VALLEY PREPARATORY SCHOOL
PRESCHOOL thru 8th MATH STANDARDS

Based upon the Common Core Standards

Last updated October 3, 2018

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UNDERSTANDING THE STANDARDS

The Common Core Standards CCS are a set of high-quality academic standards that outline what a student should know and be able to do at the end of each grade. The standards were created to ensure that all students acquire the skills and knowledge necessary to succeed in college, career, and life. Recognizing the value and need for consistent learning goals across country at both public and private school, the CCS was designed through collaboration among teachers, school chiefs, administrators, and other experts, to provide a clear and consistent framework for educators. The standards define the knowledge and skills students should gain throughout their K-12 education in order to graduate high school prepared to succeed in entry-level careers, introductory academic college courses, and workforce training programs. **Valley Preparatory School** adopted the basis of these standards to begin the 2018-19 school year. Below, you will find three (or more) **Domains** listed for each grade level: Operations & Problem-solving; Measurement & Data; and Geometry. Beside each Domain are listed the **learning-standards**. Teachers assess these standards throughout the year and then summarize the results of these assessments (by Domain) on the Report Card. Beneath each grade-level section is a link to the Common Core Standards website which provides more details about each standard.

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The Mathematic Practices also serve to "tie-together" the curriculum across the entire school, given that students continually develop these "practices" throughout their education.

Mathematical Practices

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.

KINDERGARTEN MATHEMATICS	
Operations	1. Know number names and the count sequence. 2. Count to tell the number of objects. 3. Compare numbers.
	4. Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
	5. Work with numbers to gain foundations for place value.
Measurement and Data	6. Describe and compare measurable attributes. 7. Classify objects and count the number of objects in categories.
Geometry	8. Identify and describe shapes. 9. Analyze, compare, create, and compose shapes.
http://www.corestandards.org/Math/Content/K/introduction/	

Domain

Cluster

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FIRST GRADE MATHEMATICS	
Operations	1. Represent and solve problems involving addition and subtraction. 2. Understand and apply properties of operations and the relationship between addition and subtraction. 3. Add and subtract 4. Work with addition and subtraction equations.
	5. Extend the counting sequence. 6. Understand place value. 7. Use place value understanding and properties of operations to add and subtract.
Measurement and Data	8. Measure lengths indirectly and by iterating length units. 9. Write and tell time. 10. Represent and interpret data.
Geometry	11. Reason with shapes and their attributes.
http://www.corestandards.org/Math/Content/1/introduction/	
SECOND GRADE MATHEMATICS	
Operations	1. Represent and solve problems involving addition and subtraction. 2. Add and subtract 3. Work with equal groups of objects to gain foundations for multiplication.
	4. Understand place value. 5. Use place value understanding and properties of operations to add and subtract
Measurement and Data	6. Measure and estimate lengths in standard units. 7. Relate addition and subtraction to length. 8. Work with time and money. 9. Represent and interpret data.
Geometry	10. Reason with shapes and their attributes.
http://www.corestandards.org/Math/Content/2/introduction/	
THIRD GRADE MATHEMATICS	
Operations	1. Represent and solve problems involving multiplication and division. 2. Understand properties of multiplication and the relationship between multiplication and division. 3. Multiply and divide 4. Solve problems involving the four operations, and identify and explain patterns in arithmetic.
	5. Use place value understanding and properties of operations to perform multi-digit arithmetic
	6. Develop understanding of fractions as numbers
Measurement and Data	7. Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. 8. Represent and interpret data. 9. Geometric measurement: understand concepts of area and relate area to multiplication and to addition. 10. Geometric measurement: recognize perimeter as an attribute of plane figure and distinguish between linear and area measures.
Geometry	11. Reason with shapes and their attributes
http://www.corestandards.org/Math/Content/3/introduction/	

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FOURTH GRADE MATHEMATICS	
Operations	1. Use the four operations with whole numbers to solve problems. 2. Gain familiarity with factors and multiples. 3. Generate and analyze patterns.
	4. Generalize place value understanding for multi-digit whole numbers. 5. Use place value understanding and properties of operations to perform multi-digit arithmetic.
	6. Extend understanding of fraction equivalence and ordering. 7. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. 8. Understand decimal notation for fractions, and compare decimal fractions.
Measurement and Data	9. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. 10. Represent and interpret data. 11. Geometric measurement: understand concepts of angle and measure angles
Geometry	12. Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
http://www.corestandards.org/Math/Content/4/introduction/	

FIFTH GRADE MATHEMATICS	
Operations	1. Write and interpret numerical expressions. 2. Analyze patterns and relationships.
	3. Understand the place value system. 4. Perform operations with multi-digit whole numbers and with decimals to hundredths.
	5. Use equivalent fractions as a strategy to add and subtract fractions. 6. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
Measurement and Data	7. Convert like measurement units within a given measurement system. 8. Represent and interpret data. 9. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
Geometry	10. Graph points on the coordinate plane to solve real-world and math problems. 11. Classify two-dimensional figures into categories based on their properties
http://www.corestandards.org/Math/Content/5/introduction/	

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SIXTH GRADE MATHEMATICS

The Number System	1. Apply and extend previous understandings of multiplication and division to divide fractions by fractions. 2. Compute fluently with multi-digit numbers and find common factors and multiples. 3. Apply and extend previous understandings of numbers to the system of rational numbers
Expressions & Equations	4. Apply and extend previous understandings of arithmetic to algebraic expressions. 5. Reason about and solve one-variable Equations and inequalities. 6. Represent and analyze quantitative relationships between dependent and independent variables.
Ratios & Proportional Relationships	7. Understand ratio concepts and use ratio reasoning to solve problems.
Geometry	8. Solve real-world and mathematical problems involving area, surface area, and volume.
Statistics & Probability	9. Develop understanding of statistical variability. 10. Summarize and describe distributions.
http://www.corestandards.org/Math/Content/6/introduction/	

