

Amherst and Pelham Public Schools - Curriculum Map

Subject: Mathematics

Grade Level: Sixth Grade

Unit Title	Time Frame	Unit Enduring Understanding	Unit Essential Questions	Unit Standards Student will:	Framework Standards
<p>Number Sense and Operations</p> <p><i>Connected Math (CMP) units:</i></p> <p><i>Prime Time Bits & Pieces I</i></p> <p><i>Bits & Pieces II</i></p> <p>Hands-on Algebra</p> <p>Scott Foresman Addison Wesley text, Selected lessons in Chapters 1, 2, 3, 4, 5, 7, 8</p>	<p>20 weeks through out the year</p>	<p>Exponents and scientific notation are efficient ways of expressing numbers.</p> <p>Fractions, decimals, and percents can be used interchangeably.</p>	<p>What is the purpose of exponents and scientific notation?</p> <p>What determines an appropriate representation of a number?</p>	<p>A. Understand number, ways of representing numbers, relationships among numbers, and number systems.</p> <p>Demonstrate an understanding of positive integer exponents, in particular, when used in powers of ten, (e.g., 10^2, 10^5).</p> <p>Demonstrate an understanding of place value to billions and thousandths.</p> <p>Represent and compare very large (billions) and very small (thousandths) positive numbers in various forms such as expanded notation without exponents, [e.g., $9724 = (9 \times 100) + (7 \times 100) + (2 \times 10) + 4$].</p> <p>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.</p> <p>Identify and determine common equivalent fractions, mixed numbers, decimals and percents.</p> <p>Find and position integers, fractions, mixed numbers, and decimals (both positive and negative) on the number line.</p> <p>Compare and order positive and negative integers, and positive fractions, mixed numbers, decimals, and percents.</p>	<p>6.N.1</p> <p>6.N.2</p> <p>6.N.3</p> <p>6.N.4</p> <p>6.N.5</p> <p>6.N.6</p> <p>6.N.7</p> <p>6.N.8a</p> <p>6.N.8b</p>

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		<p>Fractions, decimals, and percents can be used interchangeably</p> <p>Integers have magnitude and directions.</p>	<p>How do operations with decimals compare to operations with whole numbers?</p> <p>How do operations with fractions compare to operations with whole numbers and decimals?</p> <p>How do operations with integers compare to operations with whole numbers?</p>	<p>Apply number theory concepts – including prime and composite numbers, prime factorization, greatest common factor, least common multiple, and divisibility rules for 2,3,4,5,6,9 and 10 – to the solution of problems.</p> <p>Demonstrate an understanding of the properties of arithmetic operations: the commutative, associative, distributive, identity, and zero properties of operations on whole numbers, fractions and decimals. Investigate the distributive property of multiplication over addition for double-digit multipliers, [e.g. $12 \times (10 + 3)$ is equivalent to $(12 \times 10) + (12 \times 3)$].</p> <p>B. Understand meanings of operations and how they relate to one other.</p> <p>Select and use appropriate operations to solve problems involving addition, subtraction, multiplication and division of whole numbers, and positive integer exponents with whole numbers, and with positive fractions, mixed numbers, decimals, and percents.</p> <p>Use the number line to model addition and subtraction of integers, with the exception of subtracting negative integers.</p> <p>Apply the Order of Operations for expressions involving addition, subtraction, multiplication, and division with grouping symbols (+, -, x, ÷)</p> <p>Demonstrate an understanding of the inverse</p>	<p>6.N.9 6.N.10 6.N.11 6.N.12</p>

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		Computations estimations produce approximate results?	<p>What determines a reasonable estimation for a given situation?</p> <p>What is the purpose of estimation?</p> <p>How can estimation skills and algorithms reinforce each other?</p>	<p>relationship of addition and subtraction, and use that understanding to simplify computation and solve problems.</p> <p>C. Compute fluently and make reasonable estimates.</p> <p>Accurately and efficiently add, subtract, multiply, and divide (with double-digit divisors) whole numbers and positive decimals.</p> <p>Accurately and efficiently add, subtract, multiply, and divide positive fractions and mixed numbers. Simplify fractions.</p> <p>Add and subtract integers, with the exception of subtracting negative integers.</p> <p>Estimate results of computations with whole numbers, and with positive common fractions, mixed numbers, decimals, and percents. Describe the reasonableness of estimates.</p>	<p>6.N.13</p> <p>6.N.14</p> <p>6.N.15</p> <p>6.N.16</p>
<p>Patterns, Relations, and Algebra</p> <p>Hands On Algebra</p> <p>Selected activities from these <i>CMP</i> units:</p>		<p>Patterns and relationships can be represented graphically, numerically, symbolically, and verbally.</p> <p>Algebraic representations generalize</p>	<p>How can a pattern be identified?</p> <p>What can be learned from studying patterns?</p> <p>Why are mathematical rules necessary?</p>	<p>A. Understand patterns, relations, and functions.</p> <p>Create, analyze and determine the rules for extending, symbolic, arithmetic, and geometric patterns and progressions, (e.g. ABBCCC; 1,5,9,13...; 3,9,27,...).</p> <p>B. Represent and analyze mathematical situations and structures using algebraic symbols.</p>	<p>6.P.1</p> <p>6.P.2</p>

