



Literacy and Intervention

COMMON CORE STATE STANDARDS

Academy of MATH[®]

Proven to Raise Achievement for Struggling Students

Grades 2–12



Academy of MATH

Correlated to the Common Core State Standards for Mathematics, K–8

The following pages contain references to components in the Academy of MATH® software program that align to the Common Core State Standards for Mathematics in Grades K–8. Academy of MATH is an intensive math intervention program effective for Tier II and Tier III students performing below grade level. As such, the program addresses the development of foundational math skills with support for all strands of the Common Core Mathematics standards in Grades K–6.

For Grades 7–8, the program supports the following strands of the Common Core State Standards for Mathematics: Ratios and Proportional Relationships (Grade 7); the Number System (Grade 7), Equations and Expressions (Grades 7 and 8), and Geometry (Grades 7 and 8).

Teachers have the option to enable the Academy of MATH's SpanishTutor® for instruction and motivational guides in Spanish.

This correlation is intended to illustrate the program's approach to these content strands in the CCSS for Mathematics. For the purposes of the references contained in this document, the following abbreviations apply:

CCSS = Common Core State Standards; N/A = Not Applicable.

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Academy of MATH: Correlated to CCSS for Mathematics in Kindergarten

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	COUNTING AND CARDINALITY	ACADEMY OF MATH
Know number names and the count sequence.		
K.CC.1	Count to 100 by ones and by tens.	Levels 1-2: Number Sense; Level 1: Addition
K.CC.2	Count forward beginning from a given number within the known sequence (instead of having to begin at 1).	Level 1: Number Sense, Addition
K.CC.3	Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).	Level 1: Number Sense, Addition, Subtraction
Count to tell the number of objects.		
K.CC.4	<p>Understand the relationship between numbers and quantities; connect counting to cardinality.</p> <ul style="list-style-type: none"> a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted. c. Understand that each successive number name refers to a quantity that is one larger. 	Level 1: Number Sense, Addition
K.CC.5	Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.	Level 1: Number Sense, Addition

CCSS REFERENCE	COUNTING AND CARDINALITY	ACADEMY OF MATH
	Compare numbers.	
K.CC.6	Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. Include groups with up to ten objects.	Level 1: Number Sense
K.CC.7	Compare two numbers between 1 and 10 presented as written numerals	Level 1: Number Sense

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.	
K.OA.1	Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.	Level 1: Addition, Subtraction, Equations, Graphing
K.OA.2	Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.	Level 1: Addition, Subtraction, Equations, Graphing
K.OA.3	Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).	Level 1: Addition, Subtraction, Equations
K.OA.4	For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.	Level 1: Addition, Subtraction, Equations
K.OA.5	Fluently add and subtract within 5.	Level 1: Addition, Subtraction, Equations

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	Work with numbers 11-19 to gain foundations for place value.	
K.NBT.1	Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	Level 1: Number Sense, Addition, Subtraction, Equations

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	Describe and compare measurable attributes.	
K.MD.1	Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.	Level 1: Measurement
K.MD.2	Directly compare two objects with a measurable attribute in common, to see which object has “more of”/“less of” the attribute, and describe the difference. <i>For example, directly compare the heights of two children and describe one child as taller/shorter.</i>	Level 1: Measurement
	Classify objects and count the number of objects in each category.	
K.MD.3	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count. Limit category counts to be less than or equal to 10.	Level 1: Number Sense, Graphing

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).	
K.G.1	Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as <i>above</i> , <i>below</i> , <i>beside</i> , <i>in front of</i> , <i>behind</i> , and <i>next to</i> .	Level 1: Geometry Note: Academy of MATH doesn't address the position of objects.
K.G.2	Correctly name shapes regardless of their orientations or overall size.	Level 1: Geometry
K.G.3	Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").	Level 1: Geometry
	Analyze, compare, create, and compose shapes.	
K.G.4	Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).	Levels 1-2: Geometry
K.G.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	Levels 1-3: Geometry
K.G.6	Compose simple shapes to form larger shapes. <i>For example, "Can you join these two triangles with full sides touching to make a rectangle?"</i>	Level 1: Fractions; Level 3: Geometry

