LaGrange School District 105
4th Grade Math Curriculum

Statement of Philosophy:

Mathematics is an integrated, balanced program strong in the acquisition of computational skills and the development of mathematical reasoning. To prepare students to be college and career ready, mathematics instruction must build procedural fluency from conceptual understanding. Students should develop the ability to solve problems and reason logically while working with various media and gaining mathematical competency. The mathematics curriculum is viewed as a continuum of introducing, developing, and extending skills. The program is structured yet flexible enough to meet each student's needs.

Mathematical Practices:

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. There are eight (8) practices outlined through the Common Core Math Standards:

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

For more detailed descriptions of each mathematics practice visit: http://www.corestandards.org/Math/Practice/

4th Grade Mathematics - Overall Emphasis

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

1. Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.
2. Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how

fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

3. Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

4th Grade Mathematics - CCSS Math Focus Strands

Operations and Algebraic Thinking

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

Number and Operations in Base Ten

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions

- 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.

Measurement and Data

- 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.

Geometry

- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

Unit 1: Number Sense

Timing: September

Big Ideas in Unit 1:

- Read and write numbers in standard form up to one million
- Compare two numbers with digits up to one million
- Read and write numbers in standard form, word form and expanded form up to one million
- 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
- Compare two numbers with digits up to one million
- Round whole numbers up to one million
- Explain how to round numbers, up to one million, to any given place value
- Add and subtract numbers up to a million using the standard algorithm
- Continue a given number or shape pattern using multiplication, addition, and subtraction

Unit 1 Math Standards and Conceptual Understandings:

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.

Unit 2: Multiplication Concepts

Timing: October – Mid-November

Big Ideas in Unit 2:

- Multiply four digit numbers by one digit
- Multiply two digits by two digits
- Write and explain a multiplication equation
- Represent a multiplication word problem using an equation with a variable
- Determine the appropriate operations in order to solve multi-step word problems
- Identify factor pairs of a whole number
- List multiples of a whole number
- Define prime and composite numbers
- Find the area and perimeter of a rectangle

Unit 2 Math Standards and Conceptual Understandings:

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 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 if given whole number in the range 1-100 is prime or composite.
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.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.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.
4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems

Unit 3: Division Concepts

Timing: Mid-November – Mid-January

Big Ideas in Unit 3:

- Justify place value as a digit ten times greater than the digit to its right
- Find whole number quotients and remainders using a variety of strategies
- Use multiplication and division to solve problems focusing on interpreting remainders
- Represent the context of a multiplication and division word problem using drawings and equations
- Solve multi-step word problems
- Use mental math and estimation to check work for accuracy

Unit 3 Math Standards and Conceptual Understandings:

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.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.
4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for 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. 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 if given whole number in the range 1-100 is prime or composite.
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.
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.
4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems

Unit 4: Fraction and Decimal Equivalence

Timing: Mid-January - February

Big Ideas in Unit 4:

- Explain why fractions are equivalent and create equivalent fractions
- Use models to explain why different fractions are equivalent
- Compare fractions by creating equivalent fractions with a common denominator
- Explain that comparing two fractions must refer to the same whole
- Explain the relationship between decimals and fractions
- Create equivalent fractions whose denominators are 10 and 100
- Make a line plot to display a data set involving fractions

Unit 4 Math Standards and Conceptual Understandings:

4.NF.3b Decompose a fraction into a sum of fractions with the same denominator in more than one way,
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,
4.NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators,
4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions
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.
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. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
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.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.

Unit 5: Fractions and Operations

Timing: March - April

Big Ideas in Unit 5:

- Decompose a fraction in multiple ways
- Add and subtract fractions with common denominators
- Convert a mixed number into an improper fraction
- Multiply a fraction by a whole number
- Represent fractions using various multiplication equations

Unit 5 Math Standards and Conceptual Understandings:

4.NF.3 Add/subtract fractions and add/subtract mixed numbers with like denominators; add and subtract fraction-based word problems; decompose fractions into a sum of fractions
4.NF.4 Apply understanding of multiplying by whole numbers to word problems; use visual models to demonstrate understanding of multiplying fractions by whole numbers
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.

Unit 6: Geometry

Timing: May

Big Ideas in Unit 6:

- Draw points, lines, line segments, and angles
- Measure and classify different angles
- Identify line-symmetric figures and draw lines of symmetry

Unit 6 Math Standards and Conceptual Understandings:
4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. **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 **4.MD.5** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint **4.MD.6** Measure angles in whole-number degrees using a protractor **4.MD.7** Recognize angle measure as additive. Solve addition and subtraction problems to find unknown angles **4.OA.5** Generate a number or shape pattern that follows a given rule.