VALWOOD

GO BEYOND

Third Grade Math Curriculum

3rd Grade Overview

Course Description

In third grade instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with a numerator of 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

Topics at a Glance

- Understand fractions as numbers
- Create equivalences and compare fractions
- Compare shapes use them to represent fractions
- Fluently add and subtract within 1,000
- Solve two- step word problems involving the four operations
- Multiplication facts
- Represent and solve multiplication and division problems
- Scaled picture and bar graphs
- Measure lengths to the half and quarter inch
- Area and perimeter
- Tell time and solve time interval problems
- Volume and mass

Assessments

- Math Diagnostic Assessments
- Standardized Assessments
- Assessment tasks from adopted instructional materials

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Grade Level Expectations

Standard	Big Ideas for Third Grade
1. Number Sense, properties, and operations	1. The whole number system describes place value relationships and forms the foundation for efficient algorithms 2. Parts of a whole can be modeled and represented in different ways 3. Multiplication and division are inverse operations and can be modeled in a variety of ways
2. Patterns, Functions, & Algebraic Structures	1. Expectations for this standard are integrated into the other standards at this grade level.
3. Data Analysis, Statistics, & Probability	1. Visual displays are used to describe data
4. Shape, Dimension, & Geometric Relationships	1. Geometric figures are described by their attributes 2. Linear and area measurement are fundamentally different and require different units of measure 3. Time and attributes of objects can be measured with appropriate tools

1. Number Sense, Properties, and Operations

Number sense provides students with a firm foundation in mathematics. Students build a deep understanding of quantity, ways of representing numbers, relationships among numbers, and number systems. Students learn that numbers are governed by properties, and understanding these properties leads to fluency with operations.

Valwood Graduates
The Valwood graduate competencies are the preschool through twelfth-grade concepts and skills that all graduates will be able to demonstrate.

Valwood Graduate Competencies in the Number Sense, Properties, and Operations Standard are:

- Understand the structure and properties of our number system. At their most basic level numbers are abstract symbols that represent real-world quantities
- Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error
- Are fluent with basic numerical and symbolic facts and algorithms, and are able to select and use appropriate (mental math, paper and pencil, and technology) methods based on an understanding of their efficiency, precision, and transparency
- Make both relative (multiplicative) and absolute (arithmetic) comparisons between quantities. Multiplicative thinking underlies proportional reasoning
- Understand that equivalence is a foundation of mathematics represented in numbers, shapes, measures, expressions, and equations
- Apply transformation to numbers, shapes, functional representations, and data

Content Area: Mathematics - Third Grade

Standard: 1. Number Sense, Properties, and Operations

Valwood Graduates:

Understand the structure and properties of our number system. At their most basic level, numbers are abstract symbols that represent real-world quantities.

GRADE LEVEL EXPECTATION

Concepts and skills students master:

1. The whole number system describes place value relationships and forms the foundation for efficient algorithms.

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Use place value and properties of operations to perform multi-digit arithmetic. i. Use place value to round whole numbers to the nearest 10 or 100. ii. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. iii. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.	**Inquiry Questions:** 1. How do patterns in our place value system assist in comparing whole numbers? 2. How might the most commonly used number system be different if humans had twenty fingers instead of ten? **Relevance and Application:** 1. Knowledge and use of place value for large numbers provides context for distance in outer space, prehistoric timelines, and ants in a colony. 2. The building and taking apart of numbers provide a deep understanding of the base 10 number system. **Nature of Discipline:** 1. Mathematicians use numbers like writers use letters to express ideas. 2. Mathematicians look for and make use of structure. 3. Mathematicians look for and express regularity in repeated reasoning. [1](e.g., 9 × 80, 5 × 60.)

Content Area: Mathematics - Third Grade

Standard: 1. Number Sense, Properties, and Operations

Valwood Graduates:

Understand that equivalence is a foundation of mathematics represented in numbers, shapes, measures, expressions, and equations.

GRADE LEVEL EXPECTATION

Concepts and skills students master:

2. Parts of a whole can be modeled and represented in different ways.

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Develop understanding of fractions as numbers. i. Describe a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; describe a fraction a/b as the quantity formed by a parts of size ii. Describe a fraction as a number on the number line; represent fractions on a number line diagram.[2] iii. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 1. Identify two fractions as equivalent (equal) if they are the same size, or the same point on a number line. 2. Identify and generate simple equivalent fractions. Explain[3] why the fractions are equivalent.[4] 3. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.[5] 4. Compare two fractions with the same numerator or the same denominator by reasoning about their size. 5. Explain why comparisons are valid only when the two fractions refer to the same whole. 6. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions.[6]	**Inquiry Questions:** 1. How many ways can a whole number be represented? 2. How can a fraction be represented in different, equivalent forms? 3. How do we show part of unit? **Relevance and Application:** 1. Fractions are used to share fairly with friends and family such as sharing an apple with a sibling, and splitting the cost of lunch. 2. Equivalent fractions demonstrate equal quantities even when they are presented differently such as knowing that 1/2 of a box of crayons is the same as 2/4, or that 2/6 of the class is the same as 1/3. **Nature of Discipline:** 1. Mathematicians use visual models to solve problems. 2. Mathematicians make sense of problems and persevere in solving them. 3. Mathematicians reason abstractly and quantitatively. [2] Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. [3] e.g., 1/2 = 2/4, 4/6 = 2/3). [4] e.g., by using a visual fraction model. [5] Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. [6] e.g., by using a visual fraction model.

