CCSS Math & Geometry

Version 1.0
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Math Cluster Overview Chart

Domain	Cluster Objectives	K	1	2	3	4	5	6	7	8
Counting and Cardinality	Know number names and the count sequence.	x								
	Count to tell the number of objects.	x								
	Compare numbers.	x								
Operations and Algebraic Thinking	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	x								
	Represent and solve problems involving addition and subtraction.		x	x						
	Understand and apply properties of operations and the relationship between addition and subtraction.		x							
	Add and subtract within 20.		x	x						
	Work with addition and subtraction equations.		x							
	Work with equal groups of objects to gain foundations for multiplication.			x						
	Represent and solve problems involving multiplication and division.				x					
	Understand properties of multiplication and the relationship between multiplication and division.				x					
	Multiply and divide within 100.				x					
	Solve problems involving the four operations, and identify and explain patterns in arithmetic.				x					
	Use the four operations with whole numbers to solve problems.					x				
	Gain familiarity with factors and multiples.					x				
	Generate and analyze patterns.					x				
	Write and interpret numerical expressions.						x			
	Analyze patterns and relationships.						x			
Number and Operations in Base 10	Work with numbers 11–19 to gain foundations for place value.	x								
	Extend the counting sequence.		x							
	Understand place value.		x	x						
	Use place value understanding and properties of operations to add and subtract		x	x						
	Use place value understanding and properties of operations to perform multi-digit arithmetic.				x	x				
	Generalize place value understanding for multi-digit whole numbers.					x				
	Understand the place value system.						x			
	Perform operations with multi-digit whole numbers and with decimals to hundredths.						x			
Measurement and Data	Describe and compare measurable attributes.	x								
	Classify objects and count the number of objects in each category.	x								
	Measure lengths indirectly and by iterating length units.		x							
	Tell and write time.		x							
	Represent and interpret data.		x	x	x	x	x			
	Measure and estimate lengths in standard units.			x						
	Relate addition and subtraction to length.			x						
	Work with time and money.			x						
	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.				x					
	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.				x					
	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.				x					
	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.					x				
	Geometric measurement: understand concepts of angle and measure angles.					x				
	Convert like measurement units within a given measurement system.						x			
	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.						x			
Geometry	Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).	x								
	Analyze, compare, create, and compose shapes.	x								
	Reason with shapes and their attributes.		x	x	x					
	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.					x				
	Graph points on the coordinate plane to solve real-world and mathematical problems.						x			
	Classify two-dimensional figures into categories based on their properties.						x			
	Solve real-world and mathematical problems involving area, surface area, and volume.							x		
	Draw, construct, and describe geometrical figures and describe the relationships between them.								x	
	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.								x	
	Understand congruence and similarity using physical models, transparencies, or geometry software.									x
	Understand and apply the Pythagorean Theorem.									x
	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.									x
Number and Operations--Fractions	Develop understanding of fractions as numbers.				x					
	Extend understanding of fraction equivalence and ordering.					x				
	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.					x				
	Understand decimal notation for fractions, and compare decimal fractions.					x				
	Use equivalent fractions as a strategy to add and subtract fractions.						x			
	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.						x			
Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.							x		
	Analyze proportional relationships and use them to solve real-world and mathematical problems.								x	
The Number System	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.							x		
	Compute fluently with multi-digit numbers and find common factors and multiples.							x		
	Apply and extend previous understandings of numbers to the system of rational numbers.							x		
	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.								x	
	Know that there are numbers that are not rational, and approximate them by rational numbers.									x
Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.							x		
	Reason about and solve one-variable equations and inequalities.							x		
	Represent and analyze quantitative relationships between dependent and independent variables.							x		
	Use properties of operations to generate equivalent expressions.								x	
	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.								x	
	Work with radicals and integer exponents.									x
	Understand the connections between proportional relationships, lines, and linear equations.									x
	Analyze and solve linear equations and pairs of simultaneous linear equations.									x
Statistics and Probability	Develop understanding of statistical variability.							x		
	Summarize and describe distributions.							x		
	Use random sampling to draw inferences about a population.								x	
	Draw informal comparative inferences about two populations.								x	
	Investigate chance processes and develop, use, and evaluate probability models.								x	
	Investigate patterns of association in bivariate data.									x
Functions	Define, evaluate, and compare functions.									x
	Use functions to model relationships between quantities.									x

Representative AMI Math Curriculum

Activity ID	Content Strand	Material	Presentations/Activities
	Great story of mathematics/history		
40001		Charts/story	The story of our numerals
40002			Making charts/making models
40003			Making timelines
40004			Research: number systems, cultural history, decimal system
	The decimal system, categories and place value		
40008		Golden beads & presentation tray	Introduce decimal/whole number categories
40009		Golden beads & decimal cards	Association of symbol & quantity 1, 10, 100, 1000's
40010		Decimal cards	Understanding zero
40011		Golden beads & trays	Forming numbers using concrete quantities of beads
40012		Golden beads & decimal cards	Forming numbers w/decimal cards, hiding zeroes
40013		Golden beads, decimal cards & trays	Creating quantities w/symbols up to 9,999
40015		Wooden hierarchical material	Introduction to quantity & language, up to million
40016			Geometric shape and families to millions
40017		Number cards 1, 10, 100… 1,000,000	Introduction to symbol to millions
40018		Whm & number cards	Symbol and quantity into millions
40019		Golden beads, decimal cards	Expanded notation/decomposing numbers
40020		Sbf/lbf & sbf/lbf paper	Expanded notation/decomposing numbers
40021		Bank game	Expanded notation (along w/multiplication)
	Quantity & symbol: whole numbers: numeration		
40024		Spindle boxes (0 - 9), bead stair (1 - 9)	Introduce/review numbers 1 - 10
40025		Snake game (1-10), memory games	Introduce/review numbers 1 - 10
40026		Cards & counters	Introduce odd/even numbers
40027		Golden beads	Counting and numbers 1 – 10
40028		Golden beads	Exchange/change game across categories
40029		Teen boards, bead bars	Introduce/review counting 11 - 20
40030		Ten boards & bead bars	Introduce/review counting 1 - 100
40031		Golden beads, base board	Decimal system (numbers to thousands using base board in base 10)
40032		Small bead frame	Counting to 1000
40033		Hundred & thousand chain & labels	Counting to 1000
40034		Short/square bead chains & labels	Linear & skip counting
40035		Long/cube bead chains & labels	Linear & skip counting
40036		Large bead frame	Counting to millions
40037		Sbf/lbf and sbf/lbf paper	Presentation of symbol up to millions
	Whole numbers: addition		
40041		Golden beads	Concept of static addition with whole numbers
40042		Golden beads & decimal cards	Static addition (no carrying)
40043		Large bead frame	Static addition (no carrying)
40044		Stamp game	Static addition (no carrying)
40045		Stamp game w/square paper	Static addition w/recording
40046		Golden beads & decimal cards	Dynamic addition (w/carrying)
40047		Large bead frame	Dynamic addition (w/carrying)
40048		Dot game	Dynamic addition (w/carrying)
40049		Stamp game	Dynamic addition (w/carrying)
40050		Lbf and lbf paper	Dynamic addition w/recording
40051		Stamp game w/square paper	Dynamic addition w/recording
40052		Golden beads & decimal cards	Special cases, using zero in all terms of equation
40053		Lbf, stamp game w/paper	Introduce/consolidate algorithm
40054		Golden beads	Addition word problems, problem solving
40055		Bead bar material and pencil/paper	Addition word problems, problem solving
40056		Bead bar material and pencil/paper	Commutative law of addition
40057		Bead bar material and pencil/paper	Associative property of addition

Activity ID	Content Strand	Material	Presentations/Activities
40059	Memorization of addition facts	Addition strip board	Addition math facts, memorization
40060		Addition practice/finger charts	Addition math facts, memorization
40061		Addition snake game	Addition math facts, memorization
40062		Bead bar material and pencil/paper	Memorization of facts (addition)
40064	Whole numbers: subtraction		
40065		Golden beads	Concept of static subtraction with whole numbers
40066		Golden beads & decimal cards	Static subtraction (no borrowing)
40067		Large bead frame	Static subtraction (no borrowing)
40068		Stamp game	Static subtraction (no borrowing)
40069		Stamp game w/square paper	Static addition w/recording
40070		Golden beads & decimal cards	Dynamic subtraction (w/borrowing)
40071		Large bead frame	Dynamic subtraction (w/borrowing)
40072		Dot game	Dynamic subtraction (w/borrowing)
40073		Stamp game	Dynamic subtraction (w/borrowing)
40074		Lbf and lbf paper	Dynamic subtraction (w/borrowing)
40075		Stamp game w/square paper	Dynamic subtraction (w/borrowing)
40076		Golden beads & decimal cards	Special cases, using zero in all terms of equation
40077		Lbf, stamp game w/paper	Introduce/consolidate algorithm
40078		Golden beads	Subtraction word problems, problem solving
40079		Bead bar material and pencil/paper	Subtraction word problems, problem solving
40081	Memorization of subtraction facts	Subtraction strip board	Subtraction math facts, memorization
40082		Subtraction practice/finger charts	Subtraction math facts, memorization
40083		Subtraction snake game	Subtraction math facts, memorization
40084		Bead bar material and pencil/paper	Memorization of facts (subtraction)
	Laws of multiplication		
40087		Golden beads w/decimal cards	Introduce multiplication
40088		Bead bars	Concept of simple multiplication (facts)
40089		Bead bars	Build the decanomial w/bead bars
40090		Practice charts, bead bars, booklets	Memorization of multiplication facts
40091		Bead chains	Skip counting, memorization of facts
	Commutative law of multiplication		
40094		Bead bars and cards	Concept and language of commutative law
	Distributive law of multiplication		
40096		Bead bars, cards, parentheses, envelopes	Concept and language of distributive law
40097		Bead bars	Sensorial exploration
40098			Passage to more symbolic representations with beads
40099			Passage to more symbolic representations without beads
40100			Passage to more symbolic representations on paper
40101		Golden beads & decimal cards	Extension to the decimal system: multiplication of composite numbers
40102			Extension to the decimal system: multiplication of composite numbers and passage to more symbolic representation with number cards
40103		Paper	Extension to the decimal system: multiplication of composite numbers and passage to more symbolic representation on paper
40104			
	Long multiplication		
	Checkerboard		
40107		Checkerboard & bead bars	Introduction to the checkerboard
40108		Checkerboard & bead bars & number tickets	Multiplication by a one-digit multiplier
40109		Checkerboard & bead bars & number tickets	Multiplication by a multi-digit multiplier (using bead bars, no facts)
40110		Checkerboard & bead bars & number tickets	Multiplication by a multi-digit multiplier (using bead bars, some facts)
40111		Checkerboard, bead bars, no. Tickets, paper	Multiplication by a multi-digit multiplier (using all facts, recording problem and final product)

