Amherst and Pelham Public Schools - Curriculum Map

Subject: Mathematics Grade Level: Fifth 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: *Thousands of Miles, Thousands of Seats* *Decimals on Grids and Number Lines* *What's That Portion?* *Number Puzzles and Multiple Towers* *How Many People? How Many Teams?* *Growth Patterns* **Ten Minute Math:** *Estimation and Number Sense* *Guess My Rule Number Puzzles* *Practicing Place Value*	19 weeks (throughout the year)	Every whole number greater than one is either a prime number or can be uniquely factored as a product of primes. Fractions, decimals, and percents express a relationship between two numbers. Fractions, decimals, and percents can be used interchangeably.	How can a number be broken down into its smallest factors? How is the ordering of fractions and decimals the same as ordering whole numbers and how is it different? How does the knowledge of greatest common factor and least common multiple help in comparing fractions? When is it appropriate to use percents? Decimals? Fractions? How do operations with decimals compare to operations with whole numbers? How do operations with fractions compare to operations with whole numbers and decimals?	A. Understand number, ways of representing numbers, relationships among numbers, and number systems. Demonstrate an understanding of (positive integer) powers of ten up to 10^6. Introduce the exponential notations for squares and cubes. Demonstrate an understanding of place value to millions and thousandths. Represent and compare large (millions) and small (thousandths) positive numbers in various forms, e.g. concrete models, expanded notation for whole numbers without exponents, [e.g. 9,724= (9 x 1000) + (7 x 100) + (2 x 10) + (4 x 1)]; and word form. Demonstrate an understanding of fractions as a ratio of whole numbers, as parts of unit wholes, as parts of a collection, and as locations on the number line (including a ruler). Identify and determine common equivalent fractions (with denominators 2, 4, 5, 10) and mixed numbers (with denominators 2, 4, 5, 10), decimals, and percents (through 100%), (e.g., 1/10=0.10=10%; ¾=0.75=75%). Apply rational number landmarks – 1/2, 1/4, 3/4, 1/5, 1/10, 1/20, 1/100, and multiples of these fractions in solving problems. Find and position positive whole numbers, fractions, mixed numbers, and decimals on a number line, (e.g., find 3/5 and 0.8 on a number line).	5.N.1 5.N.2 5.N.3 5.N.4 5.N.5a 5.N.5b

Quick Images *Quick Survey* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 1, 4, 5, 7, 12		Mathematical properties of our number system aid in computation.	What determines an appropriate representation of a number?	Order numbers of the same type (integers, proper and improper fractions and mixed numbers, and decimals) in an ordered list, (e.g., order the following numbers from least to greatest: 4/3, 7/9, and 3½). Use the number line to locate, order, and pair negative and positive integers.	5.N.6a
				Compare pairs of positive integers, fractions, mixed numbers, decimals, and percents, (e.g., 1/3 > 1/6 and 90% > 60%).	5.N.6b
				Compare mixed numbers and improper fractions; decimals and percents; and fractions and decimals, (e.g., 4/3 < 1½; 0.30 = 30%; and ½ > 0.4).	
				Apply number theory concepts of common factor, common multiple, and divisibility rules for 2, 3, 5 and 10 – to the solution of problems. Demonstrate an understanding of the concepts of prime and composite numbers,	5.N.7a 5.N.7b
		Operation strategies with fractions, decimals, and percents are similar to those used with whole numbers. Multiplication does not always make larger and division does not always make smaller.	How are the four basic operations related to one another? How can estimation skills and algorithms reinforce one another? How do operations with decimals or fractions compare to operations with whole numbers? What strategies can be developed to show computation with fractions, decimals, and percents?	B. Understand meanings of operations and how they relate to one other.	
				Select and use appropriate operations to solve problems involving addition, and subtraction and with positive fractions, mixed numbers, decimals, and percents. Problems may include money.	5.N.8
				Select and use appropriate operations to solve problems involving multiplication and division of with positive fractions, mixed numbers, and decimals. Problems may include money.	
				Demonstrate an understanding of how parentheses affect expressions involving addition, subtraction, and multiplication, and use that to solve problems. ((e.g. 3x(4+2)= 3x6))	5.N.9a 5.N.9b
				Select, use and explain the commutative, associative, distributive, identity, and zero properties of operations on whole numbers, fractions and decimals in problem	5.N.10a

