LaGrange School District 105
5th 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/

5th Grade Mathematics - Overall Emphasis

In Grade 5, instructional time should focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations; and (3) developing understanding of volume.

1. Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense. (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.)
2. Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.

3. Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.

5th Grade Mathematics - CCSS Math Focus Strands

Operations and Algebraic Thinking

- Write and interpret numerical expressions.
- Analyze patterns and relationships.

Number and Operations in Base Ten

- Understand the place value system.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.

Number and Operations—Fractions

- 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.

Measurement and Data

- 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.

Geometry

- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Classify two-dimensional figures into categories based on their properties.

Unit 1: Place Value & Decimal Computation

Timing: September (4 weeks)

Big Ideas in Unit 1:

- Determine how a digit's position affects its value
- Represent powers of 10 using exponents.
- Read, write, compare, and round decimals using understanding of place value
- Continue a given number or shape pattern using multiplication, addition, and subtraction

Unit 1 Math Standards and Conceptual Understandings:

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 & compare decimals to thousandths
5.NBT.4 Round decimals to the nearest thousandths
5.MD.1* Convert among different-sized standard measurement units within a given measurement system (metric system)

*standard addressed through multiple units

Unit 2: Order of Operations

Timing: October – Mid-November (6 weeks)

Big Ideas in Unit 2:

- Fluently multiply multi-digit whole numbers using the standard algorithm
- Divide a 4-digit dividend by a 2-digit divisor to find a quotient
- Use equations, arrays, and/or models to solve and explain division problems
- Explain the relationship between multiplication and division to solve division problems. (R)
- Use order of operations including parenthesis, brackets, or braces
- Write mathematical expressions using mathematical symbols and the order of operations

Unit 2 Math Standards and Conceptual Understandings:

5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm
5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digits
5.OA.1 Write and interpret numerical expressions
5.OA.1 Parentheses, Brackets & 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.MD.1* Convert among different-sized standard measurement units within a given measurement system (metric system)

*standard addressed through multiple units

Unit 3: Decimal Operations

Timing:

Big Ideas in Unit 3:

- Add and subtract decimals to thousandths
- Multiply decimals to thousandths
- Divide decimals to thousandths
- Use models or drawings to explain how to solve addition, subtraction, multiplication, and division of decimals

Unit 3 Math Standards and Conceptual Understandings:

5.NBT.B Perform operations with multi-digit whole number and with decimals to the hundredths
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
5.OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols
5.MD.1* Convert among different-sized standard measurement units within a given measurement system (metric system)

*standard addressed through multiple units

Unit 4: Add and Subtract Fractions

Timing: 10 weeks

Big Ideas in Unit 4:

- Add and subtract fractions with unlike denominators
- Solve word problems with addition and subtraction of fractions

Unit 4 Math Standards and Conceptual Understandings:

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. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12.*
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.

Unit 5: Multiplying and Dividing Fractions

Timing:

Big Ideas in Unit 5:

- Multiply fraction or a whole number by fraction
- Divide unit fractions by whole numbers and whole numbers by unit fractions
- Interpret fractions as division of whole numbers using visual models
- Understand and explain that multiplication of fractions involves resizing or scaling
- Find the area of a rectangle that has fractional side lengths
- Solve real-world multiplication and division problems using fractions and mixed numbers

Unit 5 Math Standards and Conceptual Understandings:

5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction
5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent problem.
5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
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
5.NF.5 Interpret multiplication as scaling (resizing)
5.MD.1* Convert among different-sized standard measurement units within a given measurement system (metric system)

*standard addressed through multiple units

Unit 6: Volume

Timing: April (4 weeks)

Big Ideas in Unit 6:

- Understand the term "unit cube" and explain that volume is a measurement of space inside a solid, 3-D shape
- Estimate and calculate volume in different units
- Determine volume using multiplication and/or addition
- Solve volume related word problems

Unit 6 Math Standards and Conceptual Understandings:

5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (whole, mixed numbers and decimals)
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.

Unit 7: Geometry

Timing: May (4 weeks)

Big Ideas in Unit 7:

- Identify attributes and categories of two-dimensional figures.
- Classify two-dimensional figures in a hierarchy according to their attributes.
- Plot a given point on the plane using ordered pairs.
- Represent and interpret real world and math problems by graphing points on the coordinate plane.

Unit 7 Math Standards and Conceptual Understandings:

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.
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.OA.3 Generate numerical patterns using two given rules. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
5.G.4 Classify two-dimensional figures in a hierarchy based on properties.