Content Area: Mathematics- Third Grade

Standard: 1. Number Sense, Properties, and Operations

Valwood Graduates:

Are fluent with basic numerical and symbolic facts and algorithms, and are able to select and use appropriate (mental math, paper and pencil, and technology) methods based on an understanding of their efficiency, precision, and transparency.

GRADE LEVEL EXPECTATION

Concepts and skills students master:

3. Multiplication and division are inverse operations and can be modeled in a variety of ways.

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Represent and solve problems involving multiplication and division. i. Interpret products of whole numbers.[7] ii. Interpret whole-number quotients of whole numbers.[8] iii. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.[9] iv. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.[10] v. Model strategies to achieve a personal financial goal using arithmetic operations. b. Apply properties of multiplication and the relationship between multiplication and division. i. Apply properties of operations as strategies to multiply and divide.[11] ii. Interpret division as an unknown-factor problem.[12] c. Multiply and divide within 100. i. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division[13] or properties of operations. ii. Recall from memory all products of two one-digit numbers. d. Solve problems involving the four operations, and identify and explain patterns in arithmetic. i. Solve two-step word problems using the four operations. This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order.	**Inquiry Questions:** 1. How are multiplication and division related? 2. How can you use a multiplication or division fact to find a related fact? 3. Why was multiplication invented? Why not just add? 4. Why was division invented? Why not just subtract? **Relevance and Application:** 1. Many situations in daily life can be modeled with multiplication and division such as how many tables to set up for a party, how much food to purchase for the family, or how many teams can be created. 2. Use of multiplication and division helps to make decisions about spending allowance or gifts of money such as how many weeks of saving an allowance of $5 per week to buy a soccer ball that costs $32? **Nature of Discipline:** 1. Mathematicians often learn concepts on a smaller scale before applying them to a larger situation. 2. Mathematicians construct viable arguments and critique the reasoning of others. 3. Mathematicians model with mathematics. 4. Mathematicians look for and make use of structure. [7] e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. [8] e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. [9] e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

ii. Represent two-step word problems using equations with a letter standing for the unknown quantity. iii. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. iv. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.[14]	[10] For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = ? ÷ 3, 6 × 6 = ?. [11] Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) [12] For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. [13] e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8. [14] For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

2. Patterns, Functions, and Algebraic Structures

Pattern sense gives students a lens with which to understand trends and commonalities. Being a student of mathematics involves recognizing and representing mathematical relationships and analyzing change. Students learn that the structures of algebra allow complex ideas to be expressed succinctly.

Valwood Graduates
The Valwood graduate competencies are the preschool through twelfth-grade concepts and skills that all graduates will be able to demonstrate.

Valwood Graduate Competencies in the 2. Patterns, Functions, and Algebraic Structures Standard are:

- Are fluent with basic numerical and symbolic facts and algorithms, and are able to select and use appropriate (mental math, paper and pencil, and technology) methods based on an understanding of their efficiency, precision, and transparency
- Understand that equivalence is a foundation of mathematics represented in numbers, shapes, measures, expressions, and equations
- Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data
- Make claims about relationships among numbers, shapes, symbols, and data and defend those claims by relying on the properties that are the structure of mathematics
- Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

*** Expectations for this standard are integrated into the other standards at preschool through third grade.**

3. Data Analysis, Statistics, and Probability

Data and probability sense provides students with tools to understand information and uncertainty. Students ask questions and gather and use data to answer them. Students use a variety of data analysis and statistics strategies to analyze, develop and evaluate inferences based on data. Probability provides the foundation for collecting, describing, and interpreting data.

Valwood Graduates
The Valwood graduate competencies are the preschool through twelfth-grade concepts and skills that all graduates will be able to demonstrate.

Valwood Graduate Competencies in the 3. Data Analysis, Statistics, and Probability Standard are:

- Recognize and make sense of the many ways that variability, chance, and randomness appear in a variety of contexts
- Solve problems and make decisions that depend on understanding, explaining, and quantifying the variability in data
- Communicate effective logical arguments using mathematical justification and proof. Mathematical argumentation involves making and testing conjectures, drawing valid conclusions, and justifying thinking
- Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

Content Area: Mathematics - Third Grade

Standard: 3. Data Analysis, Statistics, and Probability

Valwood Graduates:

Solve problems and make decisions that depend on understanding, explaining, and quantifying the variability in data.

GRADE LEVEL EXPECTATION

Concepts and skills students master:

1. Visual displays are used to describe data.

Evidence Outcomes	**21st Century Skills and Readiness Competencies**
Students can: a. Represent and interpret data. i. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. ii. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs.[1] iii. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	**Inquiry Questions:** 1. What can data tell you about your class or school? 2. How do data displays help us understand information? **Relevance and Application:** 1. The collection and use of data provides better understanding of people and the world such as knowing what games classmates like to play, how many siblings friends have, or personal progress made in sports. **Nature of Discipline:** 1. Mathematical data can be represented in both static and animated displays. 2. Mathematicians model with mathematics. 3. Mathematicians use appropriate tools strategically. 4. Mathematicians attend to precision. [1] For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

4. Shape, Dimension, and Geometric Relationships

Geometric sense allows students to comprehend space and shape. Students analyze the characteristics and relationships of shapes and structures, engage in logical reasoning, and use tools and techniques to determine measurement. Students learn that geometry and measurement are useful in representing and solving problems in the real world as well as in mathematics.

