

# Brooke 1 K-6 and 7-8 Math Standards (2011-2012)

## FACT POWER

Kindergarten	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>FACT POWER:</b> Know how to count up by ones from any number under 121. Know how to count backwards from any number under 50.	<b>FACT POWER:</b> Know addition facts (addends to ten) and related subtraction facts, and use them to solve problems.	<b>FACT POWER:</b> Know doubles facts (2+2, 3+3, etc) to 50, and use them to solve problems with mental math.	<b>FACT POWER:</b> Know all multiplication facts through 12 x 12 and related division facts.	<b>FACT POWER:</b> Know fraction-decimal equivalents for halves, fourths, fifths, and tenths.				

# NUMBER SENSE STRAND

	Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
NUMBER SENSE	<p>Count by ones to at least 121. [M.1a.k]</p> <p>Count by ones starting at any number. [M.1b.k]</p> <p>Orally count by 2s to 100, starting at any number and demonstrate conceptual understanding of counting groups of 2s. [M.1c.k]</p> <p>Orally count by 5s to 100, starting at 0, and demonstrate conceptual understanding of counting groups of 5s. [M.1d.k]</p> <p>Count by 10s to 120, starting at 0, and demonstrate conceptual understanding with objects. [M.1e.k]</p> <p>Count backwards from any number under 50. [M.1f.k]</p> <p>Switch counting patterns between 10s and 1s, 5s and 1s, and 2s and 1s [M.1g.k]</p>	<p>Count by ones to 1,000 starting from any number. [M.1a.1]</p> <p>Count by 25s starting at any multiple of 25 to 200. [M.1b.1]</p> <p>Count by 5s to 1,000, starting at any multiple of 5. [M.1c.1]</p> <p>Count by 2s to 1,000 starting at any number. [M.1d.1]</p> <p>Count by 10s starting at any number under 1,000. [M.1e.1]</p> <p>Switch counting patterns between 25s, 10s, 5s, and 1s to 1000. [M.1f.1]</p> <p>Count backwards from any number under 100. [M.1g.1]</p>	<p>Count by 3 to 30 and 4 to 40, starting at any multiple of 3 or 4. [M.1a.2]</p> <p>Count by 100 and 1000, starting at any number to a million. [M.1b.2]</p>						

		Kindergarten	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>NUMBER SENSE</b>	2. Place Value	<p>Identify place value of digits in numbers up to 99. [M.2a.k]</p> <p>Demonstrate understanding that digits in the tens place represent groups of ten. [M.2b.k]</p>	<p>Identify place value of digits in numbers up to 999. [M.2a.1]</p> <p>Represent numbers in at least two ways that demonstrate an understanding of place value regrouping (e.g., represent 72 as both 7 tens and 2 ones and also 6 tens and 12 ones). [M.2b.1]</p> <p>Write numbers up to 999 represented by place value blocks and vice versa. [M.2c.1]</p> <p>Demonstrates an understanding of the values of digits up to 999 (e.g., that in 254, the 5 represents 50). [M.2d.1]</p>	<p>Identify place value of digits up through the millions place. [M.2a.2]</p> <p>Write numbers in basic expanded form (e.g., 6091 = 6000 + 90 + 1) and write numbers presented in basic expanded form in standard form (e.g., 4000 + 20 + 3 = 4,023) [M.2b.2]</p> <p>Demonstrates an understanding of the values of digits up to a million (e.g., that in 21,054, the 1 represents 1,000). [M.2c.2]</p>		<p><b>Demonstrates an understanding of the values of the digits in decimals (e.g., that in 2.54, the 4 represents 4 hundredths).</b> [M.2a.4]</p> <p>Write decimal numbers represented by place value blocks and vice versa. [M.2b.4]</p>	<p>Identify the place value and value of decimal digits to the ten-thousandths place. [M.2a.5]</p> <p><b>Write numbers in expanded form, including expanded form with exponents.</b> [M.2b.5]</p>			
	3. Numerals and words	<p>Demonstrate 1:1 correspondence when counting quantities up to at least 30. [M.3a.k]</p> <p>Read and write all numbers to 100. [M.3b.k]</p>	<p>Name and write numbers to 999. [M.3.1]</p>	<p>Name and write, in numerals and words, whole numbers to 1,000,000. [M.3.2]</p>		<p><b>Name, write, and read decimals with tenths and hundredths.</b> [M.3.4]</p>				

		Kindergarten	1st	2nd	3rd	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>NUMBER SENSE</b>	4. Uses of numbers	<b>Identify positions of objects in sequences (e.g., first, second) up to fifth. [M.4.k]</b>	Identify and distinguish among multiple uses of numbers, including cardinal (to tell how many) and ordinal (to tell which one in an ordered list). [M.4.1]							
	5. Number lines	Locate numbers up to a hundred on a number line. [M.5.k]	Locate numbers up to 999 on a number line. [M.5.1]	<b>Locate numbers up to a million on a number line. [M.5.2]</b>	<b>Locate fractions and mixed numbers on the number line and demonstrate understanding that a number line shows an infinite and continuous set of values. [M.5.3]</b>	Locate decimals on a number line. [M.5.4]	<b>Place and sequence positive whole numbers, fractions, mixed numbers, and decimals on a number line. [M.5.5]</b>	<b>Place and sequence positive and negative whole numbers, fractions, mixed numbers, decimals, and percents on a number line. [M.5a.6]</b>  <b>Represent addition and subtraction of integers on a number line. [M.5b.6]</b>	<i>Understand addition and subtraction as directions on a number line. [M.5.7]</i>	<i>Use number lines to determine and order values - pos. , neg., fractions, and integers. [M.5a.8]</i>  Graph absolute value equations with variables on a number line. [M.5b.8]  Use a number line to estimate square and cube roots. [M.5c.8]

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<b>NUMBER SENSE</b>	6. Comparing Numbers	<p>Compare sets of at least 10 concrete objects using appropriate language (e.g., none, more than, fewer than, same number of, one more than). [M.6a.k.]</p> <p>Compare numbers up to 100, using the words more than and less than. [M.6b.k]</p> <p>Order consecutive numbers up to 100. [M. 6c.k]</p>	<p><b>Order whole numbers up to 999. [M.6a.1]</b></p> <p><b>Compare whole numbers up to 999 using terms and symbols, e.g., less than, equal to, greater than (&lt;, =, &gt;). [M.6b.1]</b></p>	<p>Order numbers up to 1,000,000. [M.6a.2]</p> <p>Compare numbers up to 1,000,000 using terms and symbols. [M.6b.2]</p> <p><b>Use mental math to compare number sentences. [M.6c.2]</b></p>	<p><b>Compare unit fractions. [M.6a.3]</b></p> <p><b>Compare non-unit fractions by using benchmark values (0, ½, and 1). [M.6b.3]</b></p> <p><b>Order fractions using visual models. [M.6c.3]</b></p>	<p>Compare decimals with values in tenths and hundredths. [M.6.4]</p>	<p>Compare and order positive decimals, percents, positive fractions, positive mixed numbers, and positive whole numbers. [M.6.5]</p>	<p><b>Compare and order negative and positive integers and rational numbers. [M.6.6]</b></p>		
	7. Rounding Numbers			<p><b>Round numbers up to 9,999 to the nearest ten and hundred. [M.7.2]</b></p>	<p>Round money to the nearest dollar. [M.7a.3]</p> <p><b>Round fractions and mixed numbers to the nearest whole number. [M.7b.3]</b></p>	<p>Round whole numbers through a million to the nearest ten, hundred, thousand, ten-thousand, and hundred-thousand. [M.7a.4]</p> <p><b>Round fractions and decimals to the nearest whole number. [M.7b.4]</b></p>				