SEVENTH GRADE MATHEMATICS

The Number System	1. Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational
Expressions & Equations	2. Use properties of operations to generate equivalent expressions. 3. Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
Ratios & Proportional Relationships	4. Analyze proportional relationships and use them to solve real-world and mathematical problems..
Geometry	5. Draw, construct and describe geometrical figures and describe the relationships between them. 6. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
Statistics & Probability	7. Use random sampling to draw inferences About a population. 8. Draw informal comparative inferences About two populations. 9. Investigate chance processes and develop, use, and evaluate probability models.
http://www.corestandards.org/Math/Content/7/introduction/	

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EIGHTH GRADE MATHEMATICS	
The Number System	1. Know that there are numbers that are not rational, and approximate them by rational numbers.
Expressions & Equations	2. Work with radicals and integer exponents. 3. Understand the connections between proportional relationships, lines, and linear equations. 4. Analyze and solve linear equations and pairs of simultaneous linear equations.
Functions	5. Define, evaluate, and compare functions 6. Use functions to model relationships between quantities.
Geometry	7. Understand congruence and similarity using physical models, transparencies, or geometry software. 8. Understand and apply the Pythagorean Theorem. 9. Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.
Statistics & Probability	10. Investigate patterns of association in bivariate data.
Number & Quantity	11. The Real Number System & Quantities
Algebra (Algebra I)	12. Seeing Structure in Expressions, Creating Equations, Reasoning with Equations & Inequalities,
Functions (Algebra I)	13. Interpreting Functions, Building Functions, Linear, Quadratic and Exponential Models
Statistics & Probability (Algebra I)	14. Interpreting Categorical & Quantitative Data
http://www.corestandards.org/Math/Content/8/introduction/	

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K-8 MATH SCOPE & SEQUENCE									Operations domain: 1-4 below
K	1	2	3	4	5	6	7	8	1. Counting and Cardinality
K	1	2	3	4	5	6	7	8	2. Operations and Algebraic Thinking
K	1	2	3	4	5	6	7	8	3. Number and Operations in Base Ten
K	1	2	3	4	5	6	7	8	4. Number and Operations - Fractions
K	1	2	3	4	5	6	7	8	Measurement and Data domain
K	1	2	3	4	5	6	7	8	Geometry domain
K	1	2	3	4	5	6	7	8	Ratios and Proportional Relationships
K	1	2	3	4	5	6	7	8	The Number System
K	1	2	3	4	5	6	7	8	Expressions and Equations

Valley Preparatory School is in the process of amending our Scope and Sequence, based upon the Common Core Standards.

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OPERATIONS Counting and Cardinality	
CC | Kindergarten	
Know number names and the count sequence.	1. Count to 100 by ones and by tens.
	2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
	3. Write numbers from 0 to 100.
Count to tell the number of objects.	4a. Understand the relationship between numbers and quantities; connect counting to cardinality. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
	4b. Understand the relationship between numbers and quantities; connect counting to cardinality. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
	4c. Understand the relationship between numbers and quantities; connect counting to cardinality. Understand that each successive number name refers to a quantity that is one larger.
	5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.
Compare numbers.	6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. (Include groups with up to ten objects)
	7. Compare two numbers between 1 and 100 presented as written numerals.

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OPERATIONS Operations and Algebraic Thinking	
OA | Kindergarten	
Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	1. Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
	2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
	3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
	4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
	5. Fluently add and subtract within 5 (i.e. mental MATH FACTS 1-5) and continue developing fluency within 10.
OA | 1st Grade	
Represent and solve problems involving addition and subtraction.	1. Use addition and subtraction within 100 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
	2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
Understand and apply properties of operations and the relationship between addition and subtraction.	3. Apply properties of operations as strategies to add and subtract. (Students need not use formal terms for these properties.) *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*
	4. Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8. Add and subtract within 20.*
Add and subtract within 20.	5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
	6. Add and subtract within 100, developing fluency for addition and subtraction within 12 (i.e. mental MATH FACTS 1-12). Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction

	(e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4)
Work with addition and subtraction equations.	7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*
	8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = _ – 3, 6 + 6 = _.*
OA | 2nd Grade	
Represent and solve problems involving addition and subtraction.	1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
Add and subtract within 20.	2. Fluently add and subtract within 12 (i.e. mental MATH FACTS 1-12) and continue developing fluency within 20 using mental strategies.
Work with equal groups of objects to gain foundations for multiplication.	3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
	4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
OA | 3rd Grade	
Represent and solve problems involving multiplication and division.	1. Interpret products of whole numbers, 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.*
	2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*
	3. Use multiplication and division within 144 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
	4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*

Understand properties of multiplication and the relationship between multiplication and division.	5. Apply properties of operations as strategies to multiply and divide. (Students need not use formal terms for these properties.) *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.)*
	6. Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*
Multiply and divide within 100.	7. Fluently multiply and divide within 144 (focusing on mental MATH FACTS using 1-12), using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
Solve problems involving the four operations, and identify and explain patterns in arithmetic.	8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
	9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *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.*
OA | 4th Grade	
Multiply and divide within 100	Fluently multiply and divide within 144 (focusing on mental MATH FACTS 1-12)
Use the four operations with whole numbers to solve problems.	1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
	2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
	3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
Gain familiarity with factors and multiples.	4. Find all factor pairs for a whole number in the range 1–144. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–144 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–144 is prime or composite.

