

4th Grade Mathematics (Elmbrook School District)

Curriculum Area: Mathematics	Grade Level: 4
Date last reviewed: December 15, 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 do by the end of the school year.

Enduring Understanding:	Essential Questions:
<p>Number and Operations</p> <ul style="list-style-type: none"> ● Numbers can represent quantity, position, location and relationships and can be classified by attributes. ● Understanding the position of a digit within a number determines its value, which is based on groups of ten in our number system. ● The nature of a situation determines when to estimate or when to find an exact answer. ● Computation involves taking apart, combining, and grouping numbers using a variety of approaches. <p>Operations & Algebraic Thinking</p>	<p>Number and Operations</p> <ul style="list-style-type: none"> ● How do mathematicians use numbers to express relationships? <p>Operations & Algebraic Thinking</p> <ul style="list-style-type: none"> ● To what extent are patterns used in making

- Patterns can be found in many forms and generalized in other situations.
- Number patterns and relationships can be represented in a variety of ways.

Geometry

- Objects can be described and compared using their geometric attributes.
- Points, lines and planes are the foundations of geometry.

Measurement & Data

- Standard units provide common language for communication of measurements.
- The nature of a situation determines the method to collect and display data.

Fractions

- Fractions, decimals and percents express a relationship between parts and a whole.

sense of mathematics in our world?

Geometry

- How do geometric shapes make up the world around us?
- How is geometry useful in our daily lives? (construction, directions, etc.)

Measurement & Data

- How are tools of measurement useful in our daily lives?
- In what contexts is data useful and why is it important to analyze its strengths and weaknesses?

Fractions

- Why is it important to know part of a number?

Assessment Evidence:

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

Instructional Outline:

Mathematical Practice Standards
<ol style="list-style-type: none"> 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)		
Use the four operations with whole numbers to solve problems (4.OA.1-3)		
Standards:	I Can Statements:	Essential Elements:
OA.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ 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	I can compare factors and products in a multiplication number sentence.	EE.4.OA.1-2. Demonstrate the connection between repeated addition and multiplication.

multiplication equations.		
OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	I can multiply or divide to solve word problems involving multiplicative comparison by using drawings or writing equations with a variable.	
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.	<p>I can solve multi-step word problems using all operations and write a corresponding number sentence using a variable for the unknown.</p> <p>I can interpret remainders in a division story problem.</p> <p>I can assess the reasonableness of answers using mental computation and estimation strategies including rounding (all operations).</p>	EE.4.OA.3. Solve one-step real-world problems using addition or subtraction within 100.
Gain familiarity with factors and multiples (4.OA.4)		
Standards:	I Can Statements:	Essential Elements:
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 whether a given whole number in the range 1-100 is prime or composite.	<p>I can compare factors and products in a multiplication number sentence.</p> <p>I can find factor pairs and write a list of factors for any number up to 100.</p> <p>I can determine whether a whole</p>	EE.4.OA.4. Show one way to arrive at a product.

	<p>number up to 100 is prime or composite.</p> <p>I can write multiples of single digit numbers, determine whether a given number is a multiple of a one-digit number, and recognize and determine that a whole number is a multiple of each of its factors.</p>	
Generate and analyze patterns (4.OA.5)		
Standards:	I Can Statements:	Essential Elements:
<p>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. <i>For example, 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.</i></p>	<p>I can generate a number or shape pattern using a rule or find the rule, continue the pattern, and explain my thinking.</p> <p>I can notice and identify features of a pattern that was created by a rule.</p>	<p>EE.4.OA.5. Use repeating patterns to make predictions.</p>
Number & Operations in Base Ten (NBT)		
Generalize place value understanding for multi-digit whole numbers (4.NBT.1-3)		
Standards:	I Can Statements:	Essential Elements:
<p>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. For example, recognize that $700/70 = 10$ by applying concepts of place value and</p>	<p>I can demonstrate that each place value space is 10 times greater than the place to its right.</p>	<p>Not applicable. See EE.5.NBT.1.</p>

division.		
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 greater than, less than, and equal symbols to record the results of comparisons.	<p>I can demonstrate that each place value space is 1/10 of the place to its left.</p> <p>I can write whole numbers in expanded form.</p> <p>I can compare multi digit numbers.</p>	EE.4.NBT.2. Compare whole numbers to 10 using symbols (<, >, =).
NBT.3 Use place value understanding to round multi-digit whole numbers to any place.	<p>I can round numbers to the billions places.</p> <p>I can round numbers to the hundredths place.</p>	EE.4.NBT.3. Round any whole number 0-- 30 to the nearest ten.
Use place value understanding and properties of operations to perform multi-digit arithmetic (4.NBT.4-6)		
Standards:	I Can Statements:	Essential Elements:
NBT.4 Fluently add and subtract multi digit whole numbers using the standard algorithm.	<p>I can add multi-digit numbers using the standard algorithm.</p> <p>I can subtract multi-digit numbers with the standard algorithm.</p>	EE.4.NBT.4. Add and subtract two-- digit whole numbers.
NBT.5 Multiply a whole number (up to) a 4-digit number by a 1-digit number using strategies based on place value and the properties of operations, and multiply two 2-digit numbers using strategies based on place value and the properties of operations. Illustrate and explain the multiplication	<p>I can estimate products.</p> <p>I can use basic fact knowledge to solve extended multiplication facts.</p> <p>I can multiply (up to) a 4-digit number by a 1-digit number using</p>	Not applicable. See EE.4.OA.1.

