

GRADE 2

Students will:

Operations and Algebraic Thinking

Represent and solve problems involving addition and subtraction.

M. 2.1.4: Apply signs +, -, = to actions of joining and separating sets.

M. 2.1.5: Add and subtract within 50, e.g., by using objects or drawings to represent the problem.

Add and subtract within 20.

M. 2.2.1: Recall single – digit subtraction facts with minuends of 10 or less.

M. 2.2.2: Recall single – digit addition facts with sums up to 10.

Work with Equal Groups of objects to gain foundations for multiplication

M. 2.4.1: Distinguish between rows and columns.

M. 2.4.4: Recall doubles addition facts.

M. 2.4.2: Choose and apply addition strategies to accurately compute sums for multiple addend problems.

Number and Operations in Base Ten

Understand place value.

M. 2.5.1: Match the number in the ones, tens, and hundreds position to a pictorial representation or manipulative of the value.

M. 2.5.2: Represent numbers with multiple concrete models.

M. 2.5.2: Represent numbers using a variety of models (physical, visual and symbolic)
Examples: concrete models – base ten blocks, number lines, linking cubes, straw bundles

M. 2.5.4: Count to 100 by tens.

M. 2.5.5: Create groups of 10.

M. 2.6.1: Create a number pattern

M. 2.6.1: Use patterns and regularity in counting

M. 2.6.3: Count forward to 100 by fives and tens.

M. 2.6.3: Sequence to count by 1s, 5s, 10s, and 100s

M. 2.6.4: Count to 100 by ones.

M. 2.7.2: Match the number in the ones, tens, and hundreds position to a pictorial representation or manipulative of the value.

M. 2.7.3: Identify the value of number in the ones, tens and hundreds place.

M. 2.7.4: Identify place value for ones, tens and hundreds.

M. 2.7.4: Represent quantities in a variety of forms including words, base-ten numerals,

and expanded form

M. 2.8.1: Define greater than, less than and equal to.

M. 2.8.2: Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.

M. 2.8.2: Compare three-digit numbers using place value concepts

M. 2.8.3: Arrange two – digit numbers in order from greatest to least or least to greatest.

M. 2.8.9: Identify sets with more, less or equal objects.

Use place value understanding and properties of operations to add and subtract.

M. 2.9.2: Represent numbers with multiple models.

Examples: models – base ten blocks, number lines, linking cubes, straw bundles

M. 2.13.5: Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.

M. 2.9.4: Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.

M. 2.9.4: Communicate the relationship between models and symbolic (numeric) representations of solutions to addition and subtraction problems.

M. 2.10.2: Add within 20, demonstrating fluency for addition within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; and creating equivalent but easier or known sums.

M. 2.11.2: Add and subtract two two-digit numbers with and without regrouping.

M. 2.11.2: Model addition and subtraction problems using appropriate tools.

Estimate lengths in standard units.

M. 2.14.1: Identify units of measurement for length. Examples: inches, feet, yard; centimeter, meters

M. 2.14.2: Demonstrate how to use measurement tools. Example: avoiding gaps and overlaps

- Measure length in standard units (inches, feet, yards, centimeters and meters)

M. 2.14.3: Identify measurement tools.

M. 2.14.5: Order three objects by length.

M. 2.14.7: Describe measurable attributes of objects such as length or weight.

M. 2.15.4: Use vocabulary related to comparison of length. Examples: longer, shorter, longest, shortest, taller

M. 2.17.3: Use subtraction within 20 to solve problems. Determine the difference between the lengths of two objects.

Relate addition and subtraction to length.

M. 2.18.1: Use addition and subtraction within 20 to solve one-step addition and subtraction word problems with an unknown number. (Finding sum or difference; no missing addends)

M. 2.18.4: Add and subtract within 50, e.g., by using objects or drawings to represent the problem. (Represent quantities and operations physically, pictorially or symbolically)

M. 2.18.5: Model writing equations from word problems.

M. 2.18.6: Identify units of measurement for length. Examples: inches, feet, yard; centimeter, meters

M. 2.19.2: Use a number line to add and subtract within 10. (represent quantities and operations on number line diagram).

Work with time and money.

M. 2.20.1: Tell and write time in hours and half-hours using analog and digital clocks.

M. 2.20.3: Illustrate time to hour and half hour.

Example: Given the time 3:00, illustrate long hand and short hand positions on a clock.

M. 2.20.4: Identify the short hand as the hour hand, and the long hand as the minute hand on an analog clock.

M. 2.21.1: Determine the monetary value of a set of like and unlike bills.

M. 2.21.2: Determine the monetary value of a set of like and unlike coins.

M. 2.21.6: Identify coins and bills and their value.

M. 2.21.7: Identify symbols for dollar (\$), cent (¢).

M. 2.21.8: Identify coins by name including penny, nickel, dime and quarter.

Represent and interpret data.