Activity ID	Content Strand	Material	Presentations/Activities
40112		Checkerboard, bead bars, no. Tickets, paper	Multiplication by a multi-digit multiplier (using facts, recording problem, partial products, and final product)
40113			Multiplication by a multi-digit multiplier (no beads, using facts, recoding problem and final product)
	Large bead frame		
40115		Large bead frame & lbf paper	Multiplication by a one-digit multiplier
40116		Large bead frame & lbf paper	Multi-digit multiplier
40117		Large bead frame & lbf paper	Multi-digit multiplier (recording partial products, adding partial products, checking)
40118			
	Bank game		
40120		Bank game	Multiplication by a one-digit multiplier
40121		Bank game	Two-digit multiplier
40122		Bank game	Three-digit multiplier
	Flat bead frame		
40124		Flat/gold bead frame & paper	Multiplication by a two-to four-digit multiplier (writing final product only)
40125		Flat/gold bead frame & paper	Multiplication by a two-to four-digit multiplier (writing partial products)
	Geometric form of multiplication		
40127		Graph paper, colored pencils	Geometric form of multiplication
	Multiplication summary		
40129		Paper/pencil	Consolidate multiplication fact memorization
40130		Paper/pencil & appropriate material	Traditional multiplication algorithm
40131		Paper/pencil	Multiplication word problems
	Long division		
	Division with boards, racks, and tubes		
40134		Racks & tubes materials	Division by a one-digit divisor
40135		Racks & tubes materials	Division by a multi-digit divisor
40136		Racks & tubes and paper/pencil	Recording intermediate remainders, quotient, final remainder
40137		Racks & tubes and paper/pencil	Recording what has been used, intermediate remainders, quotient, final remainder
40138		Racks & tubes and paper/pencil	Special cases
	Division with stamps		
40140		Stamp game	Division with stamps
	Division summary		
40142		Pencil/paper	Traditional division algorithm
40143		Pencil/paper	Division word problems
	Multiples, factors, and primes		
	Multiples		
40146		Short bead chains 1^2 - 10^2	Concept and language of multiple using short chains
40147		Bead bars	Further investigation of multiples using bead bars (one-and two-digit numbers)
40148		Multiples of numbers paper	Further investigation of multiples using multiples of numbers paper
40149		Tables A & B	Calculation of multiples using table A and table B
40150		Bead bars & paper/pencil	Concept and language of common multiple
40151		Multiples of numbers paper	Investigation of common multiple using multiples of numbers paper
40152		Table C	Investigation of numbers using table C (leading to concept and language of prime number)
40153		Bead bars & paper/pencil	Concept, language, and notation for least common multiple (lcm)
	Factors		
40155		Pegs and pegboard	Concept and language of factor using pegs/ pegboard
40156		Pegs & pegboard with white strips	Concept and language of common factor
40157		Table C	Concept and language for prime factor using table C
40158		Pegs & pegboard	Calculation of prime factors using pegboard

Activity ID	Content Strand	Material	Presentations/Activities
40159		Pegs & pegboard, pencil/paper	Using prime factors to find the least common multiple (lcm) of numbers
40160		Pegs & pegboard, pencil/paper	Concept, language, and notation for greatest common factor (gcf)
40161		Sieve of eratosthenes	Handout: sieve of eratosthenes
40162			
	Divisibility		
40165		Gold beads and paper tickets	Divisibility by 2, 5, and 25
40166		Gold beads and paper tickets	Divisibility by 4 and 8
40167		Gold beads, paper tickets, pencil/ paper	Divisibility chart
40168		Gold beads and paper tickets	Divisibility by 3 and 9
40169		Gold beads and paper tickets	Divisibility by 11
40170			
	Fractions		
	Introduction and equivalence		
40173		Red metal fraction insets	Fractions: quantity and language
40174		Fraction insets & labels	Fractions: symbol, notation, further language
40175			Fractions: other representations
40176		Fraction insets	Equivalence: sensorial
	Operations: simple cases		
40178		Fraction insets and paper tickets	Simple addition (denominators common, reduction)
40179		Fraction insets and paper tickets	Simple subtraction (denominators common, reduction)
40180		Fraction insets and paper tickets	Simple multiplication (by single-digit whole number, reduction)
40181		Fraction insets and paper tickets	Simple division (by single-digit whole number, reduction)
	Operations: beyond simple cases		
40183		Fraction insets and paper tickets	Addition/subtraction: uncommon denominators
40184		Fraction insets and paper tickets	Multiplication by a fraction less than one
40185		Fraction insets and paper tickets	Division by a fraction less than one (measurement/ group)
40186		Fraction insets, paper tickets, lg. Skittles	Division by a fraction less than one (partitive / sharing)
	Operations: passages to abstraction		
40188		Transparencies prepared with fraction lines	Addition/subtraction: finding a common denominator using transparencies
40189		Pencil/paper	Addition/subtraction: finding a common denominator by multiplying the denominators
40190		Pencil/paper	Addition/subtraction: known denominator, finding the numerators by raising or reducing a fraction
40191		Pencil/paper	Addition/Subtraction: Finding the Least Common Denominator (LCD)
40192		Pencil/paper	Abstraction of the rules for operations with fractions
40193	Applications with Fractions		
	Decimal Fractions		
	Introduction to Decimal Fractions		
40197		Decimal cubes and beads	Decimals: quantity and language
40198		Label strip for decimal board	Decimals: symbol
40199		Decimal board (yellow board) & cubes/beads	Decimals: formation and reading
	Operations: Simple Cases		
40201		Decimal board (yellow board) & cubes/beads	Addition and subtraction using the decimal board
40202		Pencil/paper	Algorithm for addition and subtraction of decimals
40203		Decimal board (yellow board) & cubes/beads	Multiplication by a unit multiplier
40204		Decimal cubes and skittles	Division by a unit divisor
	Multiplication with Decimals: Beyond Simple Cases		
40206		Decimal checkerboard	Multiplication by a fraction using the decimal checkerboard
40207		Felt squares for decimal checkerboard	Category multiplication in the decimal system (whole and decimal numbers, using felt squares)

Activity ID	Content Strand	Material	Presentations/Activities
40208		Decimal checkerboard and beads	Multiplication of a fraction by a fraction using the decimal board
40209		Pencil/paper	Algorithm for multiplication of decimals
	Division with decimals: beyond simple cases		
40211		Decimal beads and skittles	Division by a mixed number or by a decimal using skittles
40212		Pencil/paper	Algorithm for division of decimals
	Introduction to percentage with the centessimal frame		
40214		Centessimal frame	Concept, language, and notation of percentage
40215		Red fraction insets and centessimal frame	Conversion of fraction insets to percentage using the centessimal frame
	Special topics extending the exploration of decimals		
40217		Pencil/paper	Relative size of terms when multiplying and dividing (positive) numbers
40218		Pencil/paper	Rounding of decimal fractions
40219		Pencil/paper	Conversion of common to decimal fractions (and vice versa)
40220			
	Squares and cubes of numbers		
	Squares		
40223		Bead squares and short chains	Concept and notation of the square of a number
40224		Bead squares and short chains	Exploring squares of numbers 1 – 10
40225		Numerical (paper) decanomial	Numerical decanomial
	Cubes		
40227		Bead cubes and long chains	Concept and notation of the cube of a number
40228		Bead cubes and long chains	Exploring cubes of numbers 1 – 10
40229		Bead cubes and long chains	Building the tower of jewels
	Operations with squares and cubes		
40231		Bead squares and cubes and paper tickets	Operations with numbers written as squares and cubes
40232			
	Squaring		
	Squaring: arithmetic passages		
40235		Gold square of 10 & rubber bands & tickets	Transformation of the square of 10 into a binomial
40236		Gold square of 10 & rubber bands & tickets	Transformation of the square of 10 into a trinomial, quadranomial, polynomial
40237		Bead squares and bead bars and tickets	Exploring the binomial: building a larger square from a smaller square
40238		Bead squares and bead bars and tickets	Exploring a polynomial: squaring a sum (one-digit terms)
40239		Golden beads and tickets	Application to decimal numbers: squaring a binomial using golden beads (whole numbers ≤ 99)
40240		Pegboard & pegs, guide square & tickets	Application to decimal numbers: squaring a binomial using hierarchical pegs (whole numbers) and introduction to guide squares
40241		Guide squares and paper/pencil	Guide squares: deriving the decimal formula for the square of a polynomial
	Squaring: algebraic passages		
40243		Gold bead squares, rubber bands, bi-cube lid	Squaring a binomial, algebraic
40244		Gold bead squares, rubber bands, tri-cube lid	Squaring a trinomial, algebraic
40245			
	Cubing		
	Cubing: arithmetic passages		
40248		Wooden cubing material	Transformation of a given cube into a cube of a binomial
40249		Wooden cubing material	Building from a cube to a larger cube with wooden cubing material
40250			Cubing a binomial, numeric, starting from the square
40251			Cubing a binomial, numeric, staring from the cube of the first term
40252			Cubing a trinomial, numeric, starting from the square

