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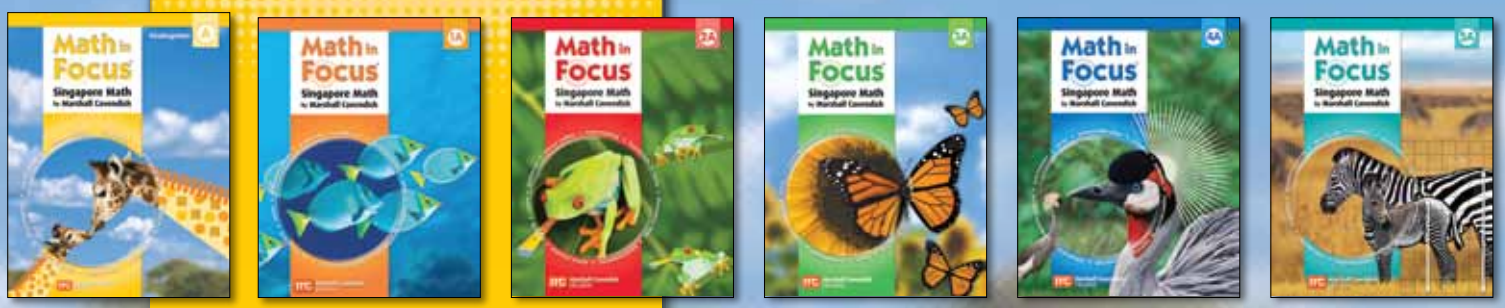
Math in Focus™

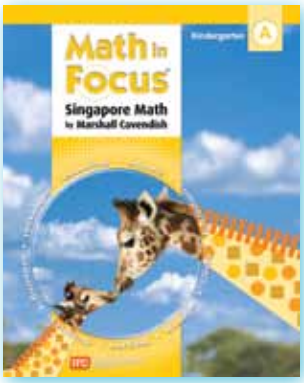
Singapore Math by Marshall Cavendish

Grades K–5 Scope and Sequence

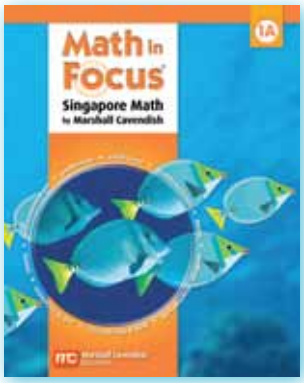
Your #1 Choice for World-Class Mathematics!

Deep Math Understanding. Real-World Problem Solvers.

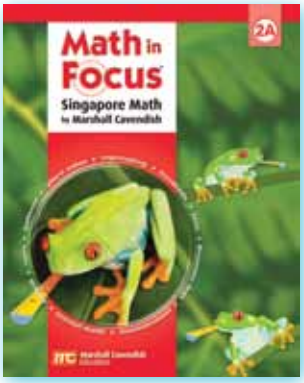




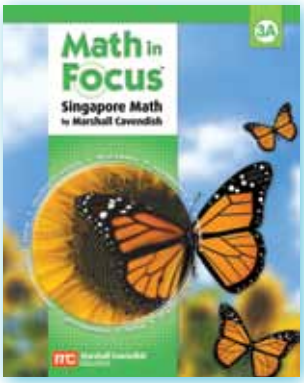
Grade K



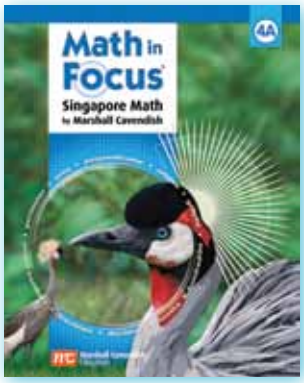
Grade 1



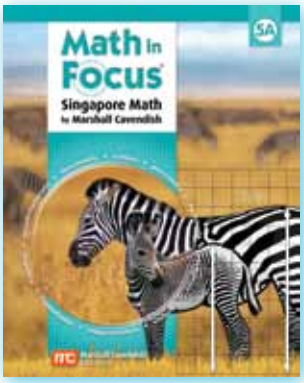
Grade 2



Grade 3



Grade 4



Grade 5

Math in Focus®: Singapore Math by Marshall Cavendish **is the U.S. Edition of Singapore's most widely used program.**

Key Differences

and Distinguishing Characteristics

Articulated Sequence

Math in Focus answers the call for a coherent sequence of topics giving students time to master foundational topics, so that little repetition is required the next year. Thus, each grade level covers fewer topics but in more depth, and you won't find all topics in every grade level.

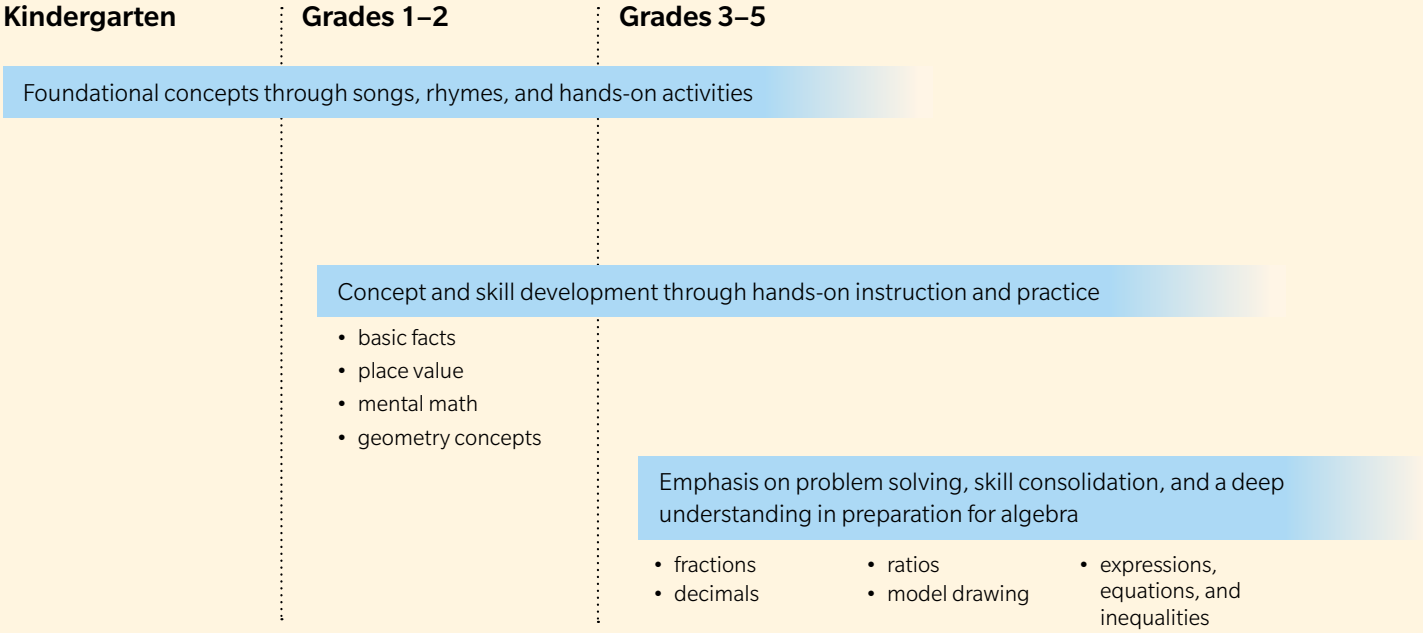
- **"Missing topics"** When a topic appears to be "missing," you can be assured that it is found in either an earlier or later grade level. For example you will find calendar concepts in Grades K and 1, but not repeated in Grade 2.
- **More advanced** As a result of not repeating topics year after year, students who use *Math in Focus* will advance faster than students in other programs. As a result, you may find topics that seem to be "too advanced." However, you will find your students easily able to handle the challenge as long as they have had the appropriate preliminary instruction.