Generate and analyze patterns.	5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*
OA | 5th Grade	
Write and interpret numerical expressions.	1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
	2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*
Analyze patterns and relationships.	3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*
Use the four operations with whole numbers to solve problems.	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations (ensuring fluency in mental MATH FACTS 1-12)

OPERATIONS Number and Operations in Base Ten	
NBT | Kindergarten	
Work with numbers 11-19 to gain foundations for place value.	1. Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
NBT | 1st Grade	
Extend the counting sequence.	1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
Understand place value.	2. Understand that the three digits of a three-digit number represent amounts of hundreds, tens and ones. Understand the following as special cases: a) 10 can be thought of as a bundle of ten ones — called a "ten;" b) The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones; and c) The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
	3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
Use place value understanding and properties of operations to add and subtract.	4. Add and subtract within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
	5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
	6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
NBT | 2nd Grade	
Understand place value.	1. Understand that the four digits of a four-digit number represent amounts of thousands, hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a) 100 can be thought of as a bundle of ten tens — called a "hundred;" and b) The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens

	and 0 ones).
	2. Count within 1000; skip-count by 5s, 10s, and 100s.
	3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
	4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
Use place value understanding and properties of operations to add and subtract.	5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
	6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
	7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
	8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
	9. Explain why addition and subtraction strategies work, using place value and the properties of operations.
NBT | 3rd Grade	
Use place value understanding and properties of operations to perform multi-digit arithmetic.	1. Use place value understanding to round whole numbers to the nearest 10 or 100.
	2. Fluently add and subtract within 10,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
	3. Multiply one-digit whole numbers within 12
NBT | 4th Grade	
Generalize place value understanding for multi-digit whole numbers.	1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
	2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
	3. Use place value understanding to round multi-digit whole numbers to any place, up to six digits

Use place value understanding and properties of operations to perform multi-digit arithmetic.	4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.
	5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
	6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
NBT | 5th Grade	
Understand the place value system.	1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
	2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
	3a. Read, write, and compare decimals to hundred-thousandths. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
	4. Use place value understanding to round decimals to any place.
Perform operations with multi-digit whole numbers and with decimals to hundredths.	5. Fluently multiply multi-digit whole numbers using the standard algorithm.
	6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models
	7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

OPERATIONS Number and Operations - Fractions	
NF | Kindergarten Be exposed to fraction concepts	
NF | 1st Grade Continue to be exposed to fraction concepts	
NF | 2nd Grade Understand fraction concepts	
NF | 3rd Grade	
Develop understanding of fractions as numbers.	1. Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into bequal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.
	2a. Understand a fraction as a number on the number line; represent fractions on a number line diagram. 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.
	2b. Understand a fraction as a number on the number line; represent fractions on a number line diagram. 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.
	3a. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
	3b. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
	3c. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *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.*
	3d. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole.

NF | 4th Grade	
Extend understanding of fraction equivalence and ordering.	1. Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
	2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	3a. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
	3b. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. 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. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*
	3c. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
	3d. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
	4a. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*
	4b. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
	4c. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

Understand decimal notation for fractions, and compare decimal fractions.	5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.2 *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*
	6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*
	7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
	9. Add and subtract decimals
Use equivalent fractions as a strategy to add and subtract fractions.	8. Add and subtract fractions with like and unlike denominators
NF | 5th Grade	
Use equivalent fractions as a strategy to add and subtract fractions.	1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*
	2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
	4a. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*

	4b. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
	5a. Interpret multiplication as scaling (resizing), by: Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
	5b. Interpret multiplication as scaling (resizing), by: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
	6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
	7a. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*
	7b. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*
	7c. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

Measurement and Data	
MD | Kindergarten	
Describe and compare measurable attributes.	1. Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
	2. Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*
Classify objects and count the number of objects in each category.	3. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. (Limit category counts to be less than or equal to 10.)
MD | 1st Grade	
Measure lengths indirectly and by iterating length units.	1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.
	2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*
Tell and write time.	3. Tell and write time in hours and half-hours using analog and digital clocks.
Represent and interpret data.	4. 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.
MD | 2nd Grade	
Measure and estimate lengths in standard units.	1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
	2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
	3. Estimate lengths using units of inches, feet, centimeters, and meters.
	4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length.	5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
	6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.
Work with time and money.	7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
	8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately.*Example: If you have 2 dimes and 3 pennies, how many cents do you have?*
Represent and interpret data.	9. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
	10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.
MD | 3rd Grade	
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
	2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (Excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (Excludes multiplicative comparison problems (problems involving notions of "times as much").)
Represent and interpret data.	3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*
	4. 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.

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	5a. Recognize area as an attribute of plane figures and understand concepts of area measurement. 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.
	5b. Recognize area as an attribute of plane figures and understand concepts of area measurement. 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. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
	7a. Relate area to the operations of multiplication and addition. 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.
	7b. Relate area to the operations of multiplication and addition. 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.
	7c. Relate area to the operations of multiplication and addition. 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.
	7d. Relate area to the operations of multiplication and addition. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
MD | 4th Grade	
Solve problems involving measurement and conversion of measurements from a larger unit to a	1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
	2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

smaller unit.	3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*
Represent and interpret data.	4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*
Geometric measurement: understand concepts of angle and measure angles.	5a. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
	5b. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
	6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
	7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
MD | 5th Grade	
Convert like measurement units within a given measurement system.	1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
Represent and interpret data.	2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*
Geometric measurement: understand concepts of	3a. Recognize volume as an attribute of solid figures and understand concepts of volume measurement. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
	3b. Recognize volume as an attribute of solid figures and understand concepts of

volume and relate volume to multiplication and to addition.	volume measurement. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
	4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
	5a. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
	5b. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems
	5c. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Geometry	
G | Kindergarten	
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).	1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind,* and *next to*.
	2. Correctly name shapes regardless of their orientations or overall size.
	3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
Analyze, compare, create, and compose shapes.	4. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
	5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
	6. Compose simple shapes to form larger shapes. *For example, "Can you join these two triangles with full sides touching to make a rectangle?"*
G | 1st Grade	
Reason with shapes and their attributes.	1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size) ; build and draw shapes to possess defining attributes
	2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Students do not need to learn formal names such as "right rectangular prism.")
	3. 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.* Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
G | 2nd Grade	
Reason with shapes and their attributes.	1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Sizes are compared directly or visually, not compared by measuring.) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