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<b>NUMBER SENSE</b> 8. Fractions, decimals, and percentages	<p>Understand the concepts of whole and half. [M.8a.k]</p> <p>Represent quantities using concrete objects, and partition sets into equal groups. [M.8b.k]</p>		<p>Find half of any even set less than 50. [M.8.2]</p>	<p>Identify and represent fractions as parts of unit wholes and parts of groups. [M.8a.3]<sup>1</sup></p> <p>Recognize immediately whether a fraction is less than 1, equal to 1, or greater than 1. [M.8b.3]</p> <p>Neatly sketch and recognize common visual representations of fractions with denominators through 8 as parts of unit wholes in both fraction bars and circles. [M.8c.3]</p> <p>Represent a mixed number as a whole number and a fraction, read mixed numbers, and identify pictures of mixed numbers. [M.8d.3]</p>	<p>Multiply to find equivalent fractions to add, subtract, and compare fractions. [M.8a.4]</p> <p>Identify and generate equivalent forms of decimals and fractions (with denominators that easily convert to hundredths – halves, quarters, fifths, and tenths). [M.8b.4]</p>	<p>Find and identify equivalent fractions and missing numerators and denominators. [M.8a.5]</p> <p>Simplify fractions and mixed numbers to lowest terms. [M.8b.5]</p> <p>Convert between mixed numbers and improper fractions. [M.8c.5]</p> <p>Convert fractions to decimals by dividing. [M.8d.5]</p> <p>Convert common fractions, decimals, and percents from one form to another. [M.8e.5]</p> <p>Identify a percent as a fraction with 100 as denominator. [M.8f.5]</p> <p>Find a fraction of a set. [M.8g.5]</p>		<p>Estimate percents (i.e. 24 of 49 is close to what percent?). [M.8a.7]</p> <p><b>Understand, read, and express percentages which are greater than 100%, less than 1%, or include fractional percentage points (i.e. 2.75%). [M.8b.7]</b></p> <p>Use proportions to calculate percents, including parts or totals. [M.8c.7]</p> <p>Understand and apply concept of percent increase and decrease. [M.8d.7]</p>	

<sup>1</sup> This includes fractions with denominators through 12.

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NUMBER SENSE	8. Fractions, decimals, and				<p>Select, use, and explain models to find equivalent fractions.<sup>2</sup> [M.8e.3]</p> <p>Recognize immediately whether any fraction is greater, equivalent, or less than <math>\frac{1}{2}</math>. [M.8f.3]</p>		Express repeating decimals with a repeat bar. [M.8h.5]			
	9. Ratios and proportions						Identify, write, and compare ratios with fraction equivalence in part-whole. [M.9.5]	<p>Translate written sentences into proportions and solve (rate, scale, conversion, rate of change). [M.9a.6]</p> <p>Understand proportional relationships as equivalent relationships involving multiplication and division. [M.9b.6]</p> <p>Use a table to set up, organize and label a proportion. [M.9c.6]</p>	<p>Translate written sentences into proportions and solve (rate, scale, conversion, rate of change). [M.9a.7]</p> <p>Convert between and within systems of measurement (time, length, capacity, weight). [M.9b.7]</p> <p>Understand proportional relationships as equivalent relationships involving multiplication and division. [M.9c.7]</p>	Translate written sentences into proportions and solve (rate, scale, conversion, rate of change). [M.9.8]

<sup>2</sup> These models include drawing two bars, folding or partitioning a given bar, grouping bars, and multiplying by a form of 1.

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NUMBER SENSE	9. Ratios and proportions							<p>Recognize and apply the two intuitive relationships implicit in all proportions (within [vertical] and between [horizontal]). [M.9d.6]</p> <p>Use the idea of a unit rate or simplification to solve proportions (alone or in conjunction with factor of change). [M.9e.6]</p> <p>Derive and recognize the "cross-products" relationship in proportions. [M.9f.6]</p> <p><b>Solve proportions using multiple methods, including cross-products. [M.9g.6]</b></p>	<p>Use a table to set up, organize and label a proportion. [M.9d.7]</p> <p>Recognize and apply the two intuitive relationships implicit in all proportions (within [vertical] and between [horizontal]). [M.9e.7]</p> <p>Use the idea of a unit rate or simplification to solve proportions (alone or in conjunction with factor of change). [M.9f.7]</p> <p>Derive and recognize the "cross-products" relationship in proportions. [M.9g.7]</p> <p><b>Solve proportions using multiple methods, including cross-products. [M.9h.7]</b></p>	

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NUMBER SENSE	9. Ratios and proportions							<p>Solve problems involving rates, particularly price per unit (weight and volume) and speed (miles per hour, feet per second), including rate conversion. [M.9h.6]</p>	<p>Solve problems involving rates, particularly price per unit (weight and volume) and speed (miles per hour, feet per second), including rate conversion. [M.9i.7]</p>	
								<p>Use proportions to convert units. [M.9i.6]</p>	<p>Use proportions to solve problems of scale and similarity. (see geometry unit). [M.9j.7]</p> <p>Use proportions to convert units. [M.9k.7]</p> <p>Use proportions to compare ratios. [M.9l.7]</p>	

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NUMBER SENSE	10. Classes of Numbers		<p><b>Identify odd and even numbers and determine whether a set of objects has an odd or even number. [M.10.1]</b></p>	<p>Recognize classes to which a number may belong (odd numbers, even numbers, and multiples of 5, 10, 25, and 100). [M.10a.2]</p> <p>Recognize that numbers can belong to multiple classes (e.g., 15 is odd and a multiple of 3). [M.10b.2]</p>	<p>Recognize and apply classes to which a number may belong (odd numbers, even numbers, and multiples of numbers through 10). [M.10a.3]</p>	<p><b>Recognize classes (in particular, odds, evens; factors or multiples of a given number; and squares) to which a number may belong, and identify the numbers in those classes. Use these in the solution of problems. [M.10a.4]</b></p> <p><b>Understand and apply the definitions of prime and composite. [M.10b.4]</b></p>	<p><b>Understand and apply the definitions of prime and composite. [M.10a.5]<sup>3</sup></b></p> <p>Find greatest common factor (GCF). [M.10b.5]</p>			<p>Define, compare, and order frequently used irrational numbers (pi, sq. root of 2, etc). [M.10.8]</p>
	11. Absolute value							<p>Understand and calculate absolute value as the distance from 0 on a number line. [M.11.6]</p>	<p>Understand and calculate absolute value. [M.11.7]</p>	<p><i>Determine and define absolute value. [M.11a.8]</i></p> <p>Express principles of absolute value using variables. [M.11b.8]</p> <p><b>Solve equations and inequalities involving absolute value. [M.11c.8]</b></p>

<sup>3</sup> This can be removed in 2012-2013 because it will have been taught in 4<sup>th</sup>.