<p>calculation using equations, rectangular arrays, and/or area models.</p>	<p>words, equations, arrays, and/or number models.</p> <p>I can multiply 2-digit by 2-digit numbers using words, equations, arrays, and/or number models..</p> <p>I can illustrate and explain multiplication using words, equations, arrays, and/or number models.</p>	
<p>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. Illustrate and explain the calculation by using equations, arrays, and/or area models.</p>	<p>I can estimate quotients.</p> <p>I can divide a 4-digit whole number by a 1 and 2-digit divisor.</p> <p>I can generate a quotient in the form of a whole number, mixed number and decimal.</p> <p>I can interpret remainders in a division number story.</p> <p>I can illustrate and explain division using words, equations, arrays, and/or number models.</p>	<p>Not applicable.</p>
<p>Number and Operations - Fractions (NF)</p>		
<p>Extend understanding of fraction equivalence and ordering (4.NF.1-2)</p>		
<p>Standards:</p>	<p>I Can Statements:</p>	<p>Essential Elements:</p>
<p>NF.1 Explain why a fraction a/b is equivalent to a fraction $(n*a)/(n*b)$ by using visual fraction models, with attention to how the</p>	<p>I can explain why a fraction a/b is equivalent to a fraction $(n*a)/(n*b)$ by using visual fraction models,</p>	<p>EE.4.NF.1-2. Identify models of one half ($\frac{1}{2}$) and one fourth ($\frac{1}{4}$).</p>

<p>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.</p>	<p>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.</p>	
<p>NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.</p>	<p>I can order and compare fractions with unlike numerators and denominators using $>$, $<$, or $=$ by thinking about benchmark fractions or creating equivalent fractions and can recognize that comparisons are valid only when the two fractions refer to the same whole.</p>	
<p>Build fractions from unit fractions by applying and extending previous understanding of operations on whole numbers (4.NF.3-4)</p>		
<p>Standards:</p>	<p>I Can Statements:</p>	<p>Essential Elements:</p>
<p>NF.3 Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$</p> <ul style="list-style-type: none"> a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each 	<p>I can understand the addition and subtraction of fractions as joining and separating parts referring to the same whole.</p> <p>I can add and subtract fractions and mixed numbers with like denominators</p>	<p>EE.4.NF.3. Differentiate between whole and half.</p>

<p>decomposition by an equation. Justify decompositions e.g. by using a visual fraction model.</p> <p>c. Add and subtract mixed numbers with like denominators eg by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction.</p> <p>d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, eg by using visual fraction models and equations to represent the problem.</p>	<p>I can solve word problems involving fractions with like denominators using addition and subtraction.</p> <p>I can show more than one way to break apart a fraction into the sum of two or more fractions using an equation or a visual fraction model.</p>	
<p>NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>a. Understand a fraction a/b as a multiple of $1/b$.</p> <p>b. Understand a multiple of a/b as a multiple of $1/b$ and use this understanding to multiply a fraction by a whole number.</p> <p>c. Solve word problems involving multiplication of a fraction by a whole number eg by using visual fraction models and equations to represent the problem.</p>	<p>I can understand a fraction a/b as a multiple of $1/b$ ($5/4 = 5 * (1/4)$)</p> <p>I can use multiples, a number line, or a visual model to multiply a fraction by a whole number, including those in number stories.</p> <p>I can solve a word problem involving multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem.</p>	<p>Not applicable. See EE.4.OA.1-2 and EE.5.NBT.5</p>
<p>Understand decimal notation for fractions and compare decimal fractions (4.NF.5-7)</p>		
<p>Standards:</p>	<p>I Can Statements:</p>	<p>Essential Elements:</p>

<p>NF.5 Express a fraction with a denominator 10 as an equivalent fraction with a denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.</p>	<p>I can convert fractions from tenths to hundredths and from hundredths to tenths.</p> <p>I can add fractions containing both tenths and hundredths.</p>	<p>Not applicable. See EE.7.NS.2.c-d.</p>
<p>NF.6 Use decimal notation for fractions with denominators of 10 and 100.</p>	<p>I can convert fractions to decimals and decimals to fractions (tenths and hundredths).</p>	
<p>NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, $<$ and justify the conclusions by using a visual model.</p>	<p>I can compare decimals to the hundredths place using $<$, $>$, and $=$. I can read and write numbers to the hundredths place.</p>	

