East Penn School District

Elementary Curriculum

A Planned Course Statement
for

1st 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:

Patrice Arnold
Carole Banko

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

Standards of Mathematical Practices
1. Make sense of and persevere in solving complex and novel mathematical problems.
2. Use effective mathematical reasoning to construct viable arguments and critique the reasoning of others.
3. Communicate precisely when making mathematical statements and express answers with a degree of precision appropriate for the context of the problem/situation.
4. 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.
5. Make use of structure and repeated reasoning to gain a mathematical perspective and formulate generalized problem solving strategies.

Essential Questions:

1. How are relationships represented mathematically?
2. How can expressions, equations, and inequalities be used to quantify, solve, model and/or analyze mathematical situations?
3. What does it mean to estimate or analyze numerical quantities?
4. When is it is appropriate to estimate versus calculate?
5. What makes a tool and/or strategy appropriate for a given task?How does the type of data influence the choice of display?
6. How can probability and data analysis be used to make predictions?
7. How does the type of data influence the choice of display?
8. How can probability and data analysis be used to make predictions?
9. How can data be organized and represented to provide insight into the relationship between quantities?
10. How is mathematics used to quantify, compare, represent, and model numbers?
11. How can mathematics support effective communication?
12. Why does “what” we measure influence “how” we measure?
13. In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted?
14. How precise do measurements and calculations need to be?
15. How can patterns be used to describe relationships in mathematical situations?
16. How can recognizing repetition or regularity assist in solving problems more efficiently?

Unit	Num	Objective	Level	Content	Evaluation	Standard
Numbers and Operations in Base Ten	1	**CC2.1.1.B.1 Extend the counting sequence to read and write numerals to represent objects.** **Big Idea: Mathematical relations among numbers can represented, compared, and communicated.** **Big Idea: Patterns exhibit relationships that can be extended, described and generalized.**	L	• Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. • The student will count, read, and write numbers to 120. • Students will represent equivalent forms of the same number through the use of concrete objects (including money), drawings, word names, and symbols up to 120. • Demonstrate the relationship between numbers and quantities, including place value, one-to-one correspondence, rote counting, counting by twos to 20, counting by tens and fives, and comparing values of whole numbers up to 120. • Use hundreds chart to identify patterns and practice counting by 1's, 2's, 5's, 10's and 25's • Identify the name and value of pennies, nickels dimes and quarters. • Count, compare and record the value of a collection of coins up to one dollar using the cent sign and dollar sign. • Count coins and make change in real life situations. • Use different sets of coins to represent the same amount of money (up to one dollar).	• Teacher observation • Tests • Assignments	**CC.1.NBT.1**
	2	**CC.2.1.1.B.2** **Use place value concepts to represents amounts of tens and ones and to compare two digit numbers.** **Big Idea: Mathematical relations among numbers can represented, compared, and communicated.**	L	• Students will demonstrate the relationship between numbers and quantities, including place value and one-to-one correspondence, and compare values of whole numbers up to 120 and include values of money. (use base ten blocks) • Apply place value concepts and base-ten numeration to order and compare whole numbers up to 120. • Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. • Differentiate between even and odd numbers. • Order a set of whole numbers from least to greatest or from greatest to least up through 100. • Order numbers as before, after, and between. Compare numbers using the terms greater and less than.	• Teacher observation • Tests • Assignments	**CC.2.1.1.B.2**

	3	**CC.2.1.1.B.3 Use place value concepts and properties of operations to add and subtract within 100.** **Big Idea: Mathematical relationships can be represented as expressions, equations, and inequalities in Mathematical situations.** **Big Idea: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.**	L	• Understand place value. Understand that the two digits of a two-digit number represent amounts of tens and ones. • Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). • Use place value understanding and properties of operations to add and subtract. a. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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. b. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. • Use place value understanding and properties of operations to add and subtract. • Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. • Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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.	• Teacher observation • Tests • Assignments	**CC.2.1.1. B.3**

