Common Core Math Spiral Curriculum

Grades K-5

Iredell Statesville School District
Curriculum Review Week 2011

Domain: Counting and Cardinality		
Grade Level	**Cluster**	**Standard**
5		
4		
3		
2		
1		
K	• Know number names and the count sequence • Counting to tell the number of objects • Compare numbers	**K.CC.1** Count to 100 by ones and by tens. **K.CC.2** Count forward beginning from a given number within the known sequence (instead of having to begin at 1). **K.CC.3** Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects). **K.CC.4** Understand the relationship between numbers and quantities; connect counting to cardinality. **a**. 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. **b.** 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. **c.** Understand that each successive number name refers to a quantity that is one larger. **K.CC.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. **K.CC.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.**1** **1**Include groups with up to ten objects. **K.CC.7** Compare two numbers between 1 and 10 presented as written numerals.

Domain: Operations and Algebraic Thinking		
Grade Level	**Cluster**	
5	• Write and interpret numerical expressions • Analyze patterns and relationships	**5.OA.1** Use **parentheses, brackets,** or **braces** in numerical **expressions**, and evaluate expressions with these symbols. **5.OA.2** Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. **5.OA.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**.
4	• Use the four operations with whole numbers to solve problems • Gain familiarity with factors and multiples • Generate and analyze patterns	**4.OA.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. **4.OA.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. **4.OA.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**. **4.OA.4** Find all **factor pairs** for a whole number in the range 1–100. Recognize that a whole number is a **multiple** of each of its **factors**. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is **prime or composite**. **4.OA.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.
3	• Represent and solve problems involving multiplication and division • Understand properties of multiplication and the relationshi	**3.OA.1** Interpret **products** of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. **3.OA.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. **3.OA.3** Use **multiplication** and **division** within 100 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. **3.OA.4** Determine the unknown whole number in a **multiplication** or **division equation** relating three whole numbers. **3.OA.5** Apply properties of operations as strategies to multiply and divide.2 *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.*

	p between multiplication and division • Multiply and divide within 100 • Solve problems involving the four operations, and identify and explain patterns in arithmetic	*(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.)* **2** Students need not use formal terms for these properties. **3.OA.6** Understand division as an unknown-**factor** problem. **3.OA.7** Fluently **multiply** and **divide** within 100, 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. **3.OA.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.3** **3** This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order. **3.OA.9** Identify arithmetic **patterns** (including patterns in the addition table or multiplication table), and explain them using properties of operations.
2	• Represent and solve problems involving addition and subtraction • Add and subtract within 20 • Work with equal groups of objects to gain foundations for multiplication	**2.OA.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. **2.OA.2** Fluently **add** and **subtract** within 20 using mental strategies.**2** By end of Grade 2, know from memory all **sums** of two one-digit numbers. **2.OA.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. **2.OA.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**
1	• Represent and solve problems involving addition and subtraction	**1.OA.1** Use addition and subtraction within 20 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. **1.OA.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. **1.OA.3** Apply properties of operations as strategies to add and subtract.**2** *Examples: If 8 +*

	• Understand and apply properties of operations and the relationship between addition and subtraction • Add and subtract within 20 • Work with addition and subtraction equations	*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.)* **2** Students need not use formal terms for these properties. **1.OA.4** Understand subtraction as an unknown-addend problem. **1.OA.5** Relate counting to **addition** and **subtraction** (e.g., by counting on 2 to add 2). *1st Grade Mathematics* ● Unpacked Content page8 **1.OA.6** Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. 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); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). **1.OA.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. **1.OA.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 = _.*
K	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from	**K.OA.1** Represent addition and subtraction with objects, fingers, mental images, drawings**2**, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. **2**Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.) **K.OA.2** Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem. **K.OA.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). **K.OA.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. **K.OA.5** Fluently add and subtract within 5.

Domain: Numbers and Operations in base ten		
Grade Level	**Cluster**	
5	• Understand the place value system • Perform operations with multi-digit whole numbers and with decimals to hundredths	**5.NBT.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. **5.NBT.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. **5.NBT.3** Read, write, and compare **decimals** to **thousandths.** a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 x (1/100) + 2 x (1/1000) b. **Compare** two decimals to thousandths based on meanings of the digits in each place, using **>, =, and < symbols** to record the results of comparisons. **5.NBT.4** Use place value understanding to **round** decimals to any place. **5.NBT.5** Fluently multiply multi-digit whole numbers using the standard algorithm. **5.NBT.5** Fluently multiply multi-digit whole numbers using the standard algorithm. **5.NBT.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.
4	• Generalize place value understanding for multi-digit whole numbers • Use place value understanding and properties of operations to perform	**4.NBT.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. **4.NBT.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.** **4.NBT.3** Use place value understanding to **round** multi-digit whole numbers to any place. **4.NBT.4** Fluently **add** and **subtract** multi-digit whole numbers using the standard algorithm. **4.NBT.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.** **4.NBT.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.**

