the 8 represents 8 millions and its value is 8,000,000). | | | |
| | 4.NS.2 | The student will demonstrate an understanding of the base 10 system to compare and order whole numbers up to seven digits. | | | |
| | 4.NS.2.a | Compare two whole numbers up to seven digits each, using words (greater than, less than, equal to, not equal to) and/or using symbols (>, <, =, ≠). | | - | - |
| | 4.NS.2.b | Order up to four whole numbers up to seven digits each, from least to greatest or greatest to least. | | | |
| | 4.NS.3 | The student will use mathematical reasoning and justification to represent, compare, and order fractions (proper, improper, and mixed numbers with denominators 12 or less), with and without models. | | | |
| | 4.NS.3.a | Compare and order no more than four fractions (proper or improper), and/or mixed numbers, with like denominators by comparing the number of parts (numerators) using fractions with denominators of 12 or less (e.g., 1/ 5 < 3/ 5 ). Justify comparisons orally, in writing, or with a model.* | | | |
| | 4.NS.3.b | Compare and order no more than four fractions (proper or improper), and/or mixed numbers, with like numerators and unlike denominators by comparing the size of the parts using fractions with denominators of 12 or less (e.g., 3/ 8 < 5/5 or with a model.* | | | |
| | 4.NS.3.c | Use benchmarks (e.g., 0, 1/2 , or 1) to compare and order no more than four fractions (proper or improper), and/or mixed numbers, with like and unlike denominators of 12 or less. Justify comparisons orally, in writing, or with a model.* | | | |
| | 4.NS.3.d | Compare two fractions (proper or improper) and/or mixed numbers using fractions with denominators of 12 or less, using the symbols >, <, and = (e.g., 2/3 > 1/ 7 ). Justify comparisons orally, in writing, or with a model.* | | | |
| | 4.NS.3.e | Represent equivalent fractions with denominators of 12 or less, with and without models.* | | | |
| | 4.NS.3.f | Compose and decompose fractions (proper and improper) and/or mixed numbers with denominators of 12 or less, in multiple ways, with and without models.* | | | |
| | 4.NS.3.g | Represent the division of two whole numbers as a fraction given a contextual situation and a model (e.g., 3/5 means the same as 3 divided by 5 or 3/5 represents the amount of muffin each of five children will receive when sharing three muffins equally) | | | |
| | 4.NS.4 | The student will use mathematical reasoning and justification to represent, compare, and order decimals through thousandths, with and without models. | | - | - |
| | 4.NS.4.a | Investigate and describe the ten-to-one place value relationship for decimals through thousandths, using concrete models (e.g., place value mats/charts, decimal squares, base 10 blocks). | | | |
| | 4.NS.4.b | Represent and identify decimals expressed through thousandths, using concrete, pictorial, and numerical representations. | | | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| | 4.NS.4.c | Read and write decimals expressed through thousandths, using concrete, pictorial, and numerical representations. | | | |
| | 4.NS.4.d | Identify and communicate, both orally and in written form, the place and value of each digit in a decimal through thousandths (e.g., given 0.385, the 8 is in the hundredths place and has a value of 0.08). | | | |
| | 4.NS.4.e | Compare using symbols (<, >, =) and/or words (greater than, less than, equal to) and order (least to greatest and greatest to least), a set of no more than four decimals expressed through thousandths, using multiple strategies (e.g., benchmarks, place value, number lines). Justify comparisons with a model, orally, and in writing. | | | |
| | 4.NS.5 | The student will reason about the relationship between fractions and decimals (limited to halves, fourths, fifths, tenths, and hundredths) to identify and represent equivalencies. | | - | - |
| | 4.NS.5.a | Represent fractions (proper or improper) and/or mixed numbers as decimals through hundredths, using multiple representations, limited to halves, fourths, fifths, tenths, and hundredths.* | | | |
| | 4.NS.5.b | Identify and model equivalent relationships between fractions (proper or improper) and/or mixed numbers and decimals, using halves, fourths, fifths, tenths, and hundredths.* | | | |
| | 4.NS.5.c | Write the decimal and fraction equivalent for a given model (e.g. ¼ =0.25 or 0.25 = ¼; 1.25 = 5/4 of1 ¼; 1.02=102/100 or 1 2/100 | | | |
| **Computation & Estimation** | 4.CE.1 | The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction with whole numbers. | | | |
| | 4.CE.1.a | Determine and justify whether an estimate or an exact answer is appropriate when solving contextual problems involving addition and subtraction with whole numbers. Refine estimates by adjusting the final amount, using terms such as closer to, between, and a little more than. | | | |
| | 4.CE.1.b | Apply strategies (e.g., rounding to the nearest 100 or 1,000, using compatible numbers, other number relationships) to estimate a solution for single-step or multistep addition or subtraction problems with whole numbers, where addends or minuends do not exceed 10,000.* | | | |
| | 4.CE.1.c | Apply strategies (e.g., place value, properties of addition, other number relationships) and algorithms, including the standard algorithm, to determine the sum or difference of two whole numbers, where addends and minuends do not exceed 10,000.* | | | |
| | 4.CE.1.d | Estimate, represent, solve, and justify solutions to single-step and multistep contextual problems involving addition and subtraction with whole numbers where addends and minuends do not exceed 1,000,000. | | | |
| | 4.CE.2 | The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using multiplication with whole numbers, and single-step problems, including those in context, using division with whole numbers; and recall with automaticity the multiplication facts through 12 × 12 and the corresponding division facts. | | | |
| | 4.CE.2.a | Determine and justify whether an estimate or an exact answer is appropriate when solving contextual problems involving multiplication and division of whole numbers. Refine estimates by adjusting the final amount, using terms such as closer to, between, and a little more than. | | | |
| | 4.CE.2.b | Recall with automaticity the multiplication facts through 12 × 12 and the corresponding division facts. | | | |
| | 4.CE.2.c | Create an equation using addition, subtraction, multiplication, and division to represent the relationship between equivalent mathematical expressions (e.g., 4 × 3 = 2 × 6; 10 + 8 = 36 ÷ 2; 12 × 4 = 60 − 12). | | | |
| | 4.CE.2.d | Identify and use the appropriate symbol to distinguish between expressions that are equal and expressions that are not equal, using addition, subtraction, multiplication, and division (e.g., 4 × 12 = 8 × 6 and 64 ÷ 8 ≠ 8 × 8). | | | |
| | 4.CE.2.e | Determine all factor pairs for a whole number 1 to 100, using concrete, pictorial, and numerical representations | | | |
| | 4.CE.2.f | Determine common factors and the greatest common factor of no more than three numbers. | | | |
| | 4.CE.2.g | Apply strategies (e.g., rounding, place value, properties of multiplication and/or addition) and algorithms, including the standard algorithm, to estimate and determine the product of two whole numbers when given: | | | |
| | 4.CE.2.g.1 | A two-digit factor and a one-digit factor | | | |
| | 4.CE.2.g.ii | a three-digit factor and a one-digit factor; | | | |
| | 4.CE.2.g.iii | a two-digit factor and a two-digit factor. | | | |
| | 4.CE.2.h | Estimate, represent, solve, and justify solutions to single-step and multistep contextual problems that involve multiplication with whole numbers. | | | |
| | 4.CE.2.i | Apply strategies (e.g., rounding, compatible numbers, place value) and algorithms, including the | | | |