	2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
	3. 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, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
G | 3rd Grade	
Reason with shapes and their attributes.	1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
	2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *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.*
G | 4th Grade	
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
	2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
	3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
G | 5th Grade	
Graph points on the coordinate plane to solve real-world and mathematical problems.	1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
	2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Classify two-dimensional	3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four*

figures into categories based on their properties.	*right angles and squares are rectangles, so all squares have four right angles.*
	4. Classify two-dimensional figures in a hierarchy based on properties.
G | 6th Grade	
Solve real-world and mathematical problems involving area, surface area, and volume.	1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
	2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
	3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
	4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.
G | 7th Grade	
Draw construct, and describe geometrical figures and describe the relationships between them.	1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
	2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
	3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
Solve real-life and mathematical problems involving angle	4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
	5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a

measure, area, surface area, and volume.	figure.
	6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
G |8th Grade	
Understand congruence and similarity using physical models, transparencies, or geometry software.	1. Verify experimentally the properties of rotations, reflections, and translations: a) Lines are taken to lines, and line segments to line segments of the same length; b) Angles are taken to angles of the same measure; and c) Parallel lines are taken to parallel lines.
	2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
	3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
	4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
	5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*
Understand and apply the Pythagorean Theorem.	6. Explain a proof of the Pythagorean Theorem and its converse.
	7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
	8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Ratios and Proportional Relationships

RP | Grade 6

Understand ratio concepts and use ratio reasoning to solve problems.	1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*
	2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." (Expectations for unit rates in this grade are limited to non-complex fractions.)*
	3a. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
	3b. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*
	3c. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
	3d. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

RP | Grade 7

Analyze proportional relationships and use them to solve real-world and mathematical problems.	1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour.*
	2a. Recognize and represent proportional relationships between quantities. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

	2b. Recognize and represent proportional relationships between quantities. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
	2c. Recognize and represent proportional relationships between quantities. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*
	2d. Recognize and represent proportional relationships between quantities. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.
	3. Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

The Number System	
NS | Grade 6	
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Compute fluently with multi-digit numbers and find common factors and multiples.*
Compute fluently with multi-digit numbers and find common factors and multiples.	2. Fluently divide multi-digit numbers using the standard algorithm.
	3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
	4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2). Apply and extend previous understandings of numbers to the system of rational numbers.*
Apply and extend previous understandings of numbers to the system of rational numbers.	5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
	6a. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
	6b. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Understand signs of numbers in

	ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
	6c. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
	7a. Understand ordering and absolute value of rational numbers. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.*
	7b. Understand ordering and absolute value of rational numbers. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write –3 oC > –7 oC to express the fact that –3 oC is warmer than –7 oC.*
	7c. Understand ordering and absolute value of rational numbers. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.*
	7d. Understand ordering and absolute value of rational numbers. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*
	8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
NS | Grade 7	
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and	1a. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*
	1b. Apply and extend previous understandings of addition and subtraction to add and

divide rational numbers.	subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
	1c. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
	1d. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. Apply properties of operations as strategies to add and subtract rational numbers.
	2a. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
	2b. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts.
	2c. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Apply properties of operations as strategies to multiply and divide rational numbers.
	2d. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
	3. Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions).

NS | Grade 8	
Know that there are numbers that are not rational, and approximate them by rational numbers.	1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
	2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

Expressions and Equations	
EE | Grade 6	
Apply and extend previous understandings of arithmetic to algebraic expressions.	1. Write and evaluate numerical expressions involving whole-number exponents.
	2a. Write, read, and evaluate expressions in which letters stand for numbers. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*
	2b. Write, read, and evaluate expressions in which letters stand for numbers. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*
	2c. Write, read, and evaluate expressions in which letters stand for numbers. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas* $V = s^3$ *and* $A = 6\ s^2$ *to find the volume and surface area of a cube with sides of length s = 1/2.*
	3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*
	4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for. Reason about and solve one-variable equations and inequalities.*
Reason about and solve one-variable equations and inequalities.	5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
	6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
	7. Solve real-world and mathematical problems by writing and solving equations of the form x + p = qand px = q for cases in which p, q and x are all nonnegative rational numbers.

	8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
Represent and analyze quantitative relationships between dependent and independent variables.	9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.*
EE | Grade 7	
Use properties of operations to generate equivalent expressions.	1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
	2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*
	4a. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*
	4b. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the*

	solutions.
EE | Grade 8	
Work with radicals and integer exponents.	1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
	2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
	3. Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as 3 times* 10^8 *and the population of the world as 7 times* 10^9*, and determine that the world population is more than 20 times larger*
	4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
Understand the connections between proportional relationships, lines, and linear equations.	5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*
	6. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.
Analyze and solve linear equations and pairs of simultaneous linear equations.	7a. Solve linear equations in one variable. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
	7b. Solve linear equations in one variable. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
	8a. Analyze and solve pairs of simultaneous linear equations. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

	8b. Analyze and solve pairs of simultaneous linear equations. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.*
	8c. Analyze and solve pairs of simultaneous linear equations. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