Valwood Graduates
The Valwood graduate competencies are the preschool through twelfth-grade concepts and skills that all graduates will be able to demonstrate.

Valwood Graduate Competencies in the 4. Shape, Dimension, and Geometric Relationships standard are:

- Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error
- Make sound predictions and generalizations based on patterns and relationships that arise from numbers, shapes, symbols, and data
- Apply transformation to numbers, shapes, functional representations, and data
- Make claims about relationships among numbers, shapes, symbols, and data and defend those claims by relying on the properties that are the structure of mathematics
- Use critical thinking to recognize problematic aspects of situations, create mathematical models, and present and defend solutions

Content Area: Mathematics - Third Grade

Standard: 4. Shape, Dimension, and Geometric Relationships

Valwood Graduates:

Make claims about relationships among numbers, shapes, symbols, and data and defend those claims by relying on the properties that are the structure of mathematics.

GRADE LEVEL EXPECTATION

Concepts and skills students master:

1. Geometric figures are described by their attributes.

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Reason with shapes and their attributes. i. Explain that shapes in different categories[1] may share attributes[2] and that the shared attributes can define a larger category.[3] 1. Identify rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. ii. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole.[4]	**Inquiry Questions:** 1. What words in geometry are also used in daily life? 2. Why can different geometric terms be used to name the same shape? **Relevance and Application:** 1. Recognition of geometric shapes allows people to describe and change their surroundings such as creating a work of art using geometric shapes, or design a pattern to decorate. **Nature of Discipline:** 1. Mathematicians use clear definitions in discussions with others and in their own reasoning. 2. Mathematicians construct viable arguments and critique the reasoning of others. 3. Mathematicians look for and make use of structure. [1] e.g., rhombuses, rectangles, and others. [2] e.g., having four sides. [3] e.g., quadrilaterals. [4] For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.

Content Area: Mathematics - Third Grade

Standard: 4. Shape, Dimension, and Geometric Relationships

Valwood Graduates:

Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error.

GRADE LEVEL EXPECTATION

Concepts and skills students master:

2. Linear and area measurement are fundamentally different and require different units of measure.

Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Use concepts of area and relate area to multiplication and to addition. i. Recognize area as an attribute of plane figures and apply concepts of area measurement.[5] ii. Find area of rectangles with whole number side lengths using a variety of methods[6] iii. Relate area to the operations of multiplication and addition and recognize area as additive.[7] b. Describe perimeter as an attribute of plane figures and distinguish between linear and area measures. c. Solve real world and mathematical problems involving perimeters of polygons. i. Find the perimeter given the side lengths. ii. Find an unknown side length given the perimeter. iii. Find rectangles with the same perimeter and different areas or with the same area and different perimeters.	**Inquiry Questions:** 1. What kinds of questions can be answered by measuring? 2. What are the ways to describe the size of an object or shape? 3. How does what we measure influence how we measure? 4. What would the world be like without a common system of measurement? **Relevance and Application:** 1. The use of measurement tools allows people to gather, organize, and share data with others such as sharing results from science experiments, or showing the growth rates of different types of seeds. 2. A measurement system allows people to collaborate on building projects, mass produce goods, make replacement parts for things that break, and trade goods.

	Nature of Discipline: 1. Mathematicians use tools and techniques to accurately determine measurement. 2. People use measurement systems to specify attributes of objects with enough precision to allow collaboration in production and trade. 3. Mathematicians make sense of problems and persevere in solving them. 4. Mathematicians model with mathematics. [5] A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units. [6] A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. [7] Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.

Content Area: Mathematics - Third Grade

Standard: 4. Shape, Dimension, and Geometric Relationships

Valwood Graduates:

Understand quantity through estimation, precision, order of magnitude, and comparison. The reasonableness of answers relies on the ability to judge appropriateness, compare, estimate, and analyze error.

GRADE LEVEL EXPECTATION

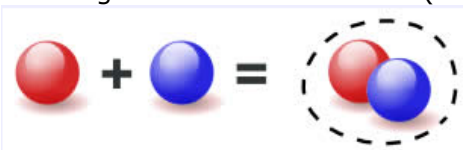
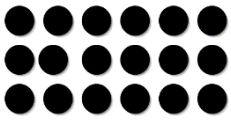
Concepts and skills students master:

3. Time and attributes of objects can be measured with appropriate tools.

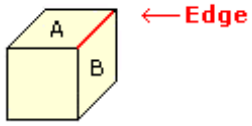
Evidence Outcomes	21st Century Skills and Readiness Competencies
Students can: a. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. i. Tell and write time to the nearest minute. (ii. Measure time intervals in minutes. iii. Solve word problems involving addition and subtraction of time intervals in minutes[8] using a number line diagram. iv. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). v. Use models to add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units.[9]	**Inquiry Questions:** 1. Why do we need standard units of measure? 2. Why do we measure time? **Relevance and Application:** 1. A measurement system allows people to collaborate on building projects, mass produce goods, make replacement parts for things that break, and trade goods **Nature of Discipline:** 1. People use measurement systems to specify the attributes of objects with enough precision to allow collaboration in production and trade. 2. Mathematicians use appropriate tools strategically. 3. Mathematicians attend to precision. 8. e.g., by representing the problem on a number line diagram 9. e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem