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| | | standard algorithm, to estimate and determine the quotient of two whole numbers, given a one-digit divisor and a two- or three-digit dividend, with and without remainders. | | | |
| | 4.CE.2.j | Estimate, represent, solve, and justify solutions to single-step contextual problems involving division with whole numbers. | | | |
| | 4.CE.2.k | Interpret the quotient and remainder when solving a contextual problem | | | |
| | 4.CE.3 | The student will estimate, represent, solve, and justify solutions to single-step problems, including those in context, using addition and subtraction of fractions (proper, improper, and mixed numbers with like denominators of 2, 3, 4, 5, 6, 8, 10, and 12), with and without models; and solve single-step contextual problems involving multiplication of a whole number (12 or less) and a unit fraction, with models. | | - | - |
| | 4.CE.3.a | Estimate and determine the sum or difference of two fractions (proper or improper) and/or mixed numbers, having like denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12 (e.g., 3/8 + 3/8 , 2 1/5 + 4/5 , 7/4- 5/4 ) and simplify the resulting fraction. Addition and subtraction with fractions may include regrouping. | | - | - |
| | 4.CE.3.b | Estimate, represent, solve, and justify solutions to single-step contextual problems using addition and subtraction with fractions (proper or improper) and/or mixed numbers, having like denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12, and simplify the resulting fraction. Addition and subtraction with fractions may include regrouping. | | - | - |
| | 4.CE.3.c | Solve single-step contextual problems involving multiplication of a whole number, limited to 12 or less, and a unit fraction (e.g., 6 × 1/3 , 1/5 × 8, 2 × 1/10 ), with models. | | | |
| | 4.CE.3.d | Apply the inverse property of multiplication in models (e.g., use a visual fraction model to represent 4/4 or 1 as the product of 4 × 1/4 ). | | | |
| | 4.CE.4 | The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction of decimals through the thousandths, with and without models. | | - | - |
| | 4.CE.4.a | Apply strategies (e.g., rounding to the nearest whole number, using compatible numbers) and algorithms, including the standard algorithm, to estimate and determine the sum or difference of two decimals through the thousandths, with and without models, in which: | | | |
| | 4.CE.4.a.i | decimals do not exceed the thousandths; and | | | |
| | 4.CE.4.a.ii | addends, subtrahends, and minuends are limited to four digits. | | | |
| | 4.CE.4.b | Estimate, represent, solve, and justify solutions to single-step and multistep contextual problems using addition and subtraction of decimals through the thousandths. | | | |
| Measurement & Geometry | 4.MG.1 | The student will reason mathematically to solve problems, including those in context, that involve length, weight/mass, and liquid volume using U.S. Customary and metric units. | | - | - |
| | 4.MG.1.a | Determine an appropriate unit of measure to use when measuring | | - | - |
| | 4.MG.1.a.i | length in both U.S. Customary (inch, foot, yard, mile) and metric units (millimeter, centimeter, meter) | | - | - |
| | 4.MG.1.a.ii | weight/mass in both U.S. Customary (ounce, pound) and metric units (gram, kilogram); and | | | |
| | 4.MG.1.a.iii | liquid volume in both U.S. Customary (cup, pint, quart, gallon) and metric units (milliliter, liter) | | | |
| | 4.MG.1.b | Estimate and measure | | - | - |
| | 4.MG.1.b.i | length of an object to the nearest U.S. Customary unit (1/2 inch, 1/4 inch, 1/8 inch, foot, yard) and nearest metric unit (millimeter, centimeter, or meter) | | - | - |
| | 4.MG.1.b.ii | weight/mass of an object to the nearest U.S. Customary unit (ounce, pound) and nearest metric unit (gram, kilogram) | | | |
| | 4.MG.1.b.iii | liquid volume to the nearest U.S. Customary unit (cup, pint, quart, gallon) and nearest metric unit (milliliter, liter) | | | |
| | 4.MG.1.c | Compare estimates of length, weight/mass, or liquid volume with the actual measurements | | | |
| | 4.MG.1.d | Given the equivalent measure of one unit, solve problems, including those in context, by determining the equivalent measures within the U.S. Customary system for | | - | - |
| | 4.MG.1.d.i | length (inches and feet, feet and yards, inches and yards) | | - | - |
| | 4.MG.1.d.ii | weight/mass (ounces and pounds) | | | |
| | 4.MG.1.d.iii | liquid volume (cups, pints, quarts, and gallons) | | | |
| | 4.MG.2 | The student will solve single-step and multistep contextual problems involving elapsed time (limited to hours and minutes within a 12-hour period) | | - | - |
| | 4.MG.2.a | Solve single-step and multistep contextual problems involving elapsed time in hours and minutes, within a 12-hour period (within a.m., within p.m., and across a.m. and p.m.) when given: | | | |

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| | 4.MG.2.a.i | the starting time and the ending time, determine the amount of time that has elapsed in hours and minutes; | | | |
| | 4.MG.2.a.ii | the starting time and amount of elapsed time in hours and minutes, determine the ending time | | | |
| | 4.MG.2.a.iii | the ending time and the amount of elapsed time in hours and minutes, determine the starting time | | | |
| | 4.MG.3 | The student will use multiple representations to develop and use formulas to solve problems, including those in context, involving area and perimeter limited to rectangles and squares (in both U.S. Customary and metric units) | | - | - |
| | 4.MG.3.a | Use concrete materials and pictorial models to develop a formula for the area and perimeter of a rectangle (including a square) | | - | - |
| | 4.MG.3.b | Determine the area and perimeter of a rectangle when given the measure of two adjacent sides (in whole number units), with and without models | | - | - |
| | 4.MG.c | Determine the area and perimeter of a square when given the measure of one side (in whole number units), with and without models. | | - | - |
| | 4.MG.d | Use concrete materials and pictorial models to explore the relationship between area and perimeter of rectangles | | - | - |
| | 4.MG.e | Identify and represent rectangles with the same perimeter and different areas or with the same area and different perimeters | | - | - |
| | 4.MG.f | Solve contextual problems involving area and perimeter of rectangles and squares | | - | - |
| | 4.MG.4 | The student will identify, describe, and draw points, rays, line segments, angles, and lines, including intersecting, parallel, and perpendicular lines | | - | - |
| | 4.MG.4.a | Identify and describe points, lines, line segments, rays, and angles, including endpoints and vertices | | - | - |
| | 4.MG.4.b | Describe endpoints and vertices in relation to lines, line segments, rays, and angles | | - | - |
| | 4.MG.4.c | Draw representations of points, line segments, rays, angles, and lines, using a ruler or straightedge | | - | - |
| | 4.MG.4.d | Identify parallel, perpendicular, and intersecting lines and line segments in plane and solid figures, including those in context | | - | - |
| | 4.MG.4.e | Use symbolic notation to name points, lines, line segments, rays, angles, and to describe parallel and perpendicular lines | | - | - |
| | 4.MG.5 | The student will classify and describe quadrilaterals (parallelograms, rectangles, squares, rhombi, and/or trapezoids) using specific properties and attributes | | - | - |
| | 4.MG.5.a | Develop definitions for parallelograms, rectangles, squares, rhombi, and trapezoids through the exploration of properties and attributes | | - | - |
| | 4.MG.5.b | Identify and describe points, line segments, angles, and vertices in quadrilaterals | | - | - |
| | 4.MG.5.c | Identify and describe parallel, intersecting, perpendicular, and congruent sides in quadrilaterals | | - | - |
| | 4.MG.5.d | Compare, contrast, and classify quadrilaterals (parallelograms, rectangles, squares, rhombi, and/or trapezoids) based on the following properties and attributes | | - | - |
| | 4.MG.5.d.i | parallel sides | | - | - |
| | 4.MG.5.d.ii | perpendicular sides; | | - | - |
| | 4.MG.5.d.iii | congruence of sides; and | | - | - |
| | 4.MG.5.d.iv | number of right angles | | - | - |
| | 4.MG.5.e | Denote properties of quadrilaterals and identify parallel sides, congruent sides, and right angles by using geometric markings. | | - | - |
| | 4.MG.5.f | Use symbolic notation to name line segments and angles in quadrilaterals | | - | - |
| | 4.MG.6 | The student will identify, describe, compare, and contrast plane and solid figures according to their characteristics (number of angles, vertices, edges, and the number and shape of faces), with and without models | | | |
| | 4.MG.6.a | Identify concrete models and pictorial representations of solid figures (cube, rectangular prism, square pyramid, sphere, cone, and cylinder) | | | |
| | 4.MG.6.b | Identify and describe solid figures (cube, rectangular prism, square pyramid, and sphere) according to their characteristics (number of angles, vertices, edges, and by the number and shape of faces) | | | |
| | 4.MG.6.c | Compare and contrast plane and solid figures (limited to circles, squares, triangles, rectangles, spheres, cubes, square pyramids, and rectangular prisms) according to their characteristics (number of sides, angles, vertices, edges, and the number and shape of faces). | | | |

