5th Grade Mathematics - Elmbrook School District

Curriculum Area: Mathematics	Grade Level: 5
Date last reviewed: December 9, 2015	Board approval date: February 3, 2016

Desired Results:

Course Description and Purpose: This framework for improving student learning focuses on high-quality math standards. It provides teachers with a clear set of math concepts and skills for students to understand and be able to due by the end of the school year.

Enduring Understanding:	Essential Questions:
Operations and Algebraic Thinking • Patterns can grow and repeat and be generalized. • Flexible methods of computation involve grouping numbers in strategic ways. • Real world situations can be represented symbolically and graphically. **Numbers and Operations in Base Ten** • Numbers can represent quantity, position, location, and relationships and can be represented using variables. • Understanding the position of a digit within a number determines its value. • Computation involves taking apart and combining numbers using a variety of approaches, and	**Operations and Algebraic Thinking** • How are problems solved when not all information is known? • How are patterns used in making sense of mathematics? **Numbers and Operations in Base Ten** • How are numbers used to convey information and solve problems? • How do mathematicians use numbers to express relationships? • Why do algorithms work?

algorithms allow mathematicians to be efficient in solving problems. **Numbers and Operations- Fractions** • Fractions are used to represent a part of a whole. • Proportional relationships express how quantities change in relationship to each other. **Measurement and Data** • Standard units of measure enable people to interpret results or data. • Analyzing geometric relationships develops reasoning and justification skills. **Geometry** • Objects can be described and compared using their geometric attributes. • Geometry and spatial sense offer ways to interpret and reflect on our physical environment.	**Numbers and Operations-Fractions** • How are rational numbers used to convey and represent information? • Why is it important to know part of a number? **Measurement and Data** • How does what we measure influence how we measure? How does how we measure influence what we measure? • What is the value of a precise language and precision tools in communicating ideas? • How can data be collected, interpreted and communicated? **Geometry** • How is geometry present and used?

Assessment Evidence:

Formative Assessments:	Summative Assessments:

Unit Pre-Assessments Quarterly Fact Fluency Assessments RSAs/Exit Slips	Unit Post-Assessments MAP (Measures of Academic Progress) Testing Learning Models Quarterly Fact Fluency Assessments

Instructional Outline:

Mathematical Practice 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.

Operations and Algebraic Thinking (OA)		
Write and interpret numerical expressions (5.OA.1-2)		
Standards:	**I Can Statements:**	**Essential Elements:**
OA.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	I can evaluate (solve) numerical expressions with parentheses, brackets and braces.	Not applicable
OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without	I can apply the Order of Operations to evaluate expressions with parentheses, solve number	Not applicable

evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	sentences, write a number sentence that matches a word problem, or insert parentheses to make a true number sentence.	
Analyze patterns and relationships (5.OA.3)		
Standards:	**I Can Statements:**	**Essential Elements:**
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. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.	I can solve rate number stories by creating and analyzing tables and graphs. I can generate two numerical patterns given two given rules. I can identify relationships between corresponding terms.	**EE.5.OA.3** Identify and extend numerical patterns.
Number & Operations in Base Ten (NBT)		
Understand the place value system (5.NBT.1-4)		
Standards:	**I Can Statements:**	**Essential Elements:**
NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the	I can represent using whole number exponents and rename powers of 10 and demonstrate that I	**EE.5.NBT.1** Compare numbers up to 99 using base ten models

place to its right and 1/10 of what it represents in the place to its left.	understand that each place value space is 10 times greater than the place to its right and 1/10th of the place to its left.	
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.	I can use basic facts knowledge to solve extended multiplication facts. I can explain patterns with multiplication with powers of 10 and explain patterns in the placement of the decimal point when it is multiplied or divided by power of 10. Use whole-number exponents to denote powers of 10	**EE.5.NBT.2** Use the number of zeros in numbers that are powers of 10 to determine which values are equal, greater than, or less than.
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 × (1/100) + 2 × (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.	I can read and write numbers from the billions place to the thousandths place. I can read, write, and compare decimals to the thousandths place using >, <, and =.	**EE.5.NBT.3** Compare whole numbers up to 100 using symbols (<, >, =)
NBT.4 Use place value understanding to round decimals to any place.	I can round numbers to any place.	**EE.5.NBT.4** Round two-digit whole numbers to the nearest 10 from 0-90.
Perform operations with multi-digit whole numbers and with decimals to hundredths (5.NBT.5-7)		
Standards:	**I Can Statements:**	**Essential Elements:**

NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.	I can fluently multiply multi-digit whole numbers using the standard algorithm	**EE.5.NBT.5** Multiply whole numbers up to 5x5.
NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-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.	I can divide a 4 digit whole number by up to a 2-digit divisor, generate an answer in the form of a whole number or mixed number, and check my calculation using multiplication. I can write an open number sentence using a variable to match a division number story and solve. I can illustrate the division calculation by rectangular arrays and/or area models	**EE.5.NBT.6-7** Illustrate the concept of division using fair and equal shares.
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.	I can add and subtract multi-digit numbers and decimals to the hundredths place and explain my reasoning. I can solve two-step number stories with addition and subtraction of whole numbers and decimals and write the corresponding open number sentence. I can multiply and divide decimals to hundredths using a variety of strategies (models, drawings and properties of operations)	

Number & Operations - Fractions (NF)		
Use equivalent fractions as a strategy to add and subtract fractions (5.NF.1-2)		
Standards:	**I Can Statements:**	**Essential Elements:**
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. (In general, a/b + c/d = (ad + bc)/bd.)	I can name and describe equivalent fractions. I can add and subtract mixed numbers with unlike denominators including those in word problems.	**EE.5.NF.1** Identify models of halves (½, 2/2) and fourths (¼, 2/4, ¾, 4/4).
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. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.	I can add and subtract fractions with unlike denominators, including those in number stories, and simplify my answers to lowest terms. I can use benchmark fractions to estimate the sum or difference of fractions and determine if an answer is reasonable.	**EE.5.NF.2** Identify models of thds (, , 3/3) and tenths (1/10, 2/10, 3/10, 4/10, 5/10, 6/10, 7/10, 8/10, 9/10, 10/10)
Apply and extend previous understanding of multiplication and division (5.NF.3-7)		
Standards:	**I Can Statements:**	**Essential Elements:**
NF.3 Interpret a fraction as division of the	I can interpret a fraction as division	Not applicable.

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. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	of the numerator by the denominator. I can solve word problems involving the division of whole numbers resulting in answers in the form of fractions or mixed numbers. I can interpret the product of a fraction multiplied by a whole number.	See **EE.6.RP.1**
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 $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.) (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.	I can multiply a fraction by a fraction, including those in word problems, and write a word problem that matches a situation. I can find the area of a rectangle with fractional dimensions. I can find the area of a rectangle with fractional sides by tiling (grid paper).	Not applicable

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.	I can compare 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 (5X4 is twice as big as 5X2). I can explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number. I can explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number. I can explain why, when creating an equivalent fraction, multiplying a numerator and denominator by the same number is multiplying by one.	Not applicable
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.	I can multiply a fraction by a whole number and mixed numbers, including those in word problems.	Not applicable See **EE.10.N-CN.2.b**
NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. a. Interpret division of a unit fraction by a non-zero whole number,and compute such quotients. For	I can interpret a fraction as division of the numerator by the denominator.	Not applicable See **EE.7.NS.2.b**

example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient.Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4. 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. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?	I can interpret division of a whole number by a unit fraction (½, ,) using models and the relationship between multiplication and division. I can divide a whole number by a fraction and divide a fraction by a whole number, including those in real-world problems.	
Measurement & Data (MD)		
Convert like measurement units within a given measurement system (5.MD.1)		
Standards:	**I Can Statements:**	**Essential Elements:**
MD.1 Convert among different-sized standard measurement units within a given	I can convert measurements within the US Customary and the Metric	**EE.5.MD.1.a** Tell time using an analog or digital clock to

measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	system to find equivalent amounts, including those in multi-step word problems.	the half or quarter hour.
		EE.5.MD.1.b Use standard units to measure weight and length of objects.
		EE.5.MD.1.c Indicate relative value of collections of coins.
Represent and interpret data (5.MD.2)		
Standards:	**I Can Statements:**	**Essential Elements:**
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. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	I can make and interpret line plots, including those representing fractional measurements (halves, fourths, eighths)	**EE.5.MD.2** Represent and interpret data on a picture, line plot, or bar graph.
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition (5.MD.3-5)		
Standards:	**I Can Statements:**	**Essential Elements:**
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	I can recognize that 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.	**EE.5.MD.3** Identify common three-dimensional shapes

measure volume. b. 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.	I can recognize 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	
MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	I can measure volume by counting unit cubes, using cubic cm, cubic in., cubic ft., and improvised units.	**EE.5.MD.4-5** Determine the volume of a rectangular prism by counting units of measure (unit cubes).
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 × w × h and V = b × 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	I can represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. I can identify the length, width and height of a rectangular prism to calculate the area of its base, and then find its volume. I can find the volume of a solid which is made up of two or more adjacent rectangular prisms.	