M. 2.22.2: Use vocabulary related to comparison of length. Examples: longer, shorter, longest, shortest, taller

M. 2.22.4: Demonstrate measuring length using standard units.

M. 2.22.4: Use standard units and the related tools to measure length to the nearest whole unit.

M. 2.22.7: Identify objects by length.

M. 2.22.8: Sort objects according to length.

M. 2.23.1: Use addition and subtraction within 20 to solve addition and subtraction word problems with an unknown number.

M. 2.23.2: Describe picture graph and bar graph.

- Read and interpret graphical representations (pictographs and bar graphs) of data
- Choose and apply appropriate strategies for organizing and recording data

M. 2.23.4: Use vocabulary related to comparing data. Examples: more than, less than, most, least, equal

M. 2.23.5: Recognize attributes of data displays.

M. 2.23.6: Locate information on data displays.

Reason with shapes and their attributes.

M. 2.24.2: Use vocabulary related to shape attributes. Examples: sides, angles, face, closed, open

M. 2.24.3: Trace shapes.

M. 2.24.4: Sort triangles, quadrilaterals, pentagons, hexagons, and cubes. (Justify the category of shapes based on their attributes)

M. 2.25.1: Define rows, columns, and total. (strategically choose and apply strategies for counting objects arranged in rows/columns)

M. 2.25.2: Identify rectangle.

M. 2.26.2: Distinguish between equal and non-equal parts.

M. 2.26.3: Model partitioning circles and rectangles.

M. 2.26.5: Identify squares, circles, triangles and rectangles.

GRADE 3

Students will:

Operations and Algebraic Thinking

M. 3.1.1: Identify and define the parts of a multiplication problem including factors, multiplier, multiplicand and product.

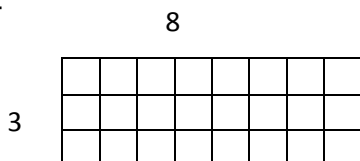
M. 3.1.2: Use multiplication to find the total number of objects arranged in rectangular arrays based on columns and rows.

M. 3.1.3: Write an equation to express the product of the multipliers (factors).

M. 3.1.4: Relate multiplication to repeated addition and skip counting.

M. 3.1.5: Apply concepts of multiplication through the use of manipulatives, number stories, skip-counting arrays, area of a rectangle, or repeated addition.

Examples: array-



Repeated addition: $8+8+8=24$

M. 3.1.6: Apply basic multiplication facts through 9×9 using manipulatives, solving problems, and writing number stories.

M. 3.2.2: Model grouping with basic division facts partitioned equally (e.g. $8 \div 2$).

M. 3.2.5: Subtract within 20.

M. 3.2.6: Represent equal groups using manipulatives.

M. 3.2.6: Represent quantities and operations (division) physically, pictorially or symbolically

M. 3.3.5: Add and subtract within 20.

M. 3.3.6: Represent repeated addition, subtraction, and equal groups using manipulatives.

Understand properties of multiplication and the relationship between multiplication and division.

M. 3.6.4: Use the inverse relationship between multiplication and division to find quotients

Multiply and divide within 100.

M. 3.7.2: Use Multiplication and division strategies efficiently based on the numbers in the problems.

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

M. 3.8.5: Solve addition and subtraction problems, including word problems, involving one- and two-digit numbers with and without regrouping, using multiple strategies. (Accurately compute sums, difference, products and quotients)
Example: strategies-using concrete objects, mental calculations, paper-and-pencil activities. .

M. 3.8.7: Represent multiplication and division with manipulatives.

M. 3.8.8: Recall basic addition and subtraction facts.

M. 3.9.7: Skip count.

Example: count by twos, fives, or tens.

M. 3.9.8: Represent addition and multiplication with manipulatives

Number and Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic. (A range of algorithms may be used.)

M. 3.10.3: Model rounding whole numbers to the nearest 100 using a number line. (Count by 100s)

M. 3.10.5: Model rounding whole numbers to the nearest 10 using a number line. (Count by 10s)

M. 3.10.9: Match the number in the ones, tens, and hundreds position to a pictorial representation or manipulative of the value.

M. 3.11.4: Subtract within 100 using strategies and algorithms based on place value. (Model subtraction problems using appropriate tools)

M. 3.11.7: Add within 100 using strategies and algorithms based on place value. (Model addition problems using appropriate tools)

M. 3.12.3: Recall basic multiplication facts.

M. 3.12.4: Recall multiplication as repeated addition.

Number and Operations – Fractions

(Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6 and 8)

M. 3.13.4: Identify parts of a whole with two, three, or four equal parts. (Write fractions that correspond to pictorial or physical models)

M. 3.13.5: Distinguish between equal and non-equal parts.

M. 3.13.6: Partition circles and rectangles into two and four equal shares; describe the shares using the words halves, fourths, and quarters; and use the phrases half of, fourth of, and quarter of. (Create models of fractions that correspond to fractions written in the form a/b)