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| Probability & Statistics | 4.PS.1 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on line graphs. | | - | - |
| | 4.PS.1.a | Formulate questions that require the collection or acquisition of data | | - | - |
| | 4.PS.1.b | Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 10 or fewer data points) using various methods (e.g., observations, measurements, experiments) | | - | - |
| | 4.PS.1.c | Organize and represent a data set using line graphs with a title and labeled axes with whole number increments, with and without the use of technology tools | | - | - |
| | 4.PS.1.d | Analyze data represented in line graphs and communicate results orally and in writing | | - | - |
| | 4.PS.1.d.i | describe the characteristics of the data represented in a line graph and the data as a whole (e.g., the time period when the temperature increased the most) | | - | - |
| | 4.PS.1.d.ii | identify parts of the data that have special characteristics and explain the meaning of the greatest, the least, or the same (e.g., the highest temperature shows the warmest day) | | - | - |
| | 4.PS.1.d.iii | make inferences about data represented in line graphs | | - | - |
| | 4.PS.1.d.iv | draw conclusions about the data and make predictions based on the data to answer questions; and | | - | - |
| | 4.PS.1.d.v | solve single-step and multistep addition and subtraction problems using data from line graphs. | | - | - |
| | 4.PS.2 | The student will model and determine the probability of an outcome of a simple event. | | | |
| | 4.PS.2.a | Describe probability as the degree of likelihood of an outcome occurring using terms such as impossible, unlikely, equally likely, likely, and certain. | | - | - |
| | 4.PS.2.b | Model and determine all possible outcomes of a given simple event where there are no more than 24 possible outcomes, using a variety of manipulatives (e.g., coins, two-sided counters, number cubes, spinners). | | - | - |
| | 4.PS.2.c | Write the probability of a given simple event as a fraction between 0 and 1, where there are no more than 24 possible outcomes. | | - | - |
| | 4.PS.2.d | Determine the likelihood of an event occurring and relate it to its whole number or fractional representation (e.g., impossible or zero; equally likely; certain or one). | | | |
| | 4.PS.2.e | Create a model or contextual problem to represent a given probability. | | - | - |
| Patterns, Functions,& Algebra | 4.PFA.1 | The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition, subtraction, and multiplication of whole numbers), including those in context, using various representations. | | - | - |
| | 4.PFA.1.a | Identify, describe, extend, and create increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines, input/output tables, and function machines). | | - | - |
| | 4.PFA.1.b | Analyze an increasing or decreasing single-operation numerical pattern found in lists, input/output tables, or function machines and generalize the change to identify the rule, extend the pattern, or identify missing terms. | | - | - |
| | 4.PFA.1.c | Given a rule, create increasing and decreasing patterns using numbers and input/output tables (including function machines). | | - | - |
| | 4.PFA.1.d | Solve contextual problems that involve identifying, describing, and extending increasing and decreasing patterns using single-operation input and output rules. | | - | - |
| **Grade 5** | | | | | |
| Number & Number Sense | 5.NS.1 | The student will use reasoning and justification to identify and represent equivalency between fractions (with denominators that are thirds, eighths, and factors of 100) and decimals; and compare and order sets of fractions (proper, improper, and/or mixed numbers having denominators of 12 or less) and decimals (through thousandths). | | | |
| | 5.NS.1.a | Use concrete and pictorial models to represent fractions with denominators that are thirds, eighths, and factors of 100 in their equivalent decimal form. | | | |
| | 5.NS.1.b | Use concrete and pictorial models to represent decimals in their equivalent fraction form (thirds, eighths, and factors of 100). | | | |
| | 5.NS.1.c | Identify equivalent relationships between decimals and fractions with denominators that are thirds, eighths, and factors of 100 in their equivalent decimal form, with and without models. | | | |
| | 5.NS.1.d | Compare (using symbols <, >, =) and order (least to greatest and greatest to least) a set of no more than four decimals and fractions (proper, improper) and/or mixed numbers using multiple strategies (e.g., benchmarks, place value, number lines). Justify solutions orally, in writing, or with a model. | | | |
| | 5.NS.2 | The student will demonstrate an understanding of prime and composite numbers, and determine the | | | |

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| | | prime factorization of a whole number up to 100. | | | |
| | 5.NS.2.a | Given a whole number up to 100, create a concrete or pictorial representation to demonstrate whether the number is prime or composite, and justify reasoning. | | | |
| | 5.NS.2.b | Classify, compare, and contrast whole numbers up to 100 using the characteristics prime and composite. | | | |
| | 5.NS.2c | Determine the prime factorization for a whole number up to 100. | | | |
| **Computation & Estimation** | 5.CE.1 | The student will estimate, represent, solve, and justify solutions to single-step and multistep contextual problems using addition, subtraction, multiplication, and division with whole numbers. | | | - |
| | 5.CE.1.a | Estimate the sum, difference, product, and quotient of whole numbers in contextual problems. | | | - |
| | 5.CE.1.b | Represent, solve, and justify solutions to single-step and multistep contextual problems by applying strategies (e.g., estimation, properties of addition and multiplication) and algorithms, including the standard algorithm, involving addition, subtraction, multiplication, and division of whole numbers, with and without remainders, in which | | | - |
| | 5.CE.1.b.i | sums, differences, and products do not exceed five digits | | | |
| | 5.CE.1.b.ii | factors do not exceed two digits by three digits | | | |
| | 5.CE.1.b.iii | divisors do not exceed two digits | | | |
| | 5.CE.1.b.iv | dividends do not exceed four digits | | | |
| | 5.CE.1.c | Interpret the quotient and remainder when solving a contextual problem | | | |
| | 5.CE.2 | The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition and subtraction of fractions with like and unlike denominators (with and without models), and solve single-step contextual problems involving multiplication of a whole number and a proper fraction, with models. | | | |
| | 5.CE.2.a | Determine the least common multiple of two numbers to find the least common denominator for two fractions. | | | |
| | 5.CE.2.b | Estimate and determine the sum or difference of two fractions (proper or improper) and/or mixed numbers, having like and unlike denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12 (e.g., 5/8 + 1/ 4 , 4/ 5 − 2/ 3 , 3 3/ 4 + 2 5 /12 ), and simplify the resulting fraction.* | | | |
| | 5.CE.2.c | Estimate and solve single-step and multistep contextual problems involving addition and subtraction with fractions (proper or improper) and/or mixed numbers having like and unlike denominators, with and without models. Denominators should be limited to 2, 3, 4, 5, 6, 8, 10, and 12. Answers should be expressed in simplest form. | | | |
| | 5.CE.2.d | Solve single-step contextual problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction (e.g., 9 × 2/ 3 , 8 × 3/ 4 ), with models. The denominator will be a factor of the whole number and answers should be expressed in simplest form. | | | |
| | 5.CE.3 | The student will estimate, represent, solve, and justify solutions to single-step and multistep problems, including those in context, using addition, subtraction, multiplication, and division with decimal numbers. | | | - |
| | 5.CE.3.a | Apply estimation strategies (e.g., rounding to the nearest whole number, tenth or hundredth; compatible numbers, place value) to determine a reasonable solution for single-step and multistep contextual problems involving addition, subtraction, and multiplication of decimals, and single-step contextual problems involving division of decimals. | | | - |
| | 5.CE.3.b | Estimate and determine the product of two numbers using strategies and algorithms, including the standard algorithm, when given | | | - |
| | 5.CE.3.b.i | a two-digit factor and a one-digit factor (e.g., 2.3 × 4; 0.08 × 0.9; .16 × 5) | | | |
| | 5.CE.3.b.ii | a three-digit factor and a one-digit factor (e.g., 0.156 × 4, 3.28 × 7, 8.09 × 0.2) | | | |
| | 5.CE.3.b.iii | a two-digit factor and a two-digit factor (e.g., 0.85 × 3.7, 14 × 1.6, 9.2 × 3.5) | | | |
| | 5.CE.3.c | Estimate and determine the quotient of two numbers using strategies and algorithms, including the standard algorithm, in which: | | | - |
| | 5.CE.3.c.i | quotients do not exceed four digits with or without a decimal point | | | |
| | 5.CE.3.c.ii | quotients may include whole numbers, tenths, hundredths, or thousandths | | | |
| | 5.CE.3.c.iii | divisors are limited to a single digit whole number or a decimal expressed as tenths | | | |
| | 5.CE.3.c.iv | no more than one additional zero will need to be annexed | | | |
| | 5.CE.3.d | Solve single-step and multistep contextual problems involving addition, subtraction, and multiplication of decimals by applying strategies (e.g., estimation, modeling) and algorithms, including the standard algorithm | | | - |
| | 5.CE.3.e | Solve single-step contextual problems involving division with decimals by applying strategies (e.g., | | | - |