Activity ID	Content Strand	Material	Presentations/Activities
40253			Cubing a trinomial, numeric, staring from the cube of the first term
	Cubing: algebraic passages		
40255			Cubing a binomial, algebraic
40256			Cubing a trinomial, algebraic
	Cubing: application to decimal numbers		
40258		Trinomial & hierarchical cubes & tickets	Cubing a decimal number (three-digit) using the hierarchical cube
40259			
	Square root		
	Square root: sensorial passages		
40262		Bead squares 1-10, paper/pencil	Concept, language, and notation for square root
40263		Bead squares 1-10, paper/pencil	Introduction: one-digit roots
40264		Gold bead material, paper/pencil	Two-digit roots: using golden bead material
40265		Gold bead material, n-n^2 chart	Two-digit roots: observing the n – n2 chart
40266		Pegboard/pegs, n-n^2 chart, guide squares	Two-digit roots: using pegboard (writing results only)
40267		Pegboard/pegs, n-n^2 chart, guide squares	Two-digit roots: writing
40268		Pegboard/pegs, n-n^2 chart, guide squares	Two- digit roots: four-digit numbers
40269		Pegboard/pegs, n-n^2 chart, guide squares	Three-digit roots and beyond: three-digit roots
40270		Pegboard/pegs, n-n^2 chart, guide squares	Three-digit roots and beyond: zero in the root
40271		Pegboard/pegs, n-n^2 chart, guide squares	Three-digit roots and beyond: zero at the end of the root
40272		Pegboard/pegs, n-n^2 chart, guide squares	Three-digit roots and beyond: four-digit roots, writing
	Square root: passages to abstraction		
40274		Pegboard/pegs, n-n^2 chart, guide squares	Leading to abstraction: using more than one category at a time
40275		Pegboard/pegs, n-n^2 chart, guide squares	Leading to abstraction: calculating the next root digit
40276		Paper/pencil, guide squares	Calculating square root on paper
40277		Paper/pencil	Rule for extraction of square root
40278			
	Cube root		
	Cube root: sensorial passages		
40281		Bead cubes 1-10, tickets	Concept, geometric representation, language, and notation for cube root
40282		White 2cm cubes	Extracting a cube root using 2cm cubes (for numbers less than 250)
40283		Wooden cubing material	Extracting a cube root for four- to six-digit numbers using chart and wooden cubing material (by category)
	Cube root: passages to abstraction		
40285		Wooden cubing material, n-n^3 chart	Extracting a cube root of four- to six-digit numbers using wooden cubing material: consolidation of the calculations of identical groups of prisms
40286		Hierarchical cube, n-n^3 chart	Extracting a cube root of seven- to nine-digit numbers using the hierarchical/decimal trinomial: writing the calculations from the decimal values of the cubes and prisms
40287		Paper/pencil	Rule for extraction of cube root
	Signed numbers		
40291		Elementary/negative snake game	Introduction to signed numbers
40292		Elementary/negative snake game	Addition of signed numbers
40293		Elementary/negative snake game	Multiplication of signed numbers
40294		Elementary/negative snake game	Subtraction of signed numbers
40295		Elementary/negative snake game	Division of signed numbers
40296		Paper/pencil	Word problems using signed numbers
40297			
	Powers of Numbers		
40300		Box of 1cm cubes, powers of two material	Factors of the same number for the power of that number

Activity ID	Content Strand	Material	Presentations/Activities
40301		Powers of two material	Unit can be any physical size
40302		Wooden cubing material	Any number has powers
40303		Wooden cubing material, pencil/ paper	Special case: multiplication or division of powers of numbers having the same base
40304		Decimal board & reciprocal strip	Negative exponents for base 10
40305		Paper/pencil	Operations with numbers written in exponential notation
40306		Paper/pencil	Operations: numbers written in expanded power notation
40307			
	Non-decimal bases		
40310		Number base board & gold beads	Counting in a non-decimal base
40311		Number base board & gold beads	Operations in different bases
40312		Number base board, gold beads, bead bars	Conversion of notation from one base to another using bead material
40313		Number base board, gold beads, bead bars	Conversion from notation of any base to base 10 using expanded power notation
40314		Paper/pencil	Algorithm for conversion of notation from one base to another
40315			
	Ratio and proportion		
40318	Ratio	Objects from environment, paper/ pencil	Concept, language, and notation for ratio
40319		Paper/pencil	Ratio can be expressed as a fraction
40320		Pegboard & pegs, paper/pencil	Ratios are equal if they are equivalent fractions
40321		Paper/pencil, objects from environment	Problem-solving using ratio
	Proportion		
40323		Metal inset material, powers of two	Concept, language, and notation for proportion
40324		Paper/pencil, objects from environment	Solving equations with proportion
40325		Paper/pencil	Cross multiplication
40326	Word problems	Paper/pencil, objects from environment	Word problems with ratio and proportion
	Introduction to algebra		
40329		Bead bars, number & operations tickets	Concept of an equation and balancing an equation using the laws of equivalence
40330		Bead bars, number & operations tickets	Order of operations
40331		Bead bars, number & operations tickets	Solving an equation for one unknown using the laws of inverse operations
40332		Bead bars, number & operations tickets	Solving for one unknown using more than one operation
40333		Paper/pencil	Solving equations having fractional coefficients
40334		Paper/pencil	Translating verbal problems into equations
40335		Paper/pencil	Solving for two unknowns when there is a pair of equations
40336		Paper/pencil	Solving for two unknowns
40337		Paper/pencil, prepared word problems	Algebraic word problems
40338			
	Graphing		
40340		Graph examples, paper/pencils	Introduce graphing (interpreting & constructing graphs)
40341		Graph paper/pencils	Types of graphs
40342			
	Statistics & probability		
40344		Graph paper/pencil	Introduce statistics
40345		Graph paper/pencil	Statistic concepts: range, median, mode, mean
40346		Bead bars, objects from the environment	Probability, estimation
	Word problems		
	Solving for distance, time, and speed		
40349		Group of children	Preliminary: run a race
40350		Gold beads & word problem labels	Solving for distance

Activity ID	Content Strand	Material	Presentations/Activities
40351		Gold beads & word problem labels	Solving for time
40352		Gold beads & word problem labels	Solving for speed
	Solving for principal, time, interest, and rate		
40354			Preliminary: discuss banking
40355		Gold beads & word problem labels	Solving for interest
40356		Gold beads & word problem labels	Solving for rate
40357		Gold beads & word problem labels	Solving for principal
40358		Gold beads & word problem labels	Solving for time
40359			
	Measurement		
40361		Objects from environment, e.G. Paperclips	Concept of measurement: non-standard unit of measurement for length
40362		Measuring tools	Concept of measurement: standard unit for measurement for length
40363		Measuring tools	Introduction to the customary/english system
40365	Metric system	Decimal board & handmade cards	Introduction to the metric system
40366		Card material	Metric system abbreviations
40367			Metric system conversions: how many smaller units are in a larger unit?
40368			Metric system conversions: how many larger units are in a smaller unit?
40370	Other measurements		Volume
40371			Weight
40372			Area
40373			Temperature
	Geometry		
	The history of geometry		
40377	Stories for geometry	Rope for the story (3-4-5)	The story of how geometry got its name
40378			Thales of miletus
40379			Pythagoras of croton
40380			Plato of athens
40381			Euclid of alexandria
40382			
	Congruency, similarity, and equivalence		
40384		Red metal inset material	Concept, language, and notation for congruent geometric figures
40385		Red metal inset material	Concept, language, and notation for similar geometric figures
40386		Red metal inset material	Concept, language, and notation for equivalent geometric figures
40387		Constructive triangles	Further investigation of congruent, similar, and equivalent figures using constructive triangles
40388			
	Geometry nomenclature		
40390		Geometry nomenclature material	Introduction to the material
40391		Geometry nomenclature material	Activity one
40392		Geometry nomenclature material	Activity two
40393		Geometry nomenclature material	Activity three
40394		Geometry nomenclature material	Activity four
40395			
	Lines		
40397		String	Types of lines
40398		String/scissors/marker	Parts of a straight line
40399		Box of geometry sticks	Positions of a straight line
40400		Box of geometry sticks	Positions of two straight lines
40401			
	Angles		
40403		Box of geometry sticks, right angle tool	Types of angles
40404		Box of geometry sticks	Parts of an angle
40405		Box of geometry sticks	Pairs of angles
40406		Box of geometry sticks	Angles formed by two lines cut by a transversal

