Amherst and Pelham Public Schools - Curriculum Map

Subject: Mathematics **Grade Level: Fourth Grade**

Revised 7/08

Content Strand: Number Sense and Operations					
Unit Title	**Time Frame**	**Unit Enduring Understanding**	**Unit Essential Questions**	**Unit Standards** **Student will:**	**Framework Standards**
Investigations units: *Landmarks and Large Numbers* *Fraction Cards and Decimal Squares* *Factors, Multiples, and Arrays* *Multiple Towers and Division Stories* *How Many Packages? How Many Groups?* **Ten Minute Math** *Counting Around the Class* *Closest Estimate* *Practicing Place Value* *Quick Images* *Quick Survey* *Today's*	21 weeks (throughout the year)	Place value patterns are repeated in large numbers. Every whole number greater than one is either a prime number or can be uniquely factored as a product of primes. Both common and decimal fractions can represent fractional parts. Fractions, decimals, and percents express a relationship between two numbers. Mathematical properties of our number system aid in computation.	How are place value patterns repeated in large numbers? How can a number be broken down into its smallest factors? How are numbers that represent fractional parts compared? How are common and decimal fractions alike and different? How are models used to show how fractional parts are combined or separated? What strategies can be used to solve estimation problems with common and decimal fractions? When is it appropriate to use percents? Decimals? Fractions? How is the ordering of fractions and decimals the same as ordering whole	A. Understand numbers, ways of representing numbers, relationships among numbers, and number systems. Exhibit an understanding of the base ten number system by reading, modeling, writing, and interpreting whole numbers to at least the hundred thousands; demonstrating an understanding of the values of the digits; and comparing and ordering the numbers. Represent, order, and compare large numbers (to at least 100,000) using various representations, including expanded notation, e.g., 853=(100 x 8)+(10 x 5)+ 3 Demonstrate an understanding of fractions as parts of unit wholes, as parts of a collection, and as locations on the number line. Select, use, and explain models, (e.g., diagrams and manipulatives) to relate common fractions and mixed numbers (1/2, 1/3, 1/4, 1/5, 1/6, 1/8, 1/10, and 1 1/2), find equivalent fractions, mixed numbers, and decimals, and order and compare fractions. Identify and generate equivalent forms of common decimals and fractions less than one whole (halves, quarters, fifths, and tenths). Exhibit an understanding of the base ten number system by reading, naming, and writing decimals between 0 and 1 up to the hundredths. Recognize classes (in particular, odds, and evens; factors or multiples of a given number; and squares) to which a number may belong, and identify the numbers in those classes. Use these in the solution of problems.	4.N.1 4.N.2 4.N.3 4.N.4 4.N.5 4.N.6 4.N.7

Number **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 1, 5, 11		Multiplication and division can be accomplished through the addition and subtraction of partial products. Proficiency with basic facts aids in estimation and computation with larger and smaller numbers.	numbers and how is it different? How do number properties assist in computation? How do number properties aid in computation? How can multiples be used to solve problems? How are the four basic operations related to one another? How are parentheses used in numeric expressions? What strategies aid in mastering multiplication and division facts?	B. Understand meanings of operations and how they relate to one another. Understand and use the inverse relationship between addition and subtraction (e.g., 8 + 6 = 14 is the inverse of 14 – 6 = 8 or 14 – 8 = 6) to solve problems and check solutions. Select, use, and explain various meanings and models of multiplication and division of whole numbers. Understand and use the inverse relationship between the two operations. Select, use, and explain the commutative, associative, and identity properties of addition and multiplication of whole numbers in problem situations, e.g. 37 x 46 = 46 x 37; (5 x 7) x 2 = 5 x (7 x 2). Introduce the use of parentheses as grouping symbols. Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money. C. Compute fluently and make reasonable estimates. Know multiplication facts through 12 x 12 and related division facts. Use these facts to solve related multiplication problems and compute related problems, e.g. 3 x 5 is related to 30 x 50, 300 x 5, and 30 x 500. Add and subtract (up to five-digit numbers) and multiply (up to three digits by two digits) accurately and efficiently. Divide up to a three-digit whole number with a single-digit divisor (with or without remainders) accurately and efficiently. Interpret any remainders.	4.N.8a 4.N.8b 4.N.9 4.N.10 4.N.11