Academy of MATH: Correlated to CCSS for Mathematics in Grade 1

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
Represent and solve problems involving addition and subtraction.		
1.OA.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.	Level 1: Addition, Subtraction, Equations, Graphing
1.OA.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.	Level 2: Addition, Equations, Graphing
Understand and apply properties of operations and the relationship between addition and subtraction.		
1.OA.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.)	Levels 1-4: Addition, Subtraction
1.OA.4	Understand subtraction as an unknown-addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8. Add and subtract within 20.	Levels 1-2: Subtraction, Equations
Add and subtract within 20.		
1.OA.5	Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	Level 1: Number Sense, Addition, Subtraction, Equations, Graphing
1.OA.6	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 =$	Levels 1-2: Addition, Subtraction, Equations

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
	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 $6 + 6 + 1 = 12 + 1 = 13$).	
Work with addition and subtraction equations.		
1.OA.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? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.	Levels 1-2: Addition, Subtraction, Equations
1.OA.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 $8 + ? = 11$, $5 = _ - 3$, $6 + 6 = _$.	Level 1-2: Addition, Subtraction, Equations

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
Extend the counting sequence.		
1.NBT.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.	Level 2: Number Sense
Understand place value.		
1.NBT.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.”	Level 1: Number Sense

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	<p>b) The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.</p> <p>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).</p>	
1.NBT.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.	Level 1: Number Sense
Use place value understanding and properties of operations to add and subtract.		
1.NBT.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.	Level 2: Addition
1.NBT.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	Level 2: Addition, Subtraction
1.NBT.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.	Level 2: Subtraction

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
Measure lengths indirectly and by iterating length units.		
1.MD.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.	Level 2: Measurement
1.MD.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.	Levels 2-3: Measurement
Tell and write time.		
1.MD.3	Tell and write time in hours and half-hours using analog and digital clocks.	Level 3: Measurement
Represent and interpret data.		
1.MD.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.	Level 1: Graphing

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
Reason with shapes and their attributes.		
1.G.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.	Levels 1-3: Geometry
1.G.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular	Level 1: Fractions; Level 3: Geometry

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. Students do not need to learn formal names such as “right rectangular prism.	
1.G.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.	Level 1: Fractions

Academy of MATH: Correlated to CCSS for Mathematics in Grade 2

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
Represent and solve problems involving addition and subtraction.		
2.OA.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.	Levels 1-2: Addition, Subtraction, Equations, Graphing
Add and subtract within 20.		
2.OA.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.	Levels 1-2: Addition, Subtraction
Work with equal groups of objects to gain foundations for multiplication.		
2.OA.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.	Levels 1-2: Number Sense, Equations
2.OA.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.	Levels 1-2: Multiplication

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
Understand place value.		
2.NBT.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706	Level 2: Number Sense

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	<p>equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:</p> <p>a) 100 can be thought of as a bundle of ten tens — called a “hundred.”</p> <p>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).</p>	
2.NBT.2	Count within 1000; skip-count by 5s, 10s, and 100s.	Levels 1-2: Number Sense
2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Level 3: Number Sense
2.NBT.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.	Level 2: Number Sense
Use place value understanding and properties of operations to add and subtract.		
2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Level 2: Addition, Subtraction, Equations
2.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.	Levels 2-3: Addition; Level 3: Equations
2.NBT.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.	Level 3: Addition, Subtraction
2.NBT.8	Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.	Levels 2-3: Addition, Subtraction
2.NBT.9	Explain why addition and subtraction strategies work,	Levels 2-3: Addition, Subtraction

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	using place value and the properties of operations. Explanations may be supported by drawings or objects.	

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
Measure and estimate lengths in standard units.		
2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	Levels 2-3: Measurement
2.MD.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.	Level 3: Measurement
2.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters.	Levels 2-3: Measurement
2.MD.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	Level 4: Measurement
Relate addition and subtraction to length.		
2.MD.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.	Levels 2-3: Addition, Subtraction; Level 3: Measurement
2.MD.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.	Level 2: Measurement

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
Work with time and money.		
2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.	Level 3: Measurement
2.MD.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?	Levels 2-3: Measurement
Represent and interpret data.		
2.MD.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.	N/A
2.MD.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 problems using information presented in a bar graph.	Levels 1-3: Graphing

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
Reason with shapes and their attributes.		
2G.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. Sizes are compared directly or visually, not compared by measuring.	Levels 2-3: Geometry
2.G.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Level 2: Measurement

2.G.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.	Levels 1-2: Fractions
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Academy of MATH: Correlated to CCSS for Mathematics in Grade 3

