

Domain: Multiplication and Division
Emphasis: Problem solving with multiplication and division

Third Grade

Key: ■ Major Clusters; ■ Supporting Clusters; ○ Additional Clusters

Major Cluster (green): Represent and solve problems involving multiplication and division.

Major Cluster (green): Understand properties of multiplication and the relationship between multiplication and division.

Major Cluster (green): Multiply and divide within 100

Major Cluster (green): Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Major Cluster (green): Geometric measurement: understand the concepts of area and relate area to multiplication and division.

Additional Cluster (yellow): Use place value understanding and properties of operations to perform multi-digit arithmetic.

Common Core State Standards for Mathematical Content

Operations and Algebraic Thinking – 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 .
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 $56 \div 8$.
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.

PASS 2.2.b.iii - Include estimating to solve 2 x 2 digit multiplication

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 $8 \times ? = 48$, $5 = _ \div 3$, $6 \times 6 = ?$

PASS 1.2 - Include addition and subtraction

Academic Vocabulary:

3.OA.1 – product, factors, multiplication, digit, interpret, total

3.OA.2 – division, quotient, symbol, whole numbers

3.OA.3 - share, arrays, equation, symbol

3.OA.5 - pattern, solve, reasonable, properties of operations, commutative property of multiplication, associative property of multiplication, distributive property of multiplication

3.NBT – fraction, whole, whole number, denominator, numerator

3.MD.2 - estimate, gram, kilogram, liter, liquid volume, masses, standard units

3.MD.7 – decompose, compose

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<p>5. 3.OA 5 Apply properties of operations as strategies to multiply and divide.2 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.)</p> <p><i>PASS 1.3- Include addition & subtraction. Include Identity Properties.</i></p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p><i>PASS 1.1 - Describe (orally or in written form), create, extend, and predict patterns in a variety of situations (e.g., 3,6,9,12..., use a function machine to generate input and output values for a table, show multiplication patterns on a hundreds chart, determine a rule and generate additional pairs with the same relationship).</i></p> <p>Number and Operations in Base Ten – 3.NBT</p> <p>1. Use place value understanding to round whole numbers to the nearest 10 or 100.</p> <p>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.</p> <p><i>PASS 2.2.a - Include estimating to find the sum or difference.</i></p> <p>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.</p> <p>Measurement and Data – 3.MD</p> <p>2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 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.</p> <p><i>PASS 4.1.a - Include pounds and ounces</i></p>	<p>Mathematical Practices</p> <ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 6. Use appropriate tools strategically. 7. Look for and express regularity in repeated reasoning.

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<p>7. Relate area to the operations of multiplication and addition.</p>	
<p>CLARIFICATIONS (partial list from the PARCC evidence tables): 3.OA.4 – Tasks do not have context (e.g. not word problems) 3.OA.7 - Tasks do not have context (e.g. not word problems) 3.MD.1 - Solve elapsed time, including solving using a number line. Limited to 60 minute intervals. Only 20% will cross the hour mark. 3.MD.7 - Distinguish between linear and area measures.</p>	
<p>COMMENTS: 2.NBT.1 – Although specific PASS objectives are not listed, the OCCT tests still require students to be able to read and model place value up to the thousands.</p>	

Teacher Notes:

Special Education Accommodations Notes:

Assessment Notes:

<p style="text-align: center;">Domain: Number and Operations – Fractions</p> <p style="text-align: center;">Emphasis: Develop an understanding of fractions as numbers</p>	<p style="text-align: center;">Third Grade</p>
<p>Major Cluster (green): Develop an understanding of fractions as numbers</p> <p>Supporting Cluster (blue): Reason with shapes and their attributes</p>	
<p>Number and Operations – Fractions – 3.NF</p> <ol style="list-style-type: none"> 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 $1/b$. 2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. <ol style="list-style-type: none"> 1. 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. 2. 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. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. <ol style="list-style-type: none"> a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$. Explain why the fractions are equivalent, e.g., by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = 3/1$; recognize that $6/1 = 6$; locate $4/4$ and 1 at the same point of a number line diagram. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model. <p><i>PASS 2.1.b.ii - Include percentages 25%, 50%, 75% and 100%</i></p> <p><i>PASS 2.1.b.ii - Fractions in Grade 3 are limited to fractions with denominators 2, 3, 4, 6, 8. To comply with PASS 2.1.b.ii, include denominators of 10 and 12.</i></p> <p>Geometry – 3.G</p> <ol style="list-style-type: none"> 2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as $1/4$ of the area of the shape. 	<p>Academic Vocabulary:</p> <p>3.NF.1 – fraction, whole, whole number, denominator, numerator</p> <p>3.NF.2 – end point, interval, number line, represent</p> <p>3.NF.3 – compare, equivalence, equivalent fractions, greater than ($>$), less than ($<$)</p> <p>3.G. – category, quadrilateral, rectangle, rhombus, shape, square, subcategory</p> <p>Mathematical Practices</p> <ol style="list-style-type: none"> 2. Reason abstractly and quantitatively. 4. Model with mathematics. 8. Look for and express regularity in repeated reasoning.
<p>CLARIFICATIONS (partial list from the PARCC evidence tables):</p> <p>3.NF.1 - Fractions may be greater than 1. Fractions equal whole numbers in 20% of tasks.</p> <p>3.NF.2 - Tasks limited to fractions with denominators of 2, 3, 4, 6 and 8.</p> <p>3.NF.3.a, 3.NF.3.b, 3.NF.3.c, 3.NF.3.d – Justifying is not required (e.g. no explanation necessary)</p> <p>3.NF.3.d - Prompts do not provide visual models.</p>	