		Algebraic representations can be used to solve real world problems. Computational estimation produce approximate results.	How do number properties assist in computation? Why are mathematical rules necessary? Why are equations useful? What determines a reasonable estimation for a given situation? What is the purpose of estimation?	situations. Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols. Recognize that parentheses can affect the order of operations. Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, -, x, ÷). Recognize that parentheses can affect the order of operations, (e.g., 3 x (4+) – (8-7) = 26. Demonstrate an understanding of the inverse relationship of addition and subtraction, and use that understanding to simplify computation and solve problems. C. Compute fluently and make reasonable estimates. Accurately and efficiently add and subtract whole numbers and positive decimals; multiply and divide (with double-digit divisors) whole numbers; and multiply positive decimals with whole numbers. Accurately and efficiently add and subtract positive fractions and mixed numbers with like and unlike denominators (2, 4, 5, 10 only); and multiply positive fractions by whole numbers. Simplify fractions in cases where both the numerator and denominator have 2, 3, 4, 5 or 10 as a common factor. Model and calculate division of a whole number by a fraction, (e.g., 6 ÷ ½). Estimate sums and differences of whole numbers, positive fractions, and positive decimals. Estimate products of whole numbers and positive decimals with whole numbers. Estimate quotients with whole numbers and decimals divided by whole numbers. Use a variety of strategies and judge the reasonableness of estimates.	5.N.10b 5.N.10c 5.N.11 5.N.12 5.N.13a 5.N.13b 5.N.13c 5.N.14

Content Strand: Patterns, Relations, and Algebra					
Unit Title	**Time Frame**	**Unit Enduring Understanding**	**Unit Essential Questions**	**Unit Standards** **Student will:**	**Framework Standards**
Investigations units: *Growth Patterns* *How Many People? How Many Teams?* *Measuring Polygons* *How Long Can You Stand on One Foot?* **Ten Minute Math:** *Estimation and Number Sense* *Number Puzzles* *Practicing Place Value* *Quick Images* *Quick Survey* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 1, 2, 3, 4, 11 12	3 weeks (throughout the year)	Functional relationships can be represented graphically and symbolically. A numeric or algebraic expression represents a quantity. Patterns and relationships can be represented graphically, numerically, symbolically, and verbally. Algebraic representations can be used to solve real world problems.	What is the relationship between patterns and functions? How can a pattern be identified? When are algebraic and numeric expressions used? What can be learned from studying patterns? How are a graph, a description, and an expression/equation that represent a real world situation related? How are graphs, tables, and symbols used to represent relationships? Why are mathematical rules necessary? Why are equations useful?	A. Understand patterns, relations, and functions. Create, analyze and determine the rules for extending, symbolic, arithmetic, and visual (geometric) patterns and progressions, e.g. ABBCCC; 1, 5, 9, 13…; 3, 9, 27…; and two-dimensional shape patterns. B. Represent and analyze mathematical situations and structures using algebraic symbols Replace variables with given values and evaluate/simplify,(e.g. 2x + 3 when x = 4). Use the properties of equality to solve problems with whole numbers, (e.g., if □ + 7 = 13, then □ = 13 – 7, therefore □= 6; If 3 x Δ = 15, then Δ = 15/3, therefore Δ = 5). C. Use mathematical models to represent and understand quantitative relationships Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, (e.g. Rick jogged 15 minutes. Every day he plans to jog 3 minutes more than on the previous day. Make a table showing the day and the time jogged up to the seventh day; Input/Output tables). Solve linear equations with one variable and solve problems with proportional relationships using various methods such as concrete models, tables, graphs, "guess, check, and revise," and pencil-paper methods. D. Analyze change in various contexts. Produce and interpret graphs, charts, and tables that represent the relationship between two variables in everyday situations. Determine how change in one variable relates to change in a	5.P.1 5.P.2 5.P.3 5.P.4 5.P.5 5.P.6

				second variable. e.g. doubling problems, flat rates, etc.	