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
Represent and solve problems involving multiplication and division.		
3.OA.1	Interpret products of whole numbers, e.g., interpret 5×7 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 5×7 .	Level 3: Multiplication
3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ 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 $56 \div 8$.	Level 3: Division
3.OA.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.	Level 3: Multiplication, Division, Equations
3.OA.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 $8 \times ? = 48$, $5 = _ \div 3$, $6 \times 6 = ?$.	Level 3: Multiplication, Division, Equations
Understand properties of multiplication and the relationship between multiplication and division.		
3.OA.5	Apply properties of operations as strategies to multiply and divide. Students need not use formal terms for these properties. Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative property of multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then	Level 3: Multiplication; Levels 4-5: Number Sense

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
	$15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative property of multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive property.)	
3.OA.6	Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.	Level 3: Division, Equations
Multiply and divide within 100.		
3.OA.7	Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	Levels 2-3: Multiplication, Division, Equations
Solve problems involving the four operations, and identify and explain patterns in arithmetic.		
3.OA.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.	Level 4: Addition, Subtraction, Multiplication, Division, Equations Note: Academy of MATH doesn't explicitly teach how to assess reasonableness of answers.
3.OA.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.	Level 3: Number Sense; Level 1: Addition, Subtraction; Levels 1-2: Multiplication

CCSS REFERENCE	NUMBERS AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	Use place value understanding and properties of operations to perform multi-digit arithmetic.	
3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	Level 4: Number Sense
3.NBT.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.	Level 4: Addition, Subtraction
3.NBT.3	Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations.	Level 3: Multiplication

CCSS REFERENCE	NUMBERS AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	Develop understanding of fractions as numbers.	
3.NF.1	Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8. 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 $1/b$.	Levels 1-3: Fractions
3.NF.2	Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8. 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	Level 3: Fractions, Measurement

CCSS REFERENCE	NUMBERS AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	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	
3.NF.3	<p>Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, 8. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.</p> <p>a) Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.</p> <p>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.</p> <p>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.</p> <p>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.</p>	Levels 4-5: Fractions

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	
3.MD.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.,	Level 3: Measurement

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	by representing the problem on a number line diagram.	
3.MD.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Excludes compound units such as cm ³ and finding the geometric volume of a container. 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.	Level 3: Measurement
Represent and interpret data.		
3.MD.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.	Level 3: Graphing
3.MD.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.	N/A
Geometric measurement: understand concepts of area and relate area to multiplication and to addition.		
3.MD.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.	Level 3-4: Measurement
3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	Level 4: Measurement
3.MD.7	Relate area to the operations of multiplication and	Levels 4-5: Measurement

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	<p>addition.</p> <p>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.</p> <p>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.</p> <p>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 $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.</p> <p>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.</p>	
Geometric measurement: recognize perimeter as an attribute of plan figures and distinguish between linear and area measures.		
3.MD.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.	<p>Levels 3-5: Measurement</p> <p>Note: Academy of MATH does not include perimeter problems with an unknown side.</p>

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
Reason with shapes and their attributes.		
3.G.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.	Levels 3-4: Geometry
3.G.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 $\frac{1}{4}$ of the area of the shape.	Levels 1-3: Fractions

Academy of MATH: Correlated to CCSS for Mathematics in Grade 4

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
Use the four operations with whole numbers to solve problems.		
4.OA.1	Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ 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.	Levels 3-4: Multiplication
4.OA.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.	N/A
4.OA.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.	Level 5: Addition, Subtraction, Multiplication, Division, Equations
Gain familiarity with factors and multiples.		
4.OA.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.	Levels 5-6: Multiplication
Generate and analyze patterns.		
4.OA.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	Level 3: Number Sense; Levels 3-4: Addition, Subtraction; Level 2: Geometry

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
	“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.	