Third Grade Academic Vocabulary For Students
Standard 1: addend, adding and subtracting through ten, algorithm, array, associative property, base ten, attribute, base ten, benchmark numbers, combination, combine, community property, compose, computation strategy, counting on, decompose, denominator, difference, divisor, digit, division, equality, equal partitions/parts, equivalence, equivalent fractions, estimate, even number, expanded form, factors, fluency, fraction, identify, improper fraction, inverse operation, integer, landmark number, mental computation, minuend, mixed number, multiplication, multiple, number line, number sentence, numerator, numeral, numeric patterns, odd number, open number sentence, operation, partition, pictorial representation, place value, product, proper fraction, quotient, reasonableness, round, same denominator, skip counting, standard form, subitize, subtrahend, sum, symbols (<,>, =), whole numbers, word problems
Standard 2: Expectations for this standard are integrated into the other standards at preschool through third grade.
Standard 3: (as related to scaled graphs) bar graph, data, data set, halves, length, linear measurement, quarters, scale, scaled bar graph, scaled picture graph, whole numbers
Standard 4: angle, area, attribute, capacity, hexagon, interval of time, length, line, line segment, linear measurement, metric system, perimeter, plane figure, polygon, quadrilateral, right angle, shape, side, solid, symmetry, transformation, unit of measurement, vertex, vertices, volume, weight,

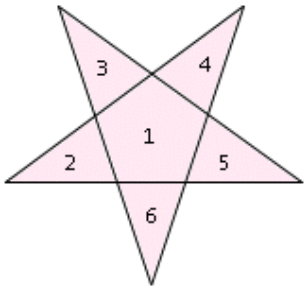
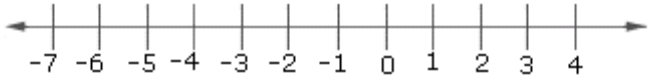
Math Global Reference Glossary for Pre-K – 5 Teachers

Word	Definition
Acute Angle	An angle smaller than 90 degrees.
Add	To bring two or more numbers (or things) together to make a new total. 
Addend	Any number being added.
Adding And Subtracting Through Ten	A non-unitary addition and subtraction strategy that uses ten and its multiples as landmark numbers. (e.g., 8+5 is thought of as 8+2=10 and 10+3=13; 23-7 is thought of 23-3=20 and 20-4=16).
Additive	Marked by, produced by, or involving addition.
Algorithm	A standardized step-by-step procedure for solving a problem.
Analog Clock	A clock with a face and hands.
Angle	Two rays that share an endpoint.
Area	The measure, in square units, of the inside of a plane figure.
Array	A rectangular arrangement of objects in rows and columns.  dot array (discrete array)  area model array
Associative Property	For any rational numbers: (a + b) + c =a +(b = c) and (a x b) x c = a x (b x c). The associative property does **not** apply to subtraction and division.
Attribute	A characteristic or quality.
Bar Graph	A graph that uses the height or length of rectangles to compare data.
Base (Geometric)	The base is the side or face that is perpendicular to the height of the figure. In a solid figure it is the polygon that defines the shape (i.e, the circular base of a cylinder or the triangles of a triangular prism.

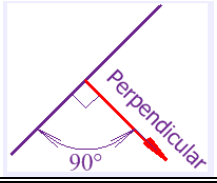
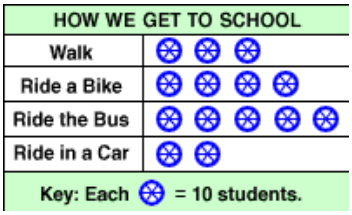
Base Ten	A number system in which each place has 10 times the value of the next place to its right.
Benchmark Fractions	Fractions used in estimation and mental calculation; commonly halves and whole numbers. (e.g. 0, ½, 1, 1½, 2)
Benchmark Numbers	Numbers used in estimation and mental calculation; most commonly multiples of 10, but also including numbers like 25 with which can be readily manipulated.
Braces	A symbol used outside of parentheses [ ] to denote order of operations.
Brackets	A symbol used to denote order of operations used outside of braces.{ }
Capacity	The maximum amount that can be contained by an object, usually measured in liquid units. (i.e. tablespoons, cups, gallons. "A vase can hold 3 cups of water.)
Cardinal Number	A number that is used in simple counting and that indicates how many elements there are in a set.
Cardinality	The cardinality of a set is the number of elements or members (numerosity) of a set. The Cardinality Principal is the connection that the last number word of the count indicates the amount of the set.
Categorical Data	Data that is grouped by category or attribute (e.g., What kind of pets do you have? Cats, dogs, rabbits, etc.).
Circle	A 2-dimensional shape made by drawing a curve that is always the same distance from the center.
Clusters	Data that are grouped around a value in a set of values.
Combination	A pair or group of items or events. Placing these items or events in a different order does not create a new combination.
Combine	Put together.
Common Denominator	A denominator that is the same for two or more fractions.
Commutative Property	For any rational numbers: a + b = b + a and a x b = b x a. (changing the order of the addends or factors does not affect the sum or product (e.g. 7 + 5 = 5 + 7 and 7 x 5 = 5 x 7))
Compare	Estimate, measure, or note similarities or differences.
Compose	Put together or combine quantities.
Composite Number	A positive whole number that has more than two factors (e.g., The factors of 10 are 1, 2, 5, and 10).
Computation Algorithm	A set of predefined steps applicable to a class of problems that gives the correct result in every case when the steps are carried out correctly.
Computation Strategy	Purposeful manipulations that may be chosen for specific problems, may not have a fixed order, and may be aimed at converting one problem into another.
Cone	A solid (3-dimensional) object that has a circular base and one vertex.
Congruent	Having exactly the same size and shape.
Conjecture	A mathematical hypothesis that has not been proved or disproved.
Constant	Consistent or unchanging. Constant change refers to linear change.
Conversion	To change the form but not the value of a particular number or quantity.
Coordinates	An ordered pair of numbers that identify a point on the coordinate plane. (coordinate pair)
Count	To tell or name one by one or by groups, for the purpose of determining the whole number of units in a collection; to number or enumerate. (see also cardinality, number word sequence, order irrelevance, and one to one correspondence)
Counting Back	Counting back from or to a number. Example of counting back from: 11-3 is solved by counting back from 11: "10, 9, 8." Example of counting back to: 11- __=8 is solved by counting back to 8 and keeping track of three counts.

