

East Penn School District
Elementary Curriculum

A Planned Course Statement
for

4th Grade Mathematics

Length of Period (mins.) 60

Periods per Cycle: 5

Length of Course (yrs.) 1.0

Adopted: June 28, 2010

Revised: April, 2013

Developed by:

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Description of Course

Course Title: K-5 Mathematics

Description:

The East Penn School District Mathematics curriculum will balance the learning of both content and process. The content consists of topics in numbers and operations, measurement, geometry, statistics and probability, and algebra. The processes will focus on problem solving, communication, representation, reasoning and proof, and connections. This curriculum will reflect 21st century skills such as collaboration, critical thinking, and the effective use of technology to prepare students to become lifelong learners and contributors to a global society.

Goals:

1. To use technology as a tool to enrich learning and to enhance achievement.
2. To utilize a differentiated project-based approach grounded through student achievement data that reflects the needs of all learners.
3. To provide career exploration opportunities throughout the mathematics curriculum scope and sequence.
4. To provide a rigorous and relevant learning experience that enables students to meet or exceed state standards and to develop 21st century skills.
5. To encourage and foster collaborative home and school relationships that support students' achievement in mathematics.

Requirements:

None

Key to Levels of Achievement (Listed with each learning objective)

Awareness (A):	Students are introduced to concepts, forms, and patterns.
Learning (L):	Students are involved in a sequence of steps and practice activities which involved further development and allow evaluation of process.
Understanding (U):	Students demonstrate ability to apply acquired concepts and skills to individual assignments and projects on an independent level.
Reinforcement (R):	Students maintain and broaden understanding of concepts and skills to accomplish tasks at a greater level of sophistication

Pennsylvania Standards For Mathematical Practice

- Make sense of and persevere in solving complex and novel mathematical problems.
- Use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.
- Communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.
- Apply mathematical knowledge to analyze and model situations/relationships using multiple representations and appropriate tools in order to make decisions, solve problems, and draw conclusions.
- Make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies.

Unit	Num	Objective	Level	Content	Evaluation	Standard
M04.A-T Numbers and Operations in Base Ten	1	Generalize place value understanding for multi-digit whole numbers.	U/R	<ul style="list-style-type: none"> • Apply place-value and numeration concepts to compare, find equivalencies, and round. • Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right. <i>Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.</i> • Read and write whole numbers in expanded, standard and word form through 1,000,000. • Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols. • Round multi-digit whole numbers (through 1,000,000) to any place. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	CC.2.1.4.B.1 Apply place value concepts to show an understanding of multi-digit whole numbers.
	2	Use place value understanding and properties of operations to perform multi-digit arithmetic.	U/R	<ul style="list-style-type: none"> • Use operations to solve problems. • Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000). • Multiply a whole number of up to four digits by a one-digit whole number and multiply 2 two-digit numbers. • Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders. • Estimate the answer to addition, subtraction, and multiplication problems using whole numbers through six digits (for multiplication, no more than 2 digits \times 1 digit, excluding powers of 10). 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	CC.2.1.4.B.2 Use place value understanding and properties of operations to perform multi-digit arithmetic.

M04.A-F Numbers and Operations - Fractions	3	Extend understanding of fraction equivalence and ordering.	L/U	<ul style="list-style-type: none"> • Find equivalencies and compare fractions. • Recognize and generate equivalent fractions. • Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols $>$, $=$, or $<$, and justify the conclusions. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	CC.2.1.4.C.1 Extend the understanding of fractions to show equivalence and ordering.
	4	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	L/U	<ul style="list-style-type: none"> • Solve problems involving fractions and whole numbers (straight computation or word problems). • Add and subtract fractions with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; answers do not need to be reduced; no improper fractions as the final answer). • Decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation. Justify decompositions (for example, by using a visual fraction model). <i>Example 1:</i> $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ <i>OR</i> $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$ <i>Example 2:</i> $2\frac{1}{12} = 1 + 1 + \frac{1}{12} = \frac{12}{12} + \frac{12}{12} + \frac{1}{12}$ • Add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping with subtraction; fractions do not need to be reduced; no improper fractions as the final answers). 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	CC.2.1.4.C.2 Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

				<ul style="list-style-type: none"> • Solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100). • Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers do not need to be reduced or written as a mixed number). <i>Example:</i> $5 \times (1/4) = 5/4$ Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; final answers do not need to be reduced or written as a mixed number). <i>Example:</i> $3 \times (5/6) = 15/6$ • Solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100). 		
	5	Understand decimal notation for fractions, and compare decimal fractions.	L/U	<ul style="list-style-type: none"> • Use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems). • Add two fractions with respective denominators 10 and 100. <i>Example:</i> Express $3/10$ as $30/100$, and add $3/10 + 4/100 = 30/100 + 4/100 = 34/100$. • Use decimal notation for fractions with denominators 10 or 100. <i>Example:</i> Rewrite 0.62 as $62/100$ and vice versa. • Compare two decimals to hundredths using the symbols $>$, $=$, or $<$, and justify the conclusions. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	CC.2.1.4.C.3 Connect decimal notation to fractions, and compare decimal fractions (base 10 denominator, e.g., $19/100$).
M04.B-O.1 Operations and Algebraic Thinking	6	Use the four operations with whole numbers to solve problems.	U/R	<ul style="list-style-type: none"> • Use numbers and symbols to model the concepts of expressions and equations. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes 	CC.2.2.4.A.1 Represent and solve problems involving the four operations.