VALLEY PREPARATORY SCHOOL
PRESCHOOL thru 8th MATH STANDARDS

Based upon the Common Core Standards
Last updated October 3, 2018

I CAN STATEMENTS: PRESCHOOL

1. I can **count** orally 1-20.
2. I can **recognize** visually the numbers 1-10.
3. I can **write** the numerals 1-10.
4. I can explore the concept of measurement.
5. I can count objects in one to one correspondence.
6. I can understand the concept of numbers from 1-10.
7. I can explore the concept of empty and full; more and less.
8. I can explore the concept of time and the calendar.
9. I can repeat a sequence of orally given numbers.
10. I can explore the concept of big and little; long and short.
11. I can identify six shapes: circle, square, rectangle, diamond, oval, and triangle.
12. I can match objects based on size, shape, or color.
13. I can explore graphs.
14. I can recognize simple patterns.
15. I can explore the concept that coins hold value.
16. I can recognize and match ten colors.
17. I can assemble accurately a 3-5 piece puzzle.
18. I can build a 3 block bridge.
19. I can begin to classify items by shape, color, and size.

I CAN STATEMENTS: PRE-KINDERGARTEN

1. I can count orally 1-50
2. I can recognize visually the numbers 1-20
3. I can write the numerals 1–20
4. I can recognize the basic geometric shapes: circle, square, rectangle, triangle, oval, diamond (rhombus).
5. I can explore the concept of more, less, and same (equal); empty, and full.
6. I can use manipulatives.
7. I can recognize concept of passage of time and calendar.
8. I can explore the concept of empty and full; more and less.
9. I can explore the concept of big and little; long and short.
10. I can explore concept of measurement.
11. I can recognize that coins hold value.
12. I can match objects.
13. I can sort and classify based on various attributes.
14. I can create and list simple graphs.
15. I can recognize, create, and extend simple patterns.

VALLEY PREPARATORY SCHOOL
PRESCHOOL thru 8th MATH STANDARDS

Based upon the Common Core Standards
Last updated October 3, 2018

I CAN STATEMENTS: KINDERGARTEN

OPERATIONS
1. I can **count** to 100 by ones.
2. I can count to 100 by tens.
3. I can count to 100 starting at any number.
4. I can **write** the numbers from 0 to 20.
5. I can write the numeral for the number of objects I counted.
6. I can count objects by saying the number names in standard order, pairing each object with one and only one number name and each number name with only one object.
7. I can understand that the last number name I said tells the number of objects counted.
8. I can understand that each successive number name is one more than the previous number.
9. I can answer 'how many' questions about up to 20 items that are arranged in a line, array, or circle.
10. I can answer 'how many' questions about up to 10 items that are in a scattered configuration.
11. I can count to show a given number up to 20 by counting out objects.
12. I can compare two groups of objects and decide which group is greater than, less than, or equal to.
13. I can compare two written numerals and decide which is greater than, less than, or equal to.
14. I can model addition with objects, fingers, drawings, etc.
15. I can model subtraction with objects, fingers, drawings, etc.
16. I can add within 10 to solve word problems by using objects or drawings.
17. I can subtract within 10 to solve world problems by using objects or drawings.
18. I can decompose numbers less than or equal to 10 by using objects or drawings. (3 + 2 = 5)
19. I can find the number that makes 10 when added to a given number that is less than 10.
20. I can fluently **add** within 5. (Math Facts)
21. I can fluently **subtract** within 5. (Math Facts)
22. I can compose and decompose numbers from 11 to 19 into ten ones and some further ones.
23. I can show each composition or decomposition by a drawing or equation.
Measurement and Data
24. I can **describe** an object using one of its measurable attributes such as length or weight.
25. I can describe one object using several measurable attributes.
26. I can **compare** two objects with a measurable attribute in common and describe the difference.
27. I can **classify** objects into given categories.
28. I can count the numbers of objects in each category.
29. I can sort the categories by count. (Less than or equal to 10.)
Geometry
30. I can describe objects around me using names of shapes.
31. I can describe their relative positions using terms like *above, below, beside, in front of,* etc.
32. I can name shapes regardless of their orientation or size.
33. I can **identify** two and three-dimensional shapes.
34. I can describe how two-dimensional shapes are alike and different.
35. I can describe how three-dimensional shapes are alike and different.
36. I can build and draw shapes from the world around me.
37. I can make and/or draw simple shapes.
38. I can use these simple shapes to make a larger shape.