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| | | estimation, modeling) and algorithms, including the standard algorithm | | | |
| | 5.CE.4 | The student will simplify numerical expressions with whole numbers using the order of operations. | | | |
| | 5.CE.4.a | Use order of operations to simplify numerical expressions with whole numbers, limited to addition, subtraction, multiplication, and division in which | | | |
| | 5.CE.4.a.i | expressions may contain no more than one set of parentheses | | | |
| | 5.CE.4.a.ii | simplification will be limited to five whole numbers and four operations in any combination of addition, subtraction, multiplication, or division | | | |
| | 5.CE.4.a.iii | whole numbers will be limited to two digits or less | | | |
| | 5.CE.4.a.iv | expressions should not include braces, brackets, or fraction bars | | | |
| | 5.CE.4.b | Given a whole number numerical expression involving more than one operation, describe which operation is completed first, which is second, and which is third | | | |
| Measurement & Geometry | 5.MG.1 | The student will reason mathematically to solve problems, including those in context, that involve length, mass, and liquid volume using metric units. | | | |
| | 5.MG.1.a | Determine the most appropriate unit of measure to use in a contextual problem that involves metric units: | | | |
| | 5.MG.1.a.i | length (millimeters, centimeters, meters, and kilometers) | | | |
| | 5.MG.1.a.ii | mass (grams and kilograms) | | | |
| | 5.MG.1.a.iii | liquid volume (milliliters and liters) | | | |
| | 5.MG.1.b | Estimate and measure to solve contextual problems that involve metric units | | | - |
| | 5.MG.1.b.i | length (millimeters, centimeters, meters, and kilometers) | | | |
| | 5.MG.1.b.ii | mass (grams and kilograms) | | | |
| | 5.MG.1.b.iii | liquid volume (milliliters and liters) | | | |
| | 5.MG.1.c | Given the equivalent metric measure of one unit, in a contextual problem, determine the equivalent measurement within the metric system | | | |
| | 5.MG.1.c.i | length (millimeters, centimeters, meters, and kilometers) | | | |
| | 5.MG.1.c.ii | mass (grams and kilograms) | | | |
| | 5.MG.1.c.iii | liquid volume (milliliters and liters) | | | |
| | 5.MG.2 | The student will use multiple representations to solve problems, including those in context, involving perimeter, area, and volume. | | | - |
| | 5.MG.2.a | Investigate and develop a formula for determining the area of a right triangle | | | |
| | 5.MG.2.b | Estimate and determine the area of a right triangle, with diagrams, when the base and the height are given in whole number units, in metric or U.S. Customary units, and record the solution with the appropriate unit of measure (e.g., 16 square inches). | | | |
| | 5.MG.2.c | Describe volume as a measure of capacity and give examples of volume as a measurement in contextual situations. | | | |
| | 5.MG.2.d | Investigate and develop a formula for determining the volume of rectangular prisms using concrete objects. | | | |
| | 5.MG.2.e | Solve problems, including those in context, to estimate and determine the volume of a rectangular prism using concrete objects, diagrams, and formulas when the length, width, and height are given in whole number units. Record the solution with the appropriate unit of measure (e.g., 12 cubic inches). | | | |
| | 5.MG.2.f | Identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation. | | | |
| | 5.MG.2.g | Solve contextual problems that involve perimeter, area, and volume in standard units of measure. | | | |
| | 5.MG.3 | The student will classify and measure angles and triangles, and solve problems, including those in context. | | | - |
| | 5.MG.3.a | Classify angles as right, acute, obtuse, or straight and justify reasoning. | | | |
| | 5.MG.3.b | Classify triangles as right, acute, or obtuse and equilateral, scalene, or isosceles and justify reasoning. | | | |
| | 5.MG.3.c | Identify congruent sides and right angles using geometric markings to denote properties of triangles. | | | |
| | 5.MG.3.d | Compare and contrast the properties of triangles. | | | |
| | 5.MG.3.e | Identify the appropriate tools (e.g., protractor, straightedge, angle ruler, available technology) to measure and draw angles. | | | |
| | 5.MG.3.f | Measure right, acute, obtuse, and straight angles, using appropriate tools, and identify measures in degrees. | | | |
| | 5.MG.3.g | Use models to prove that the sum of the interior angles of a triangle is 180 degrees and use the | | | |

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| | | relationship to determine an unknown angle measure in a triangle. | | | |
| | 5.MG.3.h | Solve addition and subtraction contextual problems to determine unknown angle measures on a diagram. | | | |
| Probability & Statistics | 5.PS.1 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on line plots (dot plots) and stem-and-leaf plots. | | | - |
| | 5.PS.1.a | Formulate questions that require the collection or acquisition of data. | | | - |
| | 5.PS.1.b | Determine the data needed to answer a formulated question and collect or acquire existing data (limited to 30 or fewer data points) using various methods (e.g., polls, observations, measurements, experiments). | | | - |
| | 5.PS.1.c | Organize and represent a data set using a line plot (dot plot) with a title, labeled axes, and a key, with and without the use of technology tools. Line plots (dot plots) may contain whole numbers, fractions, or decimals. | | | - |
| | 5.PS.1.d | Organize and represent numerical data using a stem-and-leaf plot with a title and key, where the stems are listed in ascending order and the leaves are in ascending order, with or without commas between the leaves. | | | - |
| | 5.PS.1.e | Analyze data represented in line plots (dot plots) and stem-and-leaf plots and communicate results orally and in writing: | | | - |
| | 5.PS.1.e.i | describe the characteristics of the data represented in a line plot (dot plot) and stem-and leaf plot as a whole (e.g., the shape and spread of the data); | | | - |
| | 5.PS.1.e.ii | make inferences about data represented in line plots (dot plots) and stem-and-leaf plots (e.g., based on a line plot (dot plot) of the number of books students in a bus line have in their backpack, every student will have from two to four books in their backpack) | | | - |
| | 5.PS.1.e.iii | identify parts of the data that have special characteristics and explain the meaning of the greatest, the least, or the same (e.g., the stem-and-leaf plot shows that the same number of students scored in the 90s as scored in the 70s) | | | - |
| | 5.PS.1.e.iv | draw conclusions about the data and make predictions based on the data to answer questions; and | | | |
| | 5.PS.1.e.v | solve single-step and multistep addition and subtraction problems using data from line plots (dot plots) and stem-and-leaf plots. | | | |
| | 5.PS.2 | The student will solve contextual problems using measures of center and the range | | | |
| | 5.PS.2.a | Describe mean as fair share. | | | |
| | 5.PS.2.b | Describe and determine the mean of a set of data values representing data from a given context as a measure of center. | | | |
| | 5.PS.2.c | Describe and determine the median of a set of data values representing data from a given context as a measure of center. | | | |
| | 5.PS.2.d | Describe and determine the mode of a set of data values representing data from a given context as a measure of center. | | | |
| | 5.PS.2.e | Describe and determine the range of a set of data values representing data from a given context as a measure of spread. | | | |
| | 5.PS.3 | The student will determine the probability of an outcome by constructing a model of a sample space and using the Fundamental (Basic) Counting Principle. | | | |
| | 5.PS.3.a | Determine the probability of an outcome by constructing a sample space (with a total of 24 or fewer equally likely possible outcomes), using a tree diagram, list, or chart to represent and determine all possible outcomes. | | | |
| | 5.PS.3.b | Determine the number of possible outcomes by using the Fundamental (Basic) Counting Principle. | | | |
| Pattern, Function, & Algebra | 5.PFA.1 | The student will identify, describe, extend, and create increasing and decreasing patterns with whole numbers, fractions, and decimals, including those in context, using various representations. | | | |
| | 5.PFA.1.a | Identify, describe, extend, and create increasing and decreasing patterns using various representations (e.g., objects, pictures, numbers, number lines, input/output tables, function machines). | | | - |
| | 5.PFA.1.b | Analyze an increasing or decreasing single-operation numerical pattern found in lists, input/output tables, and function machines, and generalize the change to identify the rule, extend the pattern, or identify missing terms. (Patterns will be limited to addition, subtraction, multiplication, and division of whole numbers; addition and subtraction of fractions with like denominators of 12 or less; and addition and subtraction of decimals expressed in tenths or hundredths). | | | |
| | 5.PFA.1.c | Solve contextual problems that involve identifying, describing, and extending increasing and decreasing patterns using single-operation input and output rules (limited to addition, subtraction, multiplication, and division of whole numbers; addition and subtraction of fractions with like | | | |

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| | | denominators of 12 or less; and addition and subtraction of decimals expressed in tenths or hundredths). | | | |
| | 5.PFA.2 | The student will investigate and use variables in contextual problems. | | | |
| | 5.PFA.2.a | Describe the concept of a variable (presented as a box, letter, or other symbol) as a representation of an unknown quantity. | | | |
| | 5.PFA.2.b | Write an equation (with a single variable that represents an unknown quantity and one operation) from a contextual situation, using addition, subtraction, multiplication, or division. | | | |
| | 5.PFA.2.c | Use an expression with a variable to represent a given verbal expression involving one operation (e.g., "5 more than a number" can be represented by y + 5). | | | |
| | 5.PFA.2.d | Create and write a word problem to match a given equation with a single variable and one operation. | | | |
| **Grade 6** | | | | | |
| Number & Sense | 6.NS.1 | The student will reason and use multiple strategies to express equivalency, compare, and order numbers written as fractions, mixed numbers, decimals, and percents. | | | - |
| | 6.NS.1.a | Estimate and determine the percent represented by a given model (e.g., number line, picture, verbal description), including percents greater than 100% and less than 1%. | | | |
| | 6.NS.1.b | Represent and determine equivalencies among decimals (through the thousandths place) and percents incorporating the use of number lines, and concrete and pictorial models. | | | - |
| | 6.NS.1.c | Represent and determine equivalencies among fractions (proper or improper) and mixed numbers that have denominators that are 12 or less or factors of 100 and percents incorporating the use of number lines, and concrete and pictorial models. | | | |
| | 6.NS.1.d | Represent and determine equivalencies among decimals, percents, fractions (proper or improper), and mixed numbers that have denominators that are 12 or less or factors of 100 incorporating the use of number lines, and concrete and pictorial models. | | | |
| | 6.NS.1.e | Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare and order no more than four positive rational numbers expressed as fractions (proper or improper), mixed numbers, decimals, and percents (decimals through thousandths, fractions with denominators of 12 or less or factors of 100) with and without models. Justify solutions orally, in writing or with a model. Ordering may be in ascending or descending order. | | | |
| | 6.NS.2 | The student will reason and use multiple strategies to represent, compare, and order integers. | | | - |
| | 6.NS.2.a | Represent integers (e.g., number lines, concrete materials, pictorial models), including models derived from contextual situations, and identify an integer represented by a point on a number line. | | | |
| | 6.NS.2.b | Compare and order integers using a number line. | | | |
| | 6.NS.2.c | Compare integers, using mathematical symbols (<, >, =). | | | - |
| | 6.NS.2.d | Identify and describe the absolute value of an integer as the distance from zero on the number line. | | | |
| | 6.NS.3 | The student will recognize and represent patterns with whole number exponents and perfect squares. | | | - |
| | 6.NS.3.a | Recognize and represent patterns with bases and exponents that are whole numbers | | | - |
| | 6.NS.3.b | Recognize and represent patterns of perfect squares not to exceed 202, by using concrete and pictorial models. | | | |
| | 6.NS.3.c | Justify if a number between 0 and 400 is a perfect square through modeling or mathematical reasoning. | | | |
| | 6.NS.3.d | Recognize and represent powers of 10 with whole number exponents by examining patterns in place value. | | | |
| Computation & Estimation | 6.CE.1 | The student will estimate, demonstrate, solve, and justify solutions to problems using operations with fractions and mixed numbers, including those in context. | | | - |
| | 6.CE.1.a | Demonstrate/model multiplication and division of fractions (proper or improper) and mixed numbers using multiple representations. | | | |
| | 6.CE.1.b | Multiply and divide fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form | | | |
| | 6.CE.1.c | Investigate and explain the effect of multiplying or dividing a fraction, whole number, or mixed number by a number between zero and one. | | | |
| | 6.CE.1.d | Estimate, determine, and justify the solution to single-step and multistep problems in context that involve addition and subtraction with fractions (proper or improper) and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less. Answers are expressed in simplest form | | | |
| | 6.CE.1.e | Estimate, determine, and justify the solution to single-step and multistep problems in context that | | | |