Activity ID	Content Strand	Material	Presentations/Activities
40407			Story of the babylonians
40408		Montessori protractor	Measurement of an angle in degrees using the montessori protractor
40409		Standard protractor	Measurement of an angle in degrees using the standard protractor
40410			
	Polygons		
40412		Box of geometry sticks	Types of polygons, named by the number of sides
40413		Box of geometry sticks	Parts of a polygon
40414		Box of geometry sticks	Diagonals of a polygon related to the sum of interior angles of a polygon
40415		Box of geometry sticks	Regular and irregular polygons
40416		Box of geometry sticks	Parts of a regular polygon
40418	Triangles	Box of geometry sticks	Parts of a triangle
40419		Box of geometry sticks	Types of triangles according to sides
40420		Box of geometry sticks, right angle tool	Types of triangles according to angles
40421		Pythagorean plate	The story of pythagoras
40422		Box of geometry sticks	Types of triangles according to sides and angles
40424	Quadrilaterals	Box of geometry sticks	Types of quadrilaterals
40425		Box of geometry sticks	Parts of a quadrilateral
40426		Box of geometry sticks	Family tree of quadrilaterals
	Circles		
40429		Lg. Paper/box of sticks/pencils/ string	Parts of a circle
40430		Insets of polygons/circle, ruler, paper/pencil	Circumference
40431		Box of sticks w/curved lines or circle	Positions of a circle and a straight line
40432		Box of sticks w/curved lines or circle	Position of two circumferences
	Equivalence with iron material		
40435		Red metal equivalence insets	Triangle equivalent to rectangle
40436		Red metal equivalence insets	Rhombus equivalent to rectangle
40437		Red metal equivalence insets	Trapezoid equivalent to rectangle
40438		Red metal equivalence insets	Decagon equivalent to rectangles i and ii
40439		Red metal equivalence insets	Equivalence of regular polygon to rectangle (example: pentagon)
	Area		
40442	Introduction to area	Yellow area material (w/grid lines)	Concept of measuring a surface with unit squares
40443		Yellow area material, rectangle	Concept of transforming a surface into a rectangle in order to measure area
40444		Yellow area material	Identifying base and height of rectangle, parallelogram, and triangles
	Deriving area formulas using yellow area material		
40446		Yellow area material, paper/pencil	Deriving the formula for the area of a rectangle
40447		Yellow area material, paper/pencil	Deriving the formula for the area of a parallelogram
40448		Yellow area material, paper/pencil	Deriving the formula for the area of a triangle
	Deriving area formulas using iron material		
40450		Red metal equivalence insets/iron material	Area of triangle
40451		Red metal equivalence insets/iron material	Area of rhombus
40452		Red metal equivalence insets/iron material	Area of trapezoid
40453		Red metal equivalence insets/iron material	Area of decagon: rectangle i
40454		Red metal equivalence insets/iron material	Area of decagon: rectangle ii
40455		Red metal equivalence insets/iron material	Area of regular polygon (example: pentagon)

Activity ID	Content Strand	Material	Presentations/Activities
	Deriving area formulas using paper material		
40458		Prepared divided circles and rectangles	Area of circle
	Pythagorean theorem		
40461	Equivalence with iron material	Pythagorean plate i	Pythagorean theorem: plate i
40462		Pythagorean plate ii	Pythagorean theorem: plate ii
40463		Euclid's plate	Pythagorean theorem: plate iii (euclid's plate)
	Volume		
40466		2Cm and 1cm white cube material	Concept of volume
40467		Rectangular prism, volume material, a 2cm cube	Volume of right prism
40468		Solid and divided prism materials	Volume of right prisms with non-rectangular bases
40469		Hollow prisms and sand	Volume of square pyramid
40470		Geometric solids and sand	Solids of rotation
40471		Geometric solid cylinder, paper/ pencil	Volume of a cylinder
40472		Geometric solid cone, paper/pencil	Volume of a cone
40473		Geometric solid sphere, paper/ pencil	Volume of a sphere
	Surface area		
40476	Lateral and total surface area:	Geometric solids, paper/pencil	Rectangular prism
40477			
	Geometric design and construction		
40479	Geometric design	Metal insets	Metal inset techniques
40480		Metal insets and paper/pencils	Designing using the metal insets
40481		Ruler, paper/pencil	Techniques using a straight-edge or ruler
40482		Compass, paper/pencil	Techniques using a compass
40483		Geometry tools, paper/pencil	Designing geometric figures/ designing with a straight-edge and compass
40485	Geometric constructions	Straws/string, geometric solids, paper/pencil	Geometric constructions

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CC: Counting and Cardinality	Know number names and the count sequence.	Kindergarten				
	Count to tell the number of objects.	Kindergarten				
	Compare numbers.	Kindergarten				
OA: Operations and Algebraic Thinking	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	Kindergarten				
	Represent and solve problems involving addition and subtraction	1.OA.A.1 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.	40041/40065 Golden Beads /Static Addition and Subtraction 40042/40066 Golden Beads & Decimal Cards/Static Addition and Subtraction 40043/40067 Large Bead Frame/Static Addition and Subtraction 40044/40068 Stamp Game/Static Addition and Subtraction 40045/40069 Stamp Game w/square paper/writing using symbolic representation 40051 Stamp Game with Squared Paper	Golden Bead Material Large Bead Frame Stamp Game	C	Attention should be given to some problems with missing addends. (8+?= 10) Some problems that show missing minuends and subtrahends. (10 - what number = 6)
		1.OA.A.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.	40054/40078 Word Problems Golden Beads Addition and Subtraction 40055/40079 Bead Bar Addition and Subtraction 40051 Stamp Game with Squared Paper	Stamp Game Golden Bead Material Bead Bars Symbols for operations, and solving for the unknown in an equation	C	Lessons should include a variety of ways to solve for the unknown and balance equations
		2.OA.A.1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	40054/40078 Golden Beads/Addition and Subtraction Word Problems 40055/40079 Bead Bars/Addition and Subtraction Word Problems	Golden Bead Material Bead Bars	C	Lessons should include a variety of ways to solve for the unknown and balance equations. Word problems should include the language "adding to, taking from, putting together, taking apart, and compare"
	Understand and apply properties of operations and the relationship between addition and subtraction.	1.OA.B.3. 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.)	40056 Bead Bar/Commutative Property of Addition 40061 Snake Game (Associative Property)	Bead Bars	C	Acknowledge the Commutative and Associative Properties apparent in these lessons. Add vocabulary of "Unknown Quantity". IMPORTANT: AMI math curriculum includes math problems beyond 20 and introduces both Static and Dynamic Addition and Subtraction. These concepts are presented early and supported by materials which include quantity and symbol. (40046 ,40047, 40048, 40049 for addition and 40070 ,40071, 40072, 40073 for subtraction)
		1.OA.B.4. Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.	40083 Snake Game Subtraction	Subtraction Snake Game	C	
	Add and subtract within 20.	1.OA.C.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	40091 Bead Chains 40034/40044 Review of Skip Counting 40036 Large Bead Frame	Short and Long Bead Chains	C	The intention of this standard is to help a child understand how to 'count up' from the known quantity: if you add 5 and three, you begin with 5 and count up: "6, 7, 8."
		1.OA.C.6. 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).	40061/40083 Snake Game 40059 Addition Strip Board 40060 Addition Finger Charts 40081 Subtraction Strip Board 40082 Subtraction Finger Charts	Bead Bars Addition Strip Board and Finger Charts Subtraction Strip Board and Finger Charts	C	These materials continue to support the concepts of missing number and unknown quantity found in algebra. Previous knowledge of decomposition of numbers with golden beads is needed. The purpose of this standard is for children to be able to create equivalent sums and for this they need to know that different added can create a sum to build tens for mental addition and subtraction
		2.OA.B.2. Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.	40059 Addition Strip Board 40060 Addition Finger Charts 40061 Addition Snake Game 40081 Subtraction Strip Board 40082 Subtraction Finger Charts 40083 Subtraction Snake Game 40027 Golden Beads 40047/40071 Large Bead Frame	Addition Strip Board and Finger Charts Subtraction Strip Board and Finger Charts Bead Bars Golden Beads Large and Small Bead Frame Boxes of tickets with equations and answers for all four operations	C	Flash cards can help here as well
	Work with addition and subtraction equations	1.OA.D.7. 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.	Introduction to Algebra 40329 Concept of Equation and Balancing 40330 Order of Operations 40331 Solving Equation/Inverse Operations 40332 Solving Equation/More than One Operation	Bead Bars and Operations Tickets	C	For first grade, the concept of balance can be easily shown as a child weighs objects on a balance scale, apply language, number and symbols to the relationships seen
		1.OA.D.8. 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 = .	40061/40083 Snake Game 40059 Addition Strip Board 40060 Addition Finger Charts 40081 Subtraction Strip Board 40082 Subtraction Finger Charts 40094 Concept Commutative Law	Bead Bars and Cards Snake Game Addition and Subtraction Strip Boards Addition and Subtraction Finger Charts Number Cards and Symbols	C	Emphasize the missing addend or subtrahend in a variety of ways