	multi-digit arithmetic	
3	Use place value understanding and properties of operations to perform multi-digit arithmetic	**3.NBT.1** Use place value understanding to **round** whole numbers to the nearest 10 or 100. **3.NBT.2** Fluently **add** and **subtract** within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. **1 A range of algorithms may be used.** **3.NBT.3** Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.
2	• Understand place value • Use place value understanding and properties of operations to add and subtract	**2.NBT.1** Understand that the three digits of a three-digit number represent amounts of **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. 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.NBT.2** Count within 1000; **skip-count** by 5s, 10s, and 100s. **2.NBT.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. **2.NBT.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. **2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. **2.NBT.6** Add up to four two-digit numbers using strategies based on place value and properties of operations. **2.NBT.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. **2.NBT.8** Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. **2.NBT.9** Explain why addition and subtraction strategies work, using place value and the properties of operations.
1	• Extend the counting sequence • Understand place value	**1.NBT.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. **1.NBT.2** Understand that the two digits of a two-digit number represent amounts of **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. **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). **1.NBT.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	**1.NBT.4**Add 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. **1.NBT.5** Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. **1.NBT.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.
K	Work with numbers 11 – 19 to gain foundations for place value	**K.NBT.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 (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Domain: Number and Operations in Fractions		
Grade Level	**Cluster**	
5	• Use equivalent fractions as a strategy to add and subtract fractions • Apply and extend previous understandings of multiplication and division to multiply and divide fractions	**5.NF.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. **5.NF.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. **5.NF.3** Interpret a fraction as division of the **numerator** by the **denominator** ($a/b = a \div b$). 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. **5.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. **b.** 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**. **5.NF.5** Interpret multiplication as scaling (resizing), by: a. **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. **b.** 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. **5.NF.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. **5.NF.7** Apply and extend previous understandings of division to divide **unit fractions** by whole numbers and whole numbers by unit fractions.**1** a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. **1** Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade. b. Interpret division of a whole number by a unit fraction, and compute such **quotients.** c. 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.

4	• Extend understanding of fraction equivalence and ordering • Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers • Understand decimal notation for fractions, and compare decimal fractions	**4.NF.1** Explain why a **fraction** a/b is **equivalent** to a fraction $(n \times a)/(n \times b)$ 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. **4.NF.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. **4.NF.3** Understand a **fraction** a/b with $a > 1$ as a sum of fractions $1/b$. a. Understand **addition** and **subtraction** of fractions as **joining and separating parts** referring to the same whole. 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. c. 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. d. 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. **4.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of $1/b$. b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. c. 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. **4.NF.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** **2** Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade. **4.NF.6** Use decimal notation for fractions with denominators 10 or 100. **4.NF.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.
3	Develop understanding of fractions as numbers	**3.NF.1** Understand a **fraction** $1/b$ as the quantity formed by 1 part when a whole is **partitioned** into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$. **3.NF.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. 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. b. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line. **3.NF.3** Explain **equivalence** of fractions in special cases, and **compare** fractions by reasoning about their size. a. Understand two fractions as **equivalent (equal)** if they are the same size, or the same point on a number line. b. 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. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. d. 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. Record the results of comparisons with the **symbols >, =, or <,** and justify the conclusions, e.g., by using a visual fraction model.
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1		
K		

Domain: Measurement and Data		
Grade	**Cluster**	

Level		
5	• Convert like measurement units within a given measurement system • Represent and interpret data • Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition	**5.MD.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. **5. MD.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. **5. MD.3** Recognize **volume** as an **attribute** of **solid figures** and understand concepts of volume measurement. a. 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. b. 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. **5. MD.4** Measure volumes by counting unit cubes, using **cubic cm, cubic in, cubic ft,** and improvised units. **5. MD.5** Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. 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. b. 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. c. 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.
4	• Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit • Represent and interpret data • Geometric measurement: understand concepts of angle and measure angles	**4.MD.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. **4.MD.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. **4.MD.3** Apply the **area** and **perimeter** formulas for **rectangles** in real world and mathematical problems. **4.MD.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. **4.MD.5** Recognize **angles** as geometric shapes that are formed wherever two **rays** share a common **endpoint,** and understand concepts of angle measurement: a. 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.