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	Generalize place value understanding for multi-digit whole numbers.	
4.NBT.1	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. 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 $700 \div 70 = 10$ by applying concepts of place value and division.	Level 6: Number Sense; Level 7: Multiplication, Division
4.NBT.2	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. 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.	Level 6: Number Sense
4.NBT.3	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. Use place value understanding to round multi-digit whole numbers to any place.	Level 6: Number Sense
	Use place value understanding and properties of operations to perform multi-digit arithmetic.	
4.NBT.4	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. Fluently add	Level 6: Addition, Subtraction

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	and subtract multi-digit whole numbers using the standard algorithm.	
4.NBT.5	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. 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.	Level 4: Multiplication
4.NBT.6	Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. 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.	Levels 4-5: Division

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	Extend understanding of fraction equivalence and ordering.	
4.NF.1	Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100. Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{n \times a}{n \times b}$ 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.	Level 4: Fractions
4.NF.2	Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100.	Level 5: Fractions

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	<p>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 $\frac{1}{2}$. 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.</p>	
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.		
4.NF.3	<p>Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100. Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.</p> <p>a) Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.</p> <p>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: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$; $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$; $2\frac{1}{8} = 1 + 1 + \frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$.</p> <p>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.</p> <p>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.</p>	<p>Level 5: Fractions</p>
4.NF.4	<p>Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100.</p>	<p>Levels 5-6: Fractions</p>

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	<p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>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 $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</p> <p>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 $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</p> <p>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?</p>	
Understand decimal notation for fractions, and compare decimal fractions.		
4.NF.5	<p>Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100. 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. Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade. For example, express $3/10$ as $30/100$, and add $3/10 + 4/100 = 34/100$.</p>	N/A
4.NF.6	<p>Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100. Use decimal notation for fractions with denominators 10</p>	Level 5: Fractions, Measurement

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	or 100. For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.	
4.NF.7	Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100. 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.	Level 5: Fractions

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	
4.MD.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), ...	Level 4: Measurement
4.MD.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	Level 4: Measurement

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	using diagrams such as number line diagrams that feature a measurement scale.	
4.MD.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.	Level 5: Measurement Note: Academy of MATH does not include area problems with an unknown side.
Represent and interpret data.		
4.MD.4	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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.	N/A
Geometric measurement: understand concepts of angle and measure angles.		
4.MD.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 $\frac{1}{360}$ 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.	Levels 3-4: Geometry
4.MD.6	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	Level 6: Geometry
4.MD.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	Levels 6-7: Geometry

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	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.	

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	Draw and identify lines and angles, and classify shapes by properties and their lines and angles.	
4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	Level 4: Geometry
4.G.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.	Level 5: Geometry
4.G.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.	Level 3: Geometry

Academy of MATH: Correlated to CCSS for Mathematics in Grade 5

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	OPERATIONS AND ALGEBRAIC THINKING	ACADEMY OF MATH
Write and interpret numerical expressions.		
5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	Levels 4-5: Equations
5.OA.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 $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.	Levels 5-6: Equations
Analyze patterns and relationships.		
5.OA.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.	N/A

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
Understand the place value system.		
5.NBT.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.	Level 6: Number Sense; Level 7: Multiplication, Division
5.NBT.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.	Level 7: Multiplication, Division, Fractions; Level 8: Number Sense
5.NBT.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., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$. b) Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.	Level 6: Fractions; Level 8: Number Sense
5.NBT.4	Use place value understanding to round decimals to any place.	Level 6: Fractions; Level 8: Number Sense
Perform operations with multi-digit whole numbers and with decimals to hundredths.		
5.NBT.5	Fluently multiply multi-digit whole numbers using the standard algorithm.	Levels 5-6: Multiplication
5.NBT.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.	Level 5: Division
5.NBT.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;	Level 6: Fractions

CCSS REFERENCE	NUMBER AND OPERATIONS IN BASE TEN	ACADEMY OF MATH
	relate the strategy to a written method and explain the reasoning used.	

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
Use equivalent fractions as a strategy to add and subtract fractions.		
5.NF.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, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{ad + bc}{bd}$.)	Levels 5-6: Fractions
5.NF.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 $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, by observing that $\frac{3}{7} < \frac{1}{2}$.	Levels 5-6: Fractions
Apply and extend previous understanding of multiplication and division to multiply and divide fractions.		
5.NF.3	Interpret a fraction as division of the numerator by the denominator ($\frac{a}{b} = a \div b$). 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 $\frac{3}{4}$ as the result of dividing 3 by 4, noting that $\frac{3}{4}$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $\frac{3}{4}$. If 9 people want to share a 50-	Levels 6-7: Fractions

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	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?	
5.NF.4	<p>Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.</p> <p>a) Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)</p> <p>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.</p>	Level 6: Fractions; Levels 6-7: Measurement
5.NF.5	<p>Interpret multiplication as scaling (resizing), by:</p> <p>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.</p> <p>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 $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.</p>	Level 6: Fractions
5.NF.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual	Levels 6-8: Fractions