# OPERATIONS STRAND

		Kindergarten	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
OPERATIONS	12. Addition and Subtraction	<p>Identify the number that comes before or after a given number on the number line. [M.12a.k]</p> <p>Use objects and drawings to model and solve related addition and subtraction problems to twenty. [M.12b.k]</p> <p>Find complements of ten using fingers. [M.12c.k]</p>	<p>Decompose any number under 20 3 different ways, with at least one of the ways using three parts (for instance, 5 is <math>1+1+3</math> or <math>4+1</math> or <math>2+2+1</math>, etc). [M.12a.1]</p> <p>Solve and create bar models for number problems that can be solved using addition. [M.12b.1]</p> <p>Solve and create bar models for number problems that can be solved using subtraction. [M.12c.1]</p> <p>Add three or more addends. [M.12d.1]</p> <p>Appropriately use the mental math strategies of using double facts +/- 1 and adding 10 to any number. [M.12e.1]</p>	<p>Demonstrate an understanding of and use the conventional algorithms for addition (two 3-digit numbers). [M.12a.2]</p> <p>Demonstrate an understanding of and use the conventional algorithms for subtraction (two 3-digit numbers). [M.12b.2]</p> <p>Appropriately select and use the mental math strategies of using double facts, adding tens and ones separately, using complement of ten, and adding multiples of 10 and 100. [M.12c.2]</p> <p>Find complements of 100. [M.12d.2]</p> <p>Add up to four two-digit numbers. [M.12e.2]</p>	<p>Add and subtract (up to five-digit numbers). [M.12a.3]</p> <p>Use concrete objects and visual models to add and subtract fractions with like denominators. [M.12b.3]</p> <p>Appropriately select and use the mental math strategies of using double facts, adding tens and ones separately, using complement of ten, and adding multiples of 10 and 100. [M.12c.3]</p>	<p>Add and subtract common fractions (halves, thirds, fourths, sixths, and eighths) with like denominators. [M.12a.4]</p> <p>Add and subtract decimals up to hundredths, including money. [M.12b.4]</p>	<p>Add and subtract fractions and mixed numbers. [M.12.5]</p>	<p>Add and subtract integers. [M.12.6]</p>	<p>Understand that it is necessary to have the same units in order to count, or add, or subtract (units of measurement; denominators; or variables i.e.: <math>3x + 5 \neq 8x</math>). [M.12a.7]</p> <p>Add and subtract positive and negative integers. [M.12b.7]</p> <p>Create and solve word problems representing various applications of adding and subtracting integers. [M.12c.7]</p>	<p>Add and subtract positive and negative integers. [M.12.8]</p>

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OPERATIONS				<p><b>Define multiplication as repeated addition and create pictures and arrays to model repeated addition/multiplication. [M.13a.2]</b></p> <p>Explain the connection between multiplication and skip counting. [M.13b.2]</p>	<p><b>Multiply (up to two-digit numbers by a one-digit number). [M.13a.3]</b></p> <p><b>Use and explain pictures and arrays / area models for multiplication. [M.13b.3]</b></p> <p><b>Use and explain bar models for multiplication. [M.13c.3]</b></p> <p>Create and model problems that can be solved using multiplication. [M.13d.3]</p> <p><b>Model and identify factors using arrays and the area model. [M.13e.3]</b></p>	<p><b>Multiply (up to three digits by three digits), and demonstrate an understanding of and the ability to use the conventional algorithms for multiplication (up to three digits by two digits). [M.13a.4]</b></p> <p><b>List factors of any given number. [M.13b.4]</b></p> <p>Identify square numbers using arrays and the area model. [M.13c.4]</p> <p>Multiply a fraction by a whole number and solve word problems involving multiplying a fraction by a whole number.<sup>4</sup> [M.13d.4]</p>	<p>Find the prime factorization of composite numbers. [M.13a.5]</p> <p>Multiply positive fractions with whole numbers using repeated addition. [M.13b.5]</p> <p><b>Multiply a decimal greater than one by a whole number. [M.13c.5]</b></p> <p>Explain the effect of multiplying a number by a value greater than 1 and a value less than 1. [M.13d.5]</p> <p><b>Multiply fractions. [M.13e.5]</b></p> <p>Recognize word problems that involve multiplying fractions and mixed numbers. [M.13f.5]</p>	<p><b>Evaluate and write numbers in exponential form. [M.13a.6]</b></p> <p>Explain the effect of multiplying a number by a value less than 1. [M.13b.6]</p> <p><b>Multiply whole numbers, fractions, and mixed numbers. [M.13c.6]</b></p> <p><b>Multiply decimals. [M.13d.6]</b></p> <p><b>Find a percent of a number using multiplication (fractions and decimals). [M.13e.6]</b></p>	<p>Use the distributive property to evaluate expressions. [M.13a.7]</p> <p><b>Multiply and divide integers. [M.13b.7]</b></p> <p>Create multiplication of integers word problems. [M.13c.7]</p> <p><b>Multiply fractions, with a focus on application ("fraction of") problems. [M.13d.7]</b></p> <p>Calculate basic discounts. [M.13e.7]</p>	<p><b>Simplify expressions involving positive and negative integer exponents and square roots. [M.13a.8]</b></p> <p><b>Develop and understand power rules for multiplying and dividing terms with positive and negative exponents. [M.13b.8]</b></p> <p><b>Calculate compound interest. [M.13c.8]</b></p>
	13. Multiplication									

<sup>4</sup> This is not power in 2011-2012, but it will become power in 2012-2013.

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<b>OPERATIONS</b>				<p>Define division as sharing equally and repeated subtraction and create pictures to model division. [M.14.2]</p>	<p><b>Use and explain pictures and arrays / area models for division.</b> [M.14a.3]</p> <p><b>Use and explain bar models for division.</b> [M.14b.3]</p> <p><b>Compute division problems with one digit quotients without remainders.</b> [M.14c.3]</p> <p><b>Compute division problems with one digit quotients with remainders. Interpret remainders.</b> [M.14d.3]</p> <p>Create and model problems that can be solved by division. [M.14e.3]</p>	<p><b>Divide up to a three-digit whole number with a single-digit divisor (with or without a remainder).</b> [M.14a.4]</p> <p>Interpret remainders. [M.14b.4]</p> <p>Accurately translate division problems with the division sign or division house into fractions and vice versa. Explain the relationship between division and fractions. [M.14c.4]</p>	<p><b>Divide whole numbers (up to 4-digit dividend and up to 2-digit divisor) and express the remainder as a fraction or decimal.</b> [M.14a.5]</p> <p><b>Divide two numbers when there is a decimal in the dividend only.</b> [M.14b.6]</p> <p><b>Identify and use the rules for divisibility by 2, 3, 4, 5, 6, 9, and 10.</b> [M.14c.5]</p> <p>Divide whole numbers by unit fractions and unit fractions by whole numbers. [M.14d.5]</p>	<p><b>Evaluate division problems when the quotient is less than one.</b> [M.14a.6]</p> <p>Use various models to understand that dividing by a number less than one results in a quotient that is larger than the dividend. [M.14b.6]</p> <p>Express any fraction as a division problem and any division problem as a fraction. [M.14c.6]</p> <p><b>Divide decimals (decimals in both the divisor and dividend).</b> [M.14d.6]</p> <p><b>Divide any combination of whole numbers, fractions, or mixed numbers.</b> [M.14e.6]</p>	<p><i>Evaluate division problems when the quotient is less than one.</i> [M.14a.7]</p> <p>Use various models to understand that dividing by a number less than one results in a quotient that is larger than the dividend. [M.14b.7]</p> <p>Express any fraction as a division problem and any division problem as a fraction. [M.14c.7]</p> <p><b>Divide decimals (decimals in both the divisor and dividend).</b> [M.14d.7]</p> <p><b>Divide any combination of whole numbers, fractions, or mixed numbers.</b> [M.14e.7]</p> <p><b>Divide any combination of whole numbers, fractions, or mixed numbers.</b> [M.14e.7]</p>	
		14. Division								

