

**4th Grade
Math Pacing Guide (2010-2011)**

Timeline	Topics	Indicators	Benchmarks	Aligned Instructional Resources	Assessments
8/18/10 to 9/9/10 (16 days)	<p align="center">Whole Number Operations</p> <p>* Understanding and working with an array model of multiplication</p> <p>* Reasoning about numbers and their factors</p> <p align="center">Computational Fluency</p> <p>* Fluency with multiplication combinations to 12 x 12</p>	<p>N1. Identify and generate equivalent forms of fractions and decimals. For example: a. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., $1/2$, $5/10$, “five tenths,” 0.5, shaded rectangles with half, and five tenths. b. Understand and explain that ten tenths is the same as one whole in both fraction and decimal form.</p> <p>N4. Identify and represent factors and multiples of whole numbers through 100, and classify numbers as prime or composite.</p> <p>N6. Use associative and distributive properties to simplify and perform computations; e.g., use left to right multiplication and the distributive property to find an exact answer without paper and pencil, such as $5 \times 47 = 5 \times 40 + 5 \times 7 = 200 + 35 = 235$.</p> <p>N7. Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders; e.g., situations involving measurement, money.</p> <p>N12. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division using an organized approach, and verify and interpret results with respect to the original problem.</p> <p>N11. Develop and explain strategies for performing computations mentally.</p> <p>N13. Use a variety of methods and appropriate tools for computing with whole numbers; e.g., mental math, paper and pencil, and calculator.</p> <p>N14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten.</p> <p>N14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten.</p> <p>A3. Construct a table of values to solve problems associated with a mathematical relationship.</p>	<p>NB. Recognize and generate equivalent representations for whole numbers, fractions and decimals.</p> <p>NE. Recognize and classify numbers as prime or composite and list factors.</p> <p>NK. Analyze and solve multistep problems involving addition, subtraction, multiplication and division of whole numbers.</p> <p>NL. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.</p> <p>NI. Demonstrate fluency in multiplication facts with factors through 10 and corresponding divisions.</p> <p>AF. Construct and use a table of values to solve problems associated with mathematical relationships.</p>	<p align="center">Investigations Unit 1 <i>Factors, Multiples, and Arrays</i></p>	<p align="center">End-of-Unit (Common Assessment)</p>
		<p>N1. Identify and generate equivalent forms of fractions and decimals. For example: a. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., $1/2$, $5/10$, “five tenths,” 0.5, shaded rectangles with half, and five tenths.</p> <p>M1. Relate the number of units to the size of the units used to measure an object; e.g., compare the number of cups to fill a pitcher to the number of quarts to fill the same pitcher.</p> <p>A5. Represent mathematical relationships with equations or inequalities.</p> <p>D1. Create a plan for collecting data for a specific purpose.</p>	<p>NB. Recognize and generate equivalent representations for whole numbers, fractions and decimals.</p> <p>MB. Know that the number of units is inversely related to the size of the unit for any item being measured.</p> <p>AC. Write and solve open sentences and explain strategies.</p> <p>DA. Gather and organize data from surveys and classroom experiments, including data collected over a period of time.</p>		

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Timeline	Topics	Indicators	Benchmarks	Aligned Instructional Resources	Assessments	
9/10/10 to 10/6/10 (19 days)	<p>Data Analysis</p> <ul style="list-style-type: none"> * Representing Data * Describing, summarizing, and comparing data * Analyzing and interpreting data * Designing and carrying out a data investigation <p>Probability</p> <ul style="list-style-type: none"> * Describing the probability of an event 	D2. Represent and interpret data using tables, bar graphs, line plots and line graphs.	DB. Read and interpret tables, charts, graphs (bar, picture, line, line plot), and timelines as sources of information, identify main idea, draw conclusions, and make predictions.	Investigations Unit 2 <i>Describing the Shape of the Data</i>	Oct. 4 to Oct. 8... Math Benchmark End-of-Unit (Common Assessment)	
		D5. Propose and explain interpretations and predictions based on data displayed in tables, charts and graphs.				
		D2. Represent and interpret data using tables, bar graphs, line plots and line graphs.				DC. Construct charts, tables and graphs to represent data, including picture graphs, bar graphs, line graphs, line plots and Venn diagrams.
		D4. Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data.				DC. Construct charts, tables and graphs to represent data, including picture graphs, bar graphs, line graphs, line plots and Venn diagrams.
