

RICAS Supplemental Assessment Tables and Achievement Level Descriptors

Grade 3 Mathematics

This document is designed to provide educators with assessment information for specific standards on RICAS and to describe the RICAS achievement levels for mathematics.

The first set of tables are the Supplemental Assessment Tables. These tables include additional examples or interpretations of how a standard may be assessed, explicit references to the footnotes in the CCSS, and definitions of relevant terms not included in the CCSS glossary. Examples within individual standards are highlighted in blue.

The four RICAS achievement levels are detailed later in the document. The accompanying tables provide summaries of the knowledge and skills demonstrated on RICAS for the domains of the grade as well as conceptual understanding and procedural knowledge, problem solving, mathematical reasoning, and mathematical communication.

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
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. <i>For example, describe a context in which a total number of objects can be expressed as 5×7.</i>	The distinction between expressions and equations should be made clear very early on. An expression is a mathematical phrase that combines operations, numbers, and/or variables. 5×7 is an example of an expression. An equation is a statement in which the values of two mathematical expressions are equal. $5 \times 7 = 35$ and $6 \times 2 = 3 \times 4$ are examples of equations.
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. <i>For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.</i>	
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.	Refer to CCSS Glossary, Table 2 for problem types.
3.OA.4	Determine the unknown whole number in a multiplication or division equation relating three whole numbers. <i>For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \div 3$, $6 \times 6 = ?$.</i>	

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
3.OA.5	Apply properties of operations as strategies to multiply and divide. <i>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 $15 \times 2 = 30$, 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).</i>	<ul style="list-style-type: none"> • When multiplying two numbers order does not matter. • Students need not use formal terms for these properties. • When multiplying two numbers either number can be decomposed and multiplied. • Students are not expected to use distributive notation. • When a number is multiplied by 1 the result is the same number. (Identity Property of 1 for Multiplication.)
3.OA.6	Understand division as an unknown-factor problem. <i>For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.</i>	
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.	By the end of grade 3, know from memory all products of single-digit numbers and the related division facts.
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.	Students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
3.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. <i>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.</i>	

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
3.NBT.1	Use place value understanding to round whole numbers to the nearest 10 or 100.	
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.	A range of algorithms may be used. An algorithm is a set of steps for completing a procedure. Students should develop conceptual understanding of addition and subtraction prior to their mastery of standard algorithms.
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.	
3.NF.1	Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.	<ul style="list-style-type: none"> • Grade 3 expectations in this domain are limited to fractions with denominators of 2,3,4,6, and 8. • A whole is considered to be a single unit.
3.NF.2.a	Understand a fraction as a number on the number line; represent fractions on a number line diagram. 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.	Fractions in the form $1/b$ are unit fractions .
3.NF.2b	Understand a fraction as a number on the number line; represent fractions on a number line diagram. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.	
3.NF.3a	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.	

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
3.NF.3b	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 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.	
3.NF.3c	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. <i>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.</i>	
3.NF.3d	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. 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.	Visual fraction models include tape diagrams, number line diagrams, and area models.
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., by representing the problem on a number line diagram.	

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
3.MD.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	<ul style="list-style-type: none"> • Excludes compound units such as cm^3 and finding the geometric volume of a container. • Excludes multiplicative comparison problems (problems involving notions of “times as much”; see Glossary, Table 2).
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. <i>For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</i>	
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.	The term dot plot is interchangeable with line plot.
3.MD.5a	Recognize area as an attribute of plane figures and understand concepts of area measurement. 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.	An attribute is defined as a common feature of a set of figures.
3.MD.5b	Recognize area as an attribute of plane figures and understand concepts of area measurement. 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.	
3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	The terms improvised and non-standard are considered synonymous for this standard.

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
3.MD.7a	Relate area to the operations of multiplication and addition. 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.	
3.MD.7b	Relate area to the operations of multiplication and addition. 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.	
3.MD.7c	Relate area to the operations of multiplication and addition. 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.	
3.MD.7d	Relate area to the operations of multiplication and addition. 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.	
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.	