M. 3.14.3: Identify a number line.

M. 3.15.2: Recognize pictorial representations of equivalent fractions.

M. 3.15b.2: Label a pictorial representation.

M. 3.15b.3: Recognize that a fraction is a part of a whole.

M. 3.15d.2: Identify $<$, $>$, and $=$ signs. (Represent the comparison of fractions using $<$, $>$, $=$ notation.)

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

M. 3.16.4: Tell and write time in hours and half-hours using analog and digital clocks.

M. 3.16.5: Recognize hour, minute, and second hands on an analog clock. (Accurately read and write time to the nearest minute from analog and digital clocks)

M. 3.16.6: Count by 5's to 60.

M. 3.17.1: Define liquid volume, mass, grams, kilograms, and liters.

M. 3.17.6: Measure Liquid volume and mass in metric standard units. Choose appropriate measurement tools and units of measure.

Represent and Interpret Data

M. 3.18.1: Define picture graph, bar graph, and data.

M. 3.18.2: Interpret the data to solve problems.

M. 3.18.4: Locate the data on a picture graph and a bar graph.

M. 3.18.5: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (Pictographs and Bar graphs with scales other than 1)

M. 3.19.3: Measure objects to the nearest inch. (Use standard units and the related tools to measure length to the nearest inch)

M. 3.19.4: Identify one-inch units on a ruler starting with 0.

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

M. 3.20.1: Define plane figures.

M. 3.20.2: Differentiate between closed and open figures.

M. 3.21.1: Recognize that unit squares are equal. (Accurately measure area using standard units)

M. 3.22.1: Recognize arrays as multiplication or repeated addition. (Accurately compute sums and products)

M. 3.22a.1: Recognize arrays as multiplication or repeated addition.

M. 3.22a.2: Identify units of measure as equal units.

M. 3.22b.3: Recognize multiplication as repeated addition. (Accurately compute sums and products)

M. 3.22b.4: Add within 100.

M. 3.22c.3: Partition a rectangle into rows and columns of same-size squares, and count to find the total number of them. (Model the area of a rectangle using manipulatives or graph paper)

M. 3.22c.4: Add within 100.

M. 3.22d.1: Label pre-made arrays.

M. 3.22d.4: Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles).

Geometric Measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

M. 3.23.1: Define perimeter.

M. 3.23.3: Recall basic addition and multiplication facts.

Geometry

Reason with shapes and their attributes.

M. 3.24.1: Recall the vocabulary of shapes (labels, sides, faces, vertices, etc.).

M. 3.24.2: Recognize and draw shapes having specified attributes such as a given number of angles.

M. 3.24.4: Sort shapes into categories.

M. 3.25.1: Recognize a fraction as part of a whole. .

M. 3.25.4: Partition a rectangle into rows and columns of same-size squares, and count to find the total number of them.

M. 3.25.5: Partition circles and rectangles into two, three, or four equal shares; describe the shares using the words halves, thirds, half of, a third of, etc.; and describe the whole as two halves, three thirds, or four fourths.

Grade 4

Students will:

Operations and Algebraic Thinking

Use the four operations with whole numbers to solve problems.

M. 4.1.2: Recall basic multiplication facts.

M. 4.1.4: Demonstrate computational fluency, including quick recall of addition and subtraction facts.

M. 4.2.2: Recognize key terms to solve word problems. Examples: in all, how much, how many, in each (Use drawings and other strategies solve a word problem)

M. 4.3.2: Solve single-step word problems.

M. 4.4.1: Define factors

- Use models and logical reasoning to determine all possible factor pairs for a whole number between 1-100

M. 4.4.4: Name the first ten multiples of each one-digit natural number.

Generate and analyze patterns.

M. 4.5.4: Continue an existing pattern.

M. 4.5.5: Identify arithmetic patterns.

Number and Operations in Base Ten

(Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)

Generalize place value understanding for multi-digit whole numbers.

M. 4.6.1: Use place value understanding to round whole numbers to the nearest 10 or 100.

M. 4.6.2: Add and subtract within 1000 using strategies and algorithms based on place value,

M. 4.7.2: Read and write numbers to 1000 using base-ten numerals, number names.

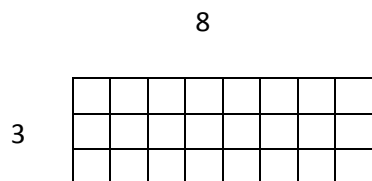
M. 4.8.1: Use place value understanding to round whole numbers to the nearest 10 or 100.

Using place value understanding and properties of operations to perform multi-digit arithmetic.

M. 4.9.1: Strategically choose and apply appropriate methods for adding and subtracting

M. 4.10.1: demonstrate understanding of the concept of fact families (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$)

M. 4.10.4: Apply concepts of multiplication through the use of manipulatives, number stories, skip- counting arrays, area of a rectangle, or repeated addition.



