Gwinnett County Public Schools Mathematics
2012- 2013 Fourth Grade – Curriculum Map

1st Quarter	2nd Quarter		3rd Quarter		4th Quarter	
Unit 1	Unit 1	Unit 3	Unit 4	Unit 6	Unit 7	Unit 8
Number and Operations	Number and Operations	Number and Operations	Number and Operations	Geometry	Measurement and Data	Preview
Whole Numbers, Part 1	**Whole Numbers, Part 2**	**Fractions , Adding and Subtracting**	**Fractions, Multiply and Divide**	**Geometry**	**Measurement**	**Whole Numbers**
Reading, Writing, Rounding, Comparing	Determining Multiples and Factors	Summing Unit Fractions	Multiplying Fractions by Whole Numbers	Identifying and Drawing Geometric Basics	Comparing Linear/Capacity/Mass	Evaluating/Interpreting Numerical Expressions
Adding and Subtracting Fluently	Determining Prime or Composite	Adding and Subtracting Mixed Nos., Like Den.	Solving Fraction X Whole Number Probs.	Classifying 2-D Figures	Solving Measurement Word Problems	Multiplying Multi-Digit Whole Numbers
Explaining Multiplication Calculations	Describing and Using Number/Shape Patterns	Solving Word Problems Involving Fractions	Finding Area by Summing Area of Parts	Identifying and Drawing Lines of Symmetry	Representing Meas. with Diagrams	Dividing up to 4-D by up to 2-D Whole Numbers
Multiplying Multi-Digit Numbers		Summing Unit Fractions			Applying Area and Perimeter	Illustrating and Explaining Division
	Unit 2		Unit 5			
Explaining Division Calculations	Number and Operations		Number and Operations		Solving Problems Using Line Plots	
Dividing Single Digit Divisors	**Fraction Equivalents**		**Fractions and Decimals**		Identifying, Drawing and Measuring Angles	
Explaining Multiplication as Comparison	Explaining Fraction Equivalence		Explaining Fraction/Decimal Equivalence		Relating Angles to a Circle	
Solving Multiplication and Division Problems	Comparing Fractions		Modeling Tenths and Hundredths		Explaining Angle Measure as Additive	
Solving Multi-Step Word Problems			Using Decimal Notation		Finding Unknown Angles	
Evaluation Answer Reasonableness			Comparing and Ordering Decimals			
Interpreting Remainders						

Standards for Mathematical Practice - Fourth Grade Specific

Mathematical Practices are listed with each grade's mathematical content standards to reflect the need to connect the mathematical practices to mathematical content in instruction.
The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy). ***Students are expected to:***

1. Make sense of problems and persevere in solving them.
In fourth grade, students know that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Fourth graders may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" They listen to the strategies of others and will try different approaches. They often will use another method to check their answers.

2. Reason abstractly and quantitatively.
Fourth graders should recognize that a number represents a specific quantity. They connect the quantity to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions, record calculations with numbers, and represent or round numbers using place value concepts.

3. Construct viable arguments and critique the reasoning of others.
In fourth grade, students may construct arguments using concrete referents, such as objects, pictures, and drawings. They explain their thinking and make connections between models and equations. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.

4. Model with mathematics.
Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Fourth graders should evaluate their results in the context of the situation and reflect on whether the results make sense.

5. Use appropriate tools strategically.
Fourth graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use graph paper or a number line to represent and compare decimals and protractors to measure angles. They use other measurement tools to understand the relative size of units within a system and express measurements given in larger units in terms of smaller units.

6. Attend to precision.
As fourth graders develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, they use appropriate labels when creating a line plot.

7. Look for and make use of structure.
In fourth grade, students look closely to discover a pattern or structure. For instance, students use properties of operations to explain calculations (partial products model). They relate representations of counting problems such as tree diagrams and arrays to the multiplication principal of counting. They generate number or shape patterns that follow a given rule.

8. Look for and express regularity in repeated reasoning.
Students in fourth grade should notice repetitive actions in computation to make generalizations Students use models to explain calculations and understand how algorithms work. They also use models to examine patterns and generate their own algorithms. For example, students use visual fraction models to write equivalent fractions.

Gwinnett County Public Schools Mathematics: Fourth Grade – Instructional Calendar 2012-2013 (1st Semester)			
1st Quarter		2nd Quarter	
Unit 1		Unit 1	Unit 3
Whole Numbers, Part 1		**Whole Numbers, Part 2**	**Fractions, Adding and Subtracting**
9.NBT.1 explain that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right (e.g., recognize that 700 ÷ 70 = 10 by applying concepts of place value and division) 10.NBT.2 read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form for places from hundredths through millions 11.NBT.2 compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results for comparisons 12.NBT.3 use place value understanding to round whole numbers to any place using tools such as a number line and/or charts 13.NBT.4 add and subtract multi-digit whole numbers fluently using the standard algorithm 14.NBT.5 illustrate and explain multiplication calculations by using equations, rectangular arrays, and/or area models 15.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 16.NBT.6 illustrate and explain division calculations by using equations, rectangular arrays, and/or area models	17.NBT.6 calculate 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 1.OA.1 explain a multiplication equation as a comparison and represent verbal statements of multiplicative comparisons as multiplication equations (e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5) 2.OA.2 solve multiplication and division word problems involving multiplicative comparison using drawings and equations (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison)** 3.OA.3 solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted and with a letter standing for the unknown quantity 4.OA.3 determine the reasonableness of answers using mental computation and estimation strategies, including rounding, when using the four operations 5.OA.3 explain the different meanings of the remainder in division problems	6.OA.4 determine multiples and factors for whole numbers 1-100 7.OA.4 determine whether a given whole number in the range 1-100 is prime or composite 8.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 (given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers; explain informally why the numbers will continue to alternate in this way) **Unit 2: Fractions Equivalents** 18.NF.1 explain why a fraction a/b is equivalent to a fraction (n x a/n x 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 19.NF.2 compare two fractions with different numerators and different denominators by creating common denominators (such as 1/8 and 3/8) or common numerators (such as 2/4 and 2/5) or by comparing to a benchmark fraction such as 1/2 20.NF.2 use the symbols >, =, or < to compare fractions and justify the conclusions by using a visual fraction model	21.NF.3 recognize that a fraction a/b with a > 1 as a sum of fractions 1/b 22.NF.3 model and explain addition and subtraction of fractions as joining and separating parts referring to the same whole 23.NF.3 decompose a fraction, by using a visual fraction model, into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation (e.g., 3/8 = 1/8 + 1/8 + 1/8; 3/8 = 1/8 + 2/8; 2 1/8 = 1 + 1 + 1/8; 8/8 = 7/8 + 1/8) 24.NF.3 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) 25.NF.3 solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators by using visual fraction models and equations to represent the problem