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OA: Operations and Algebraic Thinking	Work with equal groups of objects to gain foundations for multiplication.	2.OA.C.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	40087 Golden Beads/Intro. To Multiplication 40088 Concept of Simple Multiplication 40091 Skip Counting	Cards and counters	C	The concept of odd and even would have been practiced in the primary, but this material could be borrowed for a review in elementary
		2.OA.C.4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	40107 Introduction of Checkerboard 40108 Multiplication by a One-Digit Multiplier 40109 Multiplication by a Multi-Digit Multiplier (Using Bead Bars, No Facts)	Bead bars/number tickets Checkerboard	C	Graph the multiplication equation on graph paper to visually see the array
	Represent and solve problems involving multiplication and division.	3.OA.A.1. Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 x 7.	40089 Decanomial w/bead bars	Bead bar box (decanomial)	C	Emphasis on additional language as extension. Array Graph the array on graph paper so that the child can visually see the array
		3.OA.A.2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.	40051 Stamp Game with Squared Paper 40134 Racks and Tubes/Division by a One-Digit Divisor	Stamp game Racks and tubes	C	Reminder to use CCSS language as it applies to work in division (divisor, dividend, quotient)
		3.OA.A.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	40131 Multiplication Word Problems 40143 Division Word Problems 40442 ff. Area Work		C	Practicing with instruments of measurement (metric and standard), graphing, gaining the concept and practice measuring perimeter, area, and practice with hand made and oral word problems would all help with this standard
		3.OA.A.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = ? ÷ 3, 6 x 6 = ?.		Finger charts Decanomial	C	Emphasize various ways to consider the unknown quantity being asked using finger charts: Multiplication 8x6=(what number), 8x(what number)=48, (what number)x6=48. Division 48 : 6=(what number), 48 : 8=(what number), (what number) divided by 8=6, and (what number) divided by 6=8.
	Understand properties of multiplication and the relationship between multiplication and division	3.OA.B.5. Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive property.)	40056 Commutative Law of Addition 40057 Associative Property of Addition 40094 Commutative Law of Multiplication 40096-40104 Distributive Law of Multiplication and Associative Laws	Materials for commutative, distributive and associative properties	C	All three laws are inherent in this objective.
		3.OA.B.6. Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.			C	Practice inverse number operations
	Multiply and divide within 100	3.OA.C.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	40110 Checkerboard and Bead bars (Multi-Digit Multiplier, some facts.) 40111 Checkerboard (Multi-Digit Multiplier, recording/ final product) 40112-400113 Checkerboard	Materials for checkerboard	C	AMI curriculum creates problems in categories of units, tens, hundreds, thousands,to millions. Problems are not confined within 100. Emphasize and practice the concept of fact families, and written and oral story problems to show the relationship of multiplication and division.
	Solve problems involving the four operations, and identify and explain patterns in arithmetic.	3.OA.D.8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. This standard is limited to problems posed with whole numbers and having whole- number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).	40330 Order of Operations 40331 Solving an Equation for One Unknown Using the Laws of Inverse Operations 40337 Algebraic Word Problems 40056 Commutative Law of Addition	Bead bars Box of operation symbols and number cards Algebra materials	P	Concepts covered in Montessori Math Curriculum can support additional problems. For example: Rounding off using Golden Beads. Stressing concept of estimating while using large bead frame, checkerboard, racks and tubes, stamp game for problems in all four operations. Practice with oral and written word problems. Translate verbal problems into equations.
		3.OA.D.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.		Golden beads	C	
	Use the four operations with whole numbers to solve problems.	4.OA.A.1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	Previously presented Montessori materials are applicable to these concepts.		C	Create oral and written word problems as extensions to the concepts learned with Montessori materials.
		4.OA.A.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	Previously presented Montessori materials are applicable to these concepts.		P	AMI Guide responsible to create extensions to previously presented Montessori materials
		4.OA.A.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Previously presented Montessori materials are applicable to these concepts.		P	Help the child to look at various ways to see the operation/missing number/remainder etc. For example: when using racks and tubes, help the child analyze the relationship of the physical remainder left in the bowl(s) with the equation written with the remainder.

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OA: Operations and Algebraic Thinking	Gain familiarity with factors and multiples.	4.OA.B.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.	40146 Multiples using Short Bead Chains 40147 Investigating Multiples Bead Bars 40148 Further Investigation of Multiples Using Multiples of Numbers Paper 40149 Multiples Tables A & B 40150 Concept Common Multiple 40151 Investigating Common Multiple 40152 Table C 40153 Least Common Multiple/LCM 40155 Pegs and Pegboard/Factors	Bead bars/100 paper/tables a,b and c peg board	C	Generally: We must use mathematical language from the beginning so that the children understand and are comfortable using it themselves - it is an integral part of any math presentation. AMI guides are aware of and can use the language inherent in the Montessori Math Curriculum and introduce it naturally, so when children encounter it in the CCSS, it is very familiar to them.
	Generate and analyze patterns.	4.OA.C.5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.	40148 Further Investigation of Multiples Using Multiples of Numbers Paper 40152 Multiples - Table C 40155 Pegs and Pegboard/Factors 40156 Pegs and Pegboard/Common Factor 40157 Table C 40158 Pegs and Pegboard/Prime Factor 40159 Pegs and Pegboard/Paper LCM 40160 Pegs and Pegboard/ Greatest Common Factor (GCF) or Highest Common Factor (HCF)	Multiples - table C Pegs/pegboard	C	Oral and written word problems.
	Write and interpret numerical expressions.	5.OA.A.1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	40235 Transform Square of 10 Binomial 40236 Transform Square of 10 Trinomial, Quadranomial, Polynomial. 40237 Binomial Squares Larger Sq. from Smaller Sq. 40238 Binomial Squaring a Sum 40239 Squaring a Binomial Golden Beads 40240 Pegboard/Binomial Hierarchical Pegs 40241 Deriving Formula/Guide Square 40242 Squaring a Binomial, Algebraic 40243 Squaring a Trinomial, Algebraic	Golden beads/ bead bars/ pegboard and hierarchical pegs/guide squares Box of numbers and symbols	C	Emphasize the symbols used in Algebraic expressions: parentheses, brackets, equal signs, exponents, etc.. Stress also the idea of Order of Operations. Become increasingly aware of the Distributive, Commutative, Associative properties that are part of the squaring of binomials, trinomials, quadranomials and polynomials. Extend understanding into the further exploration of Order of Operations found in derived formulas.
		5.OA.A.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	40056 Bead Bar Material and Pencil and Paper 40337 Algebraic Word Problems	Bead bars Box of numbers and symbols	C	Oral and written word problems.
	Analyze patterns and relationships	5.OA.B.3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.			P	Bringing awareness of this simple concept may be comparatively easy as children already extend lessons on graph paper - for example: children are already familiar with using graph paper when graphing a Checkerboard problem, or when they find the square root of a number and represent that on graph paper. Using the graph paper as a number line would be easy.
NBT: Number and Operations in Base 10	Work with numbers 11–19 to gain foundations for place value.	Kindergarten			C	
	Extend the counting sequence.	Kindergarten			C	
		1.NBT.A.1. 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.	40030 Introduce/Review counting 1 - 100 40031Decimal System (Numbers to 1000's Using Base Board in Base 10)	Teen boards, bead bars Golden beads, base board	C	
	Understand place value.	1.NBT.B.2. 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).	40008 Introduce Decimal/Whole Number Categories 40009 Association of Symbol & Quantity 1, 10, 100, 1000's 40010 Understanding zero 40011Forming numbers using concrete quantities of beads 40012 Forming numbers w/decimal cards, hiding zeroes	Teen boards, bead bar Golden beads & decimal cards & trays	C	
		1.NBT.B.3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	##	Red metal inset material Golden bead material Decimal cards	C	
		2.NBT.A.1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a "hundred." b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	40012 Forming numbers w/decimal cards, hiding zeroes 40013Creating Quantities w/Symbols up to 9,999	Golden beads Decimal cards Trays	C	
		2.NBT.A.2. Count within 1000; skip-count by 5s, 10s, and 100s.	40032 Counting to 1000 40033 Counting to 1000 40034 Linear & Skip Counting 40035 Linear and Skip Counting	Small bead frame Hundred & thousand chain & labels Short/square bead chains & labels Long/cube bead chains & labels	C	
		2.NBT.A.3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	40019 Expanded Notation/Decomposing numbers 40020 Expanded Notation/Decomposing numbers	Golden Beads, Decimal Cards LBF Paper	C	

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NBT: Number and Operations in Base 10	Understand place value.	2.NBT.A.4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	40384 Concept, Language, and Notation for Congruent Geometric Figures 40385 Concept, Language, and Notation for Similar Geometric Figures 40386 Concept, Language, and Notation for Equivalent Geometric Figures 40009 Association of Symbol & Quantity 1, 10, 100, 1000	Red metal inset material Golden bead material Decimal cards	C	
	Use place value understanding and properties of operations to add and subtract	1.NBT.C.4. 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. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	40043 Static Addition (no carrying) 40044 Static addition (no carrying) 40045 Static Addition with recording 40046 Dynamic Addition (w/carrying) 40065 Concept of Static Subtraction with whole numbers 40066 Static Subtraction (no borrowing)	Large bead frame Stamp game	C	
		1.NBT.C.5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	40147 Further Investigation of Multiples Using Bead Bars (One-and Two-Digit Numbers 40149 Calculation of Multiples Using Table A and Table B Linear & Skip Counting) 40035 Linear and Skip counting	Bead bars Tables A & B Pencil	C	
		1.NBT.C.6. 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.	40047 Dynamic Addition (w/carrying) 40071 Dynamic Subtraction (w/borrowing) 40049 Dynamic Addition (w/carrying) 40073 Dynamic Subtraction (w/borrowing)	Golden beads & decimal cards Large bead frame Stamp game	C	
		2.NBT.B.5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	40047 Dynamic Addition(w/carrying) 40071 Dynamic Subtraction (w/borrowing)	Large bead frame	C	
		2.NBT.B.6. Add up to four two-digit numbers using strategies based on place value and properties of operations.	40047 Dynamic Addition (w/carrying) 40053Introduce/Consolidate Algorithm	Large bead frame Stamp game w/paper Pencil	C	
		2.NBT.B.7. Add and subtract within 1000, 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. Understand that in adding or subtracting three- digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	40047 Dynamic Addition (w/carrying) 40071 Dynamic Subtraction (w/borrowing) 40053 Introduce/Consolidate Algorithm	Large bead frame Stamp game w/paper Pencil	C	
		2.NBT.B.8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.	40047 Dynamic Addition(w/carrying) 40071 Dynamic Subtraction (w/borrowing)	Large bead frame	C	
		2.NBT.B.9. Explain why addition and subtraction strategies work, using place value and the properties of operations.	40056 Commutative Law of Addition 40057 Associative Property of Addition 40079 Subtraction Word Problems	Bead bar material Pencil/paper	C	
	Use place value understanding and properties of operations to perform multi-digit arithmetic.	3.NBT.A.1. Use place value understanding to round whole numbers to the nearest 10 or 100.	40020 Expanded Notation/Decomposing numbers	Small bead frame Large bead frame Sbf & lbf paper	C	
		3.NBT.A.2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	40047 Dynamic Addition (w/carrying) 40071 Dynamic Subtraction (w/borrowing) 40053 Introduce/Consolidate Algorithm	Stamp game w/paper Large bead frame Pencil	C	
		3.NBT.A.3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.	40088 concept of simple multiplication (facts) 40089 Build the Decanomial w/Bead Bars	Bead bars	C	
		4.NBT.B.4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.	40053 Introduce/Consolidate Algorithm	Large bead frame Stamp game with paper	C	
		4.NBT.B.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	40115 Multiplication by a One-Digit Multiplier	Large bead frame W/paper Pencil	C	
		4.NBT.B.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	40127 Geometric Form Multiplication 40442 Concept of Measuring a Surface with Unit Squares	Graph paper Colored pencils Ruler Yellow area material (w/grid lines)	C	