		D6. Describe the characteristics of a set of data based on a graphical representation, such as range of the data, clumps of data, and holes in the data.				DE. Describe data using mode, median and range.
		D7. Identify the median of a set of data and describe what it indicates about the data. D8. Use range, median and mode to make comparisons among related sets of data.				
		D9. Conduct simple probability experiments and draw conclusions from the results; e.g., rolling number cubes or drawing marbles from a bag.				DF. Conduct a simple probability experiment and draw conclusions about the likelihood of possible outcomes.
9/10/10 to 10/6/10 (Cont.)		D10. Represent the likelihood of possible outcomes for chance situations; e.g., probability of selecting a red marble from a bag containing 3 red and 5 white marbles.	DF. Conduct a simple probability experiment and draw conclusions about the likelihood of possible outcomes.	Investigations Unit 2 <i>Describing the Shape of the Data</i> (Cont.)	End-of-Unit (Common Assessment)	
		D11. Relate the concepts of impossible and certain-to-happen events to the numerical values of 0 (impossible) and 1 (certain).				
		D12. Place events in order of likelihood and use a diagram or appropriate language to compare the chance of each event occurring; e.g., impossible, unlikely, equal, likely, certain.				
		D10. Represent the likelihood of possible outcomes for chance situations; e.g., probability of selecting a red marble from a bag containing 3 red and 5 white marbles.				DH. Use the set of possible outcomes to describe and predict events.
		D11. Relate the concepts of impossible and certain-to-happen events to the numerical values of 0 (impossible) and 1 (certain).	DH. Use the set of possible outcomes to describe and predict events.			
	Computational Fluency	N1. Identify and generate equivalent forms of fractions and decimals. For example: a. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., 1/2, 5/10, "five tenths," 0.5, shaded rectangles with half, and five tenths. b. Understand and explain that ten tenths is the same as one whole in both fraction and decimal form.	NB. Recognize and generate equivalent representations for whole numbers, fractions and decimals.			
		N4. Identify and represent factors and multiples of whole numbers through 100, and classify numbers as prime or composite.	NE. Recognize and classify numbers as prime or composite and list factors.			

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10/7/10 to 11/5/10 (22 days)	<p>* Solving multiplication problems with 2-digit numbers</p> <p align="center">Whole Number Operations</p> <p>* Understanding and using the relationship between multiplication and division to solve division problems</p> <p>* reasoning about numbers and their factors</p> <p>* Representing the meaning of multiplication and division</p>	<p>N6. Use associative and distributive properties to simplify and perform computations; e.g., use left to right multiplication and the distributive property to find an exact answer without paper and pencil, such as $5 \times 47 = 5 \times 40 + 5 \times 7 = 200 + 35 = 235$.</p> <p>N7. Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders; e.g., situations involving measurement, money.</p> <p>N12. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division using an organized approach, and verify and interpret results with respect to the original problem.</p> <p>N11. Develop and explain strategies for performing computations mentally.</p> <p>N13. Use a variety of methods and appropriate tools for computing with whole numbers; e.g., mental math, paper and pencil, and calculator.</p> <p>N14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten.</p>	<p>NK. Analyze and solve multistep problems involving addition, subtraction, multiplication and division of whole numbers.</p> <p>NL. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.</p> <p>NI. Demonstrate fluency in multiplication facts with factors through 10 and corresponding divisions.</p> <p>NL. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.</p>	<p align="center">Investigations Unit 3 <i>Multiple Towers and Division Stories</i></p>	<p align="center">End-of-Unit (Common Assessment)</p>
11/8/10 to 12/10/10 (22 days)	<p align="center">Linear Measurement</p> <p>* Measuring with standard units</p> <p align="center">Features of Shape</p> <p>* Describing and classifying 2-dimensional figures</p> <p>* Describing and measuring angles</p> <p align="center">Area Measurement</p> <p>* Finding and understanding area</p>	<p>N1. Identify and generate equivalent forms of fractions and decimals. For example: a. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., $1/2$, $5/10$, “five tenths,” 0.5, shaded rectangles with half, and π</p> <p>N5. Use models and points of reference to compare commonly used fractions.</p> <p>M1. Relate the number of units to the size of the units used to measure an object; e.g., compare the number of cups to fill a pitcher to the number of quarts to fill the same pitcher.</p> <p>M2. Demonstrate and describe perimeter as surrounding and area as covering a two-dimensional shape, and volume as filling a three-dimensional object.</p>	<p>NB. Recognize and generate equivalent representations for whole numbers, fractions and decimals.</p> <p>ND. Use models, points of reference and equivalent forms of commonly used fractions to judge the size of fractions and to compare, describe and order them.</p> <p>MB. Know that the number of units is inversely related to the size of the unit for any item being measured.</p> <p>MC. Develop common referents for units of measure for length, weight, volume (capacity) and time to make comparisons and estimates.</p>	<p align="center">Investigations Unit 4 <i>Size, Shape, and Symmetry</i></p>	<p align="center">Dec. 6 to Dec. 10... Math Benchmark End-of-Unit (Common Assessment)</p>