Repeated addition: $8+8+8=24$

M. 4.11.1: Use logical reasoning to communicate the relationship between models and symbolic (numeric) representations of solutions to division problems

Number and Operations – Fractions

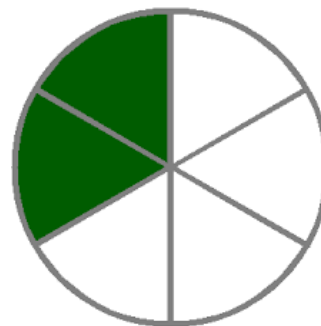
(Grade 4 expectations in this domain are limited to fractions with denominations 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

Extend understanding of fraction equivalence and ordering.

M. 4.12.3: Identify the parts of a fraction a/b as the quantity formed by a parts and size $1/b$

In this example, $a=2$ parts of the fraction (numerator); b =the whole part of the fraction (6 parts) (denominator)

$$\frac{2}{6}$$



M. 4.12.8: Distinguish between equal and non-equal parts.

M. 4.13.2: Identify a fraction as a number on the number line; represent fractions on a number line diagram.

Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

M. 4.14.2: Identify two fractions as equivalent (equal) if they are the same size or the same point on a number line.

M. 4.14.7: Recognize numbers that lie between two consecutive whole numbers, and lengths of segments on a ruler.

Understand decimal notation for fractions, and compare decimal fractions.

M. 4.16.4: Identify place value of decimals to the tenths and hundredths.

M. 4.17.1: Define tenths, hundredths, decimal notation.

M. 4.18.5: Compare two decimals to tenths.

Measurement and Data**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

M. 4.19.4: Define hour, minute, second.

M. 4.19.6: Identify standard units of measurement equivalents.

Examples: 60 minutes equals 1 hour, 16 ounces equals 1 pound

M. 4.20.2: Determine elapsed time to the day with calendars and to the hour with a clock.

M. 4.20.7: Identify monetary equivalents.

Examples: four quarters equal one dollar, five one-dollar bills equals five dollars

M. 4.21.1: Recall the formula for area ($L \times W$).

- Accurately compute measurements of area of a rectangular region

M. 4.21.3: Recall the formula for perimeter ($P = L + L + W + W$ or $P = 2L + 2W$).

- Accurately compute measurements of perimeter of a rectangular region
- Determine if a problem is asking for area or perimeter measurements

Represent and interpret data.

M. 4.22.2: Interpret data using graphs including bar, line, and circle graphs, and Venn diagrams.

- User standard units and related tools to measure length to the nearest eighth inch

Geometric Measurement: understand concept of angle and measure angles.

M. 4.23.2: Recognize and draw shapes having specified attributes such as a given number of angles or a given number of equal faces.

M. 4.24.4: Measure the length of an object by selecting and using appropriate tools such as a ruler.

M. 4.24.7: Know the difference between parallel and perpendicular lines

Geometry

Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

M. 4.26.2: Define two-dimensional figure and recognize that they are flat.

M. 4.27.4: Understand the prefixes related to two-dimensional shapes (tri- =3; quad- =4)

Grade 5

Operations and Algebraic Thinking

Write and interpret numerical expressions.

M. 5.1.6: Represent addition and subtraction with objects, mental images, drawings, expressions, or equations.

- Be able to use alternate methods to solve a problem

M. 5.2.4: Recall addition, subtraction, multiplication, division symbols

- Use logical reasoning and math vocabulary to interpret the meaning of mathematical expressions

Analyze patterns and relationships.

M. 5.3.2: Continue an existing pattern

- Graph ordered pairs on a coordinate plane

Number and Operations in Base Ten

Understand the place value system

M. 5.4.1: Use place value understanding to round whole numbers to the nearest 10 or 100.

M. 5.4.2: Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits using $>$, $=$, and $<$ symbols

M. 5.5.2: Recognize decimal place value using visual representations.

- Decimal place value to tenths and hundredths as related to money.
- Use logical reasoning to identify patterns

M. 5.6.3: Write whole numbers in words

- As it relates to writing a check

M. 5.7.2: Round whole numbers to the nearest 10 or 100.

- Determine the number that is halfway between two consecutive multiples of powers of 10 (eg, 350 & 360; 36,000 and 37,000; 0.01 & 0.02)
- Compare decimal numbers to hundredths

Perform operations with multi-digit whole numbers and with decimals to hundredths.

M. 5.8.4: Recall basic multiplication facts.

M. 5.9.5: Restate the inverse process of division as multiplication.

- Accurately compute quotients with remainders using appropriate tools (multiplication chart or calculator)

M. 5.10.9: Recall basic addition, subtraction, multiplication, and division facts.

- To include computation of decimal numbers to the hundredth place, as it relates to money.

Number and Operations – Fractions

Use equivalent fractions as a strategy to add and subtract fractions.