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NBT: Number and Operations in Base 10	Generalize place value understanding for multi-digit whole numbers. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.)	4.NBT.A.1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 70 = 10 by applying concepts of place value and division.	40127 Geometric Form of Multiplication	Graph paper Colored pencils Ruler	C	
		4.NBT.A.2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	40020 Expanded Notation/Decomposing numbers 40384 Concept, Language, and Notation for Congruent Geometric Figures 40385 Concept, Language, and Notation for Similar Geometric Figures 40386 Concept, Language, and Notation for Equivalent Geometric Figures 40009 Association of Symbol & Quantity 1, 10, 100, 1000	Sbf/lbf Sbf/lbf paper Pencil Red metal inset material	C	
		4.NBT.A.3. Use place value understanding to round multi-digit whole numbers to any place.	40020 Expanded Notation/Decomposing numbers	Sbf/lbf Sbf/lbf paper Pencil	C	
	Understand the place value system.	5.NBT.A.1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	40197 Decimals: Quantity and Language 40198 Decimals: Symbol 40199 Decimals: Formation and Reading 40127 Geometric Form of Multiplication	Decimal cubes and beads Label strip for decimal board Decimal board (yellow board) & cubes/beads Graph paper Colored pencils Ruler	C	
		5.NBT.A.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.	40111 Multiplication by a Multi-Digit Multiplier (Using All Facts, Recording Problem and Final Product) 40197 Decimals: Quantity and Language 40198 Decimals: Symbol 40199Decimals: Formation and Reading	Decimal cubes and beads Label strip for decimal board Decimal board (yellow board) & cubes/beads Checkerboard Bead bars Paper Pencil	C	
		5.NBT.A.3. Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	40197 Decimals: Quantity and Language 40198 Decimals: Symbol 40199 Decimals: Formation and Reading	Decimal cubes and beads Label strip for decimal board Decimal board (yellow board) & cubes/beads	C	
		5.NBT.A.4. Use place value understanding to round decimals to any place.	40197 Decimals: Quantity and Language 40198 Decimals: Symbol 40199 Decimals: Formation and Reading	Decimal cubes and beads Label strip for decimal board Decimal board (yellow board) & cubes/beads	C	
	Perform operations with multi-digit whole numbers and with decimals to hundredths.	5.NBT.B.5. Fluently multiply multi-digit whole numbers using the standard algorithm.	40129 Consolidate Multiplication Fact memorization 40130 Traditional Multiplication Algorithm	Paper/pencil	C	
		5.NBT.B.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	40135 Division by a Multi-Digit Divisor 40136 Recording Intermediate Remainders, Quotient, Final Remainder 40137 Recording What has been used, Intermediate Remainders, Quotient, Final Remainder 40112 Multiplication by a Multi-Digit Multiplier (Using Facts, Recording Problem, Partial Products, and Final Product) 40127 Geometric Form of Multiplication	Racks & tubes materials Paper/pencil Checkerboard Bead bars No. Tickets, paper Graph paper Colored pencils Ruler	C	
		5.NBT.B.7. Add, subtract, multiply, and divide decimals to hundredths, 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.	40201 Addition and Subtraction using the Decimal Board 40203 Multiplication by a Unit Multiplier 40206 Multiplication by a Fraction Using the Decimal Checkerboard 40207 Category Multiplication in the Decimal System (Whole and Decimal Numbers, Using Felt Squares) 40208 Multiplication of a Fraction by a Fraction Using the Decimal Board 40211 Division by a Mixed Number or by a Decimal Number 40212 Algorithm for Division of Decimals	Decimal board (yellow board) & cubes/beads Felt squares for decimal checkerboard Decimal checkerboard Beads Numbers Paper Pencil	C	
MD: Measurement and Data	Describe and compare measurable attributes.	Kindergarten				
	Classify objects and count the number of objects in each category.	Kindergarten				
	Measure lengths indirectly and by iterating length units.	Kindergarten				
		1.MD.A.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.	40361 Concept of Measurement: non-standard unit of measurement for length 40442 Concept of measuring a surface with unit squares	Objects from environment Yellow area material	C	
		1.MD.A.2. 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.	40361 Concept of Measurement: non-standard unit of measurement for length 40442 Concept of measuring a surface with unit squares	Objects from environment Yellow area material	C	

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MD: Measurement and Data	Tell and write time.	1.MD.B.3. Tell and write time in hours and half-hours using analog and digital clocks.	In Geography album: Time Measurement – My Day		C	
	Represent and interpret data.	1.MD.C.4. 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.	40340 Introduce Graphing (interpreting & constructing)	Graph examples Paper Pencils	C	
		2.MD.D.9. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	40361 Concept of Measurement: non-standard unit of measurement for length 40442 Concept of measuring a surface with unit squares 40340 Introduce Graphing (interpreting & constructing)	Objects from environment Yellow area material Graph examples Paper Pencils	C	
		2.MD.D.10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put- together, take-apart, and compare problems4 using information presented in a bar graph.	40340 Introduce Graphing (interpreting & constructing)	Graph examples Paper Pencils	C	
		3.MD.B.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	40340 Introduce Graphing (interpreting & constructing)	Graph examples Paper Pencils	C	
		3.MD.B.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	40362 Concept of Measurement Standard Unit for Measure	Measuring tools	C	
		4.MD.B.4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.	40173 Fractions: Quantity and Language 40174 Fractions: Symbol and Notation, further language 40175 Fractions: Other Representations	Red metal insets Fraction insets and labels	C	
		5.MD.B.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	40173 Fractions: Quantity and Language 40174 Fractions: Symbol and Notation, further language 40175 Fractions: Other Representations 40374 Liquid measurements: Standard and Metric	Red metal insets Fraction insets and labels	C	
	Measure and estimate lengths in standard units.	2.MD.A.1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	40362 Concept of Measurement: Standard Unit for Measure	Measuring tools	C	
		2.MD.A.2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.	40362 Concept of Measurement: Standard Unit for Measure 40361 Concept of Measurement: Non-Standard Unit of Measure	Measuring tools Objects in the environment	C	
		2.MD.A.3. Estimate lengths using units of inches, feet, centimeters, and meters.	40362 Concept of Measurement: Standard Unit for Measure 40361 Concept of Measurement: Non-Standard Unit of Measure		C	Using measuring tools, the children can play a game of "Guess And Measure", estimating a link and then measuring to see how close they got.
		2.MD.A.4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	40362 Concept of Measurement: Standard Unit for Measure 40361 Concept of Measurement: Non-Standard Unit of Measure	Objects in the environment	C	
	Relate addition and subtraction to length.	2.MD.B.5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	40054/40055 Addition Word Problems, problem solving	Golden beads Bead bars Word problems involving length	C	
		2.MD.B.6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.	40291 Introduction to Signed Numbers	Elementary/negative snake game	P	Information in the lesson Introduction to Signed Numbers can be adapted to present only the positive whole numbers.
	Work with time and money.	2.MD.C.7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.		In geography album: time measurement – my day	C	
		2.MD.C.8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?	40054/40055 Addition Word Problems, problem solving	Golden beads Bead bars Word problems involving money	C	