Measurement and Data (MD)		
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit (4.MD.1-3)		
Standards:	I Can Statements:	Essential Elements:
<p>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. Record measurement equivalents in a 2-column table.</p>	<p>I can find equivalent measurement conversions in the US Customary System, including those with fractions and those in a number stories.</p> <p>I can find equivalent measurement</p>	<p>EE.4.MD.1. Identify the smaller measurement unit that comprises a larger unit within a measurement system (inches/foot, centimeter/meter, minutes/hour).</p>

	<p>conversions in the Metric System, including those with decimals and those in number stories.</p> <p>I can record measurement equivalents in a 2-column table.</p>	
<p>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. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.</p>	<p>I can use the four operations to solve number stories involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems that require expressing measurements given in a larger unit in terms of a smaller unit</p>	<p>EE.4.MD.2.a. Tell time using a digital clock. Tell time to the nearest hour using an analog clock.</p> <p>EE.4..MD.2.b. Measure mass or volume using standard tools.</p> <p>EE.4.MD.2.c. Use standard measurement to compare lengths of objects.</p> <p>EE.4.MD.2.d. Identify coins (penny, nickel, dime, quarter) and their values.</p>
<p>MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i></p>	<p>I can use a formula to calculate the perimeter and the area of a rectangle, including those in number stories.</p> <p>When the area is known, I can find a missing length or width of a rectangle.</p>	<p>EE.4.MD.3. Determine the area of a square or rectangle by counting units of measure (unit squares).</p>
Represent and interpret data (4.MD.4)		
Standards:	I Can Statements:	Essential Elements:

<p>MD.4 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i></p>	<p>I can make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$).</p> <p>I can solve problems involving addition and subtraction of fractions by using information presented in line plots.</p>	<p>EE.4.MD.4.a. Represent data on a picture or bar graph given a model and a graph to complete.</p> <p>EE.4.MD.4.b. Interpret data from a picture or bar graph.</p>
<p>Geometric Measurement- understand concepts of angle and measure angles (4.MD.5-7)</p>		
<p>Standards:</p>	<p>I Can Statements:</p>	<p>Essential Elements:</p>
<p>MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.</p> <ol style="list-style-type: none"> An angle is measured with reference to a circle with its center at the common endpoint of the rays by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that “one degree angle” and can be used to measure angles. An angle that turns through n one degree angles is said to have an angle measure of n degrees. 	<p>I can recognize angles as shapes that are formed wherever two rays share a common endpoint and are measured with a reference to a circle.</p>	<p>EE.4.MD.5. Recognize angles in geometric shapes.</p>
<p>MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.</p>	<p>I can use a protractor to measure angles in whole number degrees.</p> <p>I can sketch angles of specified measure.</p>	<p>EE.4.MD.6. Identify angles as larger and smaller.</p>

<p>MD.7 Recognize angle measure as additive. 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. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.</p>	<p>I can recognize angle measure as additive.</p> <p>I can solve addition and subtraction problems to find unknown angles.</p>	<p>Not applicable. See EE.4.G.2.a.</p>
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Geometry (G)		
Draw and identify lines and angles, and classify shapes by properties of their lines and angles (4.G.1-3)		
Standards:	I Can Statements:	Essential Elements:
<p>G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in 2-dimensional figures.</p>	<p>I can draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.</p> <p>I can identify points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines in 2 dimensional figures.</p>	<p>EE.4.G.1. Recognize parallel lines and intersecting lines.</p>
<p>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</p>	<p>I can classify 2-dimensional figures based on lines (parallel/perpendicular) and angles (acute, obtuse, right).</p>	<p>EE.4.G.2. Describe the defining attributes of two-dimensional shapes.</p>

<p>identify right triangles.</p>	<p>I can identify and name polygons.</p> <p>I can identify, measure, and draw angles. (right, acute, obtuse, straight, reflexive)</p> <p>I can classify 2-dimensional figures based on angle size and type. I can identify right triangles.</p>	
<p>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. Identify line-symmetric figures, and draw lines of symmetry.</p>	<p>I can identify lines of symmetry in a 2-dimensional figure.</p> <p>I can draw lines of symmetry in a 2-dimensional figure.</p>	<p>EE.4.G.3. Recognize that lines of symmetry partition shapes into equal areas.</p>

Resources
<p>ALEKS aleks.com</p> <p>Assessment and LEarning in Knowledge Spaces 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.</p> <p>Dreambox dreambox.com</p> <p>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.</p>

Front Row frontrowed.com

Front row is an online learning system. Through assessments, the learning system adapts to the individual learner by building off student strengths and addressing student growth areas. All domain and standards are addressed. Use in Grades K - 5 as a supplemental resource tool.

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.

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.