Preparation for Algebra

Math in Focus answers the call to prepare students for algebra. As recommended by the National Math Panel, the *Math in Focus* sequence of topics emphasizes:

- **Number sense, basic facts, and computation** An early understanding of composition and decomposition of numbers is developed in tandem with mastery of basic facts and computation algorithms in Grades K–2.
- **Fractions and proportional reasoning** Significant time is allocated for in-depth work with fractions in Grades 3–5.
- **Problem solving** Challenging problem solving is built into each chapter in every grade level.

Developmental Continuum



	Kindergarten	Grade 1	Grade 2
Number and Operations			
Sets and Numbers	Use concrete models to create a set with a given number of objects (up to 20). Use cardinal and ordinal numbers.	Use concrete and pictorial models to create a set with a given number of objects (up to 100). Group objects and numbers up to 100 in tens and ones. Use cardinal numbers up to 100 and ordinal numbers up to 10^{th}.	Use concrete and pictorial models to create a set with a given number of objects (up to 1,000). Group objects and numbers up to 1,000 into hundreds, tens, and ones. Group objects into equal sized groups.
Number Representation	Use numbers to represent quantities up to 20.	Use number bonds to represent number combinations. Represent numbers to 100 on a number line.	Use place value models to create equivalent representations of numbers. Represent numbers to 1,000 on a number line.
Count	Count up to 20 objects in a set. Count on and back to 20. Count in 2s and 5s up to 20.	Count to 100. Count by 1s, 2s, 5s, and 10s forward and backward to 100.	Count to 1,000. Count by multiples of ones, tens, and hundreds.
Compare and Order	Compare and order sets and numbers up to 20. Compare and order using the terms *fewer*, *more*, and *less*.	Compare and order whole numbers to 100. Compare and order using the terms *same*, *more*, *fewer*, *greater than*, *less than*, *equal to*, *greatest*, and *least*.	Compare and order whole numbers to 1,000. Use <, >, and = to compare whole numbers.
Place Value		Use place value models and place value charts to represent numbers to 100.	Use base-ten models and place value charts to represent numbers to 1,000.

	Grade 3	Grade 4	Grade 5
Number and Operations			
Sets and Numbers			Explore negative numbers in context.
Number Representation	Represent numbers to 10,000 in different equivalent forms.	Represent numbers to 100,000 in various contexts.	Understand place value concepts through millions.
Count	Count to 10,000. Count by hundreds and thousands.	Count by thousands and ten thousands.	Count by hundred thousands and millions.
Compare and Order	Compare and order whole numbers to 10,000.	Compare and order whole numbers to 100,000.	Compare and order whole numbers to 10,000,000.
Place Value	Use place value models to read, write, and represent numbers to 10,000.	Express numbers to 100,000 in standard, expanded, and word forms.	Express numbers to 10,000,000 in various forms.

	Kindergarten	Grade 1	Grade 2
Number and Operations (continued)			
Place Value (continued)		Express numbers to 100 in standard and word forms.	Express numbers to 1,000 in terms of place value. Compose and decompose multi-digit numbers (including expanded form).
Fraction Concepts			Connect geometric concepts with unit fractions—halves, thirds, and fourths. Understand the relationship between a fraction and a whole. Compare and order halves, thirds, and fourths using bar models.
Money	Identify and relate coin values (penny, nickel, dime, quarter). Count and make coin combinations.	Identify and relate coin values (penny, nickel, dime, quarter). Count and make coin combinations.	Identify $1, $5, $10, and $20 bills. Count and make combinations of coins and bills. Compare money amounts.
Decimal Concepts			Use the dollar sign and decimal point.

	Grade 3	Grade 4	Grade 5
Number and Operations (continued)			
Place Value (continued)			
Fraction Concepts	Understand the meanings and uses of fractions including fraction of a set. Understand that the size of a fractional part is relative to the size of the whole. Compare fractions using models and number lines. Identify equivalent fractions through the use of models, multiplication, division, and number lines. Add and subtract like fractions.	Recognize, write, name, and illustrate mixed numbers and improper fractions. Find a fraction of a set. Generate equivalent fractions. Convert among mixed numbers and improper fractions.	Convert fractions to decimals. Relate fractions and division expressions.
Money	Add and subtract money. Solve real-world problems involving addition and subtraction of money.		
Decimal Concepts	Use the dollar sign and decimal point in money amounts.	Model decimals using tenths and hundredths.	Model decimals using thousandths.

	Kindergarten	Grade 1	Grade 2
Number and Operations (continued)			
Decimal Concepts (continued)			
Ratio, Proportion, and Percent			
Whole Number Computation: Addition and Subtraction	Model joining and separating sets. Use +, -, and = to write number sentences for addition and subtraction stories.	Model addition and subtraction situations. Use models, numbers, and symbols for addition and subtraction facts to 20. Use the order, grouping, and zero properties to develop addition and subtraction fact strategies. Add and subtract up to 2-digit numbers with and without regrouping	Model addition and subtraction with place value. Recall addition and subtraction facts. Use different methods to develop fluency in adding and subtracting multi-digit numbers. Add and subtract whole numbers to 1,000.

	Grade 3	Grade 4	Grade 5
Number and Operations (continued)			
Decimal Concepts (continued)		Understand decimal notation through hundredths as an extension of the base-ten system. Read and write decimals that are greater than or less than 1. Compare and order decimals. Identify equivalent decimals. Connect equivalent fractions and decimals.	Understand place value concepts through thousandths. Convert decimals to fractions.
Ratio, Proportion, and Percent			Use ratios to solve problems. Find equivalent ratios. Solve problems with percent. Convert fractions to percents. Find a percent of a number.
Whole Number Computation: Addition and Subtraction	Model regrouping in addition and subtraction with place value. Add and subtract whole numbers to 10,000.		