VALLEY PREPARATORY SCHOOL
PRESCHOOL thru 8th MATH STANDARDS

Based upon the Common Core Standards
Last updated October 3, 2018

I CAN STATEMENTS: FIRST GRADE

Operations	
1.	I can show addition of numbers <20 w/manipulatives.
2.	I can show subtraction of numbers <20 w/manipulatives.
3.	I can add two numbers <20 in an equation with a symbol or missing addend for the unknown number
4.	I can create a drawing to show the addition of 3 whole numbers.
5.	I can write an equation to explain my drawing.
6.	I can use properties of operations to add and subtract.
7.	I can understand the meaning of an unknown addend.
8.	I can use subtraction to find an unknown addend.
9.	I can relate counting to addition and subtraction.
10.	I can add two numbers <20 using multiple strategies.
11.	I can subtract two numbers <20 using multiple strategies.
12.	I can fluently **add** two numbers within ten. (Math Facts)
13.	I can fluently **subtract** two numbers within ten. (Math Facts)
14.	I can understand the meaning of an equal sign.
15.	I can tell if addition and subtraction equations are true or false.
16.	I can count up to 20 by counting out objects.
17.	I can count to 120 starting at any number <120.
18.	I can read and write numbers to 120 using numerals and objects.
19.	I can demonstrate that a two-digit number is made up of tens and ones.
20.	I can explain that ten ones can also be a bundle of ten.
21.	I can take the numbers from 11 to 19 and explain that they can also be a ten and one, a ten and two, etc.
22.	I can explain that the numbers of 10, 20, 30, 40, 50, 60, 70, 80, 90 are also one set of ten, two sets of ten, etc.
23.	I can recognize the symbols <, >, and =.
24.	I can compare two two-digit numbers using <, >, and =.
25.	I can **add** a two-digit number and a one-digit number (within 100) without regrouping using various strategies
26.	I can add a two-digit number and a multiple of ten (within 100) using various strategies
27.	I can add two two-digit numbers by adding tens and tens, as well as ones and ones.
28.	I can add two two-digit numbers and when necessary compose a ten.
29.	I can mentally find a number 10 more or 10 less than a given two-digit number without having to count
30.	I can subtract multiples of 10 (<100) from multiples of 10 (<100) using concrete models or drawings
Measurement and Data	
31.	I can put three objects in order by length.
32.	I can compare the lengths of two objects by using a third object.
33.	I can **measure** an object using nonstandard units of measurement
34.	I can **tell time** to the hour using an analog clock.
35.	I can tell time to the hour using a digital clock.
36.	I can tell time to the half-hour using an analog clock.
37.	I can tell time to the half-hour using a digital clock.

38. I can write the time in hours and half-hours correctly.
39. I can organize, represent, and interpret data with up to three categories.
40. I can ask and answer questions about the data.
Geometry
41. I can **identify** defining attributes of two and three- dimensional shapes.
42. I can identify non-defining attributes of two and three- dimensional shapes.
43. I can **build and draw** shapes that have defining attributes.
44. I can compose two and three-dimensional shapes and use them to make new shapes.
45. I can use these shapes to make other shapes.

I CAN STATEMENTS: SECOND GRADE

Operations
1. I can add within 100 to solve one and two step word problems using multiple strategies.
2. I can subtract within 100 to solve one and two step word problems using multiple strategies.
3. I can fluently **add** within 20 using mental strategies. (Math Facts)
4. I can fluently **subtract** within 20 using mental strategies. (Math Facts)
5. I can tell if a group of numbers is odd or even by pairing objects or counting by twos.
6. I can use addition to find the total number of objects in a rectangular array (up to 5 rows and 5 columns.)
7. I can write an equation to show the total as a sum of equal addends.
8. I can understand that three digits of a three digit number represent amounts of hundreds, tens, and ones.
9. I can count within 1000.
10. I can skip count within 1000 by using **2s**, 5s, 10s, and 100s. (Skip counting by 2s is a California only standard.)
11. I can read and write numbers to 1000 using numerals, number names, and expanded form.
12. I can compare two three-digit numbers using >, <, and =.
13. I can fluently **add** up to three-digit numbers using multiple strategies.
14. I can fluently **subtract** up to three-digit numbers using multiple strategies.
15. I can add up to four two-digit numbers.
16. I can add numbers using regrouping strategies (within 1000).
17. I can subtract numbers using regrouping strategies (within 1000).
18. I can use estimation strategies to make reasonable estimates in problem solving
19. I can mentally add 10s or 100s.
20. I can mentally subtract 10s or 100s.
21. I can explain why addition and subtraction strategies are used to solve problems.
Measurement and Data
22. I can use rulers, yardsticks, meter sticks, etc. to measure an object.
23. I can **measure** an object using two different forms of measurement.
24. I can estimate lengths using inches, feet, centimeters, and meters.
25. I can measure two objects to see which is longer.
26. I can use addition and subtraction within 100 to solve word problems involving length.
27. I can draw and use a number line with numbers up to 100.

28. I can **tell and write time** to the nearest five minutes using a.m. and p.m. from analog and digital clocks.
29. I can tell how many minutes are in an hour, days in a month, and weeks in a year.
30. I can solve word problems using **money**: dollar bills, quarters, dimes, nickels, and pennies as well as using $ and ¢ symbols
31. I can make a line plot using measurement data.
32. I can make a picture graph and bar graph with up to four categories.
Geometry
33. I can **name and draw** shapes, e.g., triangles, quadrilaterals, pentagons, hexagons, and cubes.
34. I can divide a rectangle into rows and columns of squares to find the total number of the squares.
35. I can divide circles and rectangles into equal shares using the words halves, thirds, half of, a third of, etc.
36. I can describe a whole as two halves, three thirds, and four fourths.

I CAN STATEMENTS: THIRD GRADE

Operations
1. I can explain multiplication by using groups of objects.
2. I can understand division by determining how many equal parts are in a group.
3. I can use multiplication within 100 to solve word problems
4. I can use division within 100 to solve word problems.
5. I can find the missing number in a multiplication equation.
6. I can find the missing number in a division equation.
7. I can multiply and divide using the Commutative property. (If I know that 3 x 9 = 27, then I know that 9 x 3 = 27.)
8. I can multiply and divide using the Associative property. (3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30)
9. I can multiply and divide using the Distributive property.
10. I can get the answer to a division problem by thinking of the related mult fact and knowing the missing factor.
11. I can **multiply** within 100 fluently using multiple strategies. (Math Facts)
12. I can **divide** with 100 fluently using multiple strategies.
13. I can solve two-step word problems using addition, subtraction, multiplication, and division.
14. I can decide if my answers are reasonable by using mental computation and estimation.
15. I can find patterns in addition and multiplication tables and explain them using what I know about how numbers work.
16. I can round numbers to the nearest 10 and 100.
17. I can fluently **add and subtract** within 1000.
18. I can multiply one- digit numbers by multiples of 10.
19. I can show and understand that **fractions** are equal parts of a whole.
20. I can label fractions on a number line because I know the space between any two numbers can be thought of as a whole.
21. I can explain in words or pictures how two fractions can sometimes be equal.
22. I can compare fractions by reasoning about their size.
23. I can show whole numbers as fractions.
24. I can recognize fractions that are equal to one whole.