				<ul style="list-style-type: none"> • Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. <i>Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.</i> <i>Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.</i> • Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. <i>Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects, and not just 3 more objects.</i> • Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity. • Identify the missing symbol (+, −, ×, ÷, =, <, >) that makes a number sentence true (single-digit divisor only). 	<ul style="list-style-type: none"> • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	
	7	Gain familiarity with factors and multiples.	U/R	<ul style="list-style-type: none"> • Develop and apply number theory concepts to represent numbers in various ways. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • 	CC.2.2.4.A.2 Develop and/or apply number theory concepts to find factors and multiples.

				<ul style="list-style-type: none"> • Find all factor pairs for a whole number in the interval 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one-digit number. Determine whether a given whole number in the interval 1 through 100 is prime or composite. 	<ul style="list-style-type: none"> • Project-Based Learning • Computer Assessment • Alternative Assessment 	
	8	Generate and analyze patterns.	U/R	<ul style="list-style-type: none"> • Recognize, describe, extend, create, and replicate a variety of patterns. • 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>Example 1: Given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms alternate between odd and even numbers.</i> <i>Example 2: Given the rule “increase the number of sides by 1” and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.</i> • Determine the missing elements in a function table (limit to +, −, or × and to whole numbers or money). • Determine the rule for a function given a table (limit to +, −, or × and to whole numbers). 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	CC.2.2.4.A.4 Generate and analyze patterns using one rule.
M04.C-G Geometry	9	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	L/U	<ul style="list-style-type: none"> • List properties, classify, draw, and identify geometric figures in two dimensions. • Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling 	CC.2.3.4.A.1 Draw lines and angles and identify these in two-dimensional figures. CC.2.3.4.A.2 Classify two-dimensional figures by properties of their lines

				<ul style="list-style-type: none"> • 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. • 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 mirroring parts. Identify line-symmetric figures and draw lines of symmetry (up to two lines of symmetry). 	<ul style="list-style-type: none"> • Project-Based Learning • Computer Assessment • Alternative Assessment 	<p>and angles.</p> <p>CC.2.3.4.A.3 Recognize symmetric shapes and draw lines of symmetry.</p>
M04.D-M Measurement and Data	10	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	L/U	<ul style="list-style-type: none"> • Solve problems involving length, weight (mass), liquid volume, time, area, and perimeter. • Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; c, pt, qt, gal), metric units (cm, m, km; g, kg; mL, L), and time (sec, min, hr, day, wk, mo, yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. A table of equivalencies will be provided. <i>Example 1: Know that 1 kg is 1,000 times as heavy as 1 g.</i> <i>Example 2: Express the length of a 4-foot snake as 48 in.</i> • Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; 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. 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	<p>CC.2.4.4.A.1 Solve problems involving measurement and conversions from a larger unit to a smaller unit.</p>

				<ul style="list-style-type: none"> • Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. The formulas will be provided. • Identify time (analog or digital) as the amount of minutes before or after the hour. <i>Example 1: 2:50 is the same as 10 minutes before 3:00.</i> <i>Example 2: Quarter past six is the same as 6:15.</i> 		
	11	Represent and interpret data.	L/U	<ul style="list-style-type: none"> • Organize, display, and answer questions based on data. • Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$). • Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$). • Translate information from one type of display to another (table, chart, bar graph, or pictograph). 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	<p>CC.2.4.4.A.2 Translate information from one type of data display to another.</p> <p>CC.2.4.4.A.4 Represent and interpret data involving fractions using information provided in a line plot.</p>
	12	Geometric measurement: understand concepts of angle; measure and create angles.	L/U	<ul style="list-style-type: none"> • Use appropriate tools and units to sketch an angle and determine angle measurements • Measure angles in whole-number degrees using a protractor. With the aid of a protractor, sketch angles of specified measure. • Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.) 	<ul style="list-style-type: none"> • Teacher Observations • Assignments • Quizzes • Tests • Problem Solving • Problem of the Day • Journaling • Project-Based Learning • Computer Assessment • Alternative Assessment 	<p>CC.2.4.4.A.6 Measure angles and use properties of adjacent angles to solve problems.</p>