	Kindergarten	Grade 1	Grade 2
Number and Operations (continued)			
Whole Number Computation: Addition and Subtraction Real-World Problems	Represent addition and subtraction stories.	Formulate addition and subtraction stories. Solve addition and subtraction problems using basic facts.	Solve multi-digit addition and subtraction problems by using a bar model.
Whole Number Computation: Multiplication and Division Concepts	Count by 2s and 5s up to 20.	Count by 2s, 5s, and 10s. Adding the same number to multiply. Represent sharing equally and making equal groups.	Multiply and divide with 2, 3, 4, 5, and 10. Represent multiplication as repeated addition. Represent division as repeated subtraction. Use the ×, ÷, and = symbols to represent multiplication and division situations.
Whole Number Computation: Multiplication and Division Algorithms			

	Grade 3	Grade 4	Grade 5
Number and Operations (continued)			
Whole Number Computation: Addition and Subtraction Real-World Problems	Solve addition and subtraction problems with greater numbers by using a bar model.		
Whole Number Computation: Multiplication and Division Concepts	Multiply and divide with 6, 7, 8, and 9. Represent multiplication in different ways. Represent division in different ways.	Apply understanding of models for multiplication and division. Recall multiplication facts and related division facts.	
Whole Number Computation: Multiplication and Division Algorithms	Multiply 1s, 10s, and 100s with and without regrouping. Use addition and multiplication properties to multiply. Divide 10s and 1s with and without regrouping, no remainder.	Develop fluency in multiplying multi-digit numbers. Divide by a 1-digit number, with a remainder.	Multiply multi-digit numbers. Find quotients involving multi-digit dividends.

	Kindergarten	Grade 1	Grade 2
Number and Operations (continued)			
Whole Number Computation: Multiplication and Division Real-World Problems			Use bar models to represent multiplication and division situations. Solve multiplication and division fact problems.
Fraction Computation			Add and subtract like fractions (halves, thirds, fourths).
Decimal Computation		Add and subtract money.	Solve addition and subtraction money problems.
Estimation and Mental Math		Use mental math strategies to add and subtract.	Use mental math strategies to add and subtract.

	Grade 3	Grade 4	Grade 5
Number and Operations (continued)			
Whole Number Computation: Multiplication and Division Real-World Problems	Use bar models to represent multiplication and division situations. Solve one- and two-step multiplication and division problems.	Solve multi-digit multiplication and division problems.	Solve multiplication and division problems. Select the most useful form of the quotient and interpret the remainder.
Fraction Computation	Add and subtract like fractions.	Add and subtract unlike fractions.	Add and subtract unlike fractions and mixed numbers. Multiply proper fractions, improper fractions, mixed numbers, and whole numbers. Divide fractions by whole numbers. Solve word problems with addition, subtraction, multiplication, and division of fractions.
Decimal Computation	Add and subtract money amounts.	Add and subtract decimals. Solve problems with addition and subtraction of decimals.	Add and subtract decimals. Multiply and divide decimals by whole numbers. Solve problems with multiplication and division of decimals.
Estimation and Mental Math	Use mental math strategies to add subtract, multiply, and divide.	Use mental math and estimation strategies to find sums, differences, products, and quotients.	Use estimation and mental math to estimate sums, differences, products, and quotients.

	Kindergarten	Grade 1	Grade 2
Number and Operations (continued)			
Estimation and Mental Math (continued)		Estimate quantity by using referents.	Round to the nearest ten to estimate sums and differences.
Algebra			
Patterns	Describe and extend repeating shape patterns. Count by 2s and 5s. Describe a rule for sorting objects. Find missing terms in repeating patterns.	Identify, describe, and extend two- and three-dimensional shape patterns. Skip count by 2s, 5s, and 10s. Identify a rule for sorting objects. Identify and extend growing and repeating patterns. Find missing terms in growing and repeating patterns.	Describe, extend, and create two-dimensional shape patterns. Skip count by 2s, 3s, 4s, 5s, and 10s. Identify rules for number patterns. Find missing terms in table patterns.
Properties		Identify 0 as the identity element for addition and subtraction. Use the Associative and Commutative Properties of Addition.	Understand that addition and subtraction are inverse operations. Apply properties of addition. Use the Distributive Property as a multiplication strategy.
Number Theory	Identify odd and even numbers.		

	Grade 3	Grade 4	Grade 5
Number and Operations (continued)			
Estimation and Mental Math (continued)	Use front-end estimation and rounding to estimate sums and differences.	Decide whether an estimate or exact answer is needed. Use estimation in determining relative sizes of amounts or distances. Round and estimate with decimals.	Estimate sums and differences with fractions and decimals. Estimate products and quotients with decimals.
Algebra			
Patterns	Create and analyze multiplication and division patterns. Skip count by 6s, 7s, 8s, and 9s. Analyze number and counting patterns.	Identify, describe, and extend numeric and non-numeric patterns. Use a rule to describe a sequence of numbers or objects.	Identify, describe, and extend numeric patterns involving all operations. Find rules to complete number patterns.
Properties	Understand that multiplication and division are related. Create and analyze multiplication and division patterns. Model, define, and explain properties of multiplication.	Represent division as the inverse of multiplication.	
Number Theory	Identify odd and even numbers.	Find the greatest common factor and least common multiple. Identify prime and composite numbers.	

	Kindergarten	Grade 1	Grade 2
Algebra (continued)			
Functional Relationships		Understand the relationships between the numbers in fact families.	Recognize how bar models show relationships between numbers and unknowns in number sentences.
Expressions/ Models		Use a variety of concrete, pictorial, and symbolic models for addition and subtraction.	Use a variety of concrete, pictorial, and symbolic models for addition, subtraction, multiplication, and division.
Number Sentences and Equations	Model addition and subtraction stories with addition and subtraction number sentences.	Model addition and subtraction situations by writing addition and subtraction number sentences.	Model multiplication and division situations by writing multiplication and division number sentences. Use bar models and number sentences to represent real-world problems. Determine the value of missing quantities in number sentences.
Equality and In-equality	Understand the meaning of the = sign in number sentences.	Understand the difference between equality and inequality.	Use and create models that demonstrate equality or inequality. Use <, >, and = to write number sentences.
Geometry			
Size and Position	Understand big, middle- sized, and small.	Describe position with left and right.	