RICAS Grade 3 Supplemental Assessment Table

CCSS Standard Key	Standard Text	Supplemental Assessment Information
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.	<ul style="list-style-type: none"> • This standard includes comparing and classifying shapes by their angles (right angle/non-right angle). • Trapezoids are included as examples of quadrilaterals. • For assessment purposes, a trapezoid is defined as a quadrilateral with at least one pair of parallel sides. For more information see http://commoncoretools.me/wp-content/uploads/2014/12/ccss_progression_gk6_2014_12_27.pdf
3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. <i>For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.</i>	

Grade 3 RICAS Achievement Level Descriptors

Student results on the RICAS assessments are reported according to four achievement levels:

- **Exceeding Expectations**
A student who performed at this level exceeded grade-level expectations by demonstrating mastery of the subject matter.
- **Meeting Expectations**
A student who performed at this level met grade-level expectations and is academically on-track to succeed in the current grade in this subject.
- **Partially Meeting Expectations**
A student who performed at this level partially met grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should consider whether the student needs additional academic assistance to succeed in this subject.
- **Not Meeting Expectations**
A student who performed at this level did not meet grade-level expectations in this subject. The school, in consultation with the student's parent/guardian, should determine the coordinated academic assistance and/or additional instruction the student needs to succeed in this subject.

The descriptors included in the table below illustrate the knowledge and skills students demonstrate on RICAS at each level. Knowledge and skills are cumulative at each level. No descriptors are provided for the *Not Meeting Expectations* achievement level because students' work at this level, by definition, does not meet the criteria of the *Partially Meeting Expectations* level.

Grade 3 RICAS Achievement Level Descriptors

Grade 3	Partially Meets Expectations <i>On RICAS, a student at this level:</i>	Meeting Expectations <i>On RICAS, a student at this level:</i>	Exceeding Expectations <i>On RICAS, a student at this level:</i>
Conceptual Understanding and Procedural Knowledge	<ul style="list-style-type: none"> • Demonstrates partial understanding of the grade appropriate numeration system • Performs some calculations and estimations • Identifies examples of basic math facts or mathematical concepts • Mostly reads and sometimes constructs graphs, tables and charts 	<ul style="list-style-type: none"> • Applies understanding of the base-ten system and fractions to interpret numbers and solve problems • Performs most calculations and estimations • Describes mathematical concepts and generates examples and counterexamples of concepts • Represents data and mathematical relationships using equations, verbal descriptions, tables, and graphs 	<ul style="list-style-type: none"> • Performs complex calculations and estimations • Selects the best representations for a given set of data • Explains relationships between models such as equations, verbal descriptions, tables, and graphs • Applies math facts and connects mathematical concepts from various areas of mathematics, and uses the concepts to develop generalizations • Recognizes and makes use of structure, discerning patterns by seeing complicated things as single objects
Problem Solving	<ul style="list-style-type: none"> • Applies learned procedures to solve routine problems • Uses concrete objects or pictures to help conceptualize and solve problems. 	<ul style="list-style-type: none"> • Applies learned procedures and mathematical concepts to solve a variety of problems, including multi-step problems • Solves problems using multiple methods • Demonstrates the relationships between operations used to solve problems and the context of the problems 	<ul style="list-style-type: none"> • Generates strategies and procedures to solve non-routine problems • Solves problems using multiple methods, evaluating reasonableness of intermediate steps leading to the standard algorithms • Draws connections between strategies • Analyzes givens, constraints, and relationships in problems, using multiple methods and appropriate tools

Grade 3 RICAS Achievement Level Descriptors

Grade 3	Partially Meets Expectations <i>On RICAS, a student at this level:</i>	Meeting Expectations <i>On RICAS, a student at this level:</i>	Exceeding Expectations <i>On RICAS, a student at this level:</i>
Mathematical Reasoning	<ul style="list-style-type: none"> Applies some reasoning methods to solve routine problems 	<ul style="list-style-type: none"> Uses a variety of reasoning methods to solve routine and non-routine problems Uses symbols to solve routine mathematical problems 	<ul style="list-style-type: none"> Reasons abstractly and quantitatively, using multiple reasoning methods to solve complex problems and provides justification for the reasoning Decontextualizes situations and represents them symbolically
Mathematical Communication	<ul style="list-style-type: none"> Identifies and uses basic terms 	<ul style="list-style-type: none"> Uses logical forms of representation (e.g., text, graphs, symbols) to illustrate steps to a solution 	<ul style="list-style-type: none"> Uses logical forms of representation (e.g., text, graphs, symbols) to justify solutions and solution strategies Constructs viable arguments and critiques the reasoning of others, attending to precision
Operations and Algebraic Thinking	<ul style="list-style-type: none"> Determines products and quotients of whole numbers Solves one-step word problems by multiplying and dividing within 100 with limited accuracy Determines the unknown whole number in a multiplication or division equation Recognizes simple arithmetic patterns 	<ul style="list-style-type: none"> Interprets products and quotients of whole numbers Uses equal groups and arrays to accurately solve word problems involving multiplication and division within 100 Solves two-step word problems with unknowns in equations involving all four operations Applies the properties of multiplication Recognizes products of two single-digit numbers Consistently uses estimation strategies to assess the reasonableness of answers Recognizes arithmetic patterns 	<ul style="list-style-type: none"> Uses area models to solve word problems involving multiplication and division within 100 Creates and solves equations with unknown factors to solve word problems Recognizes products of two single-digit numbers and the related division facts Explains arithmetic patterns using the properties of operations

