LaGrange School District 105
3rd 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/

3rd Grade Mathematics - Overall Emphasis

In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

1. Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

2. Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

3. Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.
4. Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

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

3rd Grade Mathematics - CCSS Math Focus Strands

Operations and Algebraic Thinking
- Represent and solve problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- Multiply and divide within 100.
- Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Number and Operations in Base Ten
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions
- Develop understanding of fractions as numbers.

Measurement and Data
- 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.

Geometry
- Reason with shapes and their attributes.

Unit 1: Measurement and Data
Timing: September

Big Ideas in Unit 1:
- Tell and write time to the nearest minute
- Solve elapsed time to the nearest 1 hour and ½ hour
- Label the parts of a graph
- Read a picture and bar graph correctly to get information
- Answer one-step "how many more" and "how many less" problems using the graph
- Multiply and divide 0, 1's, 5's, and 10's using different strategies such as skip counting and explain my thinking.

Unit 1 Math Standards and Conceptual Understandings:

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.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets*.

3.OA.7c 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.

Unit 2: Place Value
Timing: October

Big Ideas in Unit 2:

Estimating and Rounding
- Define the words rounding and estimating
- Round a whole number to the nearest 10 and 100

Understanding Place Value to Perform Multi-Digit Arithmetic
- Decompose numbers within 100 (break numbers apart)
- Add/subtract within 100 using different strategies such as:
  - place value (partial sums and trade first); number line; number bonds
- Solve one-step problems using models, pictures, words, and numbers with addition and subtraction

Measurement and Data
- Measure liquid volumes and masses of objects using standard units (grams, kilograms, and liters)
- Estimate liquid volumes and masses of objects using standard units (grams, kilograms, and liters)
- Use models to represent the context of a measurement problems
- Solve problems involving liquid volumes and masses of objects

Unit 2 Math Standards and Conceptual Understandings:

3.NBT.1 Use place value understanding to round whole numbers to nearest 10 or 100.

3.NBT.2 Fluently add/subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction

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.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l)**.** Add, subtract 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

Unit 3: Multiplication and Division
Timing: November – Mid February

Big Ideas in Unit 3:
- Identify and explain patterns
- Use multiplication to figure out the total number of objects in an array or equal groups
- Use division to divide a set of objects into equal groups
- Use strategies to multiply one digit numbers by multiples of 10
- Find a missing number in a multiplication or division problem
- Use my understanding of multiplication to solve division problems
- Use properties of multiplication and division to solve problems
- Multiply and divide to solve word problems
- Multiply and divide within 100.

Unit 3 Math Standards and Conceptual Understandings:

UNDERSTAND MULTIPLICATION AND DIVISION
- **3.OA.9** - Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends*
- **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. *For example, describe a context in which a total number of objects can be expressed as 5 × 7*.
- **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. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8*
- **3.NBT.3** - Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

APPLY MULTIPLICATION AND DIVISION
- **3.OA.4** - Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*
- **3.OA.6** - Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8*
- **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. (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.)*
- **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.MD.2** - Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Multiply or divide to solve one-step word problems involving masses or volumes
- **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

Unit 4: Fractions
Timing: Mid-February – Mid-March

Big Ideas in Unit 4:
Fractions
- Recognize fractions as parts of a whole
- Understand the difference between numerators and denominators
- Understand that fractions can be represented on a number line
  - Represent a fraction on a number line from 0 to 1
  - Divide a number line into equal parts in order to represent a fraction on a number line

Compare fractions
- Understand what makes fractions equivalent
- Recognize and form simple equivalent fractions
- Express whole numbers as fractions
- Compare fractions that have the same numerator or the same denominator
- Justify the comparisons
- Divide shapes into equal parts using unit fractions to describe each part

Unit 4 Math Standards and Conceptual Understandings:

UNDERSTAND FRACTIONS
- **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
- **3.G.2** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape

APPLY FRACTIONS
- **3.NF.3** Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size

Unit 5: Perimeter and Area
Timing: Mid-March – Mid-April

Big Ideas in Unit 5:
- Use square units to measure area
- Find area by using square units laid side to side without gaps or overlaps
- Find areas by counting square units (customary and metric)
- Use multiplication and addition to solve for area
- Use skip counting and/or repeated addition to calculate area
- Solve problems involving areas of rectangles
- Find the area of a rectangle in a word problem using addition.

- Find the area of a rectangle in a word problem using an array.
- Solve for the perimeters of polygons when given various pieces of information.
- Calculate the perimeter of a polygon when I know the lengths of each side.
- Calculate the perimeter of a polygon with an unknown side.
- Calculate the perimeter of a polygon with unknown sides.

Unit 5 Math Standards and Conceptual Understandings:

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.
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.
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."

Unit 6: Geometry and Measurement
Timing: Mid-April - May

Big Ideas in Unit 6:
- Understand that all shapes within a category share similar attributes.
- Identify and describe shapes based on their attributes.
- Divide shapes into equal parts using unit fractions to describe each part.
- *Essential Vocabulary:* angle, vertex, right angle, ray, endpoint, polygon, triangle, pentagon, attribute, hexagon, quadrilateral, octagon, parallelogram, rectangle, parallel, rhombus, square, trapezoid

Unit 6 Math Standards and Conceptual Understandings:

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. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.