	Grade 3	Grade 4	Grade 5
Alegbra (continued)			
Functional Relationships	Understand the relationships between the numbers in multiplication and division fact families. Describe number relationships in context.	Understand the relationships between the numbers and symbols in formulas for area and perimeter. Describe number relationships in context.	Understand the relationships between the numbers and symbols in formulas for surface area and volume. Describe number relationships in context.
Expressions/ Models	Use a variety of concrete, pictorial, and symbolic models for multi-digit addition, subtraction, multiplication, and division.	Use a variety of concrete, pictorial, and symbolic models for multiplication and division; and addition and subtraction with fractions and decimals.	Use letters as variables. Simplify algebraic expressions. Use the order of operations in numeric expressions with two or more operations.
Number Sentences and Equations	Write multiplication and division number sentences. Write and solve number sentences for one- and two-step real-world problems. Determine the missing parts (quantities or symbols) in number sentences.	Write and solve number sentences for one-, two-, and three-step real-world problems. Use bar models and number sentences for one-, two-, and three-step real-world problems. Determine the missing parts (quantities or symbols) in number sentences.	Write and solve number sentences and equations for one- and two-step real-world problems. Write and solve equations. Graph linear equations.
Equality and In-equality	Understand equality and inequality. Write and solve inequalities.	Understand equality and inequality.	Understand equality and inequality.
Geometry			
Size and Position			

	Kindergarten	Grade 1	Grade 2
Geometry (continued)			
Size and Position (continued)	Describe and compare objects by position.	Use positional words to describe location.	
Lines and Angles			Identify parts of lines and curves.
Two-Dimensional Shapes	Identify similarities and differences.		
	Name flat shapes that make up real-world objects. Identify, describe, sort, and classify two-dimensional shapes. Make flat shape pictures. Compare areas using non-standard units.	Identify real-world two-dimensional shapes. Identify and describe attributes and properties of two-dimensional shapes. Sort and classify two-dimensional shapes. Compose and decompose two-dimensional shapes.	Identify, describe, sort, and classify two-dimensional shapes. Identify parts of lines and curves. Compose and decompose two-dimensional shapes. Develop foundations for understanding area.
Three-Dimensional Shapes	Name and sort solid shapes. Understand that three-dimensional shapes are made up of two-dimensional shapes.	Identify real-world three-dimensional shapes. Identify two-dimensional shapes in three-dimensional shapes.	Identify, describe, sort, and classify three-dimensional shapes.

	Grade 3	Grade 4	Grade 5
Geometry (continued)			
Size and Position (continued)			
Lines and Angles	Identify perpendicular and parallel lines. Identify right angles and compare angles to right angles.	Draw perpendicular and parallel lines. Construct and measure angles.	Work with angles on a straight line. Work with angles at a point.
Two-Dimensional Shapes	Describe, analyze, compare, and classify two-dimensional shapes by their sides and angles. Classify and sort polygons and quadrilaterals by attributes and properties. Investigate composing and decomposing two-dimensional shapes. Use attributes and properties to solve problems. Find and compare the area of plane figures in different square units.	Apply the properties of squares and rectangles. Find unknown angle measures and side lengths of squares and rectangles. Identify figures that form tessellations. Understand the relationships between the numbers and symbols in formulas for area and perimeter.	Apply the properties of right, isosceles, and equilateral triangles. Apply the sum of the angle measures of a triangle. Apply the properties of a parallelogram, rhombus, and trapezoid. Demonstrate that the sum of any two side lengths of a triangle is greater than the length of the third side. Find the area of a triangle.
Three-Dimensional Shapes			Identify and classify prisms and pyramids. Identify the solid that can be made from a net.

	Kindergarten	Grade 1	Grade 2
Geometry (continued)			
Three-Dimensional Shapes (continued)		Sort and classify three-dimensional shapes. Recognize shapes from different perspectives. Compose and decompose three-dimensional shapes.	Identify surfaces that slide, stack, and roll.
Congruence and Symmetry		Develop initial understanding of congruence and symmetry.	
Transformations			
Coordinate Geometry			
Measurement			
Length and Distance	Compare lengths and heights using non-standard units. Compare and order lengths (long, short, longest, shortest). Develop a background for measurement using non-standard units.	Compare two lengths by comparing each with a third length (transitivity). Use a start line to measure length. Measure lengths, using non-standard units. Explain the need for equal-length units to measure.	Demonstrate linear measure as an iteration of units. Use rulers to measure length. Measure lengths in meters, centimeters, feet, and inches.

	Grade 3	Grade 4	Grade 5
Geometry (continued)			
Three-Dimensional Shapes (continued)			Identify cylinders, spheres, and cones. Describe cylinders, spheres, and cones by the number of and types of faces, and the number of edges and vertices. Build solids using unit cubes.
Congruence and Symmetry	Identify symmetrical figures and one line of symmetry. Solve problems involving congruency.	Identify line and rotational symmetry. Relate rotational symmetry to turns and congruency.	
Transformations	Identify pairs of shapes that show a flip, slide, and turn. Demonstrate that figures and their flip, slide, and turn images are congruent.	Use transformations to form tessellations.	
Coordinate Geometry		Develop coordinate readiness with tables and line graphs.	Plot points on a coordinate grid.
Measurement			
Length and Distance	Select appropriate units and tools to estimate and measure length. Use meter sticks, 12-inch rulers, and yardsticks to measure length. Measure length to the nearest half inch and inch. Use referents to estimate distance.		

	Kindergarten	Grade 1	Grade 2
Measurement (continued)			
Length and Distance (continued)		Explain the need for equal-length units to measure. Count length units in groups of 10s and 1s. Compare measurements made using different units. Understand the inverse relationship between the size of a unit and the number of units.	 Compare and measure lengths using customary and metric units. Demonstrate partitioning and transitivity in relation to length. Solve problems involving estimating, measuring, and computing length.
Weight/Mass	Order objects by weight. Compare weights using non-standard units.	Compare and measure weights using non-standard units. Compare two masses by comparing each with a third mass (transitivity). Solve weight problems.	Compare and measure masses. Solve mass problems.
Capacity/ Volume	Compare capacities using non-standard units.		Measure volume (capacity) in liters. Solve volume problems.

	Grade 3	Grade 4	Grade 5
Measurement (continued)			
Length and Distance (continued)	Estimate and measure length, distance, and height in meters, centimeters, and kilometers. Convert among metric units of length. Solve one- and two-step real-world problems in measurement.		
Weight/Mass	Select appropriate units and tools to estimate and measure weight. Use referents to estimate weight. Estimate and find masses of objects. Convert among units of mass.		
Capacity/ Volume	Select appropriate tools and units to estimate and measure volume and capacity. Determine the volume and capacity of a container. Relate the units of customary capacity to one another. Use referents to estimate capacity.		

	Kindergarten	Grade 1	Grade 2
Measurement (continued)			
Capacity/ Volume (continued)			
Time	Name and order the days of the week and the months of the year. Compare durations of events.	Read a calendar to identify the days of the week, months, and seasons of the year. Recognize the correct way to write the date. Tell time to the hour and half hour.	Use A.M. and P.M. to write time. Tell time to five minutes. Find elapsed time.
Temperature			
Angles			
Perimeter			

	Grade 3	Grade 4	Grade 5
Measurement (continued)			
Capacity/ Volume (continued)	Estimate and measure capacity in liters and milliliters. Convert among metric units of capacity.		
Time	Read time on a digital clock. Convert between hours and minutes. Determine elapsed time. Add and subtract units of time.		
Temperature	Read a Fahrenheit thermometer. Choose the appropriate tool and unit to measure temperature. Use referents to estimate temperature.		
Angles	Compare angles to right angles.	Estimate and measure angles with a protractor. Classify angles by angle measure. Relate 1/4-, 1/2-, 3/4-, and full turns to the number of right angles.	Apply the idea that the sum of angles on a straight line is 180°. Apply the idea that vertical angles are equal in measure. Apply the idea that the sum of angles at a point is 360°.
Perimeter	Measure perimeter of plane figures.	Find the perimeter of composite figures.	