Content Strand: Geometry					
Unit Title	**Time Frame**	**Unit Enduring Understanding**	**Unit Essential Questions**	**Unit Standards** **Student will:**	**Framework Standards**
Investigations units: *Measuring Polygons* *Prisms and Pyramids* *Growth Patterns* **Ten Minute Math:** *Estimation and Number Sense* *Practicing Place Value* *Quick Images* *Quick Survey*	4 weeks	Geometric relationships exist between two-dimensional and three-dimensional figures. Points, lines, and planes are the foundations of geometry. Relationships exist among the angles, sides, lengths, perimeters, and areas of two-	How are properties used to classify geometric figures? How are geometric figures constructed or drawn? How is the size of an angle related to rotation? How are angles measured? How do line relationships affect angle relationships? How are angle relationships used? How are the areas of rectangles, parallelograms, triangles, trapezoids, and circles related?	A. Analyze characteristics dimensional geometric shapes and properties of 2- and 3- and develop mathematical arguments about geometric relationships Identify, describe, compare, and classify special types of triangle (right, isosceles, scalene, equilateral), quadrilateral (square, rectangle, parallelogram, rhombus, and trapezoid), pentagon, hexagon, and octagon. Classify triangles and quadrilaterals into their subsets, (e.g., some isosceles triangles are equilateral, some rectangles are squares, and some parallelograms are rhombuses); recognize that all equilateral triangles are isosceles, but not all isosceles triangles are equilateral. Describe, model, draw, compare, classify, and identify special types of 3-dimensional shapes (e.g. cubes, prisms, spheres, cones, and pyramids) based on their properties, such as edges, faces, vertices, and bases. Identify relationships among points, lines, and planes, e.g. intersecting, parallel, and perpendicular lines. B. Specify locations and describe spatial relationships using coordinate geometry and other representational systems Using ordered pairs of whole numbers including 0, graph, locate, and identify points and describe	5.G.1 5.G.2 5.G.3 5.G.4a

		dimensional figures. Transformations are identified by the type of movement of an object or figure. Geometric figures can change position and maintain the same attributes on a coordinate plane.	How are two-dimensional and three-dimensional figures related? How are transformations found in designs? How does the movement of a geometric figure affect its attributes?	paths on the Cartesian coordinate plane, (e.g., integrate coordinate graphing with science data). Find the distance between 2 points on a horizontal or vertical number line as in a change in measurement, (e.g. degrees on a thermometer; inches, feet, centimeters, or meters on a ruler or tape measure). C. Apply transformations and use symmetry to analyze mathematical relationships. Predict, describe, and perform transformations on two-dimensional shapes, e.g. translations (slides), rotations (turns), and reflections (flips). Identify and describe line symmetry in 2-dimensional shapes, including shapes that have multiple lines of symmetry. Determine if two triangles or quadrilaterals are congruent by measuring sides or a combination of sides and angles as necessary; or by motions or a series of motions, e.g. translations, reflections, and rotations. Match three-dimensional objects with their two-dimensional representations, (e.g., nets and projections).	5.G.4b 5.G.5 5.G.6 5.G.7 5.G.8