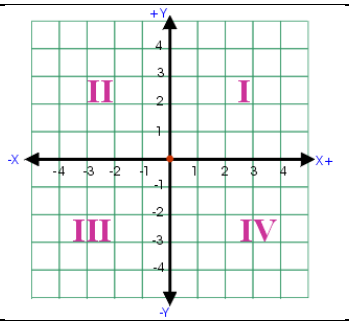
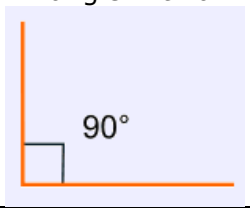
Counting On	Counting up from or to a number. Example of counting up from: 7+5 is solved by counting up 5 from 7: 8, 9, 10, 11, 12. Example of counting up to: 7 +__=12 is solved by counting from 7 up to 12 and keeping track of 5 counts.
Cube	A box-shaped solid object that has six identical square faces.
Cubic Unit	A unit such as a cubic meter used to measure volume or capacity.
Cylinder	A solid object with two identical flat ends that are circular and one curved face. It has the same cross-section from one end to the other.
Data	Information, usually numerical information.
Decimal Fraction	A fraction or decimal number (as 0.25 = 25/100 or 0.025 = 25/1000) or mixed number (as 3.025 = 3 25/1000) in which the denominator is a power of 10 usuallyu expressed by the use of a decimal point.
Decimal Number	A number that uses a decimal point to indicate parts of a whole (e.g., 3.25).
Decompose	Breaking quantities into useful chunks.
Degrees	A unit of measurement as of an angle or temperature.
Denominator	The number below or to the right of the line in a fraction, indicating the number of equal parts into which one whole is divided. For example, in the fraction 2/7 , 7 is the denominator.
Diagram	A visual representation.
Difference	The amount that remains after one quantity is subtracted from another.
Digit	Any one of the ten symbols: 0, 1, 2. 3, 4, 5, 6, 7, 8, 9.
Dimension	The property of an object that is measureable in space. A line has one dimension because it can only be measured once. A rectangle has two dimensions that can be measured.
Directional And Positional	Words that describe a position or place of an object or number in space
Distributive Property	a(b + c) = ab + ac and a(b — c) = ab — ac, where a, b, and c are any real numbers. The distributive property is used to multiply multi-digit numbers 3x34=(3x30)+(3x4)
Dividend	In a division problem, the number of items you are separating – "the whole" (see also partitive and quotative division)
Division	The action of separating something into parts, or the process of being separated.
Divisor	The number by which a dividend is divided
Doubles Plus One	An addition strategy that utilizes knowledge of doubles facts to add two numbers that are one away from each other (e.g., 5 + 6 can be found by knowing that 5 + 5=10 and one more would be 11.)
Edge	The segment on a three-dimensional geometric figure that is formed by the intersection of two faces. 
Elements (Of A Pattern)	The individual items in a set.
Equal	Exactly the same amount or value.
Equality	Represented by an equal sign. In an equation, the equal sign represents a relationship between two expressions that have the same value
Equal Partitions/Part	Pieces of an object or set that are equivalent in amount.
Equivalence	Capable of being put into a one-to-one relationship. Having virtually identical or corresponding parts.
Equivalent	Equal partitions/parts, equal to each other, the same amount.
Equivalent Fractions	Fractions that represent the same amount but have different numerators and denominators. For example ½ = 2/4 = 3/6= 4/8 = 5/10
Estimate	(noun)A number close to an exact amount. An estimate tells about how much or about how many. (verb) To find a number close to an exact amount
Even Number	A whole number that has 2 as a factor. All even numbers are divisible by two