Measurement and Data
25. I can **tell and write time** to the nearest minute.
26. I can solve word problems involving time by adding and subtracting.
27. I can **measure liquids and solids** with liters, grams, and kilograms.
28. I can solve word problems involving mass and volume by using addition, subtraction, multiplication, and division.
29. I can create a picture or bar graph to show data and solve problems using the information from the graphs.
30. I can create a line plot from measurement data where the measured objects have been measured to the nearest whole number, half, or quarter.
31. I can understand that the area of plane shapes can be measured in square units.
32. I can **measure areas** by counting unit squares.
33. I can measure area by using what I know about multiplication and addition.
34. I can solve real world math problems using what I know about the perimeter of shapes.
Geometry
35. I can place shapes into categories based on their attributes.
36. I can **recognize and draw** quadrilaterals such as rhombuses, rectangles, and squares, as well as other quadrilaterals.
37. I can divide shapes into parts with equal areas and show those areas as fractions.

STATEMENTS: FOURTH GRADE

Operations
1. I can understand that multiplication equations can be seen as comparisons of groups (e.g., 35 = 5 x 7 is the same as saying that 35 is 5 times as many as 7 and 7 times as many as 5.)
2. I can multiply to solve word problems by using drawings and equations that have symbols for unknown numbers.
3. I can divide to solve word problems by using drawings and equations that have symbols for unknown numbers.
4. I can solve multi-step word problems involving whole numbers using what I know about addition, subtraction, multiplication, and division.
5. I can represent word problems by using equations with a letter standing for an unknown number.
6. I can decide if my answers are reasonable by using mental computation and estimation (including rounding.)
7. I can find all factor pairs for a whole number between 1–100.
8. I can tell whether a whole number between 1–100 is prime or composite.
9. I can create a number or shape pattern that follows a given rule.
10. I can multiply and divide using the Associative property. (3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30)
11. I can identify features of a pattern even though the features of the pattern were not obvious in the rule.
12. I can recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
13. I can read and write multi-digit whole numbers using numerals, number names, and expanded form.
14. I can compare two multi-digit numbers using >, <, and =.
15. I can round multi-digit whole numbers to any place.

16.	I can fluently add multi-digit whole numbers.
17.	I can fluently subtract multi-digit whole numbers.
18.	I can multiply a whole number of up to four digits by a one-digit whole number.
19.	I can multiply two two-digit numbers and explain by drawings, equations, rectangular arrays, etc.
20.	I can find whole number quotients and remainders with up to four-digit dividends and one-digit divisors.
21.	I can compare two decimals to hundredths by reasoning about their size. I can record the results using >, <, and = and justify the conclusion by using a number line or other visual model. (California only standard)
22.	I can show models and explain why multiplying a numerator and a denominator by the same number does not change the value of a fraction.
23.	I can compare two fractions with different numerators and different denominators by creating common denominators or numerators or by comparing them to a benchmark fraction like ½.
24.	I can recognize that comparisons are valid only when the fractions refer to the same whole.
25.	I can compare the fractions using >, <, and = and explain the comparison using a visual fraction model.
26.	I can understand that improper fractions have numerators that are greater than the denominators.
27.	I can understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
28.	I can decompose a fraction into a sum of fractions with the same denominator in more than one way.
29.	I can add and subtract mixed numbers with like denominators.
30.	I can solve word problems involving addition and subtraction of fractions with like denominators.
31.	I can multiply a fraction by a whole number.
32.	I can solve word problems involving multiplication of a fraction by a whole number.
33.	I can show a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100 so I can add the two fractions
34.	I can use decimals to show fractions with denominators of 10 and 100.
35.	I can compare two decimals to hundredths by reasoning about their size.
Measurement and Data	
1.	I can show that I know the relative sizes of measurement units within one system of units, e.g., *km, m, cm, kg, g, lb, oz, l, ml, hr, min, sec.*
2.	I can show measurements in a larger unit in terms of a smaller unit and record them in a two-column table.
3.	I can use addition, subtraction, multiplication, and division to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money (including simple fractions and decimals).
4.	I can use area and perimeter formulas for rectangles to solve real-world math problems.
5.	I can make a line plot to show a set of fraction measurements.
6.	I can add and subtract the set of fraction measurements from a line plot to solve problems.
7.	I can recognize angles as geometric shapes where two rays share a common endpoint.
8.	I can understand that angles are measured with reference to a circle, with its center at the common endpoint of the rays.
9.	I can measure angles in whole-number degrees using a protractor.
10.	I can solve addition and subtraction problems to find unknown angles.
Geometry	
11.	I can draw points, line segments, rays, angles, (right, acute, obtuse), and perpendicular and parallel lines. I can identify these in two-dimensional figures.
12.	I can classify two-dimensional figures based on their attributes. Two-dimensional shapes include special triangles, e.g. equilateral, isosceles, scalene, as well as special rectangles, e.g., rhombus, square, rectangle, parallelogram