M. 5.11.3: Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.

- Accurately add like fractions
 - Example: understand that $1/8 + 1/8 + 1/8 = 3/8$

M. 5.12.7: Recognize a fraction as a number on the number line; represent fractions on a number line diagram.

M. 5.13.2: Recognize a fraction a/b with $a > 1$ as a sum of fractions $1/b$

- Understand that a fraction is less than a whole

M. 5.14a.2: Partition a rectangle into rows and columns of same-size squares, and count to find the total number of them.

M. 5.14b.1: Count the area squares for the length and width.

M. 5.15.8: Identify factor and product.

M. 5.16.4: Write number sentences for word problems.

M. 5.17.3: Recognize key terms to solve word problems.

Examples: times, every, at this rate, each, per, equal/equally, in all, total

Measurement and Data

Convert like measurement units within a given measurement system.

M. 5.18.1: Identify relative sizes of measurement units (lb, oz; and hr, min, sec.)

M. 5.18.3: Solve two-step word problems that are related to real life situations.

M. 5.19.3: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories.

M. 5.19.5: Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories.

- Interpret data on a picture graph and bar graph

M. 5.20ab.2: Define solid figures.

M. 5.20ab.6: Describe attributes of three-dimensional figures.

- Understand the shape would come off the page. Knowing a building would be a 3D figure

M. 5.21.2: Compare the unit size of volume/capacity in the customary system including fluid ounces, cups, pints, quarts, gallons.

M. 5.21.3: Measure areas by counting unit squares

M. 5.22.4: Apply the area and perimeter formulas for rectangles in real-world and mathematical problems.

M. 5.22.6: Recognize the formula for volume.

M. 5.22c.3: Identify solid figures.

Geometry

Graph points on the coordinate plane to solve real-world and mathematical problems

M. 5.23.2: Define x-axis, y-axis, and zero on a coordinate.

- Understand the order meaning: first number in the pair run left to right and second number is up or down.

M. 5.23.4: Illustrate vertical and horizontal number lines.

M. 5.23.7: Locate positive numbers on a horizontal number line.

M. 5.23.8: Locate positive numbers on a vertical number line. Examples: thermometer, map

M. 5.24.1: Define ordered pair of numbers, quadrant one, coordinate plane, and plot points.

- Represent real world and mathematical problems on a coordinate plane

M. 5.24.2: Label the horizontal axis (x).

M. 5.24.3: Label the vertical axis (y).

Classify two-dimensional figures into categories based on their properties.

M. 5.26.4: Know basic shapes, but not that a rectangle is a parallelogram.

Grade 6

Students will

Ratios and Proportional Relationships

Understand ratio concepts and use ratio reasoning to solve problems.

M. 6.1.1: Define quantity, fraction, and ratio.

M. 6.1.2: Reinterpret a fraction as a ratio. Example: Read $\frac{2}{3}$ as 2 out of 3.

M. 6.2.4: Interpret a fraction as division of the numerator by the denominator. Example: $(\frac{a}{b} = a \div b)$.

M. 6.2.5: Write a ratio as a fraction.

M. 6.3.2: Calculate unit rate or rate by using ratios or proportions.

M. 6.3a.4: Draw and label a table of equivalent ratios from given information.

M. 6.3a.5: Identify the parts of a table of equivalent ratios (input, output, etc).

M. 6.3b.1: Compute the unit rate, unit price, and constant speed.

M. 6.3c.1: Define percent. Solve problems involving finding the whole, given a part and the percent.

M. 6.3d.1: Form a ratio.

M. 6.3d.2: Convert like measurement units within a given system. Example: 120 min = 2 hrs

The Number System

Apply and extend previous understandings of multiplication and division to divide by fractions.

M. 6.4.1: Define fraction (including numerator and denominator), reciprocal, equation, and quotient.

- Use visual models to represent fractions and operations on fractions

M. 6.5.4: Recall basic division and multiplication facts.

M. 6.6.1: Solve division problems involving multi-digit whole numbers and decimal numbers.

M. 6.6.2: Solve multiplication problems involving multi-digit whole numbers and decimal numbers.

M. 6.6.3: Recall basic multiplication and division facts.

M. 6.6.4: Solve addition and subtraction of multi-digit decimal numbers (emphasis on alignment)

M. 6.6.5: Solve addition and subtraction of multi-digit whole numbers.

M. 6.6.6: Recognize place value of whole numbers and decimals.

- Recognize place value of money.

M. 6.6.7: Demonstrate addition, subtraction, multiplication, and division of whole numbers and decimals using manipulatives

M. 6.7.5: List multiples of any given whole number.

M. 6.7.7: List common factors of given whole numbers

M. 6.8.1: Define integers, positive and negative numbers.

M. 6.8.2: Demonstrate the location of positive and negative numbers on a vertical and horizontal number line.

- Find positive and negative numbers on a number line and label them.