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OPERATIONS	14. Division								Simplify division problems (writing them first in fraction form) including problems with decimals, fractions, and whole numbers. [M.14f.7]	
	15. Application of Base-ten		Given a two-digit number, mentally find 10 more or 10 less than the number without having to count and explain the reasoning used. [M.15.1]	Use knowledge of the base-ten system and addition/subtraction facts to compute related problems, e.g., 3 + 5 is related to 30 + 50, 300 + 500. [M.15a.2]  Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number 100-900. [M.15b.2]	<b>Use knowledge of the base-ten system and multiplication facts to compute related problems, e.g., 3 x 5 is related to 3 x 50, 300 x 5.</b> [M.15.3]	Use knowledge of the base-ten system and division facts to compute related problems, e.g., 30 ÷ 6 is related to 30 ÷ 60, 300 ÷ 6, and 3,000 ÷ 60. [M.15.4]	Evaluate base 10 exponents. [M.15.5]	<b>Use knowledge of the base ten system to multiply by powers of 10, using whole numbers and decimals, e.g. 300 x .01 = 3, 300 x 50 = 15,000.</b> [M.15.6]	Read and simplify numbers written in scientific notation (positive powers of 10). [M.15a.7]  Use scientific notation to express large numbers. [M.15b.7]	<b>Add, subtract, multiply, and divide numbers written in scientific notation.</b> [M.15.8]

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
OPERATIONS	16. Properties		Use the commutative, associative, and identity properties of addition on whole numbers in computations and problem situations. [M.16.1]	Use, name, and explain the commutative, associative, and identity properties of addition. [M.16.2]	Use, name, and explain the commutative, associative, and identity properties of multiplication. [M.16.3]	Use, name, and explain the distributive property. [M.16a.4]  Use the distributive property to do mental math, e.g., $99 \times 6$ , $102 \times 8$ . [M.16b.4]		Understand applicability of the commutative and associative property to addition and subtraction of integers and variables. [M.16a.6]  Use the distributive property to simplify algebraic expressions. [M.16b.6]	Understand applicability of commutative property to addition, subtraction, multiplication and division of integers and variables. [M.16.7]	Use the distributive property to simplify algebraic expressions. [M.16a.8]  Express the commutative and associative properties using variables, as they apply to multiplication and division. [M.16b.8]  Express the identities equations for multiplication and division using variables. [M.16c.8]  Use the associative, commutative, and distributive properties to manipulate equations. [M.16d.8]

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>OPERATIONS</b>	17. Inverse Operations		Understand and use the inverse relationship between addition and subtraction to create fact families. [M.17.1]	Use inverse relationships to check solutions for addition and subtraction problems. [M.17.2]	Understand, explain, and use the inverse relationship between multiplication and division to create fact families. [M.17.3]	Understand, explain, and use the inverse relationship between addition and subtraction and multiplication and division. [M.17.4]	Use the strategy of working backwards to solve problems. [M.17.5]		Understand that subtraction can always be rewritten as addition using the additive inverse. [M.17a.7]  Understand that division and multiplication are inverse operations especially in the context of fractions, i.e.: $n * (1/4) = n/4$ ; and $n * 2/3 = x / (3/2)$ . [M.17b.7]  Divide fractions by using the multiplicative inverse. [M.17c.7]	Recognize and apply the inverse relationship between exponents and roots. [M.17.8]
	18. Operation meaning	Select and use appropriate operations (addition or subtraction) to solve problems involving addition as combination and subtraction as change to less/ take away. [M.18.k]	Solve combination word problems. [M.18a.1]  Solve take away word problems. [M.18b.1]  Solve comparison word problems. [M.18c.1]  Solve equalizing word problems. [M.18d.1]	Select and use addition or subtraction to solve problems, including those involving money. [M.18a.2]  Create a variety of number problems that demonstrate an understanding of addition and subtraction. [M.18b.2]	Select and use addition, subtraction, multiplication, or division to solve problems, including those involving money. [M.18a.3]  Solve problems that require two steps with one or two different operations. [M.18b.3]	Select and use appropriate operations to solve problems, including those involving money and including problems that require two or three steps with different operations. [M.18.4]	Select and use appropriate operations (addition, subtraction, multiplication) to solve problems, including those involving fractions or decimals. [M.18.5]	Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems involving fractions or decimals. [M.18.6]	Select and use appropriate operations (addition, subtraction, multiplication, division) to solve problems involving fractions or decimals. [M.18a.7]  Identify, write and solve story problems that distinguish between multiplication and division of fractions. [M.18b.7]	

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
OPERATIONS	19. Estimation			Estimate, calculate, and solve problems involving addition and subtraction of three-digit numbers. Describe differences between estimates and actual calculations and identify when each is needed. [M.19.2]	<b>Understand and use the strategies of rounding to estimate quantities <u>before</u> performing computations.</b> [M.19.3]	<b>Estimate quantities and the results of whole-number computations</b> [M.19a.4]  <b>Estimate to check the reasonableness of products and quotients.</b> [M.19b.4]	Estimate products of whole numbers and decimals. [M.19.5]	Use estimation in solving problems, including all operations and including fraction and decimals. [M.19.6]		
	20. Multiple operations						Demonstrate understanding of meaning of parentheses and use parentheses when writing expressions. [M.20.5]	<b>Use the order of operations.</b> [M.20.6]	Extend the use of the order of operations to include exponents (in combination with parentheses). [M.20.7]	

# PATTERNS, RELATIONS, and ALGEBRA

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
PATTERNS, RELATIONS, and ALGEBRA	21. Attributes	Sort and classify objects by color, shape, size, number, and other properties. [M.21.k]								
	22. Patterns	Identify, reproduce, describe, and extend color, rhythmic, shape, number, and letter repeating patterns with simple attributes, e.g., ABABAB.... [M.22.k]	Identify, reproduce, describe, extend, and create simple rhythmic, shape, size, number, color, and letter repeating patterns. [M.22a.1]  Describe and continue addition and subtraction number patterns, e.g., 1, 4, 7, 10...; or 25, 23, 21.... [M.22b.1] <sup>5</sup>  Identify different addition and subtraction patterns on the hundreds chart. [M.22c.2] <sup>6</sup>		Describe, create, extend, and explain symbolic and arithmetic patterns. [M.22.3]	Describe, create, extend, and explain symbolic and arithmetic patterns. [M.22a.4]  Write an equation with a variable to express the general rule in arithmetic patterns. [M.22b.4]	Extend and explain symbolic and arithmetic patterns to any place, including extending patterns by using division. [M.22.5]		Find missing entries in sequences of numbers, letters or shapes, with a focus on multiplication and division relationships extending to fractions. [M.22.7]	Evaluate various patterns (including exponential growth and decay) and be able to extend sequences using the pattern. [M.22a.8]  Describe, complete, extend, analyze, generalize, and create a wide variety of patterns (including iterative, recursive, linear, quadratic, and exponential). [M.22b.8]

<sup>5</sup> Patterns should be up to +/- 10 patterns.