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| | | involve multiplication and division with fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form. | | | |
| | 6.CE.2 | The student will estimate, demonstrate, solve, and justify solutions to problems using operations with integers, including those in context. | | | - |
| | 6.CE.2.a | Demonstrate/model addition, subtraction, multiplication, and division of integers using pictorial representations or concrete manipulatives. | | | |
| | 6.CE.2.b | Add, subtract, multiply, and divide two integers. | | | |
| | 6.CE.2.c | Simplify an expression that contains absolute value bars \| \| and an operation with two integers (e.g., −\|5 − 8\| or \|−12\|/ 8 ) and represent the result on a number line. | | | |
| | 6.CE.2.d | Estimate, determine, and justify the solution to one and two-step contextual problems, involving addition, subtraction, multiplication, and division with integers. | | | |
| Measurement & Geometry | 6.MG.1 | The student will identify the characteristics of circles and solve problems, including those in context, involving circumference and area. | | | - |
| | 6.MG.1.a | Identify and describe chord, diameter, radius, circumference, and area of a circle. | | | - |
| | 6.MG.1.b | Investigate and describe the relationship between | | | - |
| | 6.MG.1.b.i | diameter and radius | | | - |
| | 6.MG.1.b.ii | radius and circumference | | | - |
| | 6.MG.1.b.iii | diameter and circumference. | | | - |
| | 6.MG.1.c | Develop an approximation for pi (3.14) by gathering data and comparing the circumference to the diameter of various circles, using concrete manipulatives or technological models. | | | - |
| | 6.MG.1.d | Develop the formula for circumference using the relationship between diameter, radius, and pi. | | | |
| | 6.MG.1.e | Solve problems, including those in context, involving circumference and area of a circle when given the length of the diameter or radius. | | | |
| | 6.MG.2 | The student will reason mathematically to solve problems, including those in context, that involve the area and perimeter of triangles and parallelograms. | | | - |
| | 6.MG.2.a | Develop the formula for determining the area of parallelograms and triangles using pictorial representations and concrete manipulatives (e.g., two-dimensional diagrams, grid paper). | | | |
| | 6.MG.2.b | Solve problems, including those in context, involving the perimeter and area of triangles and parallelograms. | | | |
| | 6.MG.3 | The student will describe the characteristics of the coordinate plane and graph ordered pairs. | | | - |
| | 6.MG.3.a | Identify and label the axes, origin, and quadrants of a coordinate plane | | | |
| | 6.MG.3.b | Identify and describe the location (quadrant or the axis) of a point given as an ordered pair. Ordered pairs will be limited to coordinates expressed as integers | | | |
| | 6.MG.3.c | Graph ordered pairs in the four quadrants and on the axes of a coordinate plane. Ordered pairs will be limited to coordinates expressed as integers. | | | |
| | 6.MG.3.d | Identify ordered pairs represented by points in the four quadrants and on the axes of the coordinate plane. Ordered pairs will be limited to coordinates expressed as integers. | | | |
| | 6.MG.3.e | Relate the coordinates of a point to the distance from each axis and relate the coordinates of a single point to another point on the same horizontal or vertical line. Ordered pairs will be limited to coordinates expressed as integers. | | | |
| | 6.MG.3.f | Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to determine the length of a side joining points with the same first coordinate or the same second coordinate. Ordered pairs will be limited to coordinates expressed as integers. Apply these techniques in the context of solving contextual and mathematical problems. | | | |
| | 6.MG.4 | The student will determine congruence of segments, angles, and polygons. | | | - |
| | 6.MG.4.a | Identify regular polygons. | | | |
| | 6.MG.4.b | Draw lines of symmetry to divide regular polygons into two congruent parts. | | | |
| | 6.MG.4.c | Determine the congruence of segments, angles, and polygons given their properties. | | | |
| | 6.MG.4.d | Determine whether polygons are congruent or noncongruent according to the measures of their sides and angles. | | | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| **Probability & Statistics** | 6.PS.1 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on circle graphs. | | | - |
| | 6.PS.1.a | Formulate questions that require the collection or acquisition of data with a focus on circle graphs. | | | - |
| | 6.PS.1.b | Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments). | | | - |
| | 6.PS.1.c | Determine the factors that will ensure that the data collected is a sample that is representative of a larger population. | | | - |
| | 6.PS.1.d | Organize and represent data using circle graphs, with and without the use of technology tools. The number of data values should be limited to allow for comparisons that have denominators of 12 or less or those that are factors of 100 (e.g., in a class of 20 students, 7 choose apples as a favorite fruit, so the comparison is 7 out of 20, 7/20 , or 35%). | | | - |
| | 6.PS.1.e | Analyze data represented in a circle graph by making observations and drawing conclusions. | | | - |
| | 6.PS.1.f | Compare data represented in a circle graph with the same data represented in other graphs, including but not limited to bar graphs, pictographs, and line plots (dot plots), and justify which graphical representation best represents the data. | | | - |
| | 6.PS.2 | The student will represent the mean as a balance point and determine the effect on statistical measures when a data point is added, removed, or changed. | | | |
| | 6.PS.2.a | Represent the mean of a set of data graphically as the balance point represented in a line plot (dot plot) | | | |
| | 6.PS.2.b | Determine the effect on measures of center when a single value of a data set is added, removed, or changed. | | | |
| | 6.PS.2.c | Observe patterns in data to identify outliers and determine their effect on mean, median, mode, or range. | | | |
| **Patterns, Functions & Algebra** | 6.PFA.1 | The student will use ratios to represent relationships between quantities, including those in context. | | | - |
| | 6.PFA.1.a | Represent a relationship between two quantities using ratios. | | | - |
| | 6.PFA.1.b | Represent a relationship in context that makes a comparison by using the notations $\frac{a}{b}$, a:b, and a to b. | | | |
| | 6.PFA.1.c | Represent different comparisons within the same quantity or between different quantities (e.g., part to part, part to whole, whole to whole). | | | |
| | 6.PFA.1.d | Create a relationship in words for a given ratio expressed symbolically. | | | |
| | 6.PFA.1.e | Create a table of equivalent ratios to represent a proportional relationship between two quantities, when given a ratio. | | | |
| | 6.PFA.1.f | Create a table of equivalent ratios to represent a proportional relationship between two quantities, when given a contextual situation. | | | |
| | 6.PFA.2 | The student will identify and represent proportional relationships between two quantities, including those in context (unit rates are limited to positive values). | | | - |
| | 6.PFA.2.a | Identify the unit rate of a proportional relationship represented by a table of values, a contextual situation, or a graph. | | | |
| | 6.PFA.2.b | Determine a missing value in a ratio table that represents a proportional relationship between two quantities using a unit rate. | | | |
| | 6.PFA.2.c | Determine whether a proportional relationship exists between two quantities, when given a table of values, context, or graph. | | | |
| | 6.PFA.2.d | When given a contextual situation representing a proportional relationship, find the unit rate and create a table of values or a graph. | | | |
| | 6.PFA.2.e | Make connections between and among multiple representations of the same proportional relationship using verbal descriptions, ratio tables, and graphs. | | | |
| | 6.PFA.3 | The student will write and solve one-step linear equations in one variable, including contextual problems that require the solution of a one-step linear equation in one variable. | | | - |
| | 6.PFA.3.a | Identify and develop examples of the following algebraic vocabulary: equation, variable, expression, term, and coefficient. | | | |
| | 6.PFA.3.b | Represent and solve one-step linear equations in one variable, using a variety of concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles, weights on a balance scale) | | | |
| | 6.PFA.3.c | Apply properties of real numbers and properties of equality to solve a one-step equation in one | | | |