		Operation strategies with fractions, decimals, and percents are similar to those used with whole numbers.	What strategies can be developed to show computation with fractions, decimals, and percents?	Demonstrate in the classroom an understanding of and the ability to use alternative and conventional algorithms for addition and subtraction (up to five-digit numbers), and multiplication (up to three digits by two digits). **[**Note: An alternative algorithm can be a student invented procedure or an instructional method such as cluster problems that breaks down the algorithmic steps. **The MCAS does not test for knowledge of conventional algorithms.]** Demonstrate in the classroom an understanding of and the ability to use the alternative and conventional algorithms for division of up to a three-digit whole number with a single-digit divisor (with or without remainders). **[The MCAS does not test for knowledge of conventional algorithms.]** Round whole numbers through 100,000 to the nearest 10, 100, 1000, 10,000, and 100,000. Select and use a variety of strategies (e.g., front-end, rounding, and regrouping) to estimate quantities, measures, and the results of whole-number computations up to three-digit whole numbers and amounts of money to $1000, and to judge the reasonableness of the answer. Use concrete objects and visual models to add and subtract common fractions.	4.N.12 4.N.13 4.N.14 4.N.15 4.N.16 4.N.17 4.N.18

Content Strand: Patterns, Relations, and Algebra

Unit Title	Time Frame	Unit Enduring Understanding	Unit Essential Questions	Unit Standards Student will:	Framework Standards
Investigations units: *Multiple Towers and Division Stories* *Penny Jars and Plant Growth* *Factors, Multiples, and Arrays* **Ten Minute Math:** *Counting Around the Class* *Closest Estimate* *Quick Images* *Quick Survey* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 1, 2, 8 and 12	3 weeks throughout the year	Number patterns and relationships can be represented using variables. Functional relationships can be represented graphically and symbolically. A numeric or algebraic expression represents a quantity.	Why are variables used? How can a pattern be generalized? What strategies can be used to solve for unknowns in algebraic equations? What is the relationship between patterns and functions? How are graphs, tables, and symbols used to represent relationships? When are algebraic and numeric expressions used?	A. Understand patterns, relations, and functions. Create, describe, extend, and explain symbolic (geometric) and numeric patterns, including multiplication patterns like 3, 30, 3000… B. Represent and analyze mathematical situations and structures using algebraic symbols. Use symbol and letter variables (e.g., Δ, x) to represent unknowns or quantities that vary in expressions and in equations or inequalities (mathematical sentences that use =, <, >). Determine values of variables in simple equations, (e.g., 4106 – Δ = 37; 5 = □ + 3 ; □ - O = 3). C. Use mathematical models to represent and understand quantitative relationships. Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships. Use Venn Diagrams to sort and analyze data. Solve problems involving proportional relationships, including unit pricing, (e.g., four apples cost 80¢, so one apple costs 20¢) and map interpretation, (e.g., one inch represent five miles, so two inches represent ten miles). D. Analyze change in various contexts. Determine how change in one variable relates to a change in a second variable, e.g., input-output tables; function	4.P.1 4.P.2 4.P.3 4.P.4a 4.P.4b 4.P.5 4.P.6

				machines; *What's My Rule?* problems.	

Content Strand: Geometry

Unit Title	Time Frame	Unit Enduring Understanding	Unit Essential Questions	Unit Standards Student will:	Framework Standards
Investigations units : *Size, Shape, and Symmetry* *Penny Jars and Plant Growth* **Ten Minute Math** *Quick Images* *Quick Survey* *Today's Number* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 4, 8	4 weeks	Objects can be described and compared using geometric attributes. Points, lines and planes are the foundations of geometry. A transformation is a specific movement of an object. Transformations are identified by the type of movement of an	How can objects be represented and compared using geometric attributes? How are points, lines, line segments, rays, and angles related? How are properties used to classify geometric figures? How are geometric figures constructed or drawn? How are angles measured? How are angles classified? What are translations, rotations, and reflections? How are transformations found in designs?	A. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. Compare and analyze attributes and other features (e.g., number of sides, faces, corners (vertices), right angles, diagonals, and symmetry) of two- and three-dimensional geometric shapes. Describe, model, draw, compare, and classify two- and three-dimensional shapes, e.g., circles, polygons: triangles, squares, rectangles, parallelograms, pentagons, hexagons, quadrilaterals, octagons—cubes, spheres, pyramids, cylinders, cones, rectangular and square prisms. Recognize congruent and similar 2-d shapes and solids. Identify angles as acute, right, or obtuse. Describe and draw horizontal, vertical, diagonal, intersecting, perpendicular, and parallel lines and curves. Identify lines, segments and points. B. Specify locations and describe spatial relationships using coordinate geometry and other representational systems. Using ordered pairs of numbers and/or letters to graph, locate, identify points, and describe paths on a grid (first quadrant only). C. Apply transformations and use symmetry to analyze mathematical situations. Describe and apply transformations such as reflections (flips), rotations (turns), and translations (slides) for determining if two shapes are congruent. Identify and describe line symmetry in two-dimensional shapes.	4.G.1 4.G.2 4.G.3 4.G.4 4.G.5 4.G.6 4.G.7