		<p>M3. Identify and select appropriate units to measure: a. perimeter – string or links (inches or centimeters). b. area – tiles (square inches or square centimeters). c. volume – cubes (cubic inches or cubic centimeters).</p> <p>M4. Develop and use strategies to find perimeter using string or links, area using tiles or a grid, and volume using cubes; e.g., count squares to find area of regular or irregular shapes on a grid, layer cubes in a box to find its volume.</p>	<p>MA. Select appropriate units for perimeter, area, weight, volume (capacity), time and temperature, using: • objects of uniform size; • U.S. customary units; e.g., mile, square inch, cubic inch, second, degree Fahrenheit, and other units as appropriate; • metric units; e.g., millimeter, kilometer, square centimeter, kilogram, cubic centimeter, degree Celsius, and other units as appropriate.</p> <p>MD. Identify appropriate tools and apply counting techniques for measuring side lengths, perimeter and area of squares, rectangles, and simple irregular two-dimensional shapes, volume of rectangular prisms, and time and temperature.</p>		

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11/8/10 to 12/10/10 (Cont.)	<p>Linear Measurement</p> <p>* Measuring with standard units</p> <p>Features of Shape</p> <p>* Describing and classifying 2-dimensional figures</p> <p>* Describing and measuring angles</p> <p>Area Measurement</p> <p>* Finding and understanding area</p>	G1. Identify, describe and model intersecting, parallel and perpendicular lines and line segments; e.g., use straws or other material to model lines.	GC. Describe and identify intersecting, parallel and perpendicular lines or segments in the environment.	Investigations Unit 4 <i>Size, Shape, and Symmetry</i> (Cont.)	Dec. 6 to Dec. 10... Math Benchmark End-of-Unit (Common Assessment)
		G2. Describe, classify, compare and model two- and three-dimensional objects using their attributes.	GE. Use attributes to describe, classify and sketch plane figures and build solid objects.		
		G3. Identify similarities and differences of quadrilaterals; e.g., squares, rectangles, parallelograms and trapezoids. G4. Identify and define triangles based on angle measures (equiangular, right, acute and obtuse triangles) and side lengths (isosceles, equilateral and scalene triangles).	GA. Provide rationale for groupings and comparisons of two-dimensional figures and three-dimensional objects. GF. Develop definitions of classes of shapes.		
		G5. Describe points, lines and planes, and identify models in the environment.	GB. Describe and identify points, lines and planes in the environment.		
		G6. Specify locations and plot ordered pairs on a coordinate plane, using first quadrant points.	GG. Find and name locations in coordinate systems.		
		G7. Identify, describe and use reflections (flips), rotations (turns), and translations (slides) in solving geometric problems; e.g., use transformations to determine if 2 shapes are congruent.	GI. Describe, identify and model reflections, rotations and translations, using physical materials.		
		G7. Identify, describe and use reflections (flips), rotations (turns), and translations (slides) in solving geometric problems; e.g., use transformations to determine if 2 shapes are congruent.	GJ. Describe a motion or series of transformations that show two shapes are congruent.		
12/13/10 to 2/1/11 (26 days)	<p>Base-Ten Number System</p> <p>* Extending knowledge of the number system to 10,000</p> <p>Computational Fluency</p> <p>* Adding and subtracting accurately and efficiently</p> <p>Whole Number Operations</p> <p>* Describing, analyzing, and comparing strategies for adding and subtracting whole numbers</p> <p>* Understanding different types of subtraction problems</p>	N1. Identify and generate equivalent forms of fractions and decimals. For example, a. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., $1/2$, $5/10$, "five tenths," 0.5, shaded rectangles with half, and $5/10$.	NB. Recognize and generate equivalent representations for whole numbers, fractions and decimals.	Investigations Unit 5 <i>Landmarks and Large Numbers</i>	End-of-Unit (Common Assessment)
		N2. Use place value structure of the base-ten number system to read, write, represent and compare whole numbers through millions and decimals through thousandths.	NA. Use place value structure of the base-ten number system to read, write, represent and compare whole numbers and decimals.		