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| | | variable. Coefficients are limited to integers and unit fractions. Numeric terms are limited to integers. | | | |
| | 6.PFA.3.d | Confirm solutions to one-step linear equations in one variable using a variety of concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles, weights on a balance scale). | | | |
| | 6.PFA.3.e | Write a one-step linear equation in one variable to represent a verbal situation, including those in context. | | | |
| | 6.PFA.3.f | Create a verbal situation in context given a one-step linear equation in one variable. | | | |
| | 6.PFA.4 | The student will represent a contextual situation using a linear inequality in one variable with symbols and graphs on a number line. | | | - |
| | 6.PFA.4.a | Given the graph of a linear inequality in one variable on a number line, represent the inequality in two equivalent ways (e.g., x < -5 or -5 > x) using symbols. Symbols include <, >, ≤, ≥. | | | |
| | 6.PFA.4.b | Write a linear inequality in one variable to represent a given constraint or condition in context or given a graph on a number line. | | | |
| | 6.PFA.4.c | Given a linear inequality in one variable, create a corresponding contextual situation or create a number line graph. | | | |
| | 6.PFA.4.d | Use substitution or a number line graph to justify whether a given number in a specified set makes a linear inequality in one variable true. | | | |
| | 6.PFA.4.e | Identify a numerical value(s) that is part of the solution set of a given inequality in one variable. | | | |
| **Grade 7** | | | | | |
| Number & Number Sense | 7.NS.1 | The student will investigate and describe the concept of exponents for powers of ten and compare and order numbers greater than zero written in scientific notation. | | | - |
| | 7.NS.1.a | Investigate and describe powers of 10 with negative exponents by examining patterns | | | |
| | 7.NS.1.b | Represent a power of 10 with a negative exponent in fraction and decimal form. | | | |
| | 7.NS.1.c | Convert between numbers greater than 0 written in scientific notation and decimals. | | | |
| | 7.NS.1.d | Compare and order no more than four numbers greater than 0 written in scientific notation. Ordering may be in ascending or descending order. | | | |
| | 7.NS.2 | The student will reason and use multiple strategies to compare and order rational numbers. | | | - |
| | 7.NS.2.a | Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare (using symbols <, >, =) and order (a set of no more than four) rational numbers expressed as integers, fractions (proper or improper), mixed numbers, decimals, and percents. Fractions and mixed numbers may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place. Ordering may be in ascending or descending order. Justify solutions orally, in writing or with a model. | | | |
| | 7.NS.3 | The student will recognize and describe the relationship between square roots and perfect squares. | | | - |
| | 7.NS.3.a | Determine the positive square root of a perfect square from 0 to 400 | | | |
| | 7.NS.3.b | Describe the relationship between square roots and perfect squares. | | | |
| Computation & Estimation | 7.CE.1 | The student will estimate, solve, and justify solutions to multistep contextual problems involving operations with rational numbers. | | | - |
| | 7.CE.1.a | Estimate, solve, and justify solutions to contextual problems involving addition, subtraction, multiplication, and division with rational numbers expressed as integers, fractions (proper or improper), mixed numbers, and decimals. Fractions may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place. | | | |
| | 7.CE.2 | The student will solve problems, including those in context, involving proportional relationships. | | | - |
| | 7.CE.2.a | Given a proportional relationship between two quantities, create and use a ratio table to determine missing values. | | | |
| | 7.CE.2.b | Write and solve a proportion that represents a proportional relationship between two quantities to find a missing value, including problems in context. | | | |
| | 7.CE.2.c | Apply proportional reasoning to solve problems in context, including converting units of measurement, when given the conversion factor. | | | |
| | 7.CE.2.d | Estimate and determine the percentage of a given whole number, including but not limited to the use of benchmark percentages. | | | |

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| Measurement & Geometry | 7.MG.1 | The student will investigate and determine the volume formula for right cylinders and the surface area formulas for rectangular prisms and right cylinders and apply the formulas in context. | | | - |
| | 7.MG.1.a | Develop the formulas for determining the volume of right cylinders and solve problems, including those in contextual situations, using concrete objects, diagrams, and formulas. | | | - |
| | 7.MG.1.b | Develop the formulas for determining the surface area of rectangular prisms and right cylinders and solve problems, including those in contextual situations, using concrete objects, two-dimensional diagrams, nets, and formulas. | | | - |
| | 7.MG.1.c | Determine if a problem in context, involving a rectangular prism or right cylinder, represents the application of volume or surface area. | | | - |
| | 7.MG.1.d | Describe how the volume of a rectangular prism is affected when one measured attribute is multiplied by a factor of $1/4$, $1/3$, $1/2$, 2, 3, or 4, including those in contextual situations. | | | - |
| | 7.MG.1.e | Describe how the surface area of a rectangular prism is affected when one measured attribute is multiplied by a factor of $1/2$ or 2, including those in contextual situations. | | | - |
| | 7.MG.2 | The student will solve problems and justify relationships of similarity using proportional reasoning. | | | - |
| | 7.MG.2.a | Identify corresponding congruent angles of similar quadrilaterals and triangles, through the use of geometric markings. | | | - |
| | 7.MG.2.b | Identify corresponding sides of similar quadrilaterals and triangles. | | | - |
| | 7.MG.2.c | Given two similar quadrilaterals or triangles, write similarity statements using symbols. | | | - |
| | 7.MG.2.d | Write proportions to express the relationships between the lengths of corresponding sides of similar quadrilaterals and triangles. | | | - |
| | 7.MG.2.e | Recognize and justify if two quadrilaterals or triangles are similar using the ratios of corresponding side lengths. | | | - |
| | 7.MG.2.f | Solve a proportion to determine a missing side length of similar quadrilaterals or triangles. | | | - |
| | 7.MG.2.g | Given angle measures in a quadrilateral or triangle, determine unknown angle measures in a similar quadrilateral or triangle. | | | - |
| | 7.MG.2.h | Apply proportional reasoning to solve problems in context including scale drawings. Scale factors shall have denominators no greater than 12 and decimals no less than tenths. | | | - |
| | 7.MG.3 | The student will compare and contrast quadrilaterals based on their properties and determine unknown side lengths and angle measures of quadrilaterals. | | | - |
| | 7.MG.3.a | Compare and contrast properties of the following quadrilaterals: parallelogram, rectangle, square, rhombus, and trapezoid | | | - |
| | 7.MG.3.a.i | parallel/perpendicular sides and diagonals; | | | - |
| | 7.MG.3.a.ii | congruence of angle measures, side, and diagonal lengths | | | - |
| | 7.MG.3.a.iii | lines of symmetry | | | - |
| | 7.MG.3.b | Sort and classify quadrilaterals as parallelograms, rectangles, trapezoids, rhombi, and/or squares based on their properties | | | - |
| | 7.MG.3.b.i | parallel/perpendicular sides and diagonals; | | | - |
| | 7.MG.3.b.ii | congruence of angle measures, side, and diagonal lengths | | | - |
| | 7.MG.3.b.iii | lines of symmetry | | | - |
| | 7.MG.3.c | Given a diagram, determine an unknown angle measure in a quadrilateral, using properties of quadrilaterals. | | | - |
| | 7.MG.3.d | Given a diagram, determine an unknown side length in a quadrilateral using properties of quadrilaterals. | | | - |
| | 7.MG.4 | The student will apply dilations of polygons in the coordinate plane | | | - |
| | 7.MG.4.a | Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been dilated. Scale factors are limited to $1/4$, ½, 2, 3, or 4. The center of the dilation will be the origin | | | - |
| | 7.MG.4.b | Sketch he image of a dilation of a polygon limited to a scale favor of ¼, ½, 2, 3, or 4. The center of dilation will be the origin | | | - |
| | 7.MG.4.c | Identify and describe dilations in context including, but not limited to, scale drawings and graphic design. | | | - |