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<p><i>Shapes & Designs Covering & Surrounding, Bits & Pieces II, Data About Us</i></p> <p>Scott Foresman Addison Wesley text, Selected lessons in Chapters 8, 12</p>		<p>patterns and relationships.</p> <p>Functional relationships can be expressed verbally, graphically, numerically, and symbolically, and are used to solve real world problems.</p> <p>Algebraic representations can be used to solve real world problems.</p> <p>Algebraic representations generalize patterns and relationships.</p>	<p>Why are equations useful?</p> <p>How are a graph, a description, and an expression/equation that represent a real world situation related?</p> <p>How can a function be identified?</p> <p>What can be learned from studying functions?</p> <p>Why are equations and inequalities useful?</p>	<p>Replace variables with given values and evaluate/simplify, (e.g., $2(X) + 3$ when $X=4$).</p> <p>Use the properties of equality to solve problems, (e.g., if $a + 7 = 13$, then $a = 13 - 7$, therefore, $a = 6$; if $3 \times b = 15$, then $\frac{1}{3} \times 3 \times b = \frac{1}{3} \times 15$, therefore $b = 5$).</p> <p>C. Use mathematical models to represent and understand quantitative relationships.</p> <p>Represent real situations and mathematical relationships with concrete models, tables, graphs, and rules in words and with symbols, e.g. input-output tables.</p> <p>Solve linear equations using concrete models, tables, graphs, and pencil-paper methods.</p> <p>Produce and interpret graphs that represent the relationship between two variables in everyday situations.</p> <p>D. Analyze change in various contexts.</p> <p>Use physical models to investigate and describe how change in one variable relates to change in a second variable, (e.g., doubling problems, flat rates, etc.).</p> <p>Identify and describe relationships between two variables with a constant rate of change. Contrast these with relationships where the rate of change is not constant.</p>	<p>6.P.3</p> <p>6.P.4</p> <p>6.P.5</p> <p>6.P.6</p> <p>6.P.7a</p> <p>6.P.7b</p>

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<p>Geometry</p> <p><i>CMP</i> units:</p> <p><i>Shapes & Designs, plus selected lessons from other CMP units</i></p> <p>Scott Foresman Addison Wesley text, Selected lessons in Chapter 9</p>	<p>6 weeks</p>	<p>Relationships exist among the angles, sides, lengths, perimeters, and areas of two-dimensional figures.</p> <p>Geometric relationships exist between two-dimensional and three-dimensional figures.</p> <p>Geometric figures can change position and maintain</p>	<p>How are angle relationships used?</p> <p>How do the dimensions of a geometric figure affect area, surface area, and volume?</p> <p>How are two-dimensional and three-dimensional figures related?</p> <p>How do line relationships affect angle relationships?</p> <p>Why graph geometric figures and transformations on a coordinate plane?</p> <p>How does the movement of a geometric figure affect its attributes?</p>	<p>A. Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships</p> <p>Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides, (e.g. quadrilaterals, and isosceles, equilateral, and right triangles).</p> <p>Identify 3-dimensional shapes (e.g. cubes, prisms, spheres, cones, and pyramids) based on their properties, such as edges, faces, and vertices.</p> <p>Identify relationships among points, lines, and planes, (e.g., intersecting, parallel, perpendicular). Explore the angles formed by intersecting lines.</p> <p>B. Specify locations and describe spatial relationships using coordinate geometry and other representational systems</p> <p>Graph points and identify coordinates of points on the Cartesian coordinate plane, (all four quadrants). [Gr.6 MCAS will only assess coordinate graphing in the first quadrant.]</p> <p>Find the distance between 2 points on horizontal or vertical number lines.</p> <p>C. Apply transformations and use symmetry to analyze mathematical relationships.</p> <p>Predict, describe, and perform transformations on two-</p>	<p>6.G.1 6.G.2 6.G.3</p> <p>6.G.4 6.G.5</p> <p>6.G.6 6.G.7 6.G.8</p>