G—Geometry, MD—Measurement and Data, NBT—Number and Operations in Base Ten, NF—Number and Operations Fractions, OA—Operations and Algebraic Thinking; ** See Glossary, Table 2

Common Core Appendix: Table 2. Common multiplication and division situations.

	Unknown Product	Group Size Unknown ("How many in each group?" Division)	Number of Groups Unknown ("How many groups?" Division)
	$3 \times 6 = ?$	$3 \times ? = 18$, and $18 \div 3 = ?$	$? \times 6 = 18$, and $18 \div 6 = ?$
Equal Groups	There are 3 bags with 6 plums in each bag. How many plums are there in all? *Measurement example*. You need 3 lengths of string, each 6 inches long. How much string will you need altogether?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? *Measurement example*. You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? *Measurement example*. You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
Arrays,[4] Area[5]	There are 3 rows of apples with 6 apples in each row. How many apples are there? *Area example*. What is the area of a 3 cm by 6 cm rectangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? *Area example*. A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? *Area example*. A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?
Compare	A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? *Measurement example*. A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? *Measurement example*. A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue hat? *Measurement example*. A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
General	$a \times b = ?$	$a \times ? = p$, and $p \div a = ?$	$? \times b = p$, and $p \div b = ?$

[4]The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

[5]Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

Gwinnett County Public Schools Mathematics: Fourth Grade – Instructional Calendar 2012-2013 (2nd Semester)

3rd Quarter	4th Quarter	
Unit 4	Unit 7	
Fractions, Multiply and Divide	**Measurement**	
26.NF.4 apply and extend previous understanding of multiplication to multiply a fraction by a whole number 27.NF.4 recognize a fraction a/b as a multiple of 1/b (e.g., use a visual fraction model to represent 5/4 as the product 5 x (1/4), recording the conclusion by the equation 5/4 = 5 x (1/4)) 28.NF.4 understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number (e.g., use a visual fraction model to express 3 x (2/5) as 6 x (1/5), recognizing this product as 6/5; (In general, n x (a/b) = (n x a)/b)) 29.NF.4 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. For example, if each person at a party will eat 3/8 of a pound of roast beef and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?) **Unit 5: Fractions and Decimals** 30.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 (e.g., express 3/10 as 30/100 and add 3/10 + 4/100 = 34/100) *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.* 31.NF.6 use decimal notation for fractions with denominators 10 or 100 (e.g., rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram) 32.NF.7 read, write, order, and compare place value of decimals to hundredths, using <, >, or =, by reasoning about their size and justify the conclusions using a visual model **Unit 6: Geometry** 46.G.1 draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines and identify these in two-dimensional figures 47.G.2 examine and compare angles in order to classify and identify two-dimensional figures by their angles to include right triangles 48.G.2 classify two-dimensional figures based on the presence or absence of parallel or perpendicular line segments, or the presence or absence of angles of a specified size 49.G.3 identify and draw lines of symmetry for two-dimensional figures	33.MD.1 compare one unit to another within a single system of linear measurement and record measurement equivalents in a two-column table, including km, m, cm, yd, ft, in. (e.g., 1 ft is 12 times as long as 1 in; express the length of a 4 ft. snake as 48 in.) 34.MD.1 compare one unit to another within a single system of capacity measurement and record measurement equivalents in a two-column table, including l, ml, c, pt, qt, gal 35.MD.1 compare one unit to another within a single system of weight measurement and record measurement equivalents in a two-column table, including g, kg, lb, oz. 36.MD.2 solve word problems by applying the four operations to problems involving whole number, decimal and fractional distances, intervals of time, liquid volumes, masses of objects, and money 37.MD.2 represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale 38.MD.3 apply the area and perimeter formulas for rectangles in real world and mathematical problems 39.MD.4 create 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 (from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection)	40.MD.5 recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement 41.MD.5 recognize that an angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the faction 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 42.MD.5 recognize that an angle that turns through "n" one-degree angles is said to have an angle measure of "n" degrees 43.MD.6 measure and draw angles using tools such as a protractor or angle ruler 44.MD.7 model and explain angle measure as additive (e.g., 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) 45.MD.7 solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems by using an equation with a symbol for the unknown angle measure **Unit 8: Preview—Whole Numbers**

G—Geometry, MD—Measurement and Data, NBT—Number and Operations in Base Ten, NF—Number and Operations Fractions, OA—Operations and Algebraic Thinking