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MD: Measurement and Data	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	40054/40055 Addition Word Problems, problem solving	Golden beads Bead bars Word problems involving time	C	
		3.MD.A.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	40370 Volume 40371 Weight 40372 Area 40374 Liquid measurements: Standard and Metric	Objects in the environment Pan balance Measuring cups, beakers, graduated cylinders, etc.	C	
	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	3.MD.C.5. Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.	40442 Measuring Surface w/Unit Sqs 40443 Transforming Surface to Rectangle to Measure Area	Yellow area material (w/grid lines) Yellow area material, rectangle	C	
		3.MD.C.6. Measure areas by counting unit squares (square cm, square m, square in, square ft., and improvised units).	40442 Measuring Surface w/Unit Sqs	Yellow area material (w/grid lines)	C	
		3.MD.C.7. Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a x b and a x c. Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	40444 Identifying bxh 40446 Formula for Area of Rectangle 40447-40448 Formula for Parallelogram and Triangle 40450-40455 Area of Triangle, Rhombus, Trapezoid, Decagon and Regular Polygons like Pentagons	Yellow area material Yellow area material, paper/pencil Yellow area material, paper/pencil Red metal equivalence insets/iron material	C	Mapped AMI activities also cover deriving formulas for the area of parallelograms and triangles, and explores areas of rhombus, trapezoid, decagons and regular polygons like pentagons. Word problems extend this work and provide real-world experience.
	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	3.MD.D.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	40416 Parts of a Regular Polygon 40442 Measuring Surface w/Unit Sqs 40443 Transforming Surface to Rec	Box of geometry sticks Yellow area material (w/grid lines) Yellow area material, rectangle	P	Mapped AMI activities introduce concept of perimeter but do not specifically address problem-solving with perimeter.
	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	4.MD.A.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb., oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two- column table. For example, know that 1 ft. is 12 times as long as 1 in. Express the length of a 4 ft. snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...	40361 Non-standard Unit for Length 40362 Standard Unit for Length 40363 Intro to Customary English Syst 40365 Intro to Metric System 40366-40368 Metric Syst Conversions	Objects from the environment Measuring tools Measuring tools Decimal board & handmade cards Card material	P	Creation of conversion table not directly noted in lessons here.
		4.MD.A.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	40349 Preliminary Run a Race 40350-40352 Solving Dist, Time, Speed 40340-40341 Intro to/Types of Graphs 40354-40358 Solving for Interest, Rate, Principle, Time 40370-40373 Volume, Weight, Area, Temperature	Group of children Gold beads & word problem labels Graph examples, paper/pencils Golden beads & word problem labels	C	
		4.MD.A.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.	40334 Trans Verbal Probs to Equations 40337 Algebraic Word Problems 40331-40332 Solving for One Unknown	Paper/pencil Paper/pencil Bead bars, number/operations tickets	C	
	Geometric measurement: understand concepts of angle and measure angles.	4.MD.C.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.	40403 Types of Angles 40404 Parts of an Angle	Box of geometry sticks, right angle tool Box of geometry sticks	C	
		4.MD.C.6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	40408 Measurement of Angle Degrees 40409 Measurement of Angle Degrees	Montessori protractor Standard protractor	C	
		4.MD.C.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	40408 Measurement of Angle Degrees 40409 Measurement of Angle Degrees 40405 Pairs of Angles 40406 Angles Cut by a Transversal	Montessori protractor Standard protractor Box of geometry sticks Box of geometry sticks	C	Mapped AMI activities go beyond standard to cover various types of angles created by transversals.

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MD: Measurement and Data	Convert like measurement units within a given measurement system.	5.MD.A.1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	40367 Conversions Small to Large Unit 40368 Conversions Large to Small Unit		C	
	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	5.MD.C.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	40466 Concept of Volume	2Cm and 1cm white cube material	C	
		5.MD.C.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units.	40466 Concept of Volume	2Cm and 1cm white cube material	C	
		5.MD.C.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. a. Apply the formulas V=LxWxH and V=BxH for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. b. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	40467 Volume of Right Prism 40468 Right Prisms w/Non-Rec Bases	Rectangular prism, volume material, a 2cm cube Solid and divided prism material	C	Mapped AMI activities also cover Volume of Square Pyramid, Solids of Rotation, Volume of a Cylinder, Volume of a Cone and Volume of a Sphere
G: Geometry	Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).	Kindergarten				
	Analyze, compare, create, and compose shapes.	Kindergarten				
	Reason with shapes and their attributes.	1.G.A.1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.	40390 Introduction to the Material 40391 Activity One 40392 Activity Two 40393 Activity Three 40394 Activity Four 40412 Types of Polygons, Named by the Number of Sides	Geometry nomenclature material Box of geometry sticks Right angle tool	C	
		1.G.A.2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.	40479 Metal Inset Techniques 40480 Designing Using the Metal Insets 40481 Techniques Using a Straight-Edge or Ruler 40482 Techniques Using a Compass 40483 Designing Geometric Figures/ Designing with a Straight-Edge and Compass	Metal insets Ruler Compass Geometry tools Straws/string Geometric solids	C	
		1.G.A.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, 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.	40173 Fractions Quantity and Language 40174 Fractions Symbol, Notation, Further Language 40174 Fractions Symbol, Notation, Further Language 40176 Equivalence Sensorial	Red metal fraction insets Labels	C	
		2.G.A.1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Sizes are compared directly or visually, not compared by measuring.) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	40390 Introduction to the Geometry Nomenclature Material 40391 Activity One 40392 Activity Two 40393 Activity Three 40394 Activity Four 40412 Types of Polygons, Named by the Number of Sides 40415 Regular and Irregular Polygons 40424 Types of Quadrilaterals	Geometry nomenclature material Box of geometry sticks Right angle tool	C	
		2.G.A.2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	40442 Concept of Measuring a Surface with Unit Squares	Yellow area material	C	
		2.G.A.3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.	40173 Fractions Quantity and Language 40174 Fractions Symbol, Notation, Further Language 40175 Fractions Other Representations 40176 Equivalence Sensorial	Red metal fraction insets	C	
		3.G.A.1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	40424 Types of Quadrilaterals 40425 Parts of a Quadrilateral 40426 Family Tree of Quadrilaterals	Box of geometry sticks Right angle tool	C	

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G: Geometry		3.G.A.2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.	40173 Fractions Quantity and Language 40174 Fractions Symbol, Notation, Further Language 40175 Fractions Other Representations 40176 Equivalence Sensorial	Red metal fraction insets Labels	C	
	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	4.G.A.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	40397 Types of Lines 40398 Parts of a Straight Line 40499 Positions of a Straight Line 40400 Positions of Two Straight Lines	"String Scissors Box of geometry sticks	C	
		4.G.A.2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	40499 Positions of a Straight Line 40400 Positions of Two Straight Lines 40403 Types of Angles 40404 Parts of an Angle 40420 Types of Triangles According to Angles	Box of geometry sticks Right angle tool	C	
		4.G.A.3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	40387 Further Investigation of Congruent, Similar, and Equivalent Figures Using Constructive Triangles	Constructive triangles	P	Children who have worked with the constructive triangles will have discovered the concept themselves; the teacher will need to provide the language "line of symmetry"
	Graph points on the coordinate plane to solve real-world and mathematical problems.	5.G.A.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	40340 Introduce Graphing (Interpreting & Constructing Graphs) 40341 Types of Graphs	Graph paper Graph examples	P	
		5.G.A.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. Classify two-dimensional figures into categories based on their properties.	40340 Introduce Graphing (Interpreting & Constructing Graphs) 40341 Types of Graphs	Graph paper Graph examples	C	
	Classify two-dimensional figures into categories based on their properties.	5.G.B.3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.	40390 Introduction to the Geometry Nomenclature Material 40426 Family Tree of Quadrilaterals	Geometry nomenclature material	C	
		5.G.B.4. Classify two-dimensional figures in a hierarchy based on properties.	40391 Introduction to the Geometry Nomenclature Material 40422 Types of Triangles According to Sides and Angles 40426 Family Tree of Quadrilaterals	Geometry nomenclature material Box of sticks	C	On Standardized Tests, the question often asks students to classify figures into a chart based on properties.
	Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.A.1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	40446-48 Deriving the formula for rectangles, parallelograms and three kinds of triangles 40450-55 Formulas with metal insets of equivalent figures-triangles, rhombus, trapezoid, decagon and regular polygons	Yellow material for area, iron insets for equivalence	C	Word problems and hands-on building projects within the classroom extend these concepts and provide real-world experience.
		6.G.A.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	40466 Concept of volume 40467 Volume of a right prism	1 & 2 Cm volume cubes, whole and divided geometric solids, hollow solids	C	Much more work is done with a variety of figures including hexagonal, triangular solids and pyramids in lessons 40468-40469.
		6.G.A.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.			X	
		6.G.A.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	40476 Total and Lateral Area	Geometric solids & paper	C	
NF: Number and Operations--Fractions	*"(Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.) (Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)"*					AMI starts much earlier, e.g.. K, 1, 2
	Develop understanding of fractions as numbers	3.NF.A.1. Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.	40173 Fractions: Quantity and Language 40174 Fractions: Symbol, Notation, Further Language 40175 Fractions: Other Representations	Red metal fraction insets and labels Divided squares and triangles Constructive triangles	C	

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NF: Number and Operations--Fractions	Develop understanding of fractions as numbers	3.NF.A.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.			X	Concepts of fractions on number line are not covered, although the same concepts are developed in the context of divided polygons in the Fraction Insets AMI lesson not numbered: "Fractions as Parts of a Set" (HMTI, 2013)
		3.NF.A.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	40176 Equivalence: Sensorial	Red fraction insets and labels Box of fraction pieces Fraction charts 3, 4, 5, & 11	P	AMI lesson not numbered: "Nomenclature for Equivalence" (HMTI, 2013) completes equivalence table
	Extend understanding of fraction equivalence and ordering.	4.NF.A.1. Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	40176 Equivalence: Sensorial	Red fraction insets and labels Divided squares and triangles Box of fraction pieces Fraction charts 3, 4, 5, & 11	P	AMI work starts earlier, e.g. 1-2; this is an outcome of "repeated effortful practice" of the students
		4.NF.A.2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	40176 Equivalence: Sensorial	Red fraction insets and labels Box of fraction pieces Fraction charts 3, 4, 5, & 11	P	
	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	4.NF.B.3. Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	40178 Simple Addition (Denominators Common, Reduction) 40179 Simple Subtraction (Denominators Common, Reduction)	Fraction insets and paper tickets	C	
		4.NF.B.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 x (1/4), recording the conclusion by the equation 5/4 = 5 x (1/4). b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 x (2/5) as 6 x (1/5), recognizing this product as 6/5. (In general, n x (a/b) = (n x a)/b.) c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?	40180 Simple Multiplication (by Single-Digit Whole Number, Reduction)	Fraction insets and paper tickets	C	Related lessons might be: 40319 Ratio can be Expressed as a Fraction, 40320 Ratios are Equal if They are Equivalent Fractions