<sup>6</sup> These can exceed +/- 10 because the hundred chart is there for support.

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
PATTERNS, RELATIONS, and ALGEBRA	23. Equality		<p>Explain that = means “is the same as” and demonstrates understanding by solving both sides to see if quantities are the same. [M.23a.1]</p> <p>Identify bar models that show equality. [M.23b.1]</p>	<p>Use and explain the reflective property. [M.23.2]</p>		<p>Use knowledge of equivalency to solve problems using given relationships for two to three variables, including scale equalities and pictorial relationships. [M.23.4]</p>		<p>Solve problems using balances by using the property of equality. [M.23a.6]</p> <p>Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. [M.23b.6]</p> <p>Solve equations using the property of equality. [M.23c.6]</p>	<p>Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. [M.23a.7]</p> <p>Solve equations using the property of equality. [M.23b.7]</p>	<p>Solve equations with variables on both sides of the equal sign using the property of equality. [M.23.8]</p>

	Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
24. Variables		<p><b>Determine the value of a variable in simple equations involving addition and subtraction, e.g., <math>\square + 7 = 10</math>.</b> [M.24.1]<sup>7</sup></p>	<p>Construct and solve addition and subtraction equations with variables. [M.24.2]</p>	<p><b>Determine the value of a variable in addition, subtraction, multiplication, and division equations.</b> [M.24.3]</p>	<p>Determine the value of a variable in addition, subtraction, multiplication, and division equations. [M.24a.4]</p> <p><b>Use symbol and letter variables to represent unknown quantities in equations or inequalities.</b> [M.24b.4]</p>	<p>Use variables to write mathematical expressions and equations. [M.24.5]</p>	<p><b>Use variables to write mathematical expressions and equations.</b> [M.24b.6]</p> <p>Evaluate algebraic expressions (given variable values) involving all 4 operations, exponents, and parentheses. [M.24c.6]</p>	<p><b>Solve for a variable in 1- and 2-step algebraic equations involving multiplication, division, addition, and/or subtraction.</b> [M.24a.7]</p> <p>Derive 1- and 2-term algebraic equations and expressions (no exponents) from worded scenarios. [M.24b.7]</p> <p>Evaluate algebraic expressions (given variable values) involving all 4 operations, exponents, and parentheses. [M.24c.7]</p>	<p>Understand and use variables as symbols that can represent any value, set of values, or range of value (absolute value, inequalities). [M.24a.8]</p> <p><b>Combine like terms within variable expressions including fractions with variables in the denominator.</b> [M.24b.8]</p> <p>Evaluate variable expressions with up to three variables, absolute value, square roots, and/or compound parentheses. [M.24c.8]</p> <p>Use variables to write mathematical expressions and equations. [M.24d.8]</p>

<sup>7</sup> Note: If students only struggle with a missing total in a subtraction problem on the right side of the equation ( $9 = \square - 6$ ), they are still considered to have mastered this standard.

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>PATTERNS, RELATIONS, and ALGEBRA</b>	24. Variables									Demonstrate an understanding of the identity $(-x)(-y) = xy$ , and use to simplify expressions. [M.24e.8]  <b>Factor and multiply polynomials (including using FOIL method).</b> [M.24f.8]
	25. Number sentences	Writes addition and subtraction number sentences using +, -, and =. [M.25.k]		Write number sentences using +, -, <, =, and/or > to represent mathematical relationships in everyday situations. [M.25.2]		Write number sentences using +, -, ×, ÷, <, =, and/or > to represent mathematical relationships in everyday situations. [M.25.4]		Distinguish between variable expressions and equations with variables. [M.25.6]		

		Kindergarten	1st	2nd	3rd	4th	5th	6th	7th	8th
<b>PATTERNS, RELATIONS, and ALGEBRA</b>			<p><b>Apply rules (addition or subtraction) given in input-output tables when given the input. [M.26a.1]</b></p> <p><b>Determine rules for input-output tables. [M.26b.1]</b></p>	<p><b>Apply rules (addition or subtraction) given in input-output tables when given either the input or the output. [M.26a.2]</b></p> <p>Determine rules for input-output tables. [M.26b.2]</p>	<p>Apply rules (addition, subtraction, multiplication, and division or any combination of two operations) given in input-output tables when given either the input or the output. [M.26a.3]</p> <p>Determine rules for input-output tables. [M.26b.3]</p>	<p>Apply given rules (addition, subtraction, multiplication, and division or any combination of two operations) given in input-output tables when given either the input or the output. This includes rules with an ABAB pattern. [M.26a.4]</p> <p><b>Determine and apply rules for input-output tables, including two-step rules. [M.26b.4]</b></p>		<p><b>Determine rules for input-output tables and write rules using variable expressions and equations. [M.26a.6]</b></p> <p><b>Distinguish between constant and non-constant rates of change in tables and graphs. [M.26b.6]</b></p> <p><b>Define slope as the rate of change, and determine the slope from a line, equation, and table (and two points). [M.26c.6]</b></p>	<p>Determine rules for input-output tables and graphs and write rules using variable expressions and equations. [M.26a.7]</p> <p>Distinguish between positive and negative rates of change in tables and graphs. [M.26b.7]</p> <p><b>Define slope as the rate of change, and determine the slope from a line, equation, and table (and two points). [M.26c.7]</b></p> <p>Determine the y-intercept from a line and from an equation (<math>y=mx+b</math>). [M.26d.7]</p> <p>Understand, use, and apply the definitions of y-intercept and slope. [M.26e.7]</p>	<p><b>Determine linear equations given 2 data points or a point and slope. [M.26a.8]</b></p> <p><b>Understand, use, and apply the definitions of y-intercept, slope, and x-intercept in the context of graphs, tables, equations, or story problems. [M.26b.8]</b></p> <p><b>Construct and interpret scatter plots and best fit lines. [M.26c.8]</b></p> <p><b>Convert and recognize linear equations in standard form, point-slope form, and slope-intercept form. [M.26d.8]</b></p> <p><b>Explain the significance of positive, negative, zero, and undefined slopes and the slopes of parallel and perpendicular lines. [M.26e.8]</b></p>
		26. Functions, Linear Equations								