	and have 0, 2, 4, 6, or 8 in the ones place.
Expanded Form	A way to write numbers that shows the place value of each digit (e.g., 789= 700+80+9).
Exponents	A number used to tell how many times a number or variable is used as a factor. (i.e., 5^3 indicates that 5 is a factor 3 times, that is, 5 x 5 x 5. The value of 5^3 is 125. 5 is the base number and 3 is the exponent.)
Expression	A group of characters or symbols representing a quantity (example: 5+6=11, 7x8, 3x+6).
Face	A face is a flat surface of a three-dimensional figure. 
Factors	Numbers that are multiplied together to form a product (e.g., 6 x 7 = 42, 6 and 7 are factors).
Fluency	Efficiency, accuracy, and flexibility in solving computation problems.
Fraction	A number that describes a part of a whole or group, usually in the form a/b where "a" is any real number and "b" is any real number >0.
Frequency Table	A table that depicts the number of times that something occurs in an interval or set of data.
Function Table	A table that matches each input value with an output value. The output values are determined by the function. Couldn't paste diagrams
Generalizable	The ability to extend a number of results to form a rule. For example 5+3=3+5 and 1.5+2.7=2.7+1.5 can be generalized to a+b=b+a.
Graph	A drawing that shows a relationship between sets of data.
Greater Than	Larger. The special symbol used to show one number is larger than another is >. a>b indicates that a is larger than b.
Height	The vertical distance from top to bottom.
Hexagon	A polygon with six sides.
Horizontal	Parallel to the horizon.
Identify (Numeral Identification)	To give the name of a written numeral or other symbol in isolation (e.g., When presented a card with the numeral 563, the child says "five hundred sixty-three). (compare to recognize)
Identity Property	Of Addition: for any number n; n+0=0 Of Subtraction: for any number n; n-0=n Of Multiplication: for any number n, nx1=n Of Division: for any number n, n/1=n
Improper Fraction	A fraction with a value greater than 1 that is not written as a mixed number.
In And Out Tables (Function Tables)	A table that matches each input value with an output value. The output values are determined by the function.
Integer	Any positive or negative whole number and the number zero.
Interval Of Time	A definite length of time marked off by two instants.
Inverse Operation	An operation that undoes another operation (e.g. addition and subtraction are inverse operations).
Landmark Number	Numbers that are familiar landing places that make for simple calculations and to which other numbers can be related (e.g., 10, 50, and 100 are commonly used landmarks).
Length	The distance along a line or figure from one point to another. One dimension of a two-or three-dimensional figure.
Less Than	Smaller. The special symbol used to show one number is smaller than another is <. a<b indicates that a is smaller than b.
Linear Measurement	A unit or system of units for the measurement of length.
Line	An infinite set of points forming a straight path in 2 directions.
Line Plot	A graph showing frequency of data on a number line.
Line Segment	A part of a line defined by 2 end points.

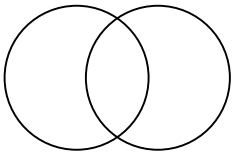
Line Of Symmetry	A line that divides a figure into two halves that are mirror images of each other.
Mass	Quantity of matter in an object. Usually measured in weight.
Mean	The average of a set of data. It is the number found by dividing the sum of the numbers in a set of data by the number of addends. (calculation of the mean is not a expectation of this elementary curriculum)
Measure	To find the quantity, length, area, volume, capacity, weight, duration, etc. of something.
Measurement Words	Words used to describe differences in objects being measured (i.e. heavier/lighter, shorter/longer).
Median	In a set of data, the number in the middle when the data is organized from least to greatest. When there are an even number of data, the median is the mean of the two middle values. (e.g. For the set of numbers 2, 4, 6, 8, 10, 12 the median is 7)
Mental Computation	Computing an exact answer without using paper and pencil or other physical aids.
Metric System	An international system of measurement based on tens. The basic units of measure are meter, liter, gram, degrees Celsius.
Minuend	The number you subtract from (e.g., 8-3=5; 8 is the minuend).
Mixed Number	A number consisting of an integer and a fraction.
Mode	The number or item that appears most often in a set of data. There may be one, more than one, or no mode. (when there are 2 modes we say that the data set is bimodal. When there are more than 2 modes we say that there is no mode.)
More Than	Greater than (informal)
Multiple	The product of the number and any whole number (e.g., The multiples of 4 are 0, 4, 8, 12, 16…).
Multiplicative Comparison	Interpret that 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.
Net	A two-dimensional shape that can be folded into a three-dimensional figure. The following is the net of a pentagonal pyramid. 
Non-Standard Units	Units other than customary or metric units used for measurement (e.g. a paper clip might be used as a non-standard unit of length).
Number Line	A diagram that represents numbers as points on a line, marked at intervals. 
Number Sentence	An equation or inequality with numbers (e.g., 6 + 3 = 9 or 8 + 1 < 12).
Number Sense	A person's ability to use and understand numbers: knowing relative values; how to use numbers to make judgments; how to use numbers in flexible ways when adding, subtracting, multiplying or dividing; how to develop useful strategies when counting, measuring, or estimating. This would include number meanings, number relationships, number size, and the relative effect of operations on numbers.