M. 6.8.3: Give examples of positive and negative numbers to represent quantities having opposite directions in real-world contexts.

- Real world examples – temperature, bank account deposits and withdrawals.

M. 6.8.4: Discuss the measure of centering of 0 in relationship to positive and negative numbers.

- Explain the meaning of zero in a variety of real-world contexts

M. 6.9.4: Draw and extend vertical and horizontal number lines.

M. 6.9a.1: Discover that the opposite of the opposite of a number is the number itself.

M. 6.9a.2: Show on a number line that numbers that are equal distance from 0 and on opposite sides of 0 have opposite signs

- Represent rational numbers and their opposites on a number line including both positive and negative quantities.

M. 6.9b.4: Recall how to plot ordered pairs on a coordinate plane.

M. 6.9c.2: Plot pairs of integers and/or rational numbers on a coordinate plane.

- Graph points corresponding to ordered pairs made up of two rational numbers

M. 6.9c.3: Arrange integers and /or rational numbers on a horizontal or vertical number line.

M. 6.9c.4: Locate the position of integers and/or rational numbers on a horizontal or vertical number line.

M. 6.10.2: Recall how to order numbers.

M. 6.10a.2: Recall the inequality of two numbers using their position on a number line in relation to 0.

M. 6.10b.4: Recall the measure of centering of greater than and less than and their symbols.

- Use inequality symbols

M. 6.10d.2: Recall how to order positive and negative numbers. (Use number line if needed)

M. 6.11.1: Calculate the distances between points having the same first or second coordinate

- Determine lengths of line segments on a coordinate plane when the line segment joins points with the same first coordinate (vertical distance) or the same second coordinate(horizontal distance)

M. 6.11.2: Graph points in all four quadrants of the coordinate plane in real-world situations.

M. 6.11.3: Recall how to graph points in all four quadrants of the coordinate plane.

Expressions and equations

Apply and extend previous understandings of arithmetic to algebraic expressions

M. 6.12.2: Compute a numerical expression

M. 6.12.5: Calculate the multiplication of single or multi digit whole numbers.

M. 6.13.2: Convert mathematical term to mathematical symbols and numbers.

M. 6.13a.1: Convert mathematical terms to mathematical symbols and numbers (Ex. sum; +, difference; -, product; \bullet , quotient; \div).

M. 6.13a.2: Recall different ways to show multiplication and division.

M. 6.13b.2: Match mathematical terms with correct mathematical symbols

M. 6.13c.3: Calculate a numerical expression (Ex. $V=4 \bullet 4 \bullet 4$).

M. 6.13c.4: Recognize the correct order to solve expressions with more than one operation

- Use Order of operations

M. 6.15.4: Calculate a numerical expression (Ex. $V=4 \bullet 4 \bullet 4$).

- Use the properties of operations

M. 6.16.3: Determine if an inequality is by replacing the variable with a given number.

M. 6.16.4: Determine if an equation is true by replacing the variable with a given number.

- Substitute specific values into inequalities and equations to determine if it makes it true. Ex: $___ + 2=7$. Does 4 make it true?

M. 6.16.6: Recognize the symbols for =, >, <, \leq , and \geq .

M. 6.17.4 & M. 6.18.5: List given information from the problem

M. 6.19.5: Recognize the inequality symbols; <, >.

M. 6.19.6: Construct and label a number line.

M. 6.20.7: Draw and label a coordinate plane.

M. 6.20.8: Recall how to draw a number line.

Geometry

Solve real-world and mathematical problems involving area, surface area and volume.

M. 6.21.3: Apply area formulas to solve real-world mathematical problems.

M. 6.21.5: Explain how to find the area for rectangles using the formula $A=l \times w$

- Use real world examples (how much paint to purchase to paint a wall/room, how much carpet to buy).

M. 6.22.8: Recall how to multiply fractional numbers

M. 6.23.1: Define vertices

M. 6.23.5: Recognize polygons.

M. 6.24.4: Recall how to calculate the area of a rectangle and triangle.

M. 6.24.6: Identify three-dimensional figures.

Statistics and Probability

Develop understanding of statistical variability.

M. 6.26.5: Recall how to read a graph or table.

- Calculate mean, median, and range

M. 6. 29abcd.5: Organize the data.

M. 6. 29abcd.6: Collect the data.

Grade 7

Students will:

Ratios and Proportional Relationships

Analyze proportional relationships and use them to solve real-world and mathematical problems

M. 7.1.2: Recall how to find unit rates using ratios.

M. 7.2.2: Demonstrate how to write ratios as a fraction.

M. 7.2a.2 & M. 7.2d.3: Locate the origin on a coordinate plane.

M. 7.2a.3 Show how to graph on Cartesian plane.

M. 7.2a.4: Determine if the graph is a straight line through the origin.

M. 7.2a.4: Use a table or graph to determine whether two quantities are proportional

- Produce graphs and tables
- Communicate the relationships between graphs, tables and equations to justify proportional relationships.