		Kindergarten	1st	2nd	3rd	4th	5th	6th	7th	8th
PATTERNS, RELATIONS, and ALGEBRA	26. Functions, Linear Equations								Use the 4-quadrant coordinate plane to graph linear and non-linear functions from input-output tables. Graph equations in the form $y = mx + b$ . [M.26f.7]	<p><b>Solve systems of linear equations by addition, subtraction, and/or substitution.</b> [M.26f.8]</p> <p><b>Solve systems of linear equations by graphing.</b> [M.26g.8]</p>
	27. Quadratic Equations									<p><b>Solve quadratic equations by factoring.</b> [M.27a.8]</p> <p><b>Solve quadratic equations by completing the square and/or using the quadratic formula.</b> [M.27b.8]</p> <p><b>Solve quadratic equations by graphing.</b> [M.27c.8]</p> <p>Recognize and apply patterns of quadratic equations; i.e.: how the shape, location and direction of the graph changes based on the addition of terms and/or the varying of coefficients. [M.27d.8]</p>

	Kindergarten	1st	2nd	3rd	4th	5th	6th	7th	8th
<b>PATTERNS, RELATIONS, and ALGEBRA</b> 28. inequalities									<b>Manipulate, solve &amp; graph inequalities on number lines and coordinate grids. [M.28a.8]</b>  Translate written sentences into inequalities. [M.28b.8]  Solve inequalities involving absolute value. [M.28c.8]

# TIME, MONEY, and MEASUREMENT STRAND

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	
<b>TIME, MONEY AND MEASUREMENT</b>	29 . Money values	Identify U.S. coins by name and tells the value of each coin. [M.29.k]	<p><b>Identify the value of all U.S. coins, and \$1, \$5, \$10, and \$20 bills.</b> [M.29a.1]</p> <p><b>Find the value of a collection of coins and dollar bills.</b> [M.29b.1]</p> <p><b>Find different ways to represent an amount of money up to \$2.</b> [M.29c.1]</p> <p>Describe functions related to trading, including coin trades, and base-ten trades. [M.29d.1]</p>	<p>Find the value of a collection of coins and dollar bills and different ways to represent an amount of money up to \$5. Use appropriate notation, e.g., 69¢, \$1.35. [M.29a.2]</p> <p>Convert cents to dollars and vice versa. [M.29b.2]</p>							

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
TIME, MONEY AND MEASUREMENT	30. Length	Recognize attributes of length by using appropriate language: longer, taller, shorter, same length. [M.30a.k]		<p><b>Use a ruler on both the English and metric side to measure objects to the nearest inch or centimeter.</b> [M.30a.2]</p> <p><b>Compare the length of two or more objects.</b> [M.30b.2]</p> <p>Measure the length of objects using two different units and describe how the two measurements relate to the size of the units. [M.30c.2]</p> <p>Make and use estimates of length. [M.30d.2]</p> <p><b>Calculate perimeter of rectangles by counting on grids, by adding on diagrams, or by measuring.</b> [M.30e.2]</p> <p><b>Identify inches, feet, yards, miles and meters and centimeters as units of length.</b> [M.30f.2]</p>	<p><b>Carry out unit conversions: yards-feet-inches.</b> [M.30a.3]</p>	<p>Carry out English unit conversions: yards-feet-inches. [M.30a.4]</p> <p><b>Carry out metric unit conversions: millimeter-centimeter-decimeter-meter-kilometer.</b> [M.30b.4]</p> <p>Measure to the nearest quarter inch. Measure objects when object is not lined up at 0. [M.30c.4]</p> <p><b>Calculate perimeter of all polygons when given measurements or by measuring.</b> [M.30d.4]</p> <p><b>Draw line segments of a specified length using a ruler.</b> [M.30e.4]</p> <p>Create shapes with a given perimeter. [M.30f.4]</p> <p>Select the appropriate units for measuring length in both the English and the metric system. [M.30g.4]</p>	Understand, use, and explain $\pi$ as the ratio of circumference to diameter. [M.30.5]		<p>Use compasses to create circles of specified dimensions. [M.30a.7]</p> <p>Understand, use and explain pi as the ratio of circumference to diameter of every circle. [M.30b.7]</p> <p><b>Calculate perimeter and area of two-dimensional shapes, including shapes with variables and missing values.</b> [M.30c.7]</p> <p>Memorize the following metric prefixes: milli = 1/1000; centi = 1/100; kilo = 1000x. [M.30d.7]</p>	<p><b>Demonstrate an understanding of the Pythagorean Theorem. Apply the theorem to the solution of problems.</b> [M.30a.8]</p> <p><i>Calculate the area and circumference of circles.</i> [M.30b.8].</p>
			Makes and uses estimates of length from everyday experiences. [M.30b.k]							

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
	30. Length			Select the appropriate units for measuring length in both the English and the metric system. [M.30f.4]						
TIME, MONEY AND MEASUREMENT	31. Area	<p>Recognize attributes of area by using appropriate language: bigger, smaller, same size. [M.31a.k]</p> <p>Uses nonstandard units to measure area. [M.31b.k]</p>		<p>Calculate area of rectangles by counting squares inside shapes drawn on grids. [M.31a.2]</p> <p>Identify units associated with area. [M.31b.4]</p>		<p>Calculate area of quadrilaterals and triangles when given measurements or by measuring. [M.31a.4]</p> <p>Calculate area of irregular shapes by counting on a grid (including half spaces) or by partitioning into regular rectangles and triangles. [M.31b.4]</p> <p>Create shapes with a given area. [M.31c.4]</p>	<p>Derive, use, and understand a procedure and formula for calculating the area of a parallelogram, rectangle, triangle, and square. [M.31a.5]</p> <p>Given length of the radius or diameter, estimate the area of a circle. [M.31b.5]</p> <p>Calculate the area of a circle. [M.31c.5]</p> <p>Use concepts of area and perimeter to solve applied problems. [M.31d.5]</p> <p>Find the surface area of rectangular prisms and cubes. [M.31e.5]</p>		<p>Derive and apply the area formulas for trapezoids. [M.31a.7]</p> <p>Calculate area of irregular shapes by counting on a grid or by partitioning into regular polygons. [M.31b.7]</p> <p>Determine the area of complex shapes using subtraction. [M.31c.7]</p> <p>Evaluate square roots of perfect squares and apply to area problems. [M.31d.7]</p> <p>Derive and apply formulas related to circles (circumference and area). [M.31e.7]</p> <p>Calculate surface area of cylinders. [M.31f.7]</p>	<p>Calculate the surface area and volume of rectangular prisms and cylinders. [M.31a.8]</p> <p>Calculate the surface area of spheres. [M.31b.8]</p> <p>Determine the area of complex shapes using subtraction. [M.31c.8]</p>