		N3. Round whole numbers to a given place value.			
		N8. Solve problems involving counting money and making change, using both coins and paper bills.	NF. Count money and make change using both coins and paper bills.		
		N9. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies.	NK. Analyze and solve multistep problems involving addition, subtraction, multiplication and division of whole numbers.		
		N9. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies.	NJ. Estimate the results of whole number computations using a variety of strategies, and judge the reasonableness.		
		N11. Develop and explain strategies for performing computations mentally. N13. Use a variety of methods and appropriate tools for computing with whole numbers; e.g., mental math, paper and pencil, and calculator. N14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of 100.	NM. Add and subtract commonly used fractions with like denominators and decimals, using models and paper and pencil.		
N12. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division using an organized approach, and verify and interpret results with respect to the original problem.	NL. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.				
	NK. Analyze and solve multistep problems involving addition, subtraction, multiplication and division of whole numbers.				

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12/13/10 to 2/1/11 (Con't.)		N14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten. A3. Construct a table of values to solve problems associated with a mathematical relationship.	NI. Demonstrate fluency in multiplication facts with factors through 10 and corresponding divisions. AF. Construct and use a table of values to solve problems associated with mathematical relationships.	Investigations Unit 5 <i>Landmarks and Large Numbers</i> (Con't.)	End-of-Unit (Common Assessment)
2/2/11 to 3/7/11 (22 days)	Rational Numbers * Understanding the meaning of fractions and decimal fractions * Comparing the values of fractions and decimal fractions Computation with Rational Numbers * Using representations to add rational numbers	N1. Identify and generate equivalent forms of fractions and decimals. For example: a. Connect physical, verbal and symbolic representations of fractions, decimals and whole numbers; e.g., 1/2, 5/10, "five tenths," 0.5, shaded rectangles with half, and five tenths. b. Understand and explain that ten tenths is the same as one whole in both fraction and decimal form. N2. Use place value structure of the base-ten number system to read, write, represent and compare whole numbers through millions and decimals through thousandths. N5. Use models and points of reference to compare commonly used fractions. N9. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies. N9. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies. N10. Use physical models, visual representations, and paper and pencil to add and subtract decimals and commonly used fractions with like denominators. A3. Round whole numbers to a given place value. A5. Use models and points of reference to compare commonly used fractions.	NB. Recognize and generate equivalent representations for whole numbers, fractions and decimals. NA. Use place value structure of the base-ten number system to read, write, represent and compare whole numbers and decimals. ND. Use models, points of reference and equivalent forms of commonly used fractions to judge the size of fractions and to compare, describe and order them. NJ. Estimate the results of whole number computations using a variety of strategies, and judge the reasonableness. NM. Add and subtract commonly used fractions with like denominators and decimals, using models and paper and pencil. AF. Construct and use a table of values to solve problems associated with mathematical relationships. AC. Write and solve open sentences and explain strategies.	Investigations Unit 6 <i>Fraction Cards and Decimal Squares</i>	Mar. 1 to Mar. 4... Math Benchmark End-of-Unit (Common Assessment)
		M2. Demonstrate and describe perimeter as surrounding and area as covering a two-dimensional shape, and volume as filling a three-dimensional object.	MC. Develop common referents for units of measure for length, weight, volume (capacity) and time to make comparisons and estimates.		

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Timeline	Topics	Indicators	Benchmarks	Aligned Instructional Resources	Assessments
3/8/11 to 4/5/11 (16 days)	<p align="center">Features of Shape</p> <p>* Transating between 2- and 3-dimensional shapes</p> <p align="center">Volume</p> <p>* Structuring rectangular prisms and determingin their volume</p>	M3. Identify and select appropriate units to measure: a. perimeter – string or links (inches or centimeters). b. area – tiles (square inches or square centimeters). c. volume – cubes (cubic inches or cubic centimeters).	MA. Select appropriate units for perimeter, area, weight, volume (capacity), time and temperature, using: • objects of uniform size; • U.S. customary units; e.g., mile, square inch, cubic inch, second, degree Fahrenheit, and other units as appropriate; •	Investigations Unit 7 <i>Moving Between Solids and Silhouettes</i>	End-of-Unit (Common Assessment)
		M4. Develop and use strategies to find perimeter using string or links, area using tiles or a grid, and volume using cubes; e.g., count squares to find area of regular or irregular shapes on a grid, layer cubes in a box to find its volume.	MD. Identify appropriate tools and apply counting techniques for measuring side lengths, perimeter and area of squares, rectangles, and simple irregular two-dimensional shapes, volume of rectangular prisms, and time and temperature.		