volumes of the non-overlapping parts, applying this technique to solve real world problems.		
Geometry (G)		
Graph points on the coordinate plane to solve real-world problems (5.G.1-2)		
Standards:	**I Can Statements:**	**Essential Elements:**
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).	I can use a pair of perpendicular number lines, called axes, to define a coordinate system with the origin being (0,0) I can 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.	**EE.5.G.1-4** Sort two-dimensional figures and identify the attributes (angles, number of sides, corners, color) they have in common.
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.	I can represent real world and math problems by graphing points and can interpret coordinate values of the points.origin, and the coordinates of a defined coordinate	

	system. I can interpret coordinate values of points in the context of the situation.	
Classify two-dimensional figures into categories based on their properties (5.G.3-4)		
Standards:	**I Can Statements:**	**Essential Elements:**
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.	I can describe and compare attributes of polygons and classify polygons based on those attributes. I can describe and calculate perimeter and area of a rectangle.	**EE.5.G.1-4** Sort two-dimensional figures and identify the attributes (angles, number of sides, corners, color) they have in common.
G.4 Classify two-dimensional figures in a hierarchy based on properties.	I can classify two-dimensional figures in a hierarchy based on properties.	

Resources
ALEKS aleks.com **A**ssessment and **LE**arning in **K**nowledge **S**paces is a web-based learning system. It uses adaptive questioning to quickly and accurately determine exactly what a student knows and doesn't know in a course. ALEKS then instructs the student on the topics that the student has demonstrated that they are ready to learn and reassesses the student on mastered topics throughout the course to ensure the topic concept is retained. All domains and standards are addressed through this online learning system. Use in Grades 3 - 5 as a supplemental resource tool. **Front Row frontrowed.com**

Front row is an online learning system. It uses adaptive questioning to determine and deliver the right lesson at the right time to personalize to the individual student. All domains and standards are addressed through this online learning system. Use in Grades K-5 as an intervention or enrichment tool.

Dreambox dreambox.com
Dreambox is an online learning system. It uses adaptive questioning to determine and deliver the right lesson at the right time to personalize to the individual student. All domains and standards are addressed through this online learning system. Use in Grades K-5 as an intervention or enrichment tool.

Khan Academy khanacademy.org
Khan Academy is an online learning resource. It offers practice exercises, instructional videos, and a personalized learning system. The math missions is adaptive to guide learners in their strengths and learning gaps. All domains and standards are addressed through this online learning system. Use in Grades K-5 as a supplemental resource tool.

TenMarks tenmarks.com
TenMarks is an online learning system. It is a personalized self-paced system that offers customized assignments to meet students' needs towards mastery of the domains. All domains and standards are addressed through this online learning system. Use in Grades 1-5 as a supplemental resource tool.

Xtra Math xtramath.org
Xtra Math is an online math fact fluency program that helps students master addition, subtraction, multiplication, and division facts. Two domains, Operations and Algebraic Thinking and Number and Operations in Base Ten, are addressed. Use in Grades 2-5 as a supplemental resource tool.

Flash To Pass
This is an app for basic math fact fluency practice in all four operations. It is designed for the iPhone and iPad. Two domains, Operations and Algebraic Thinking and Number and Operations in Base Ten, are addressed. Use in Grades 2-5 as a supplemental tool.

Do The Math
Designed to support struggling students in Grades 1-5, Do The Math is organized into 13 scaffolded modules that focus on whole numbers and fractions.

Vizzle
Vizzle is on online researched-based program that provides a library of more than 14,000 lessons and the tools and media to customize them or create your own from scratch. The lessons can be tailored to any grade level, assigned to any student, and played on iPad or Android tablets, laptop or desktop computers. Data is tracked automatically. This award-winning Special Education Software is developed collaboratively with educators.

Scholastic Fastt Math
Fastt Math is an online program for students in Grades 2 and beyond; both those who are accelerating their acquisition of math facts as well as those who are struggling to catch up. FASTT Math's adaptive technology creates an individualized learning progression for every student, and embedded assessment ensures math fact mastery.

Learn Zillion
LearnZillion is a learning platform that combines video lessons, assessments, and progress reporting. Each lesson highlights a Common Core standard, starting with math in grades 3-9.

Front Row Inquiry
Inquiry based lessons are cross-curricular activities that build conceptual understanding of mathematical topics while students explore real-world scenarios! In Front Row's Inquiry based lessons, students develop the questions to answer and work together to find solutions. These lessons encourage collaboration, critical thinking, and productive struggle among students to increase student engagement and a much deeper understanding of math concepts.

Everyday Math Resources
Everyday Mathematics is a comprehensive Pre-K through Grade 6 mathematics program engineered for the Common Core State Standards. Developed by The University of Chicago, School Mathematics Project, the *Everyday Mathematics* spiral curriculum continually reinforces abstract math concepts through concrete real-world applications.