CCSS REFERENCE	NUMBER AND OPERATIONS – FRACTIONS	ACADEMY OF MATH
	fraction models or equations to represent the problem.	
5.NF.7	<p>Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Students 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.</p> <p>a) Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$.</p> <p>b) Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$.</p> <p>c) 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?</p>	Level 6: Fractions

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
Convert like measurement units within a given measurement system.		
5.MD.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.	Level 5: Measurement
Represent and interpret data.		
5.MD.2	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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.	N/A
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.		
5.MD.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.	Level 5: Measurement
5.MD.4	Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	Level 5: Measurement
5.MD.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	Levels 5-8: Measurement

CCSS REFERENCE	MEASUREMENT AND DATA	ACADEMY OF MATH
	<p>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.</p> <p>b) Apply the formulas $V = l \times w \times h$ and $V = b \times h$ 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.</p> <p>c) 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.</p>	

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	Graph points on the coordinate plane to solve real-world and mathematical problems.	
5.G.1	<p>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).</p>	Levels 3, 5: Graphing
5.G.2	<p>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.</p>	Levels 3, 5: Graphing

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	Classify two-dimensional figures into categories based on their properties.	
5.G.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.	Levels 5-6: Geometry
5.G.4	Classify two-dimensional figures in a hierarchy based on properties.	Levels 5-7: Geometry

Academy of MATH: Correlated to CCSS for Mathematics in Grade 6

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	RATIOS AND PROPORTIONAL RELATIONSHIPS	ACADEMY OF MATH
Understand ratio concepts and use ratio reasoning to solve problems.		
6.RPR.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.”	Level 8: Number Sense
6.RPR.2	Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, 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.” Expectations for unit rates in this grade are limited to non-complex fractions.	N/A
6.RPR.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.,	Level 8: Number Sense Levels 6-8: Fractions Levels 6-8: Measurement

CCSS REFERENCE	RATIOS AND PROPORTIONAL RELATIONSHIPS	ACADEMY OF MATH
	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.	

CCSS REFERENCE	THE NUMBER SYSTEM	ACADEMY OF MATH
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.		
6.NS.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 $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) 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?	Levels 6-8: Fractions
Compute fluently with multi-digit numbers and find common factors and multiples.		
6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.	Levels 6-7: Division
6.NS.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	Levels 6-8: Fractions
6.NS.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple	Levels 6-7: Multiplication

CCSS REFERENCE	THE NUMBER SYSTEM	ACADEMY OF MATH
	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 $4(9 + 2)$.	
Apply and extend previous understandings of numbers to the system of rational numbers.		
6.NS.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.	Level 7: Number Sense
6.NS.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.	Level 7: Number Sense Level 8: Graphing
6.NS.7	Understand ordering and absolute value of rational numbers.	Level 7: Number Sense

CCSS REFERENCE	THE NUMBER SYSTEM	ACADEMY OF MATH
	<p>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.</p> <p>b) Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3\text{ }^{\circ}\text{C} > -7\text{ }^{\circ}\text{C}$ to express the fact that $-3\text{ }^{\circ}\text{C}$ is warmer than $-7\text{ }^{\circ}\text{C}$.</p> <p>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.</p> <p>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.</p>	
6.NS.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.	Level 8: Graphing

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
	Apply and extend previous understandings of arithmetic to algebraic expressions.	
6.EE.1	Write and evaluate numerical expressions involving whole-number exponents.	Levels 7-8: Number Sense; Level 8: Equations

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
6.EE.2	<p>Write, read, and evaluate expressions in which letters stand for numbers.</p> <p>a) Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation “Subtract y from 5” as $5 - y$.</p> <p>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.</p> <p>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 $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$.</p>	Levels 7-8: Equations; Level 8: Measurement
6.EE.3	<p>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 $3y$.</p>	Levels 7-8: Equations; Level 6: Multiplication
6.EE.4	<p>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.</p>	Levels 7-8: Equations

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
Reason about and solve one-variable equations and inequalities.		
6.EE.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.	Levels 7-8: Equations
6.EE.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.	Levels 6-8: Equations
6.EE.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.	Level 6: Equations
6.EE.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.	N/A
Represent and analyze quantitative relationships between dependent and independent variables.		
6.EE.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.	N/A

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
Solve real-world and mathematical problems involving area, surface area, and volume.		
6.G.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.	Level 7: Measurement
6.G.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.	Levels 6-7: Measurement
6.G.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.	N/A
6.G.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.	Level 8: Measurement