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NF: Number and Operations--Fractions	Use equivalent fractions as a strategy to add and subtract fractions.	5.NF.A.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)	40183 Addition/Subtraction: Uncommon Denominators 40188 Addition/Subtraction: Finding a Common Denominator Using Transparencies 40189 Addition/Subtraction: Finding a Common Denominator by Multiplying the Denominators 40190 Addition/Subtraction: Known Denominator, Finding the Numerators by Raising or Reducing a Fraction 40191 Addition/Subtraction: Finding the Least Common Denominator (LCD) 40193 Addition/Subtraction - Finding a Common Denominator Using Graph Paper 40194 Raising/Reducing a Fraction Arithmetically	Fraction insets and paper tickets Box of fraction pieces Transparencies prepared with fraction lines Graph paper	C	
		5.NF.A.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.	40193 Applications with Fractions		P	This is an outcome of "repeated effortful practice" of the child, however it would be helpful to have some reliable sample problems
	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.B.3. Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	40181 Simple Division (by Single-Digit Whole Number, Reduction)	Fraction insets and paper tickets Large skittles	C	
		5.NF.B.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b. For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = ac/bd.) b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.	40180 Simple Multiplication (by Single-Digit Whole Number, Reduction) 40184 Multiplication by a Fraction Less than One	Fraction insets Paper tickets Box of fraction pieces	P	"AMI lesson not numbered: ""Multiplication Using Graph Paper"" (HMTI, 2013) AMI does not directly map multiplication of fractions to area, except loosely in using graph paper to find common denominator"
		5.NF.B.5. Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n x a)/(n x b) to the effect of multiplying a/b by 1.	40184 Multiplication by a Fraction Less than One 40180 Simple Multiplication (by Single-Digit Whole Number, Reduction)	Fraction insets paper tickets box of fraction pieces	C	This is an outcome of repeated practice of working problems. If the child does not come to this realization a separate discussion may occur guiding the child through the materials.
		5.NF.B.6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	40192 Abstraction of the Rules for Operations with Fractions 40193 Applications with Fractions		C	This is an outcome of "repeated effortful practice" of the child, however it would be helpful to have some reliable sample problems
		5.NF.B.7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (1Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.) a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) x 4 = 1/3. b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 x (1/5) = 4. b. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?	40185 Division by a Fraction Less than One (Measurement/Group) 40186 Division by a Fraction Less than One (Partitive / Sharing)"	Fraction insets and paper tickets Large skittles Pencil/paper	C	

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NF: Number and Operations--Fractions	Understand decimal notation for fractions, and compare decimal fractions.	4.NF.C.5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.4 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.	40197 Decimals: Quantity and Language 40198 Decimals: Symbol 40199 Decimals: Formation and Reading 40201 Addition and Subtraction Using the Decimal Board 40202 Algorithm for Addition and Subtraction of Decimals	Decimal cubes and beads Label strip for decimal board Decimal board (yellow board) & cubes/beads	C	
		4.NF.C.6. Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.	40214 Concept, Language, and Notation of Percentage 40215 Conversion of Fraction Insets to Percentage using the Centessimal Frame 40219 Conversion of Common to Decimal Fractions (and vice versa)	Centessimal frame Red fraction insets and centessimal frame Pencil/paper	C	
		4.NF.C.7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	40218 Rounding of Decimal Fractions	Centessimal frame Graph paper	P	AMI doesn't directly teach number line for fractions
(RP) Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.A.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."	40318 Concept, Language, and Notation for Ratio 40319 Ratio can be expressed as a fraction	Objects from the classroom, paper and pencil	C	
		6.RP.A.2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠w 0, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."1	40321 Problem solving using Ratio	Objects from the classroom, paper and pencil	p	
		6.RP.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole- number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	40321 Problem solving using Ratio 40320 Ratios are equal if they are equivalent fractions 40350-40352 Solving for Distance / Time / Speed	Pegboard and pegs, paper and pencil Paper/pencil, objects from the environment	P	Teacher should introduce the term "rate" when presenting these lessons
(NS) The Number System	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	6.NS.A.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Compute fluently with multi-digit numbers and find common factors and multiples.	40185 Division by a fraction less than one (Measurement/ Group) 40186 Division by a fraction less than one (partitive/ sharing) 40192 Abstraction of the Rules for Operations with Fractions	Fraction insets and paper tickets Fraction insets, paper tickets, large skittles	C	Provide word problems that meet the needs for this standard
	Compute fluently with multi-digit numbers and find common factors and multiples.	6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.	40142 Traditional Algorithm	Pencil/paper	C	
		6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	40209 Algorithm For Multiplication of Decimals 40202 Algorithm for Addition and Subtraction of Decimals 40212 Algorithm for Division of Decimals	Pencil/paper	C	
		6.NS.B.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).	40096 Distributive Law of Multiplication 40153 Concept, Language, and Notation for LCM 40160 Concept, Language, and Notation for Greatest Common Factor (GCF)	Bead bars, cards, parentheses, envelopes, bead bars. Pencil and paper Pegboard	P	Finalize the abstraction by practicing the specific examples that are featured in the standard
	Apply and extend previous understandings of numbers to the system of rational numbers.	6.NS.C.5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	40291 Introduction to Signed Numbers 40296 Word Problems Using Signed Numbers		C	

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(NS) The Number System	Apply and extend previous understandings of numbers to the system of rational numbers.	6.NS.C.6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.			X	
		6.NS.C.7. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3 oC > –7 oC to express the fact that –3 oC is warmer than –7 oC. c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars. d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.	40291 Introduction to Signed Numbers 40296 Word Problems Using Signed Numbers		P	Absolute value portions not covered.
		6.NS.C.8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.			X	
(EE) Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents.	40231 Operations with Numbers Written as Squares and Cubes Squaring: Arithmetic Passages 40135, 40236, 40237, 40238, 40238, 40239, 40240, 40241 Cubing: Arithmetic Passages 40248, 40249, 40250, 40251, 40251, 40252, 40253 40306 Operations with Numbers Written in Exponential Notation 40307 Operations: Numbers Written in Expanded Power Notation	Bead squares and cubes, paper tickets, paper and pencil. Gold squares, rubber bands, tickets, golden beads, pegboard and pegs, guide squares, paper and pencil. Wooden cubing material/ paper and pencil.	C	
		6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 – y. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole- number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.	40243 Squaring a Binomial, Algebraic 40244 Squaring a Trinomial, Algebraic 40255 Cubing a Binomial, Algebraic 40256 Cubing a Trinomial, Algebraic 40329 Concept of an Equation and Balancing an Equation Using the Laws of Equivalence 40330 Order of Operations	Gold bead squares, rubber bands, bi cube lid, tri cube lid.	C	
		6.EE.A.3. Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.	Distributive Law of Multiplication 40096, 40097, 40098, 40099, 40100, 40101, 40102, 40103 (especially 40100 Passage to More Symbolic Representations on Paper)	Bead bars, cards, parentheses, envelopes, golden beads, decimal cards, pencil and paper.	C	
		6.EE.A.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.	40243 Squaring a Binomial, Algebraic 40244 Squaring a Trinomial, Algebraic 40255 Cubing a Binomial, Algebraic 40256 Cubing a Trinomial, Algebraic 40329 Concept of an Equation and Balancing an Equation Using the Laws of Equivalence 40330 Order of Operations Introduction to Algebra 40329, 40330, 40331, 40332	Gold bead squares, rubber bands, bi cube lid, tri cube lid. Paper and pencil Bead bars	C	May need to fill in with some lessons on writing equivalent expressions.

CCSS DOMAIN	CCSS CLUSTER OBJECTIVES	CCSS STANDARDS	RELEVANT A.M.I. ACTIVITIES	RESOURCES / MATERIALS	"COMPLETENESS *C = completely covers;* *P = partially covers;* *X = no coverage/ nothing maps"*	COMMENTS
(EE) Expressions and Equations	Reason about and solve one-variable equations and inequalities.	6.EE.B.5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	Introduction to Algebra 40329, 40330, 40331, 40332	Paper, pencil, and ruler.	C	Introduce use of a number line and bar figures. Idea of a pan balance in relation to balancing an equation. Venn Diagrams. Equation vs. inequality.
		6.EE.B.6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	Introduction to Algebra 40329, 40330, 40331, 40332 40337 Algebraic Word Problems	Paper, pencil, and ruler. Prepared word problems.	C	Need to introduce the use of tables. Previous knowledge of addition, subtraction, multiplication, and division.
		6.EE.B.7. Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.	40337 Algebraic Word Problems	Pencil and paper, and prepared problems.	C	Bar models. Word problems would need to be specific for these situations.
		6.EE.B.8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	40337 Algebraic Word Problems	Pencil and paper, and prepared problems.	P	Word problems would need to be written specifically for these.
	Represent and analyze quantitative relationships between dependent and independent variables.	6.EE.C.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	40340 Introduce Graphing 40341 Types of Graphs Word Problems Solving for Distance, Time, and Speed 40349, 40350, 40351, 40352	Graph examples, paper and pencil, ruler. Golden beads and word problem labels.	P	Word problems would need to be written specifically for these.
(SP) Statistics and Probability	Develop understanding of statistical variability.	6.SP.A.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.			X	
		6.SP.A.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.			X	
		6.SP.A.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.			P	
	Summarize and describe distributions.	6.SP.B.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	40341 Types of Graphs		P	Parts (A) and (B) are practiced during science experiments and field work. Parts (see) and (D) are not covered.
		6.SP.B.5. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.				