	Kindergarten	Grade 1	Grade 2
Measurement (continued)			
Perimeter (continued)			
Area	Compare areas using non-standard units.	Compose and decompose two-dimensional shapes (foundation for understanding area).	Develop foundations for understanding area.
Surface Area and Volume			
Data Analysis			
Classifying and Sorting	Understanding similarities and differences in objects and shapes. Sorting and classifying objects using one or two attributes.	Sort and classify geometric shapes. Sorting and classifying data in order to make graphs.	Sort and classify two- and three-dimensional shapes by properties. Collect and organize data in picture graphs.

	Grade 3	Grade 4	Grade 5
Measurement (continued)			
Perimeter (continued)	Choose the appropriate tool, unit, and strategy to measure perimeter. Estimate the perimeter of surfaces and objects.	Solve problems involving the perimeter of squares, rectangles, and composite figures.	
Area	Find and compare the area of plane figures in different square units. Make different plane figures with the same area. Estimate area of small and large surfaces. Compare the area and perimeter of two plane figures. Find the area of rectangles and composite figures.	Explain area as an attribute of two-dimensional figures. Connect area measure to the area model for multiplication; use it to justify the formula for the area of a rectangle. Estimate and measure area in square units. Select appropriate units, strategies, and tools to solve area problems. Explain the relationships among area formulas of different polygons.	Find the area of triangles.
Surface Area and Volume	Decompose solid figures to find the surface area. Estimate and measure volume in cubic units.		
Data Analysis			
Classifying and Sorting	Classify and sort polygons and quadrilaterals by attributes and properties. Collect and organize data in bar graphs and line plots.	Construct line plots, stem-and-leaf plots, tables, and line graphs.	Represent data in a double bar graph.

	Kindergarten	Grade 1	Grade 2
Data Analysis (continued)			
Collect and Organize Data	Organize data for a picture graph.	Collect and organize data in different ways.	Collect and organize data in different ways.
Represent Data	Represent data in pictographs.	Represent measurements and data in picture graphs, tally charts, and bar graphs.	Represent data in picture graphs.
Interpret/ Analyze Data	Interpret data in tally charts and pictographs.	Interpret data in picture graphs, tally charts, and bar graphs. Read bar graphs with scales. Solve problems involving data.	Interpret picture graphs with scales. Solve real-world problems using picture graphs.
Probability			
Outcomes			
Expressing Probability			
Problem Solving			
Build Skills Through Problem Solving	Build skills in addition and subtraction through problem solving.	Build skills in addition, subtraction, and measurement through problem solving.	Build skills in addition, subtraction, multiplication, division, and measurement through problem solving.

	Grade 3	Grade 4	Grade 5
Data Analysis (continued)			
Collect and Organize Data			
Represent Data			
Interpret/ Analyze Data	Interpret picture and bar graphs with scales. Use frequency tables, bar graphs, picture graphs, and line plots to solve real-world problems.	Interpret tally charts, bar graphs, picture graphs, tables, and line graphs. Find the mean (average), median, mode, and range of a data set.	Analyze data in a double bar graph.
Probability			
Outcomes		Decide whether an outcome is certain, more likely, equally likely, less likely, or impossible.	Determine experimental probability of an outcome.
Expressing Probability		Express the probability of an event as a fraction.	Compare the results of an experiment with theoretical probability. Find all possible combinations by listing, making a tree diagram, and multiplying.
Problem Solving			
Build Skills Through Problem Solving	Build skills in addition, subtraction, multiplication, division, and measurement through problem solving.	Build skills in multiplication, division, fraction concepts, data analysis, and measurement through problem solving.	Build skills in multiplication; division; fraction concepts, decimals, ratios, and percents; data analysis; and measurement through problem solving.

	Kindergarten	Grade 1	Grade 2
Problem Solving (continued)			
Solve Real-World Problems	Solve real-world problems involving addition and subtraction.	Solve real-world problems involving addition and subtraction.	Solve real-world problems involving addition, subtraction, multiplication, division, and measurement.
Use Appropriate Strategies and Thinking Skills to Solve Problems		Apply problem solving strategies in Put on Your Thinking Cap! and Problem Solving activities.	Apply problem solving strategies in Put on Your Thinking Cap! and Problem Solving activities.
Apply and Explain Problem Solving	Solve real-world problems.	Apply and explain problem solving processes in Put on Your Thinking Cap! and other activities.	Apply and explain problem solving processes in Put on Your Thinking Cap! and other activities.
Explore Concepts	Use models to explain reasoning.	Explore concepts more deeply and justify reasoning in Let's Explore and Hands-On activities. Apply Thinking Skills, Put on Your Thinking Cap!, Challenging Practice, and Problem Solving activities.	Explore concepts more deeply and justify reasoning in Let's Explore and Hands-On activities. Apply Thinking Skills, Put on Your Thinking Cap!, Challenging Practice, and Problem Solving activities.
Investigate Mathematical Ideas	Investigate ideas with two-dimensional shapes.	Further investigate mathematical ideas by completing critical thinking skills activities.	Further investigate mathematical ideas by completing critical thinking skills activities.
Identify, Demonstrate, and Explain Mathematical Proof	Demonstrate that only a few big things fit into small spaces and many small things fit into big spaces. Describe, sort, and classify two- and three-dimensional shapes.	Explore transitivity by comparing lengths and weights of three different objects. Identify and describe attributes and properties of two- and three-dimensional shapes.	Demonstrate the inverse relationship between the size of a unit and the number of units. Identify, describe, sort, and classify two- and three-dimensional shapes.

	Grade 3	Grade 4	Grade 5
Problem Solving (continued)			
Solve Real-World Problems	Solve real-world problems involving addition, subtraction, multiplication, division, and measurement.	Solve real-world problems involving multiplication, division, fraction concepts, data analysis, and measurement.	Solve real-world problems involving multiplication; division; concepts with fractions, decimals, ratios, and percents; data analysis; and measurement.
Use Appropriate Strategies and Thinking Skills to Solve Problems	Apply problem solving strategies in Put on Your Thinking Cap! and Problem Solving activities.	Use appropriate strategies to solve real-world problems.	Use appropriate strategies to solve real-world problems.
Apply and Explain Problem Solving	Apply and explain problem solving processes in Put on Your Thinking Cap! and other activities.	Apply and explain problem solving processes in Put on Your Thinking Cap! and other activities.	Apply and explain problem solving processes in Put on Your Thinking Cap! and other activities.
Explore Concepts	Explore concepts more deeply and justify reasoning in Let's Explore and Hands-On activities. Apply Thinking Skills, Put on Your Thinking Cap!, Challenging Practice, and Problem Solving activities.	Explore concepts more deeply and justify reasoning in Let's Explore and Hands-On activities. Apply Thinking Skills, Put on Your Thinking Cap!, Challenging Practice, and Problem Solving activities.	Explore concepts more deeply and justify reasoning in Let's Explore and Hands-On activities. Apply Thinking Skills, Put on Your Thinking Cap!, Challenging Practice, and Problem Solving activities.
Investigate Mathematical Ideas	Further investigate mathematical ideas by completing critical thinking skills activities.	Further investigate mathematical ideas by completing critical thinking skills activities.	Further investigate mathematical ideas by completing critical thinking skills activities.
Identify, Demonstrate, and Explain Mathematical Proof	Demonstrate that figures and their flip, slide, and turn images are congruent. Identify pairs of shapes that show a flip, slide, and turn.	Show that some figures can be turned and not change shape or size (rotational symmetry). Use properties of squares and rectangles to solve problems.	Apply the idea that the sum of angles on a straight line is 180°. Apply the idea that the sum of angles at a point is 360°. Explain the relationships among area formulas of different polygons.