CCSS REFERENCE	STATISTICS AND PROBABILITY	ACADEMY OF MATH
Develop understanding of statistical variability.		
6.SP.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.	Level 6: Graphing
6.SP.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.	Level 8: Graphing
6.SP.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.	Level 8: Graphing
Summarize and describe distributions.		
6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Level 7: Graphing
6.SP.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.	Level 8: Graphing

Academy of MATH: Correlated to CCSS for Mathematics in Grade 7

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	RATIOS AND PROPORTIONAL RELATIONSHIPS	ACADEMY OF MATH
Analyze proportional relationships and use them to solve real-world and mathematical problems.		
7.RPR.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.	N/A
7.RPR.2	Recognize and represent proportional relationships between quantities. a) Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. b) Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. c) Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as $t = pn$. d) Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.	Level 8: Number Sense, Geometry
7.RPR.3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	Level 8: Number Sense, Fractions

CCSS REFERENCE	THE NUMBER SYSTEM	ACADEMY OF MATH
	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	
7.NS.1	<p>Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>a) Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</p> <p>b) Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</p> <p>c) Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.</p> <p>d) Apply properties of operations as strategies to add and subtract rational numbers.</p>	<p>Levels 7-8: Number Sense, Addition Level 8: Subtraction</p>
7.NS.2	<p>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>a) Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</p>	<p>Level 8: Multiplication, Division Levels 7-8: Fractions</p>

CCSS REFERENCE	THE NUMBER SYSTEM	ACADEMY OF MATH
	<p>b) Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.</p> <p>c) Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>d) Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.</p>	
7.NS.3	Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions.	Level 8: Addition, Subtraction, Multiplication, Division, Fractions, Equations

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
	Use properties of operations to generate equivalent expressions.	
7.EE.1	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Levels 7-8: Equations
7.EE.2	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that “increase by 5%” is the same as “multiply by 1.05.”	Level 8: Fractions, Equations
	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	
7.EE.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using	Level 8: Addition, Subtraction, Multiplication, Division, Fractions, Equations

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
	<p>tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.</p>	
7.EE.4	<p>Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</p> <p>a) Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?</p> <p>b) Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want your pay to be at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.</p>	Level 8: Equations, Measurement

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
Draw, construct, and describe geometrical figures and describe the relationships between them.		
7.G.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	Level 5: Measurement Note: Academy of MATH doesn't enable students to draw onscreen.
7.G.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	N/A
7.G.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	N/A
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.		
7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	Level 8: Measurement
7.G.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	Levels 7-8: Geometry
7.G.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	Levels 7-8: Measurement

Academy of MATH: Correlated to CCSS for Mathematics in Grade 8

CCSS = Common Core State Standards; N/A = Not Applicable.

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
Work with radicals and integer exponents.		
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $32 \times 3^{-5} = 3^{-3} = 1/33 = 1/27$.	N/A
8.EE.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.	Levels 7-8: Number Sense
8.EE.3	Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. <i>For example, estimate the population of the United States as 3 times 108 and the population of the world as 7 times 109, and determine that the world population is more than 20 times larger.</i>	N/A
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	N/A
Understand the connections between proportional relationships, lines, and linear equations.		
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a	N/A

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
	distance-time equation to determine which of two moving objects has greater speed.	
8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .	N/A
Analyze and solve linear equations and pairs of simultaneous linear equations.		
8.EE.7	Solve linear equations in one variable. a) Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	Level 8: Equations
8.EE.8	Analyze and solve pairs of simultaneous linear equations. a) Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b) Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6. c) Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects	N/A

CCSS REFERENCE	EXPRESSIONS AND EQUATIONS	ACADEMY OF MATH
	the line through the second pair.	

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	Understand congruence and similarity using physical models, transparencies, or geometry software.	
8.G.1	Verify experimentally the properties of rotations, reflections, and translations: a) Lines are taken to lines, and line segments to line segments of the same length. b) Angles are taken to angles of the same measure. c) Parallel lines are taken to parallel lines.	Level 8: Geometry
8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	Level 8: Geometry
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	Level 8: Geometry
8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	Level 8: Geometry
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles	Level 8: Geometry

CCSS REFERENCE	GEOMETRY	ACADEMY OF MATH
	created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.	
Understand and apply the Pythagorean Theorem.		
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.	N/A
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	N/A
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	N/A
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.		
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	N/A