Content Strand: Measurement					
Unit Title	**Time Frame**	**Unit Enduring Understanding**	**Unit Essential Questions**	**Unit Standards** **Student will:**	**Framework Standards**
Investigations units: *Measuring Polygons* *Growth Patterns* *Prisms and Pyramids* **Ten Minute Math:** *Estimation and Number Sense* *Practicing Place Value* *Quick Images* *Quick Survey* **Scott Foresman Addison Wesley** text, Selected lessons in Chapter 9	5 weeks (throughout the year)	All measurements are approximations. Area and volume formulas are derived from linear measures. Selection of standard measurement tools and units depend on the real world situation.	Why are all measurements approximations? How can problems involving two- and three-dimensional measures be solved? How can problems involving two- and three-dimensional measures be solved? How can the area of closed figures be estimated? Why are formulas used in measurement? What is the relationship between linear measures and area and volume? Why are specific units and tools used to measure different attributes	A. Understand measurable attributes of objects and the units, systems, and processes of measurement. B. Apply appropriate techniques, tools, and formulas to determine measurements. Apply the concepts of perimeter and area to the solution of problems involving triangles and rectangles. Apply formulas where appropriate. Use coordinate grids, dot paper, or geoboards to find the area of triangles, rectangles and squares and irregular shapes. Identify, measure, describe, classify, and draw various angles, triangles and quadrilaterals, (e.g., acute, right, obtuse, straight, equilateral, square, and rectangle) given two sides and the angle between them or two angles and the side between them (e.g. Draw a triangle with one right angle and two sides congruent) Measure and construct angles using appropriate tools such as protractors, angle rulers, and compasses. Solve problems involving simple unit conversions within a system of measurement, (e.g., same system unit conversions, map scales, scale models, etc.). Find volumes and surface areas of rectangular prisms. Find the sum of the measures of interior angles in squares, rectangles, and triangles with and without measuring the angles, (e.g., find the missing angle of a triangle if two of the angles measure 48° and 63°). Identify the attributes of a circle: circumference, radius, diameter. Draw a circle with a given radius and/or given diameter. Find the circumference of a circle given the radius or diameter and the appropriate formula.	5.M.1a 5.M.1b 5.M.2a 5.M.2b 5.M.3 5.M.4 5.M.5 5.M. 6

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:- *How Long Can You Stand on One Foot?* *Growth Patterns* **Ten Minute Math:** *Estimation and Number Sense* *Practicing Place Value* *Quick Survey* **Scott Foresman Addison Wesley** text, Selected lessons in Chapters 5	5 weeks (throughout the year)	Representation of data depends on the characteristics of that data. Statistical measures provide a numeric picture of the shape of the data. Choices in data collection and representation affect their interpretation and use. The expected outcome of an event is a prediction of what might actually happen in the long run. Probability is the mathematics of chance. Sampling affects the relationship between experimental and	What data display is appropriate for a given set of data? How can the mean, median, mode, and range be used to describe the shape of the data? How can mean, median, and mode be computed/compared? What is the purpose of displaying data? How does the selection of a sample affect conclusions based on the sample? Which measure of central tendency is most appropriate in a given situation? How can the data representation influence conclusions? How is the probability of an event determined and described? How are predictions made based on the outcomes of a probability experiment? Why is probability used?	A. Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them. B. Select and use appropriate statistical methods to analyze data. C. Develop and evaluate inferences and predictions that are based on data. Given a set of data, find the median, mean, mode, maximum, minimum, and range and apply to solutions of problems. Describe and compare data sets using concepts of median, mean, mode, range, maximum and minimum Model the concept of mean concretely and in real-life activities. Develop, construct, conduct, and interpret a statistical investigation using appropriate data collection techniques and representations (tables, bar graphs, pictographs, line graphs, line plots, and Venn Diagrams). Understand simple circle graphs using common fractions and percents. Interpret and label circle graphs, (e.g., given a sectioned circle graph and data, use the data to appropriately label the sections in the circle graph. D. Understand and apply basic concepts of probability Solve data-set problems using organized lists. Construct and analyze two-step tree diagrams to represent outcomes of probability experiments that involve equally likely events, (e.g. You are trying to decide what to wear to school. Your options are a red pants, green pants, or jeans, with a striped shirt or plain shirt. Using the key: r=red pants, g=green pants, j=jeans, s=striped shirt, and p=plain shirt, make a tree diagram to show all possible combinations). Determine a ratio to predict the probability of outcomes of simple experiments, (e.g. tossing a coin, rolling a number cube (dice), using a spinner, and test the predictions, (e.g.,	5.D.1a 5.D.1b 5.D.2a 5.D.2b 5.D.3 5.D.4

		theoretical probability.	How are experimental and theoretical probability related?	You roll a six-sided number cube. What is the probability you would roll an even number? Make a table to show the actual results for twenty rolls).	