M. 7.2b.4: Recall how to find unit rate.

M. 7.2d.1: Define ordered pairs.

M. 7.2d.2: Show how to plot points on a Cartesian plane.

M. 7.3.1: Define interest, tax, markups and markdowns, fees.

M. 7.3.5: Recall how to find percent and ratios.

M. 7.3.6: Recall steps for solving multi-step problems

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.

M. 7.4.2: Recall how to extend a horizontal number line.

M. 7.4.3: Recall how to extend a vertical number line.

M. 7.4.4: Demonstrate addition and subtraction of whole numbers using a horizontal or vertical number line.

M. 7.4a.3: Recall properties of addition and subtraction.

M. 7.4b.1 & M. 7.4c.1: Define additive inverse and opposite.

M. 7.4b.2: Model addition and subtraction using manipulatives.

M. 7.4b.3 & M. 7.4c.4: Show addition and subtraction using a number line.

M. 7.4c.2: Show subtraction as the additive inverse.

M. 7.4c.3: Give examples of the opposite of a given number.

M. 7.4d.1: Discuss various strategies for solving real-world and mathematical problems.

M. 7.4d.2: Identify properties of operations for addition and subtraction.

M. 7.4d.3: Recall the steps for solving addition and subtraction of rational numbers.

M. 7.5.2: Recall the steps for solving multiplication and division of whole number problems

M. 7.5a.3: Recall basic multiplication facts using manipulatives.

M. 7.5a.4: Identify the properties of operations for multiplication.

M. 7.5b.2: Recall the rules for multiplying integers.

M. 7.5b.3: Solve real-world problems.

M. 7.5c.2: Identify properties of operations for multiplication

M. 7.6.3: Identify properties of operations for addition and multiplication.

M. 7.6.4: Recall the rules for multiplication and division

- Solve word problems involving multiplication and division

M. 7.6.5: Recall the rules for addition and subtraction

- Solve word problems involving addition and subtraction

Expressions and Equations

Use properties of operations to generate equivalent expressions

M. 7.7.1: Define coefficient

M. 7.7.5: Combine like terms of a given expression

M. 7.8.4: Restate numerical expressions with words.

M. 7.8.5: Recall mathematical terms such as sum, difference, etc

Solve real life and mathematical problems using numerical and algebraic expressions and equations

M. 7.9.8: Recall estimation strategies.

- Translate verbal forms of a problem into mathematical symbols

M. 7.10.4 & M.7.10a.4: Test the found number or number set for accuracy by substitution. Example: Is 5 an accurate solution of $2(x + 5)=12$?

M. 7.10a.6: List given information from the problem.

M. 7.10b.4: Test the solution set for accuracy

M. 7.10b.6: List information from the problem.

Geometry

Draw, construct, and describe geometrical figures and describe the relationships between them.

M. 7.11.1: Define scale, scale drawings, length

M. 7.11.4: Recognize numeric patterns.

M. 7.12.2: Draw segments of a given length using a ruler.

M. 7.13.1: Define two-dimensional figure, three-dimensional figure, plane section, rectangular prism, and rectangular pyramid.

M. 7.13.3: Describe the relationship between two- and three-dimensional figures.

M. 7.13.4: Recognize symmetry.

M. 7.13.5: List attributes of three-dimensional figures.

M. 7.13.6: List attributes of two-dimensional figures.

M. 7.14.3: Recognize the attributes of a circle.

- Discriminate between contexts asking for circumference and those asking for area measurements.

M. 7.15.2: Discuss strategies for solving multi-step problems.

M. 7.15.4: Identify right angles and straight angles.

M. 7.15.5: Discuss parallel, perpendicular, and intersecting lines.

- Identify parallel, perpendicular and intersecting lines.

M. 7.16.1: Define volume for cubes, and right prisms.

M. 7.16.4: Identify the attributes of cubes, and right prisms.

Statistics and Probability

Use random sampling to draw inferences about a population.

M. 7.17.2: Explain the validity of random sampling.

M. 7.17.6: Discuss real world examples of valid sampling and generalizations.

M. 7.18.3: Predict an outcome of the entire population based on random samplings.

- Predict an outcome based on random samplings.

Draw informal comparative inferences about two populations.

M. 7.19.5 & M. 7.20.4: Calculate the mean, medial and range.

Investigate chance processes and develop, use, and evaluate probability models.

M. 7.21.2: Recall the order of fractions on a number line.

- Order fractions

M. 7.22.5: Recognize equivalent fractions.

M. 7.23a.1: Define probability of chance, outcome, and event.

M. 7.23a.2: List all possible outcomes using a graphic representation (probability model-tree diagram, organized list, table, etc.).