	Kindergarten	Grade 1	Grade 2
Problem Solving (continued)			
Identify, Demonstrate, and Explain Mathematical Proof (continued)	Interpret data in tally charts and pictographs. Identify and extend repeating shape patterns.	Interpret picture graphs, tally charts, and bar graphs. Identify and extend growing number patterns and repeating shape patterns.	Interpret picture graphs with scales. Identify rules for number patterns.
Use a Variety of Reasoning Skills	Sort and classify using attributes. Identify similarities and differences.	Recognize shapes from different perspectives. Use the Commutative and Associative properties, and 10s and 1s to solve two-digit addition and subtraction problems.	Identify surfaces that slide, stack, and roll. Explore the inverse relationship between addition and subtraction.
Communication			
Consolidate Mathematical Thinking	Consolidate thinking in independent activities.	Present mathematical thinking through Math Journal activities.	Present mathematical thinking through Math Journal activities.
Communicate with Peers, Teachers, and Others	Discuss mathematical ideas in paired and small-group activities.	Discuss mathematical ideas in Let's Explore activities. Work together in pairs or groups in Let's Explore, Games, and other activities.	Discuss mathematical ideas in Let's Explore activities. Work together in pairs or groups in Let's Explore, Games, and other activities.
Share Mathematical Thinking	Share mathematical ideas in paired and small-group activities.	Share mathematical ideas with others during Let's Explore and Hands-On activities.	Share mathematical ideas with others during Let's Explore and Hands-On activities.

	Grade 3	Grade 4	Grade 5
Problem Solving (continued)			
Identify, Demonstrate, and Explain Mathematical Proof (continued)	Interpret bar graphs with scales. Create and analyze multiplication and division patterns.	Analyze a data set by finding its mean, median, mode, and range. Identify, describe, and extend numeric and non-numeric patterns.	Compare the results of an experiment to validate the use of theoretical probability. Identify, describe, and extend numeric patterns involving all operations.
Use a Variety of Reasoning Skills	Model, define, and explain properties of multiplication. Explore the inverse relationship between multiplication and division. Use estimation to check reasonableness.	Use properties of squares and rectangles to solve problems about area and perimeter. Use estimation to check reasonableness (whole-number addition, subtraction, multiplication and division).	Explore the relationship among lists, tree diagrams, and multiplication to calculate combinations. Use properties of multiplication (including the Distributive Property) in estimation and mental math.
Communication			
Consolidate Mathematical Thinking	Present mathematical thinking through Math Journal activities.	Present mathematical thinking through Math Journal activities.	Present mathematical thinking through Math Journal activities.
Communicate with Peers, Teachers, and Others	Discuss mathematical ideas in Let's Explore activities. Work together in pairs or groups in Let's Explore, Games, and other activities.	Discuss mathematical ideas in Let's Explore activities. Work together in pairs or groups in Let's Explore, Games, and other activities.	Discuss mathematical ideas in Let's Explore activities. Work together in pairs or groups in Let's Explore, Games, and other activities.
Share Mathematical Thinking	Share mathematical ideas with others during Let's Explore and Hands-On activities.	Share mathematical ideas with others during Let's Explore and Hands-On activities.	Share mathematical ideas with others during Let's Explore and Hands-On activities.

	Kindergarten	Grade 1	Grade 2
Communication (continued)			
Express Mathematical Ideas	Express ideas in paired and small group activities.	Express ideas in Math Journal activities, using lesson vocabulary. Use chapter and lesson vocabulary correctly.	Express ideas in Math Journal activities, using lesson vocabulary. Use chapter and lesson vocabulary correctly.
Connections			
Recognize Connections in Mathematical Ideas	Understand the connection between quantities and written numerals.	Understand the relationship between counting and addition and subtraction. Understand the relationships among the numbers in fact families. Connect addition and multiplication (repeated addition). Recognize and apply different strategies for adding and subtracting one- and two-digit numbers.	Examine and apply the inverse relationship between addition and subtraction. Connect geometric concepts with unit fractions. Connect subtraction and division (repeated subtraction). Recognize and apply different strategies for multiplication and division facts.
Understand How Concepts Build on One Another	Explore relationships among counting, ordering, and ordinal numbers.	Learn how place value concepts apply to regrouping in addition and subtraction.	Understand how patterns can be described using numbers, operations, and data displays. Recognize the relationship between bar models, number sentences, and number patterns.

	Grade 3	Grade 4	Grade 5
Communication (continued)			
Express Mathematical Ideas	Express ideas in Math Journal activities, using lesson vocabulary. Use chapter and lesson vocabulary correctly.	Express ideas in Math Journal activities, using lesson vocabulary. Use chapter and lesson vocabulary correctly.	Express ideas in Math Journal activities, using lesson vocabulary. Use chapter and lesson vocabulary correctly.
Connections			
Recognize Connections in Mathematical Ideas	Apply the inverse relationship between multiplication and division. Understand that the size of a fractional part is relative to the size of the whole. Connect the units of customary capacity to one another. Understand the relationships between the numbers in multiplication-division fact families.	Demonstrate that decimal notation is an extension of the base-ten system. Examine the relationship between fractions and decimals. Make connections among multiplication, division, factors, and multiples. Convert among mixed numbers and improper fractions.	Relate fractions and division. Understand the connection among fractions, decimals, ratios, and percents as ways to represent parts of a whole. Examine the relationships between three-dimensional figures and the two-dimensional figures that form them. Relate fractions and division.
Understand How Concepts Build on One Another	Understand the meanings and uses of fractions including fraction of a set. Use addition, subtraction, multiplication, and division to construct and analyze graphs, frequency tables, and line plots.	Describe number relationships in context. Connect equivalent fractions and decimals. Make connections among the greatest common factor, least common multiple, and operations with fractions.	Explain the relationships among area formulas of different polygons. Connect equivalent fractions, decimals, and percents.