		b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees. **4.MD.6 Measure angles** in whole-number degrees using a **protractor**. Sketch angles of specified measure. **4.MD.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.
3	• Solve problems involving measurement and estimation of intervals of time, liquid, volumes and masses of objects • Represent and interpret data • Geometric measurement: understand concepts of area and relate area to multiplication and to addition • Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures	**3.MD.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. **3.MD.2 Measure** and **estimate liquid volumes** and **masse**s of objects using **standard units** of **grams (g), kilograms (kg),** and **liters (l).1** 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.**2** **1** Excludes compound units such as cm3 and finding the geometric volume of a container. **2** Excludes multiplicative comparison problems (problems involving notions of —times as much ; see Glossary, Table 2). **3.MD.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. **3.MD.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.** **3.MD.5** Recognize **area** as an **attribute** of **plane figures** and understand concepts of area measurement. a. 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. b. 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. **3.MD.6** Measure areas by counting unit squares (**square cm, square m, square in, square ft**, and improvised units). **3.MD.7** Relate area to the operations of multiplication and addition. a. 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. b. 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. c. 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. d. 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. **3.MD.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.
2	• Measure and estimate lengths in standard units • Relate addition and subtraction to length • Work with time and money • Represent and interpret data	**2.MD.1 Measure** the **length** of an object by selecting and using appropriate tools such as **rulers, yardsticks, meter sticks**, and **measuring tapes**. **2.MD.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. **2.MD.3 Estimate** lengths using units of **inches, feet, centimeters,** and **meters**. **2.MD.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. **2.MD.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. **2.MD.7** Tell and write **time** from analog and digital clocks to the nearest five **minutes,** using **a.m**. and **p.m.** **2.MD.8** Solve word problems involving **dollar bills, quarters, dimes, nickels,** and **pennies, using $ and ¢ symbols** appropriately. **2.MD.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. **2.MD.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**4** using information presented in a bar graph.
1	• Measure lengths indirectly and by iterating length units • Tell and write time • Represent and interpret data	**1.MD.1** Order three objects by length; compare the **lengths** of two objects indirectly by using a third object. **1.MD.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.* **1.MD.3** Tell and write **time** in **hours** and **half-hours** using analog and digital clocks. **1.MD.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.
K	• Describe and compare measurable attributes • Classify objects and count the	**K.MD.1** Describe measurable attributes of objects, such as **length** or **weight**. Describe several measurable attributes of a single object. **K.MD.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. **K.MD.3** Classify objects into given categories; count the numbers of objects in each category and sort the categories by count

	number of objects in each category	

Domain: Geometry		
Grade	**Cluster**	

Level		
5	• Graph points on the coordinate plane to solve real-world and mathematical problems • Classify two-dimensional figures into categories based on their properties	**5.G.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). **5.G.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. **5.G.3** Understand that **attributes** belonging to a **category** of two-dimensional figures also belong to all subcategories of that category. **5.G.4** Classify two-dimensional figures in a **hierarchy** based on properties.
4	Draw and identify lines and angles, and classify shapes by properties of their lines and angles	**4.G.1** Draw **points, lines, line segments, rays, angles (right, acute, obtuse),** and **perpendicular** and **parallel lines.** Identify these in two-dimensional figures. **4.G.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. **4.G.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.
3	Reason with shapes and their attributes	**3.G.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. **3.G.2 Partition** shapes into parts with **equal areas**. Express the area of each part as a **unit fraction** of the whole.
2	Reason with shapes and their attributes	**2.G.1** Recognize and draw shapes having specified attributes, such as a given **number of angles** or a given **number of equal faces**.**5** Identify **triangles, quadrilaterals, pentagons, hexagons,** and **cubes.**[5] **5** Sizes are compared directly or visually, not compared by measuring. **2.G.2 Partition** a **rectangle** into **rows** and **columns** of same-size squares and count to find the total number of them. **2.G.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.
1	Reason with shapes and their attributes	**1.G.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. **1.G.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.**1**

		1 Students do not need to learn formal names such as —right rectangular prism. **1.G.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.
K	• Identify and describe shapes • Analyze, compare, create and compose shapes	**K.G.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*.** **K.G.2** Correctly name shapes regardless of their orientations or overall size. **K.G.3** Identify shapes as two-dimensional (lying in a plane, "**flat**") or three dimensional ("**solid**"). **K.G.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). **K.G.5** Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. **K.G.6** Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?"