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>TIME, MONEY AND MEASUREMENT</b>	32. Volume	<p>Recognize attributes of volume by using appropriate language: holds less, holds more, holds the same amount. [M.32a.k]</p> <p>Makes and uses estimates of volume from everyday experiences. [M.32b.k]</p> <p>Uses nonstandard units to measure volume. [M.32c.k]</p>		<p><b>Directly compare the volume of two objects.</b> [M.32a.2]</p> <p>Make and use estimates of volume. [M.32b.2]</p> <p>Correctly identify gallons, quarts, and liters as units of volume. [M.32c.2]</p>			<p>Find the volume of complex 3D figures by counting the number of cubic units contained in the figure. [M.32a.5]</p> <p><b>Calculate volume of triangular and rectangular prisms with a given base area.</b> [M.32b.5]</p> <p>Calculate volume of cylinders. [M.32c.5]</p>		<p><b>Calculate volume of prisms (rectangular and otherwise) with a given base area.</b> [M.32a.7]</p> <p>Evaluate cube roots and apply to volume problems. [M.32b.7]</p> <p>Calculate volume of cylinders. [M.32c.7]</p> <p><b>Use concepts of volume and surface area to solve applied problems.</b> [M.32d.7]</p>	<p><i>Calculate the volume of rectangular prisms and cylinders.</i> [M.32a.8]</p> <p>Calculate the volume of spheres. [M.32b.8]</p>
	33. Weight	<p>Recognizes attributes of weight by using appropriate language: heavier, lighter, same weight. [M.33.k]</p>		<p>Correctly use a balance scale. [M.33a.2]</p> <p><b>Directly compare and order the weight of two or more objects.</b> [M.33b.2]</p> <p>Make and use estimates of weight. [M.33c.2]</p> <p><b>Identify ounces, pounds, tons, and kilograms as units of weight and select appropriate units to use.</b> [M.33d.2]</p>					<p>Recognize grams as units of weight. [M.33.7]</p>	

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
TIME, MONEY AND MEASUREMENT	34. Time	<p>Recognizes attributes of time by using appropriate language: longer, shorter, same time. [M.34a.k]</p> <p>Identify positions of events in time as earlier or later. [M.34b.k]</p> <p>Identify parts of the day (morning, afternoon, night). [M.34c.k]</p> <p>List the days of the week and months of the year in order. [M.34d.k]</p> <p>Identify today's, tomorrow's, and yesterday's dates using a calendar. [M.34e.k]</p> <p>Read dates on a calendar and associate them with days of the week. [M.34f.k]</p>		<p><b>Tell time to the hour, half-hour, quarter-hour, and minute on analog and digital clocks using a.m. and p.m. [M.34a.2]</b></p> <p>Calculate elapsed time using a calendar. [M.34b.2]</p>	<p><b>Convert between hours and minutes. [M.34a.3]</b></p> <p>Add hours and minutes. [M.34b.3]</p> <p><b>Compute elapsed time when given starting time and ending time, starting time and duration, or duration and ending time. [M.34c.3]</b></p>					
	35. Temperature			<p>Use a thermometer (Fahrenheit). [M.35.2]</p>						

# GEOMETRY STRAND

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
<b>GEOMETRY</b>	36. Two-dimensional shapes	Name, describe, and sort, simple two-dimensional shapes, including circles, triangles, squares, rectangles, pentagons, and hexagons. [M.36.k]		<p>Identify, describe, draw, compare, and classify two-dimensional shapes, including circles, triangles, quadrilaterals, squares, rectangles, pentagons, hexagons, and octagons. [M.36a.2]</p> <p>Describe, compare, and analyze attributes and parts of two-dimensional shapes, including straight lines, curves, length of sides, and number of vertices and sides. [M.36b.2]</p> <p>Recognize congruent shapes. [M.36c.2]</p>		<p>Describe, compare, and analyze attributes and parts of two-dimensional shapes, including parallel sides, length of sides, types of angles, symmetry, and number of vertices, diagonals, and sides.<sup>8</sup> [M.36a.4]</p> <p>Determine if shapes are congruent. [M.36b.4]</p>	<p>Define congruent figures as having the same size and same shape; identify congruent figures. [M.36a.5]</p> <p>Identify the center, radius, and diameter of a circle; recognize the relationship between radius and diameter. [M.36b.5]</p>		<p>Master naming conventions for lines and polygons. [M.36a.7]</p> <p>Derive, describe, and apply the relationship between the number of sides and sum of angles for any convex polygon. [M.36b.7]</p> <p>Define and determine congruence or similarity through measurement and use of proportions. [M.36c.7]</p> <p>Calculate missing measurements of similar figures using proportions. [M.36d.7]</p> <p>Use scale factors to create similar figures. [M.36e.7]</p>	<p><b>Define and determine congruence or similarity through measurement and use of proportions.</b> [M.36a.8]</p> <p><b>Calculate the sum of angles within polygons.</b> [M.36b.8]</p> <p><b>Use scale factors to create similar figures.</b> [M.36c.8]</p>

<sup>8</sup> Note: This includes identifying triangles as isosceles, equilateral, or scalene and as right, acute, or obtuse.

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<b>GEOMETRY</b>	37. Three-dimensional shapes	<b>Identify shapes as two-dimensional (flat) or three-dimensional (solid).</b> [M.37.k]		<p><b>Identify three-dimensional shapes: cubes, prisms, spheres, pyramids, cylinders, and cones.</b> [M.37a.2]</p> <p>Describe, compare, and analyze attributes and parts of three-dimensional shapes, including length of sides, curved versus flat faces, and number of vertices, edges, and faces. [M.37b.2]</p>		<p>Identify, model, and draw three-dimensional shapes: cubes, spheres, pyramids, prisms, and cones. [M.37a.4]</p> <p>Describe, compare, and analyze attributes and parts of three-dimensional shapes, including length of sides, and number of vertices, edges, and faces. [M.37b.4]</p>	<p>Given a net of a shape or distinct faces of a shape, determine the shape. [M.37.5]</p>		<p><i>Recognize and name 3-dimensional objects and relate them to their 2-dimensional precursors (nets, descriptions) and attributes (faces, edges, vertices).</i> [M.37a.7]</p> <p>Describe, compare, and identify attributes and parts of three-dimensional shapes, including length of sides, and number of vertices, edges, and faces. [M.37b.7]</p>	<p><b>Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.</b> [M.37.8]</p>
	38. Placement/Movement	Identify positions of objects in space, and use appropriate language (e.g., beside, inside, next to, close to, above, below, apart) to describe and compare relative positions. [M.38.k]		<p><b>Identify shapes that have been rotated, reflected, translated, and enlarged. Describe direction of translations.</b> [M.38.2]</p>		<p>Describe and apply transformations such as reflections, rotations, and translations. [M.38a.4]</p> <p>Predict and validate the results of portioning, folding, and combining two-and three-dimensional shapes. [M.38b.4]</p>			<p><b>Identify and perform translations and reflections of polygons on a labeled coordinate plane.</b> [M.38.7]</p>	<p><b>Predict the results of transformations, and draw the transformed figure, including multiple step transformations.</b> [M.38.8]</p>
	39. Symmetry			<p><b>Identify and draw lines of symmetry in two-dimensional shapes.</b> [M.39.2]</p>		<p><b>Identify and describe line symmetry in two-dimensional shapes.</b> [M.39.4]</p>				