	Kindergarten	Grade 1	Grade 2
Connections (continued)			
Solve Real-World Problems in Contexts Outside of Mathematics	Solve real-world problems involving more and less.	Solve real-world problems involving addition, subtraction, and measurement.	Solve real-world problems involving addition, subtraction, multiplication, division, measurement, and data analysis.
Representation			
Use Representations to Model, Organize, and Record	Use concrete models to create a set with a given number of objects (up to 20).	Use concrete and pictorial models to create a set with a given number of objects (up to 100).	Use concrete and pictorial models to create a set with a given number of objects (up to 1,000).
	Use numbers and numerals to represent quantities up to 20.	Represent numbers to 100 on a number line.	Represent numbers to 1,000 on a number line.
	Use picture cards to communicate understanding of comparisons (bigger and smaller).	Use number bonds to represent numbers.	
	Understand the meaning of the = sign in number sentences.	Understand equality and inequality.	Use symbolic notation (< and >) to compare numbers.
	Model addition and subtraction stories with addition and subtraction number sentences.	Use the +, −, and = symbols to represent real-world addition and subtraction situations.	Use bar models to represent addition and subtraction situations.
	Represent addition and subtraction stories.	Represent numerical data using picture graphs, tally charts, and bar graphs.	Represent numerical data using picture graphs with scales, tally charts, and bar graphs.
		Represent sharing equally and making equal groups.	Use the ×, ÷, and = symbols to represent multiplication and division situations.

	Grade 3	Grade 4	Grade 5
Connections (continued)			
Solve Real-World Problems in Contexts Outside of Mathematics	Solve real-world problems involving addition, subtraction, multiplication, division, and measurement.	Solve real-world problems involving multiplication, division, fraction concepts, data analysis, and measurement.	Solve real-world problems involving multiplication; division; fraction, decimal, ratio, and percent concepts; data analysis; and measurement.
	Solve real-world problems related to money.		Compare experimental results and theoretical probability.
Representation			
Use Representations to Model, Organize, and Record	Use place value models to read, write, and represent numbers to 10,000.	Represent numbers to 100,000 in various contexts.	Explore negative numbers in context.
	Represent numbers in different equivalent forms.	Express numbers to 100,000 in standard, expanded, and word forms.	Express numbers to 10,000,000 in various forms.
	Use the dollar sign and decimal point in money amounts.	Model decimals to tenths and hundredths.	Find equivalent ratios.
	Solve addition and subtraction problems with greater numbers by using a bar model	Write addition and subtraction number sentences for real-world problems with fractions and decimals.	Explore the use of letters as variables in expressions and inequalities.
	Represent multiplication and division in different ways.	Use models to show relationships between improper fractions and mixed numbers.	Convert fractions and decimals to percents.
	Use a variety of representations for multiplication and division, such as arrays, area models, number lines, grouping, and sharing.	Apply understanding of models for multiplication and division.	Represent combinations with lists, tree diagrams, and multiplication.

	Kindergarten	Grade 1	Grade 2
Representation (continued)			
Use Representations to Model, Organize, and Record (continued)			Represent multiplication with skip counting, dot paper arrays, and bar models. Represent division as repeated subtraction sentences.
	Describe and extend shape patterns. Describe a rule for sorting objects.	Identify, describe, and extend two- and three-dimensional shape patterns. Identify a rule for sorting objects. Identify and extend growing and repeating patterns.	Describe, extend, and create two-dimensional shape patterns. Identify rules for number patterns.
Select and Apply Representations to Model Problems	Represent quantities with objects, number cubes, and numerals.	Use number bonds to represent number combinations. Use a variety of concrete, pictorial, and symbolic models for addition and subtraction.	Use place value models to create equivalent representations of numbers. Use a variety of concrete, pictorial, and symbolic models for addition, subtraction, multiplication, and division. Represent multiplication with skip counting and arrays.
Interpret Phenomena through Representations	Show understanding of big, middle-sized, small, and same size. Describe and compare objects by position.	Measure and compare lengths and weights using non-standard units. Use positional words to describe location.	Use metric and customary units to measure length, volume (capacity), weight, and mass.

	Grade 3	Grade 4	Grade 5
Representation (continued)			
Use Representations to Model, Organize, and Record (continued)	Determine the missing parts (quantities or symbols) in number sentences.	Write addition and subtraction number sentences for real-world problems with fractions and decimals.	Write and solve equations.
	Create and analyze multiplication and division patterns.		
	Identify a rule for number and counting patterns.	Use a rule to describe a sequence of numbers or objects.	Find rules to complete number patterns.
Select and Apply Representations to Model Problems	Use a variety of models to represent fractions and equivalent fractions.	Translate between equivalent improper fractions and mixed numbers.	Translate between fractions and percents.
	Use a variety of concrete, pictorial, and symbolic models for multi-digit addition, subtraction, multiplication, and division.	Use a variety of models for multi-digit multiplication and division of whole numbers.	Select the most useful form of the quotient.
	Use customary units (including fractions) to measure length, weight, and capacity.	Use a variety of models for addition and subtraction of fractions and decimals.	Use a net to find the surface area of a prism.
Interpret Phenomena through Representations	Use referents to estimate length, capacity, and weight.	Measure perimeter and area in customary and metric units.	Measure volume of a rectangular prism.

	Kindergarten	Grade 1	Grade 2
Representation (continued)			
Interpret Phenomena through Representations (continued)	Name flat shapes that make up real-world objects.	Identify real-world two- and three-dimensional shapes.	
	Represent measurements and data in picture graphs and bar graphs.	Represent data in picture graphs.	Represent data in bar graphs and picture graphs.
	Order a number of objects according to length, height, or weight.	Solve problems about sharing equally and making equal groups.	Solve real-world problems about social phenomena.
	Use one-to-one correspondence.	Use a variety of models for adding and subtracting.	Use bar models to represent addition, subtraction, multiplication, and division situations.
		Use technology (virtual manipulatives and computers) to model and draw.	Use technology (virtual manipulatives and computers) to model and draw.

	Grade 3	Grade 4	Grade 5
Representation (continued)			
Interpret Phenomena through Representations (continued)	Use frequency tables, bar graphs, picture graphs, and line plots to solve problems.	Collect data and organize it in a table.	Represent data in a double bar graph.
		Create a line graph from data in a table.	Represent an equation as a graphed line.
	Solve real-world problems involving social situations.	Use measures of central tendency to describe typical values of data sets (social).	
	Solve real-world problems related to money.	Solve real-world problems involving multiplication, division, fraction concepts, data analysis, and measurement.	Solve real-world problems involving social situations.
	Use technology (virtual manipulatives and computers) to model and draw. Use a calculator to model, compute, and solve problems.	Use technology (virtual manipulatives and computers) to model and draw.	Use technology (virtual manipulatives and computers) to model and draw.

Aligned with National and International Research Recommendations

Focus and Depth

National Council of Teachers of Mathematics

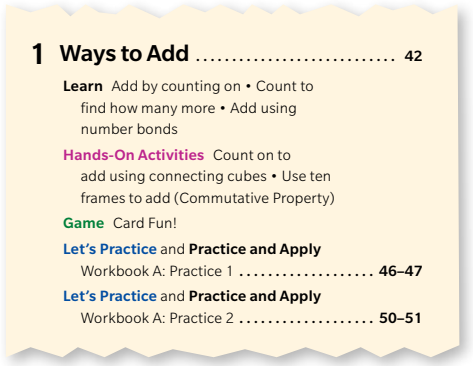
"A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades."

—Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics, 2006

Math in Focus

addresses fewer topics in greater depth at each level.

- Knowledge is built carefully and thoroughly with both *multi-page* lessons and *multi-day* lessons.
- Time is built into the program to develop understanding with *hands-on activities* with manipulatives, as well as *extensive skills practice.*



Grade 1, Chapter 3, Lesson 1

Interlocking Concepts and Skills

National Math Advisory Panel

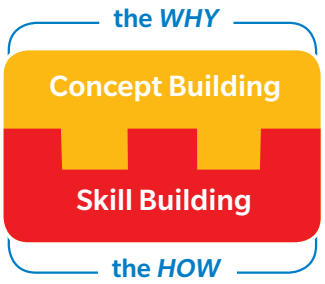
"Use should be made of what is clearly known from rigorous research about how children learn, especially by recognizing the mutually-reinforcing benefits of conceptual understanding, procedural fluency, and automatic (i.e., quick and effortless) recall of facts."

—Foundations for Success, 2008

Math in Focus

develops concepts and skills in tandem.

- Manipulatives and visual representations provide a conceptual backbone.
- *Skills are connected to concepts* through visual representations.
- Extensive problem solving *merges conceptual understanding with computational skills.*



Clear Visuals and Use of Models

National Research Council

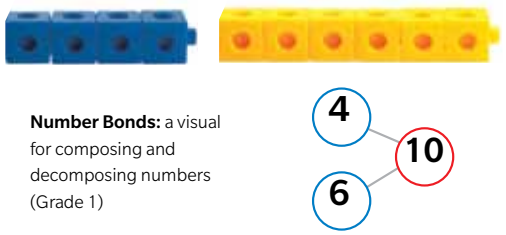
"Opportunities should involve connecting symbolic representations and operations with physical or pictorial representations, as well as translating between various symbolic representations."

—*Adding It Up: Helping Children Learn Mathematics*, 2001

Math in Focus

uses clear and engaging visuals that present concepts and model solutions.

- *Minimal text* and simple, direct visuals allow all students, regardless of language skills, to focus on the math lesson.
- The use of *model drawings* offer a visual representation of word problems, leading to symbolic solutions of rich and complex problems.
- Consistent use of the *concrete–pictorial–abstract pedagogy* repeatedly "models" the model-drawing problem solving strategy.



Number Bonds: a visual for composing and decomposing numbers (Grade 1)

Emphasis on Problem Solving

Singapore Ministry of Education

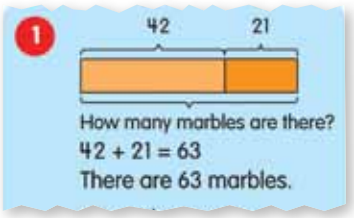
"Mathematical problem solving is central to mathematics learning. It involves the acquisition and application of mathematics concepts and skills in a wide range of situations, including non-routine, open-ended, and real-world problems."

—*Mathematics Syllabus: Primary*, 2006

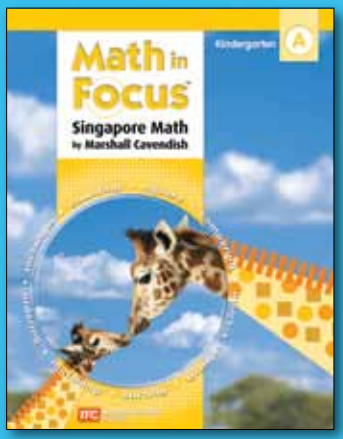
Math in Focus

uses a scaffolded approach to solving word problems, focusing on model drawing to build success and confidence.

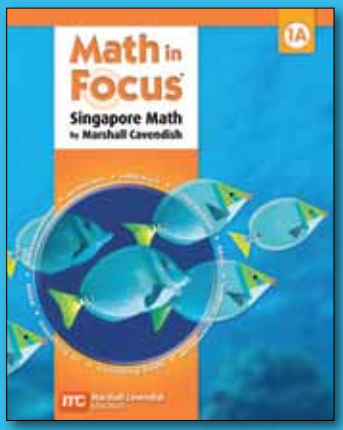
- The visual representation of word problems leads to symbolic solutions of *rich and complex problems.*
- Students draw on prior knowledge, as well as recently acquired concepts and skills, as they combine *problem solving strategies with critical thinking skills.*



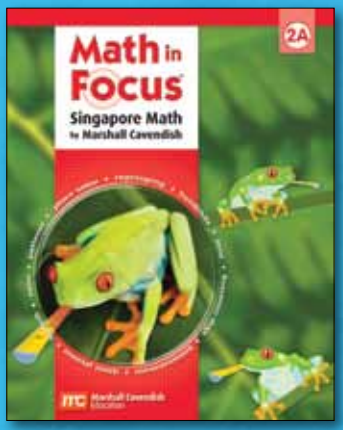
Bar Model: a visual representation of a word problem (Grade 2)



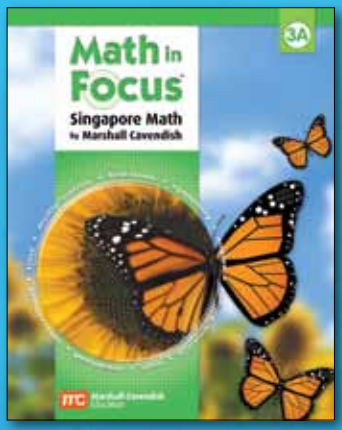
Grade K



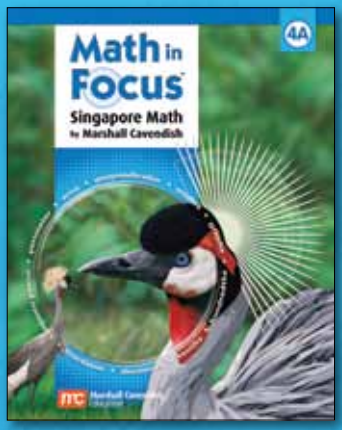
Grade 1



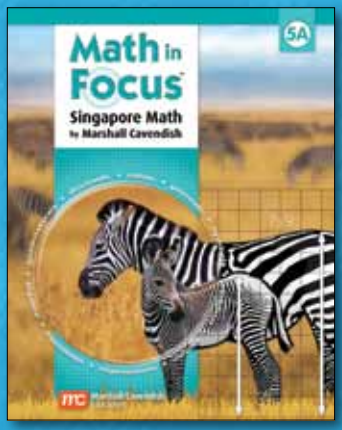
Grade 2



Grade 3



Grade 4



Grade 5

Math in Focus™

Singapore Math by Marshall Cavendish

Math in Focus: Singapore Math by Marshall Cavendish is the U.S. edition of *My Pals are Here! Maths*, the world-class program most widely used in Singapore classrooms today. Marshall Cavendish math programs have contributed to Singapore's consistent top performance in international studies since 1995.

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