Operations and Algebraic Thinking	4.	**CC.2.2.1.A.1 Represent and solve problems involving addition and subtraction within 20.** **Big Idea: Mathematical relationships can be represented as expressions, equations, and inequalities in Mathematical situations.** **Big Idea: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.**	L	• Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.2 • Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. • Add and subtract within 20. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). • Add and subtract within 20. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). • Work with addition and subtraction equations. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2. • Identify the correct operations to solve a word problem. • Analyze problem situations to choose a correct operation. • Invent different strategies and approaches to solve daily problems occurring in and out of the classroom. • Determine what is the best method to solve a single step problem.	• Teacher observation • Tests • Assignments	**CC.2.2.1.A.1**

	5.	**CC.2.2.1.A.2 Understand and apply properties of operations and the relationship between addition and subtraction.** **Big Idea: Mathematical relationships can be represented as expressions, equations, and inequalities in Mathematical situations.** **Big Idea: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.** **Big Idea: Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.**	L	• Apply properties of operations as strategies to add and subtract. Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.) (Students need not use formal terms for these properties.) • Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8. • Understand and apply properties of operations and the relationship between addition and subtraction. Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8. • Work with addition and subtraction equations. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = __– 3, 6 + 6 = __. • Fact Families • Students will recognize and extend patterns based on shape, size, color, sound, or number. • The student will identify the rule for a repeating pattern that could be extended. • The student will identify the rule for a number sequence that could be extended indefinitely.	• Teacher observation • Tests • Assignments	CC.2.2.1.A.2
Geometry	6	**CC.2.3.1.A.1** **Compose and distinguish between two and three dimensional shapes based on their attributes.**	L	• Reason with shapes and their attributes. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); for a wide variety of shapes; build and draw shapes to possess defining attributes.	• Teacher observation • Tests • Assignments	**CC.2.3.1.A.1**

		Big Idea: Geometric relationships can be described, analyzed and classified based on spatioal reasoning and / or visualization. **Big Idea: Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.**		• Reason with shapes and their attributes. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, rectangular prisms, cones, and cylinders) to create a composite shape, and compose new shapes from the composite shape.		
	7	**CC.2.3.1.A.2** **Use the understanding of fractions to partition shapes into halves, thirds and quarters.**	L	• Use concrete objects, drawings, diagrams or models to show the concept of a fraction as part of a whole; use whole numbers and fractions (halves, thirds and fourths) to represent quantities. • Reason with shapes and their attributes. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, thirds, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.	• Teacher observation • Tests • Assignments	**CC.2.3.1. A.2**
Measurement and Data	8.	**CC.2.4.1.A.1** **Order lengths and measure them both indirectly and by repeating length units.** **Big Idea: Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.**	L	• Order three objects by length; compare the lengths of two objects indirectly by using a third object. • Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit /inches and centimeters) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. • Measure lengths indirectly and by iterating length units. Order three objects by length; compare the lengths of two objects indirectly by using a third object.	• Teacher observation • Tests • Assignments	**CC.2.4.1. A.1**

		Big Idea: Data can be modeled and used to make inferences. **Big Idea: Measurement attributes can be quantified and estimated using customary and non-customary units of measure.**		• Measure lengths indirectly and by iterating length units. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. • Use a graph to compare measurable characteristics of different objects • Use standard units to compare characteristics of different objects • Collect two objects and compare them by a defined attribute (length, capacity or weight). • Select an appropriate unit and/or tool for the attribute being measured.		
	9.	**CC.2.4.1.A.2** **Tell and write time to the nearest half hour using both analog and digital clocks**	L	• Tell and write time. Tell and write time in hours and half-hours using analog and digital clocks.	• Teacher observation • Tests • Assignments	**CC.2.4.1.A.2**
	10.	**CC.2.4.1.A.4** **Represent and interpret data using tables and charts.**	L	• Represent and interpret data. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. • Read and compare data shown on bar graphs, pictographs and/or tally charts (guiding questions may include: How many? How many more? How many less? Equal? Why? What? How do you know?).	• Teacher observation • Tests • Assignments	**CC.2.4.1.A.4**

http://www.pde.state.pa.us/early_childhood/lib/early_childhood/1st_Grade_Standards_Final.pdf