		object or figure.	How is the size of an angle related to rotation?	D. Use visualization, spatial reasoning, and geometric modeling to solve problems. Predict and validate the results of partitioning, folding, and combining two- and three-dimensional shapes, e.g. nets. Relate geometric ideas to numbers, e.g., seeing rows in an array as a model of multiplication; investigating the patterns of square (1,4,9,16,25,…)and triangular numbers (1,3,6,10,15,…).	4.G.8 4.G.9 4.G.10

Content Strand: Measurement

Unit Title	Time Frame	Unit Enduring Understanding	Unit Essential Questions	Unit Standards Student will:	Framework Standards
Investigations units: *Describing the Shape of the Data* *Size, Shape, and Symmetry* *Penny Jars and Plant Growth* **Ten Minute Math** *Closest Estimate* *Quick Images* *Quick Survey* *Today's Number* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 4, 9, 10,	4 weeks	Units within a system are built upon each other. Elapsed time is the measure of the duration of an event. The perimeters, areas, and volumes or rectangular objects depend on their dimensions. All measurements are approximations.	How are the units of measure within a standard system related? What tools and units are used to measure the attributes of an object? What is the difference between length of time and time of day? How can patterns be used to determine standard formulas for area and perimeter? How are perimeter, area, and volume related? Why are all measurements approximations? How can the area of closed figures be	A. Understand measurable attributes of objects and the units, systems, and processes of measurement. Demonstrate an understanding of such attributes as length, area, weight, and volume, and select the appropriate type of unit for measuring each attribute. Carry out simple unit conversions within a system of measurement, (e.g., hours to minutes, cents to dollars, yards to feet or inches, etc.). B. Apply appropriate techniques, tools, and formulas to determine measurements. Identify time to the minute on analog and digital clocks using a.m. and p.m. Compute elapsed time using a clock (e.g., hours and minutes since…) and using a calendar (e.g., days since…). Estimate and find area and perimeter of a rectangle, triangle, or irregular shape using diagrams, models, and grids or by measuring. Identify and use appropriate metric and U.S. Customary (English) units and tools (e.g., ruler, tape measure, meter stick, balance scale, thermometer, angle ruler, graduated cylinder) to estimate, measure, and solve problems involving length, area, volume, weight, time, angle size, and temperature.	4.M.1 4.M.2 4.M.3 4.M4. M.5.4

11			estimated?		

Content Strand: Data Analysis, Statistics, and Probability

Unit Title	Time Frame	Unit Enduring Understanding	Unit Essential Questions	Unit Standards Student will:	Framework Standards
Investigations units: *Describing the Shape of the Data* **Ten Minute Math:** *Quick Survey* *Today's Number* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 4, 11, 12	4 weeks	The type of data determines how data sets can be organized, displayed and analyzed. Representation of data depends on the characteristics of that data. Statistical measures provide a numeric picture of the shape of the data. Probability can be represented numerically and graphically. The expected outcome of an event is a prediction of what might actually happen in the long run.	How does the type of data influence the choice of graph? What data display is appropriate for a given set of data? What kinds of questions can be answered using different data displays? How can the mean, median, mode, and range be used to describe the shape of the data? be computed and compared? How is probability represented numerically? How is the probability of an event determined and described? How are predictions made based on the outcomes of a	A. Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them. Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. B. Select and use appropriate statistical methods to analyze data. Match representations of a data set such as lists, tables, or graphs (including circle graphs) with the actual set of data. C. Develop and evaluate inferences and predictions that are based on data. Construct, draw conclusions, and make predictions from various representations of data sets, including tables, bar graphs, pictographs, line graphs, line plots, tallies, and Venn Diagrams D. Understand and apply basic concepts of probability. Represent the possible outcomes for a simple probability situation, (e.g., the probability of drawing a red marble from a bag containing 3 red marbles and 4 green marbles, outcomes of spinners, 2 colored counters; or number cubes/dice, etc.). List and count the number of possible combinations of objects from two or three sets, (e.g., how many different outfits can one make from a set of three shirts, a set of two skirts, and a set of two hats?). Classify outcomes as fair, unfair, certain, likely, unlikely, or impossible by designing and conducting experiments using concrete objects such as counters, number cubes, spinners,	4.D.1 4.D.2 4.D.3 4.D.4 4.D.5 4.D.6

			probability experiment?	or coins.	