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		<p>the same attributes on a coordinate plane.</p> <p>Constructions are based on properties of geometric figures.</p> <p>Line and angle relationships represent aspects of the world we inhabit.</p>	<p>How are geometric properties used in construction?</p> <p>How do line relationships affect angle relationships?</p>	<p>dimensional shapes, (e.g., translations, rotations, and reflections).</p> <p>Identify types of symmetry including line and rotational symmetry.</p> <p>Determine if two shapes are congruent by measuring sides or a combination of sides and angles, as necessary; or by motions or series of motions, e.g. translations, rotations, and reflections. Investigate tessellations and tilings.</p> <p>D. Use visualization, spatial reasoning, and geometric modeling to solve problems.</p> <p>Match three-dimensional objects and their two-dimensional representations objects, (e.g., nets, projections and perspective drawings).</p> <p>Identify and draw shapes and figures from different views/perspectives.</p>	<p>6.G.9 6.G.10</p>
<p>Measurement</p> <p>CMP units:</p> <p><i>Covering & Surrounding, plus selected lessons from other CMP units</i></p> <p>Scott Foresman</p>	<p>6 weeks</p>	<p>Selection of standard measurement tools and units depend on the real world situation.</p> <p>The degree of precision in measurements depends on the</p>	<p>Why are specific units and tools used to measure different attributes?</p> <p>What determines the degree of precision of a measurement?</p>	<p>A. Understand measurable attributes of objects and the units, systems, and processes of measurement</p>	

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Addison Wesley text, Selected lessons in Chapter 10		<p>measurement tool.</p> <p>Proportional reasoning involves comparisons of the relationships among ratios.</p>	<p>How are comparisons used in proportional reasoning?</p> <p>How is proportional reasoning of geometric figures used to solve problems?</p> <p>What kinds of questions can be answered using proportional reasoning?</p>	<p>B. Apply appropriate techniques, tools, and formulas to determine measurements</p> <p>Apply the concepts of perimeter and area to solutions of problems. Apply formulas where appropriate.</p> <p>Identify, measure, describe, classify, and construct various angles, triangles and quadrilaterals.</p> <p>Solve problems involving proportional relationships and units of measurement, (e.g., same system unit conversions, map scales, scale models, and speed).</p> <p>Find areas of triangles, and parallelograms. Recognize that shapes with the same number of sides, but different appearances can have the same area. Develop strategies to find the area of complex shapes.</p> <p>Identify, measure, and describe circles and the relationships of the radius, diameter, circumference, and area (e.g. $d = 2r$; $p = C/d$), and use the concepts to solve problems.</p> <p>Find volumes and surface areas of rectangular prisms.</p> <p>Find the sum of the angles in simple polygons (up to eight sides) with and without measuring the angles.</p>	<p>6.M.1 6.M.2 6.M.3 6.M.4 6.M.5 6.M.6 6.M.7</p>

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<p>Data Analysis, Statistics, and Probability</p> <p>CMP units:</p> <p><i>Data About Us</i> <i>How Likely Is It?</i></p> <p>Scott Foresman Addison Wesley text, Selected lessons in Chapters 11</p>		<p>Choices in data collection and representation affect their interpretation and use.</p> <p>The analysis and interpretation of data depends of the type of display.</p> <p>Graphical representations and statistical measures can be used to make interpretations and predictions about real world situations.</p> <p>Probability is the mathematics of chance.</p>	<p>What is the purpose of displaying data?</p> <p>How does the selection of a sample affect conclusions based on the sample?</p> <p>Which measure of central tendency is most appropriate in a given situation?</p> <p>What is the purpose of data displays and statistical measures?</p> <p>How can the data representation influence conclusions?</p> <p>Why is probability used?</p>	<p>A. Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.</p> <p>B. Select and use appropriate statistical methods to analyze data.</p> <p>C. Develop and evaluate inferences and predictions that are based on data.</p> <p>Describe and compare data sets using concepts of median, mean, mode, range, maximum and minimum.</p> <p>Develop, conduct and interpret statistical investigations using appropriate data-collection techniques and representations (tables, bar graphs, pictographs, line graphs, line plots, Venn diagrams, circle graphs and stem-and-leaf plots).</p> <p>D. Understand and apply basic concepts of probability</p> <p>Use tree diagrams and other models, (e.g. lists and tables) to represent possible or actual outcomes of trials. Analyze the results.</p>	<p>6.D.1 6.D.2</p> <p>6.D.3 6.D.4</p>

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		Sampling affects the relationship between experimental and theoretical probability.	How are experimental and theoretical probability related?	Predict the probability of outcomes of simple experiments, (e.g. using coins, number cubes (dice), spinners, and counters) and test the predictions. Use the appropriate ratios between 0 and 1 to represent the probability of the outcome and associate the probability with the likelihood of the event.	