		G7. Identify, describe and use reflections (flips), rotations (turns), and translations (slides) in solving geometric problems; e.g., use transformations to determine if 2 shapes are congruent.	GI. Describe, identify and model reflections, rotations and translations, using physical materials. GJ. Describe a motion or series of transformations that show two shapes are congruent.		
4/6/11 to 5/2/11 (17 Days)	<p align="center">Tables and Graphs</p> <p>* Using graphs to represent change * Using tables to represent change</p> <p align="center">Change</p> <p>* Describing and representing a constant rate of change</p>	G6. Specify locations and plot ordered pairs on a coordinate plane, using first quadrant points.	GG. Find and name locations in coordinate systems.	Investigations Unit 9 <i>Penny Jars and Plant Growth</i>	Apr. 25 to May 3... OAA State Testing End-of-Unit (Common Assessment)
		A1. Use models and words to describe, extend and make generalizations of patterns and relationships occurring in computation, numerical patterns, geometry, graphs and other applications.	AB. Use patterns to make predictions, identify relationships, and solve problems		
		A6. Describe how a change in one variable affects the value of a related variable; e.g., as one increases the other increases or as one increases the other decreases.	AD. Represent an unknown quantity as a variable using a symbol, including letters. AG. Describe how a change in one variable affects the value of a related variable.		
		D1. Create a plan for collecting data for a specific purpose.	DA. Gather and organize data from surveys and classroom experiments, including data collected over a period of time.		
		D2. Represent and interpret data using tables, bar graphs, line plots and line graphs. D5. Propose and explain interpretations and predictions based on data displayed in tables, charts and graphs.	DB. Read and interpret tables, charts, graphs (bar, picture, line, line plot), and timelines as sources of information, identify main idea, draw conclusions, and make predictions.		
		D2. Represent and interpret data using tables, bar graphs, line plots and line graphs.	DC. Construct charts, tables and graphs to represent data, including picture graphs, bar graphs, line graphs, line plots and Venn diagrams.		
		D3. Interpret and construct Venn diagrams to sort and describe data.			
		D4. Compare different representations of the same data to evaluate how well each representation shows important aspects of the data, and identify appropriate ways to display the data.			

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		D6. Describe the characteristics of a set of data based on a graphical representation, such as range of the data, clumps of data, and holes in the data.	DE. Describe data using mode, median and range.		
5/3/11 to 5/26/11 (18 Days)	<p align="center">Computational Fluency</p> <p>* Solving multiplication problems with 2-digit numbers</p> <p align="center">Whole Number Operations</p> <p>* Understanding division as making groups of the divisor</p>	N4. Identify and represent factors and multiples of whole numbers through 100, and classify numbers as prime or composite.	NE. Recognize and classify numbers as prime or composite and list factors.	Investigations Unit 8 <i>How Many Packages? How Many Groups?</i>	End-of-Unit (Common Assessment)
		N6. Use associative and distributive properties to simplify and perform computations; e.g., use left to right multiplication and the distributive property to find an exact answer without paper and pencil, such as $5 \times 47 = 5 \times 40 + 5 \times 7 = 200 + 35 = 235$.	NK. Analyze and solve multistep problems involving addition, subtraction, multiplication and division of whole numbers.		
		N7. Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders; e.g., situations involving measurement, money.			
		N12. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division using an organized approach, and verify and interpret results with respect to the original problem.			
		N9. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies.	NJ. Estimate the results of whole number computations using a variety of strategies, and judge the reasonableness.		
		N9. Estimate the results of computations involving whole numbers, fractions and decimals, using a variety of strategies.	NM. Add and subtract commonly used fractions with like denominators and decimals, using models and paper and pencil.		
		N11. Develop and explain strategies for performing computations mentally.	NL. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.		
		N13. Use a variety of methods and appropriate tools for computing with whole numbers; e.g., mental math, paper and pencil, and calculator.			
N14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit numbers and multiples of ten.	NI. Demonstrate fluency in multiplication facts with factors through 10 and corresponding divisions.				
			NL. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.		