M. 7.23b.7: Recall how to create a table or graphic display of data.

Grade 8

Students will:

The Number System

Know that there are numbers that are not rational, and approximate them by rational numbers.

M. 8.1.1: Define rational number and irrational number.

M. 8.1.3: Demonstrate how to convert fractions to decimals.

M. 8.2.3: Recall how to compare numbers.

- Accurately place rational number on a number line and compare.

M. 8.2.4: Identify perfect squares and square roots.

M. 8.2.5: Demonstrate how to locate points on a vertical or horizontal number line.

M. 8.2.6: Recall how to estimate

M. 8.4.1: Define square root, cube root

- Fluently determine the square roots of small perfect squares and cube roots of small perfect cubes with a calculator or chart.

M. 8.4.3: Restate exponential numbers as repeated multiplication.

M. 8.4.4: Calculate the multiplication of single or multi-digit whole numbers

M. 8.5.4: Recall how to write numbers in scientific notation.

- Rewrite very large or very small numbers in contextual situations in the form of single digit multiples of powers of ten

M. 8.5.5: Recall estimation strategies

M. 8.6.1: Define scientific notation.

M. 8.6.7: Restate exponents as repeated multiplication.

Understand the connections among proportional relationships, lines and linear equations.

M. 8.7.2: Demonstrate how to write ratios.

M. 8.7.4: Demonstrate how to graph on a Cartesian plane.

M. 8.7.5: Recall how to find unit rate

M. 8.8.2: Generate the slope of a line using given ordered pairs on a graph

M. 8.8.4: Demonstrate how to plot points on a coordinate plane using ordered pairs from table

M. 8.8.6: Recognize ordered pairs

M. 8.8.8: Identify intersecting lines

Analyze and solve linear equations and pairs of simultaneous linear equations

M. 8.9b.1: Define coefficient and distributive property

M. 8.9b.5: Use the distributive property

M. 8.10.3: Recall properties of operation for addition and multiplication.

M. 8.10a.1: Define point of intersection.

M. 8.10a.3: Demonstrate how to graph on the Cartesian plane.

M. 8.10a.4: Identify ordered pairs.

M. 8.10b.2: Recall how to estimate.

M. 8.10b.5: Recall how to graph ordered pairs on a Cartesian plane

Functions

Define, evaluate and compare functions.

M. 8.11.2: Demonstrate how to plot points on a Cartesian plane using ordered pairs

M. 8.11.4: Recognize numeric patterns

M. 8.12.3: Recall how to read/interpret information from a table

M. 8.12.5: Recall how to name points on a Cartesian plane using ordered pairs

M. 8.13.2: Recognize linear equations.

- Identify linear vs. nonlinear on a graph

M. 8.13.3: Identify ordered pairs.

- Make a graph from a table

Use functions to model relationships between quantities.

M. 8.14.4: Recall how to name points from a graph (ordered pairs).

M. 8.15.3: Recall how to plot points on a Cartesian plane.

M. 8.15.4: Identify parts of the Cartesian plane.

M. 8.15.5: Recognize ordered pairs

Geometry**Understand congruence and similarity using physical models, transparencies, or geometry software.**

M. 8.16.2: Relate slides to translations.

M. 8.16.3: Relate turns to rotations.

M. 8.16.4: Relate flips to reflections.

M. 8.16a.1: Distinguish between lines and line segments.

M. 8.16a.2: Demonstrate how to measure length.

M. 8.16c.1: Identify parallel lines.

M. 8.17.1: Define congruent

M. 8.17.2: Recognize translations.

M. 8.17.3: Recognize reflections.

M. 8.17.4: Recognize rotations.

M. 8.17.6: Identify congruent figures.

M. 8.20.1: Define exterior angle

M. 8.20.2: Identify attributes of triangles.

M. 8.20.3: Identify supplemental angles.

M. 8.20.4: Identify vertical angles.

Understand and apply the Pythagorean Theorem

M. 8.21.2: Identify right triangles.

M. 8.21.3: Demonstrate how to find square roots.

M. 8.22.3: Identify right triangles.

M. 8.22.4: Demonstrate how to find square roots.

M. 8.23.1: Recall how to name points on a Cartesian plane using ordered pairs.

M. 8.23.2: Recognize ordered pairs (x, y) .

M. 8.23.4: Identify right triangles.

M. 8.23.5: Demonstrate how to find square roots.

Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

M. 8.24.4: Recall how to find circumference of a circle.

- Find circumference from the radius of a circle.

M. 8.24.5: Identify parts of a circle.

Statistics and Probability**Investigate patterns of association in bivariate data**

M. 8.25.2: Describe patterns found in a scatter plot.

- Construct a scatter plot

M. 8.26.5: Recognize the concept of outlier and its relationship to the data distribution

M. 8.27.4: Recognize how to read a graph

M. 8.28.3: Analyze a two-way table containing categorical variables

- Read a two-way table

M. 8.28.8: Recall how to collect data