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| **Probability & Statistics** | 7.PS.1 | The student will use statistical investigation to determine the probability of an event and investigate and describe the difference between the experimental and theoretical probability. | | | - |
| | 7.PS.1.a | Determine the theoretical probability of an event. | | | - |
| | 7.PS.1.b | Given the results of a statistical investigation, determine the experimental probability of an event. | | | - |
| | 7.PS.1.c | Describe changes in the experimental probability as the number of trials increases. | | | - |
| | 7.PS.1.d | Investigate and describe the difference between the probability of an event found through experiment or simulation versus the theoretical probability of that same event. | | | - |
| | 7.PS.2 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on histograms. | | | - |
| | 7.PS.2.a | Formulate questions that require the collection or acquisition of data with a focus on histograms. | | | - |
| | 7.PS.2.b | Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments). | | | - |
| | 7.PS.2.c | Determine how sample size and randomness will ensure that the data collected is a sample that is representative of a larger population. | | | - |
| | 7.PS.2.d | Organize and represent numerical data using histograms with and without the use of technology. | | | - |
| | 7.PS.2.e | Investigate and explain how using different intervals could impact the representation of the data in a histogram. | | | - |
| | 7.PS.2.f | Compare data represented in histograms with the same data represented in other graphs, including but not limited to line plots (dot plots), circle graphs, and stem-and-leaf plots, and justify which graphical representation best represents the data. | | | - |
| | 7.PS.2.g | Analyze data represented in histograms by making observations and drawing conclusions. Determine how histograms reveal patterns in data that cannot be easily seen by looking at the corresponding given data set. | | | - |
| **Patterns, Functions & Algebra** | 7.PFA.1 | The student will investigate and analyze proportional relationships between two quantities using verbal descriptions, tables, equations in y = mx form, and graphs, including problems in context. | | | - |
| | 7.PFA.1.a | Determine the slope, m, as the rate of change in a proportional relationship between two quantities given a table of values, graph, or contextual situation and write an equation in the form y = mx to represent the direct variation relationship. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation). | | | - |
| | 7.PFA.1.b | Identify and describe a line with a slope that is positive, negative, or zero (0), given a graph. | | | - |
| | 7.PFA.1.c | Graph a line representing a proportional relationship, between two quantities given an ordered pair on the line and the slope, m, as rate of change. Slope may include positive or negative values. | | | - |
| | 7.PFA.1.d | Graph a line representing a proportional relationship between two quantities given the equation of the line in the form y = mx, where m represents the slope as rate of change. Slope may include positive or negative values. | | | - |
| | 7.PFA.1.e | Make connections between and among representations of a proportional relationship between two quantities using problems in context, tables, equations, and graphs. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation). | | | - |
| | 7.PFA.2 | The student will simplify numerical expressions, simplify and generate equivalent algebraic expressions in one variable, and evaluate algebraic expressions for given replacement values of the variables. | | | - |
| | 7.PFA.2.a | Use the order of operations and apply the properties of real numbers to simplify numerical expressions. Exponents are limited to 1, 2, 3, or 4 and bases are limited to positive integers. Expressions should not include braces { } but may include brackets [ ] and absolute value bars | |. Square roots are limited to perfect squares. | | | |
| | 7.PFA.2.b | Represent equivalent algebraic expressions in one variable using concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles). | | | |
| | 7.PFA.2.c | Simplify and generate equivalent algebraic expressions in one variable by applying the order of operations and properties of real numbers. Expressions may require combining like terms to simplify. Expressions will include only linear and numeric terms. Coefficients and numeric terms may be positive or negative rational numbers. | | | |
| | 7.PFA.2.d | Use the order of operations and apply the properties of real numbers to evaluate algebraic expressions for given replacement values of the variables. Exponents are limited to 1, 2, 3, or 4 and bases are limited to positive integers. Expressions should not include braces { } but may include brackets [ ] and absolute value bars | |. Square roots are limited to perfect squares. Limit the number | | | |

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| | | of replacements to no more than three per expression. Replacement values may be positive or negative rational numbers. | | | |
| | 7.PFA.3 | The student will write and solve two-step linear equations in one variable, including problems in context, that require the solution of a two-step linear equation in one variable. | | | |
| | 7.PFA.3.a | Represent and solve two-step linear equations in one variable using a variety of concrete materials and pictorial representations. | | | |
| | 7.PFA.3.b | Apply properties of real numbers and properties of equality to solve two-step linear equations in one variable. Coefficients and numeric terms will be rational. | | | |
| | 7.PFA.3.c | Confirm algebraic solutions to linear equations in one variable. | | | |
| | 7.PFA.3.d | Write a two-step linear equation in one variable to represent a verbal situation, including those in context. | | | |
| | 7.PFA.3.e | Create a verbal situation in context given a two-step linear equation in one variable. | | | |
| | 7.PFA.3.f | Solve problems in context that require the solution of a two-step linear equation. | | | |
| | 7.PFA.4 | The student will write and solve one- and two-step linear inequalities in one variable, including problems in context, that require the solution of a one- and two-step linear inequality in one variable. | | | |
| | 7.PFA.4.a | Apply properties of real numbers and the addition, subtraction, multiplication, and division properties of inequality to solve one- and two-step inequalities in one variable. Coefficients and numeric terms will be rational. | | | |
| | 7.PFA.4.b | Investigate and explain how the solution set of a linear inequality is affected by multiplying or dividing both sides of the inequality statement by a rational number less than zero. | | | |
| | 7.PFA.4.c | Represent solutions to one- or two-step linear inequalities in one variable algebraically and graphically using a number line. | | | |
| | 7.PFA.4.d | Write one- or two-step linear inequalities in one variable to represent a verbal situation, including those in context. | | | |
| | 7.PFA.4.e | Create a verbal situation in context given a one or two-step linear inequality in one variable. | | | |
| | 7.PFA.4.f | Solve problems in context that require the solution of a one- or two-step inequality. | | | |
| | 7.PFA.4.g | Identify a numerical value(s) that is part of the solution set of as given one- or two-step linear inequality in one variable. | | | |
| | 7.PFA.4.h | Describe the differences and similarities between solving linear inequalities in one variable and linear equations in one variable. | | | |
| **Grade 8** | | | | | |
| Number & Number Sense | 8.NS.1 | The student will compare and order real numbers and determine the relationships between real numbers. | | | |
| | 8.NS.1.a | Estimate and identify the two consecutive natural numbers between which the positive square root of a given number lies and justify which natural number is the better approximation. Numbers are limited to natural numbers from 1 to 400. | | | |
| | 8.NS.1.b | Use rational approximations (to the nearest hundredth) of irrational numbers to compare, order, and locate values on a number line. Radicals may include both positive and negative square roots of values from 0 to 400 yielding an irrational number. | | | |
| | 8.NS.1.c | Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare and order no more than five real numbers expressed as integers, fractions (proper or improper), decimals, mixed numbers, percents, numbers written in scientific notation, radicals, and $\pi$. Radicals may include both positive and negative square roots of values from 0 to 400. Ordering may be in ascending or descending order. Justify solutions orally, in writing or with a model. | | | |
| | 8.NS.2 | The student will investigate and describe the relationship between the subsets of the real number system. | | | |
| | 8.NS.2.a | Describe and illustrate the relationships among the subsets of the real number system by using representations (e.g., graphic organizers, number lines). Subsets include rational numbers, irrational numbers, integers, whole numbers, and natural numbers. | | | |
| | 8.NS.2.b | Classify and explain why a given number is a member of a particular subset or subsets of the real number system. | | | |
| | 8.NS.2.c | Describe each subset of the set of real numbers and include examples and non-examples. | | | |

| Topic | Number | Standard | Discover | Explore | Challenge |
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| **Computation & Estimation** | 8.CE.1 | The student will estimate and apply proportional reasoning and computational procedures to solve contextual problems. | | | |
| | 8.CE.1.a | Estimate and solve contextual problems that require the computation of one discount or markup and the resulting sale price. | | | |
| | 8.CE.1.b | Estimate and solve contextual problems that require the computation of the sales tax, tip and resulting total. | | | |
| | 8.CE.1.c | Estimate and solve contextual problems that require the computation of the percent increase or decrease. | | | |
| **Measurement & Geometry** | 8.MG.1 | The student will use the relationships among pairs of angles that are vertical angles, adjacent angles, supplementary angles, and complementary angles to determine the measure of unknown angles. | | | |
| | 8.MG.1.a | Identify and describe the relationship between pairs of angles that are vertical, adjacent, supplementary, and complementary. | | | |
| | 8.MG.1.b | Use the relationships among supplementary, complementary, vertical, and adjacent angles to solve problems, including those in context, involving the measure of unknown angles. | | | |
| | 8.MG.2 | The student will investigate and determine the surface area of square-based pyramids and the volume of cones and square-based pyramids. | | | - |
| | 8.MG.2.a | Determine the surface area of square-based pyramids by using concrete objects, nets, diagrams, and formulas. | | | - |
| | 8.MG.2.b | Determine the volume of cones and square-based pyramids, using concrete objects, diagrams, and formulas. | | | - |
| | 8.MG.2.c | Examine and explain the relationship between the volume of cones and cylinders, and the volume of rectangular prisms and square based pyramids. | | | - |
| | 8.MG.2.d | Solve problems in context involving volume of cones and square-based pyramids and the surface area of square-based pyramids | | | - |
| | 8.MG.3 | The student will apply translations and reflections to polygons in the coordinate plane. | | | |
| | 8.MG.3.a | Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated vertically, horizontally, or a combination of both. | | | |
| | 8.MG.3.b | Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been reflected over the x- or y-axis. | | | |
| | 8.MG.3.c | Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been translated and reflected over the x- or y-axis or reflected over the x- or y-axis and then translated. | | | |
| | 8.MG.3.d | Sketch the image of a polygon that has been translated vertically, horizontally, or a combination of both. | | | |
| | 8.MG.3.e | Sketch the image of a polygon that has been reflected over the x- or y-axis. | | | |
| | 8.MG.3.f | Sketch the image of a polygon that has been translated and reflected over the x- or y-axis, or reflected over the x- or y-axis and then translated. | | | |
| | 8.MG.3.g | Identify and describe transformations in context (e.g., tiling, fabric, wallpaper designs, art) | | | |
| | 8.MG.4 | The student will apply the Pythagorean Theorem to solve problems involving right triangles, including those in context. | | | |
| | 8.MG.4.a | Verify the Pythagorean Theorem using diagrams, concrete materials, and measurement. | | | |
| | 8.MG.4.b | Determine whether a triangle is a right triangle given the measures of its three sides. | | | |
| | 8.MG.4.c | Identify the parts of a right triangle (the hypotenuse and the legs) given figures in various orientations | | | |
| | 8.MG.4.d | Determine the measure of a side of a right triangle, given the measures of the other two sides. | | | |
| | 8.MG.4.e | Apply the Pythagorean Theorem, and its converse, to solve problems involving right triangles in context. | | | |
| | 8.MG.5 | The student will solve area and perimeter problems involving composite plane figures, including those in context. | | | - |
| | 8.MG.5.a | Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, circles, and semicircles. Determine the area of subdivisions and combine to determine the area of the composite plane figure. | | | - |
| | 8.MG.5.b | Subdivide a plane figure into triangles, rectangles, squares, trapezoids, parallelograms, and semicircles. Use the attributes of the subdivisions to determine the perimeter of the composite plane figure. | | | - |
| | 8.MG.5.c | Apply perimeter, circumference, and area formulas to solve contextual problems involving composite plane figures. | | | - |