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<b>GEOMETRY</b>	40. Angles			Identify angles as right angles, greater than a right angle, or less than/smaller than a right angle. [M.40.2]	Identify angles as right angles, greater than a right angle, or less than/smaller than a right angle. [M.40.3]	Identify angles as right angles, acute, or obtuse. [M.40a.4]  Measure angles and estimate their measurement [M.40b.4]  Recognize that angle measure is additive and use this to find unknown angles on a diagram. [M.40c.4]	Recognize that there are 360 degrees in a circle and 180 degrees in a line. [M.40a.5]  <b>Identify and measure interior angles of polygons. [M.40b.5]</b>  <b>Describe and identify complementary and supplementary angles. [M.40c.5]</b>  Name angles. [M.40d.5]  Identify and measure angles using a protractor within 2 degrees of accuracy. [M.40e.5]		Recognize supplementary, complementary and vertical angles. [M.40a.7]  <b>Use the properties, definitions, and relationships of angles to determine the measurement of angles, including problems with transversals. [M.40b.7]</b>	Recognize supplementary, complementary, vertical, and corresponding angles. [M.40a.8]  <i>Use the properties, definitions, and relationships of angles to determine the measurement of angles, including problems with transversals and/or proportional relationships. [M.40b.8]</i>
	41. Lines					<b>Describe and draw intersecting, parallel, and perpendicular lines. [M.41.4]</b>				

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	42. Coordinates						Plot and locate the coordinates of points on the Cartesian coordinate plane (first quadrant only). [M.42.5] <sup>9</sup>	<p><b>Plot and locate the coordinates of points on the 4-quadrant Cartesian coordinate plane. [M.42b.6]</b></p> <p>Understand that when two ordered pairs differ only by signs, the locations of the points are related by reflection across one or both axes.</p>	<b>Locate and plot points on a 4-quadrant Cartesian coordinate plane. [M.42.7]</b>	

<sup>9</sup> This will need to be power in 2013-2014 because it will be the first time they will have seen it.

# DATA ANALYSIS, STATISTICS, and PROBABILITY STRAND

		Kindergarten	1st	2nd	3rd	4th	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
DATA ANALYSIS, STATISTICS, and PROBABILITY	43. Data Analysis	Collect, sort, organize, and draw conclusions about data using concrete objects, pictures, numbers, and graphs. [M.43.k]	Use interviews, surveys, and observations to gather data about themselves and their surroundings. [M.43.1]		Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. [M.43.3]				Identify, interpret, and create stem & leaf plots and Venn diagrams. [M.43a.7]  Identify, interpret, utilize and construct pie charts (circle graphs) by integrating knowledge of circles, angles, percents, and proportions. [M.43b.7]	<p><b>Select, construct, and interpret whichever of the following is most appropriate to a given set of data: stem &amp; leaf plots, histograms, line plot, line graph, pie chart, bar graph, Venn diagrams, and box and whisker plots. [M.43a.8]</b></p> <p>Calculate outliers for a given data set. [M.43b.8]</p> <p>Draw conclusions about data based upon the distribution of points and outliers. [M.43c.8]</p> <p>Differentiate between continuous and discrete data and ways to represent them. [M.43d.8]</p>

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<b>DATA ANALYSIS, STATISTICS, and PROBABILITY</b>	44. Lists, Tables, Graphs	Collect and organize data in lists, tables, and simple bar graphs. [M.44.k]	<b>Organize, represent, and interpret data using tallies, tables, bar graphs, and pictographs with a scale of 1. [M.44a.1]</b>  Match representations of data presented in tallies, tables, bar graphs, and pictographs to the actual data set. [M.44b.1]	Read and answer questions using tallies, tables, bar graphs, and pictographs with a scale of 1. [M.44.2]	Identify appropriate ways to display data. [M.44a.3]  Match representations of data to the actual data set. [M.44b.3]  <b>Construct and draw conclusions from representations of data sets in the form of tallies, tables, and line plots, and pictographs, and bar graphs with a scale other than 1. [M.44c.3]</b>	<b>Identify appropriate ways to display data. [M.44a.4]</b>  <b>Construct and draw conclusions from representations of data sets in the form of tables, line plots, pictographs, tallies, circle graphs, line graphs, and bar graphs (with a scale other than 1). [M.44b.4]</b>		<b>Construct and interpret stem and leaf plots and line plots. [M.43a.6]</b>  Read and interpret circle graphs. [M.43b.6]  Display data using dot plots, histograms, and box plots. <sup>10</sup> [M.43c.6]		

<sup>10</sup> Not power in 2011-2012 but possibly will be in 2012-2013, depending on those assessments.

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<b>DATA ANALYSIS, STATISTICS, and PROBABILITY</b>  45. Probability								<p><i>Define probability and how to express probabilities appropriately. [M.45a.7]</i></p> <p><b>Calculate the probability of simple and compound events using tree diagrams and organized lists. [M.45b.7]</b></p> <p>Use the fundamental counting principle to determine combinations and/or probabilities of compound events through multiplication. [M.45c.7]</p> <p>Solve probability problems expressed as part: part ratios using proportions. [M.45d.7]</p> <p><i>Understand the difference between probability and possibility, and theoretical vs. experimental probability. [M.45e.7]</i></p>	<p><i>Compute the probability of simple and compound events. [M.45a.8]</i></p> <p><i>Construct and interpret tree diagrams, tables, etc. to compute/ represent problems. [M.45b.8]</i></p> <p><b>Develop an understanding of the Fundamental Counting Principle to determine the probability of compound events. [M.45c.8]</b></p> <p><b>Determine the probability of dependent and independent events. [M.45d.8]</b></p>

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<b>DATA ANALYSIS, STATISTICS, and PROBABILITY</b> 46. Combinations						<p><b>Find median, mean, mode, maximum, minimum, and range. Recognize measures of central tendency as means of analyzing and comparing data sets. [M.46a.5]</b></p> <p>Analyze the effect on measures of central tendency of adding or removing a given data point. [M.46b.5]</p>	<p><b>Manipulate data sets to obtain particular values for measures of central tendency. [M.46c.7]</b></p> <p>Describe data by giving measures of central tendency and variability (interquartile range and/or mean absolute deviation).</p>	<p><i>Find median, mean, mode, maximum, minimum, and range. Recognize measures of central tendency as means of analyzing and comparing data sets. [M.46a.7]</i></p> <p><i>Recognize measures of central tendency as means of analyzing and comparing data sets. [M.46b.7]</i></p> <p><b>Manipulate data sets to obtain particular values for measures of central tendency. [M.46c.7]</b></p> <p>Construct data sets with a given mean, median, and mode. [M.46d.7]</p>	<p><i>Find median, mean, mode, maximum, minimum, and range. Recognize measures of central tendency as means of analyzing and comparing data sets. [M.46a.8]</i></p> <p><i>Recognize measures of central tendency as means of analyzing and comparing data sets. [M.46b.8]</i></p> <p><b>Create and interpret box-and-whisker plots. [M.46c.8]</b></p> <p><b>Manipulate data sets to obtain particular values for measures of central tendency. [M.46d.8]</b></p> <p>Determine the appropriate measures of central tendency in given scenarios. [M.46e.8]</p> <p>Determine which statistics best represent central tendency of a given set of data. [M.46f.8]</p> <p>Construct data sets with a given mean, median, and mode. [M.46g.8]</p>