Number Word Sequence	A regular sequence of number words, typically, but not necessarily, by ones. (both forward and backward). An element of counting.
Numeral	A symbol used to represent a number.
Numerator	A number written above or to the left of the line in a common fraction to indicate the number of parts of the whole. For example, 2 is the numerator in the fraction $^{2}/_{7}$.
Numeric Expression	A mathematical combination of numbers, variables, and operations. (e.g,. a box with an amount of pencils, x, with 3 missing is x-3).
Numerical Data	Data expressed in or involving numbers.
Obtuse Angle	An angle greater than 90 and less than 180 degrees.
Odd Number	A whole number that is not divisible by 2. All odd numbers have 1, 3, 5, 7, or 9 in the ones place.
Open Number Sentence	A number sentence in which one or more numerical values is missing (e.g., __+6=13).
Off-Century Counting	Counting forward or backward by 100, starting at any number that is not a multiple of one hundred (e.g., 125, 225, 325…).
Off-Decade Counting	Counting forward or backward by 10, starting at any number that is not a multiple of 10 (e.g. 54, 44, 34 . . .).
On-Century Counting	Counting forward or backward by 100 starting at any multiple of 100. (e.g. 100, 200, 300 …)
On-Decade Counting	Counting forward or backward by 10, starting at any multiple of ten (e.g. 10, 20. 30 . . .).
One-To-One Correspondence	In counting, assigning one counting number for each object counted in order to determine how many in a set.
Open Number Sentence	A number sentence in which one or more numerical values is missing (e.g., __+6=13).
Operation	A mathematical process; addition, subtraction, multiplication, division, and raising a number to a power are some mathematical operations.
Order	The arrangement of people or things in relation to each other according to a particular sequence, pattern or method.
Order Of Operations	The customary order in which operations must be performed in order to arrive at the intended result. They are, in order, brackets, braces, parentheses, multiplication and division, addition and subtraction. Calculations always move from left to right when no other indication is made, for instance 8 – 3 + 5 = (8-3)+5.
Order Irrelevance (In Counting)	The understanding that the number of objects in a set is unchanged regardless of the order in which the members of the set are counted. (an element of counting)
Ordered Pair	A pair of numbers used to name a location on coordinate plane (x,y); the first number is the horizontal distance from the origin, the second is the vertical distance from the origin. (see also coordinates)
Ordinal Number	Indicates the relative position of an object in an ordered set (e.g., 1st, 2nd, 5th).
Origin	The intersection of the x and y axes in a coordinate plane. Its coordinates are (0,0).
Outcome	A possible result of a random process (e.g., Heads and tails are the two possible outcomes of flipping a coin.)
Outlier	An item of data that is significantly greater or less than all the other items of data.
Oval	Any curve that looks like an egg or an ellipse.
Parallel Lines	Lines that are always the same distance apart; never meeting.
Parallelogram	A polygon with opposite sides that are parallel and equal in length, and opposite angles that are equal. NOTE: squares, rectangles and rhombuses are all parallelograms.
Partition	Breaking quantities into useful chunks in order to solve problems.

Partitive Division	A partitive division problem is one where you know the total number of groups, and you are trying to find the number of items in each group. If you have 30 popsicles and want to divide them equally among 5 friends you are figuring out how many popsicles each friend would get. (see also quotative division)
Part-Part-Whole	See Elementary Math Curriculum, Table A.
Pattern	An ordered set of numbers, shapes or other mathematical objects, arranged according to a rule.
Pentagon	A geometric figure with five sides.
Perimeter	The sum of the measures of the lines forming a polygon.
Perpendicular	When two lines intersect to make a right angle. 
Pictograph	A graph using pictures or symbols to show data. 
Pictorial Representation	Using a picture to model a solution strategy or mathematical idea.
Place Value	The value of the place of a digit of a number (e.g., In the number 7324, 4 is 4x1, 2 is 2 x 10, 3 is 3 x 100, and 7 is 7 x 1,000) The understanding that each place to the left of the next is valued at 10x the place to then right, and conversely that those to the right are 1/10 of those to the left. Place value understandings are a key element of number sense.
Plane Figure	A two-dimensional shape.
Polygon	A closed figure formed by three or more line segments that do not cross.
Powers Of Ten	Any number that can be expressed as repeated multiplication of 10 (e.g., 10, 100, 1000)
Prime Number	A whole number that has exactly two different positive factors, itself and 1 (e.g., 7 is a prime number because its only factors are 7 and 1). 1 is not a prime number because it does not have 2 factors.
Prism	A polyhedron with two polygonal faces lying in parallel planes and with the other faces parallelograms
Problem-Solving Situations	Contexts in which problems are presented that apply mathematics to practical situations in the real world, or problems that arise from the investigation of mathematical ideas
Product	The result of multiplication
Proper Fraction	A fraction less than one.
Property (Geometry)	A defining attribute of a geometric figure. Parallel opposite sides is a property of rectangles.
Protractor	A measurement tool used to measure an angle.
Quadrant One	The x and y axes of the coordinate plane divide the plane into four regions called quadrants. These regions are labeled counter-clockwise, starting from the top-right.