| Topic | Number | Standard | Discover | Explore | Challenge |
|---|---|---|---|---|---|
| Probability & Statistics | 8.PS.1 | The student will use statistical investigation to determine the probability of independent and dependent events, including those in context. | | | - |
| | 8.PS.1.a | Determine whether two events are independent or dependent and explain how replacement impacts the probability. | | | - |
| | 8.PS.1.b | Compare and contrast the probability of independent and dependent events. | | | - |
| | 8.PS.1.c | Determine the probability of two independent events. | | | - |
| | 8.PS.1.d | Determine the probability of two dependent events. | | | - |
| | 8.PS.2 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on boxplots. | | | - |
| | 8.PS.2.a | Formulate questions that require the collection or acquisition of data with a focus on boxplots. | | | - |
| | 8.PS.2.b | Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments). | | | - |
| | 8.PS.2.c | Determine how statistical bias might affect whether the data collected from the sample is representative of the larger population. | | | - |
| | 8.PS.2.d | Organize and represent a numeric data set of no more than 20 items, using boxplots, with and without the use of technology. | | | - |
| | 8.PS.2.e | Identify and describe the lower extreme (minimum), upper extreme (maximum), median, upper quartile, lower quartile, range, and interquartile range given a data set, represented by a boxplot. | | | - |
| | 8.PS.2.f | Describe how the presence of an extreme data point (outlier) affects the shape and spread of the data distribution of a boxplot. | | | - |
| | 8.PS.2.g | Analyze data represented in a boxplot by making observations and drawing conclusions. | | | - |
| | 8.PS.2.h | Compare and analyze two data sets represented in boxplots. | | | - |
| | 8.PS.2.i | Given a contextual situation, justify which graphical representation (e.g., pictographs, bar graphs, line graphs, line plots/dot plots, stem-and-leaf plots, circle graphs, histograms, and boxplots) best represents the data. | | | - |
| | 8.PS.2.j | Identify components of graphical displays that can be misleading. | | | - |
| | 8.PS.3 | The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on scatterplots. | | | - |
| | 8.PS.3.a | Formulate questions that require the collection or acquisition of data with a focus on scatterplots. | | | - |
| | 8.PS.3.b | Determine the data needed to answer a formulated question and collect the data (or acquire existing data) of no more than 20 items using various methods (e.g., observations, measurement, surveys, experiments). | | | - |
| | 8.PS.3.c | Organize and represent numeric bivariate data using scatterplots with and without the use of technology. | | | - |
| | 8.PS.3.d | Make observations about a set of data points in a scatterplot as having a positive linear relationship, a negative linear relationship, or no relationship | | | - |
| | 8.PS.3.e | Analyze and justify the relationship of the quantitative bivariate data represented in scatterplots. | | | - |
| | 8.PS.3.f | Sketch the line of best fit for data represented in a scatterplot. | | | - |
| Patterns, Function & Algebra | 8.PFA.1 | The student will represent, simplify, and generate equivalent algebraic expressions in one variable. | | | |
| | 8.PFA.1.a | Represent algebraic expressions using concrete manipulatives or pictorial representations (e.g., colored chips, algebra tiles), including expressions that apply the distributive property. | | | |
| | 8.PFA.1.b | Simplify and generate equivalent algebraic expressions in one variable by applying the order of operations and properties of real numbers. Expressions may need to be expanded (using the distributive property) or require combining like terms to simplify. Expressions will include only linear and numeric terms. Coefficients and numeric terms may be rational. | | | |
| | 8.PFA.2 | The student will determine whether a given relation is a function and determine the domain and range of a function. | | | - |
| | 8.PFA.2.a | Determine whether a relation, represented by a set of ordered pairs, a table, or a graph of discrete points is a function. Sets are limited to no more than 10 ordered pairs. | | | - |
| | 8.PFA.2.b | Identify the domain and range of a function represented as a set of ordered pairs, a table, or a graph of discrete points. | | | - |
| | 8.PFA.3 | The student will represent and solve problems, including those in context, by using linear functions and analyzing their key characteristics (the value of the y-intercept (b) and the coordinates of the | | | - |

| Topic | Number | Standard | Discover | Explore | Challenge |
|---|---|---|---|---|---|
| | | ordered pairs in graphs will be limited to integers). | | | |
| | 8.PFA.3.a | Determine how adding a constant (b) to the equation of a proportional relationship y = mx will translate the line on a graph. | | | - |
| | 8.PFA.3.b | Describe key characteristics of linear functions including slope (m), y-intercept (b), and independent and dependent variables. | | | - |
| | 8.PFA.3.c | Graph a linear function given a table, equation, or a situation in context. | | | - |
| | 8.PFA.3.d | Create a table of values for a linear function given a graph, equation in the form of y = mx + b, or context. | | | - |
| | 8.PFA.3.e | Write an equation of a linear function in the form y = mx + b, given a graph, table, or a situation in context. | | | - |
| | 8.PFA.3.f | Create a context for a linear function given a graph, table, or equation in the form y = mx + b. | | | - |
| | 8.PFA.4 | The student will write and solve multistep linear equations in one variable, including problems in context that require the solution of a multistep linear equation in one variable. | | | |
| | 8.PFA.4.a | Represent and solve multistep linear equations in one variable with the variable on one or both sides of the equation (up to four steps) using a variety of concrete materials and pictorial representations. | | | |
| | 8.PFA.4.b | Apply properties of real numbers and properties of equality to solve multistep linear equations in one variable (up to four steps). Coefficients and numeric terms will be rational. Equations may contain expressions that need to be expanded (using the distributive property) or require combining like terms to solve. | | | |
| | 8.PFA.4.c | Write a multistep linear equation in one variable to represent a verbal situation, including those in context. | | | |
| | 8.PFA.4.d | Create a verbal situation in context given a multistep linear equation in one variable. | | | |
| | 8.PFA.4.e | Solve problems in context that require the solution of a multistep linear equation. | | | |
| | 8.PFA.4.f | Interpret algebraic solutions in context to linear equations in one variable. | | | |
| | 8.PFA.4.g | Confirm algebraic solutions to linear equations in one variable. | | | |
| | 8.PFA.5 | The student will write and solve multistep linear inequalities in one variable, including problems in context that require the solution of a multistep linear inequality in one variable. | | | |
| | 8.PFA.5.a | Apply properties of real numbers and properties of inequality to solve multistep linear inequalities (up to four steps) in one variable with the variable on one or both sides of the inequality. Coefficients and numeric terms will be rational. Inequalities may contain expressions that need to be expanded (using the distributive property) or require combining like terms to solve. | | | |
| | 8.PFA.5.b | Represent solutions to inequalities algebraically and graphically using a number line. | | | |
| | 8.PFA.5.c | Write multistep linear inequalities in one variable to represent a verbal situation, including those in context. | | | |
| | 8.PFA.5.d | Create a verbal situation in context given a multistep linear inequality in one variable. | | | |
| | 8.PFA.5.e | Solve problems in context that require the solution of a multistep linear inequality in one variable. | | | |
| | 8.PFA.5.f | Identify a numerical value(s) that is part of the solution set of a given inequality. | | | |
| | 8.PFA.5.g | Interpret algebraic solutions in context to linear inequalities in one variable. | | | |