Grade 3 RICAS Achievement Level Descriptors

Grade 3	Partially Meets Expectations <i>On RICAS, a student at this level:</i>	Meeting Expectations <i>On RICAS, a student at this level:</i>	Exceeding Expectations <i>On RICAS, a student at this level:</i>
Number and Operations in Base Ten	<ul style="list-style-type: none"> • Uses place value to round two-digit numbers to the nearest 10 • Solves problems by adding and subtracting within 1000 using various strategies with limited accuracy 	<ul style="list-style-type: none"> • Uses place value to round three digit numbers to the nearest 10 • Fluently adds and subtracts within 1000 using various strategies • Solves problems involving multiplication of a one-digit whole number by multiples of 10 in the range 10-90 	<ul style="list-style-type: none"> • Uses place value to round three digit numbers to the nearest 100 • Recognizes the relationship between addition and subtraction • Uses algorithms to add and subtract within 1000 and multiply one-digit whole numbers by multiples of 10 in the range 10-90, and explain why they work
Number and Operations - Fractions	<ul style="list-style-type: none"> • Visually identifies fractional parts of a whole • Recognizes equivalent fractions • Compares two fractions with like numerators or like denominators 	<ul style="list-style-type: none"> • Identifies fractional parts of a whole • Identifies and represents fractions on number lines or other visual fraction models that are already created • Generates equivalent fractions • Represents whole numbers as fractions • Compares fractions with like numerators or denominators by reasoning about their size using visual fraction models that are already created, and symbols $<$, $>$ and $=$ 	<ul style="list-style-type: none"> • Explains fraction equivalence • Recognizes and explains fractional equivalence of whole numbers • Creates visual fraction models to justify the size comparison made about two fractions that refer to the same whole.
Measurement and Data	<ul style="list-style-type: none"> • Tells, writes and measures time to the nearest minute • Identifies appropriate tools and units of measurement to solve problems • Uses scaled picture graphs and bar graphs to solve problems • Uses line plots to solve problems 	<ul style="list-style-type: none"> • Solves word problems involving addition and subtraction of time intervals in minutes • Selects and uses appropriate tools and units of measure to solve problems • Draws simple scaled picture graphs and bar graphs and uses them to solve one-step problems 	<ul style="list-style-type: none"> • Uses estimation to solve word problems involving measurement • Draws scaled picture graphs and scaled bar graphs and uses them to solve two-step problems • Interprets scaled picture and bar graphs, and line plots • Differentiates perimeter from area

Grade 3 RICAS Achievement Level Descriptors

Grade 3	Partially Meets Expectations <i>On RICAS, a student at this level:</i>	Meeting Expectations <i>On RICAS, a student at this level:</i>	Exceeding Expectations <i>On RICAS, a student at this level:</i>
Measurement and Data	<ul style="list-style-type: none"> • Finds area by using non-standard units • Solves mathematical problems involving perimeters of polygons, including finding the perimeter given the side length 	<ul style="list-style-type: none"> • Generates measurement data using rulers marked with halves and fourths of an inch • Creates line plots with whole numbers, halves and fourths to record and show data to solve problems • Finds area by using standard units • Relates multiplication and addition to area • Determines area by decomposing shapes into non-overlapping rectangles and adding the areas of the non-overlapping parts • Solves mathematical problems involving perimeters of polygons, including finding an unknown side length and identifies rectangles with the same perimeter and different area 	<ul style="list-style-type: none"> • Solves mathematical and real-world problems involving perimeters of polygons, including finding an unknown side length and is able to reproduce rectangles with the same perimeter and different area
Geometry	<ul style="list-style-type: none"> • Identifies two-dimensional shapes based on their sides and angles • Partitions shapes into parts 	<ul style="list-style-type: none"> • Describes two-dimensional shapes based their sides and angles • Partitions shapes into parts with equal areas and expresses the area as a unit fraction of the whole 	<ul style="list-style-type: none"> • Compares and classifies two-dimensional shapes based on their sides and angles