	
Quadrilateral	A polygon with four sides.
Qualitative	Of, or relating to descriptions based on some quality rather than quantity. (e.g. "Today is hotter than yesterday." "It is very likely to rain today")
Quantitative	Data of, relating to, or expressible in numeric terms. (e.g. "It is 98° outside." "There is an 85% chance of rain today")
Quantity	How much there is of something.
Quotative Division	Quotative division is when you know the total number of each set and you are determining how many sets you can make. If you have 30 students and you need to make groups of 5, how many groups will you make? (see also partitive division)
Quotient	The result of division.
Range	The difference between the least and greatest values in a set of data.
Rational Number	A number that can be expressed in the form a/b, where a and b are integers and b,0, for example, 3/4, 2/1, or 11/3. Every integer is a rational number, since it can be expressed in the form a/b, for example, 5 = 5/1. Rational numbers may be expressed as fractional or decimal numbers, for example, 3/4 or .75. Finite decimals, repeating decimals, and mixed numbers all represent rational numbers.
Ray	A part of a line that has one endpoint and extends indefinitely in one direction.
Real-World Problems (Also Called Real-World Experiences)	Quantitative problems that arise from a wide variety of human experience which may take into consideration contributions from various cultures (for example, Mayan or American pioneers), problems from abstract mathematics, and applications to various careers (for example, making change or calculating the sale price of an item). These may also be called real-world experiences, story problems, story contexts and word problems.
Rectangle	A quadrilateral with two pairs of congruent, parallel sides and four right angles.
Rectilinear Figure	Consisting of, bounded by, or formed by a straight line or lines. (rectilinear means having straight lines)
Regular Polygon	A polygon with all sides the same length and all angles the same measure.
Remainder	What is left over when the dividend is not a multiple of the divisor.
Repeating Pattern	A pattern of items, shapes or numbers, that repeats itself.
Rhombus	A parallelogram with all four sides equal in length.
Right Angle	An angle with a measure of 90°; a square corner. 
Round	To express a number in a simplified form by finding the nearest whole number, ten, hundred, thousand, etc. (e.g., 537 to the nearest hundred rounds to 500, to the nearest 10 rounds to 540).

Rule	A principle to which an action conforms or is required to conform. In mathematical relationships rules are often described or defined by operations. (e.g. add 6) (see also in and out tables)
Sample Space	The set of all possible outcomes of an experiment.
Scale	The ratio between the actual size of an object and a proportional representation. A system of marks at fixed intervals used in measurement or graphing.
Separate	See Table A below
Shape (Plane)	A two-dimensional figure having length and width.
Shape (Solid)	A three-dimensional figure having length, width and height. (examples include, spheres, cubes, pyramids and cylinders.
Side	Any one of the line segments that make up a polygon.
Skip Counting	When you count forwards or backwards by a number other than 1.
Solid	A geometric figure with three dimensions, length, width and height.
Sort	To arrange or group in a special way (such as by size, type, or alphabetically).
Sphere	A 3-dimensional object shaped like a ball. Every point on the surface is the same distance from the center.
Square	A parallelogram with four congruent sides and four right angles.
Square Number	A number that is the result of multiplying an integer by itself.
Standard Form	A number written with one digit for each place value (e.g., The standard form for the number two hundred six is 206).
Standard Units	Units from the customary system or metric system used for measurement (e.g. inch and centimeter are standard units of length).
Standards For Mathematical Practice	The working practices of mathematicians. In the Common Core State Standards they are: 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Stress Counting	Counting by ones, emphasizing a multiplicative pattern (1, 2, **3**, 4, 5, **6**). (related to and often preliminary to skip counting)
Subitize	Instantly quantifying a small collection without counting.
Subtrahend	In subtraction, the number being subtracted (e.g., In 8 — 5 = 3, 5 is the subtrahend).
Sum	The result of addition.
Symmetry	The property of exact balance in a figure; having the same size and shape across a dividing line (line/mirror symmetry) or around a point (rotational).
Symbolic Notation	A mathematical idea represented with symbols.
Table	An organized way to list data. Tables usually have rows and columns of data.
Tally Marks	Marks used to keep track of things being counted, usually organized in groups of five. 
Take Away	Subtract – to take one number away from another.
T-Chart	A chart showing the relationship between two variables.

Three-Dimensional	An object that has height, width and depth.
Transformation **Slides (Translations)** **Flips (Reflections)** **Turns (Rotations)**	A rule for moving every point in a plane figure to a new location. Three types of transformations are A transformation that moves a figure a given distance in a given direction. A transformation that creates a mirror image of a figure on the opposite side of a line. A transformation in which a figure is turned a given angle and direction around a point.
Trapezoid	A quadrilateral with one pair of parallel sides.
Tree Diagram	An organized way of listing all the possible outcomes of an experiment.
Triangle	A 3-sided polygon.
Two-Dimensional	A shape that only has two dimensions (such as width and height) and no thickness.
Unit Fraction	A rational number written as a fraction where the numerator is one and the denominator is a positive integer. For example, ¼ , ½ , 1/3 , 1/8
Unit Of Measurement	A quantity used as a standard of measurement. For example units of time are second, minute, hour, day, week, month, year and decade.
Unknown	A value that is missing in a problem.
Variable	A value represented by a symbol, most often a letter, in an expression, equation, or formula. (e.g. in the expression y+3, y is the variable).
Venn Diagram	A drawing that uses circles to show relationships among sets. 
Vertex	The point where two or more straight lines meet.
Vertices	Plural of vertex.
Vertical	Upright; perpendicular to the horizon.
Volume	A measure of the amount of space occupied by a three-dimensional figure, generally expressed in cubic units.
Weight	The measure of the heaviness of an object.
Whole Numbers	The set of natural numbers plus the number zero (0, 1, 2, 3 . . .).
Width	The distance from side to side.