13. I can recognize a line of symmetry for a two-dimensional figure.

I CAN STATEMENTS: FIFTH GRADE

Operations
1. I can use parentheses, brackets, or braces in numerical expressions.
2. I can write simple math expressions by using mathematical symbols.
3. I can find all the prime factors of a whole number in the range of 2-50.
4. I can use numerical rules and patterns to form ordered pairs. I can graph the ordered pairs on a coordinate plane.
5. I can understand and explain the value of the digits in a multi- digit number.
6. I can explain patterns when a decimal is multiplied or divided by a power of 10.
7. I can read, write, and compare decimals to thousandths.
8. I can round decimals to any place.
9. I can fluently multiply multi-digit whole numbers.
10. I can divide four-digit dividends by two-digit divisors.
11. I can add, subtract, multiply, and divide decimals to hundredths.
12. I can add and subtract fractions with unlike denominators (including mixed numbers.)
13. I can solve word problems using addition and subtraction of fractions.
14. I can understand a fraction as division of the numerator by the denominator.
15. I can solve word problems involving division of whole numbers where the answers are in the form of fractions or mixed numbers.
16. I can multiply a fraction or a whole number by a fraction.
17. I can think of multiplication as the scaling or resizing of a number.
18. I can solve real-world problems involving multiplication of fractions and mixed numbers.
19. I can divide fractions by whole numbers and whole numbers by fractions.
Measurement and Data
20. I can convert measurements within the same measuring system.
21. I can make a line plot to display a data set of measurements in fractions of a unit.
22. I can understand volume in solid figures.
23. I can measure volume by counting unit cubes.
24. I can relate volume to multiplication and addition and solve real-world and mathematical problems involving volume.
25. I can use the formulas $V = l \times w \times h$ and $V = b \times h$ to find the volume of an object.
Geometry
26. I can understand how to make a graph with ordered pairs on a coordinate plane.
27. I can graph points in the first quadrant of the coordinate plane to represent real-world and mathematical problems.
28. I can classify two-dimensional figures into categories and sub- categories by their attributes.
29. I can create a hierarchy diagram of two-dimensional figures based on their properties.

VALLEY PREPARATORY SCHOOL
PRESCHOOL thru 8th MATH STANDARDS

Based upon the Common Core Standards

Last updated October 3, 2018

VPS "QUICKLOOK" MATH STANDARDS

	Operations Last updated 10/3/18	Measurement & Data	Geometry
PRE-SCHOOL	• count orally 1-20 • recognize the numbers 1-20 • write the numerals 1–10		
PRE-KINDER	• count orally 1-50 • recognize the numbers 1-50 • write the numerals 1–30		
KINDER	• Count orally to 100 • Write numbers from 0 to 100 • Count the number of objects • Be fluent in mental MATH FACTS 1-5 (+,-) • Compare two numbers between 1 and 100 • Understand place value of a 2-digit number • Be exposed to fraction concepts	• Describe measureable attributes of objects (length and weight) • Classify/sort objects	• Describe the relative position of three objects (beside, behind, etc) • Correctly name shapes • Compare two & three dimensional shapes
1ST GRADE	• Count orally to 120 • Add and subtract within 100 (i.e. the answer is less than 100) • Develop fluency in mental MATH FACTS 1-12 for (+,-) • Understand place value of a 3-digit number • Solve word problems within 100 • Compare two 2-digit numbers (<, >, =) • Continue to be exposed to fraction concepts	• Order three objects by length • Tell and write time in hours & half-hrs • Organize, represent, and interpret data with up to three categories	• Compose two or three dimensional shapes • Partition circles and rectangles into 2 or 4 equal shares
2ND GRADE	• Count orally within 1000 • Add and subtract within 1000 (i.e. the answer is less than 1000) • Continue to develop fluency in mental MATH FACTS 1-12 (+,-) • Solve word problems within 100 • Understand place value of a 4-digit number • Compare two 3-digit numbers (<, >, =) • Understand fraction concepts	• Measure the length of an object • Use add/subtract within 100 to solve word problems involving length • Tell and write time to the nearest 5-min • Solve word problems using dollar, quarter, dimes, nickels, pennies • Draw a picture and bar graph	• Identify triangles, quadrilaterals, pentagons, hexagons, and cubes • Partition circles and rectangles into 2, 3, or 4 equal shares
3RD GRADE	• Add & subtract within 10,000 • Fluently use mental MATH FACTS 1-12 (+,-) • Develop fluency using mental MATH FACTS 1-12 (x, ÷) • Understand place value of a 5-digit number (ten thousands) • Solve two-step words problems using (+, -, x, ÷) • Compare two fractions with same denominator • Round whole numbers to the nearest thousands	• Tell and write time to nearest minute • Measure liquid volumes • Understand concepts of area measurement • Solve real world problems involving perimeter	• Recognize rhombuses, rectangles, and squares as examples of quadrilaterals • Partition shapes into parts with equal areas
4TH GRADE	• Fluently use mental MATH FACTS 1-12 for (+, -, x, ÷) • Solve multi-step word problems using (+, -, x, ÷) • Understand place value of a 6-digit number (hundred thousands) • Solve equations using order of operations • Compare two fractions with different denominators • Add & subtract fractions with like & unlike denominators • Add & subtract mixed numbers with like denominators • Multiply a fraction by a whole number • Add & subtract decimals • Round whole numbers to the nearest ten thousands	• Use four operations to solve word problems involving distance, time, volume, mass, and money • Measure angles	• Draw points, lines, line segments, rays, angles, and perpendicular/parallel lines • Recognize a line of symmetry
5TH GRADE	• Fluently use mental MATH FACTS 1-12 for (+, -, x, ÷) • Solve multi-step word problems using (+, -, x, ÷) • Solve equations using order of operations • Add/subtract/multiply/divide with fractions • Add/subtract/multiply/divide with decimals • Understand place value from thousandths to millions • Round whole numbers to the nearest hundred thousands	• Convert among different measurement units ex. 5cm = .05m • Measure volumes • Solve real world problems using volume	• Understand a coordinate system • Graph points in the first quadrant of a coordinate system