Domain: Number and Operations – Fractions
Emphasis: Develop an understanding of fractions as numbers

Third Grade

COMMENTS:

Teacher Notes:

Special Education Accommodations Notes:

<p style="text-align: center;">Domain: Measurement and Data</p> <p style="text-align: center;">Emphasis: Solve problems using measurement and data</p>	<p style="text-align: center;">Third Grade</p>
<p>Major Cluster (green): Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects</p> <p>Major Cluster (green): Geometric measurement: understand concepts of area and relate area to multiplication and addition.</p> <p>Supporting Cluster (blue): Represent and interpret data.</p> <p>Supporting Cluster (blue): Reason with shapes and their attributes.</p> <p>Additional Cluster (yellow): Geometric Measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.</p>	
<p>Common Core State Standards for Mathematical Content</p> <p>Measurement and Data – 3.MD</p> <ol style="list-style-type: none"> 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. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). 1 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. <p><i>PASS 4.1.a - Include pounds and ounces</i></p> <p><i>PASS 4.2.c - Include reading a thermometer and solving for temperature change.</i></p> <p><i>PASS 4.3 - Determine the correct amount of change when a purchase is made with a five dollar bill.</i></p> <ol style="list-style-type: none"> 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. <p><i>PASS 5.1.a - Pose questions, collect, record, and interpret data to help answer questions.</i></p> <p><i>PASS 5.2.b - Read graphs and charts, identify the main idea, draw conclusions, and make predictions based on the data.</i></p> <p><i>PASS 5.2.c. - Construct bar graphs, frequency tables, line graphs, line plots, and pictographs with labels and a title from a set of data.</i></p> <ol style="list-style-type: none"> 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. Recognize area as an attribute of plane figures and understand concepts of area measurement. <ol style="list-style-type: none"> 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. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an 	<p>Academic Vocabulary:</p> <p>3.MD.1 - measure, minute, hour, time, time interval</p> <p>3.MD.2 - estimate, gram, kilogram, liter, liquid volume, masses, standard units</p> <p>3.MD.3 - category, data set, scaled bar graph, scaled picture graph (pictograph)</p> <p>3.MD.4 - length, inch, line plot, quarters, units, fourths, halves, half, horizontal scale ruler, thirds</p> <p>3.MD.5 - plane figures, area, attribute, square unit, unit square</p> <p>3.MD.6 - square centimeter, square meter, square inch, square foot, improvised</p> <p>3.MD.7 - decompose, compose</p> <p>3.MD.8 - area measure, linear measure, perimeter, polygon</p> <p>3.G. – category, quadrilateral, rectangle, rhombus, shape, square, subcategory</p> <p>Common Core State Standards for Mathematical Practice</p> <ol style="list-style-type: none"> Construct viable arguments and critique the reasoning of others. Use appropriate tools strategically.

<p style="text-align: center;">Domain: Measurement and Data</p> <p style="text-align: center;">Emphasis: Solve problems using measurement and data</p>	<p style="text-align: center;">Third Grade</p>
<p style="text-align: center;">area of n square units.</p> <ol style="list-style-type: none"> 6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). 7. Relate area to the operations of multiplication and addition. <ol style="list-style-type: none"> a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. 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 style="background-color: yellow;"><i>PASS 5.2 - Probability: Describe the probability (more, less, or equally likely) of chance events.</i></p> <p>*Geometry – 3.G</p> <ol style="list-style-type: none"> 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. <p style="background-color: yellow;"><i>PASS 3.1. - Identify and compare attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes.</i></p> <p style="background-color: yellow;"><i>PASS 3.2. - Analyze the effects of combining and subdividing two-and three-dimensional figures.</i></p> <p style="background-color: yellow;"><i>PASS 3.3. Make and use coordinate systems to specify locations and shapes on a grid with ordered pairs and to describe paths from one point to another point on a grid.</i></p> <ol style="list-style-type: none"> 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. 	
<p>CLARIFICATIONS (partial list from the PARCC evidence tables):</p>	

<p style="text-align: center;">Domain: Measurement and Data</p> <p style="text-align: center;">Emphasis: Solve problems using measurement and data</p>	<p style="text-align: center;">Third Grade</p>
<p>3.MD.1 – Limited to 60 minute intervals.</p> <p>3.MD.3 – Students are not required to create the entire graph.</p>	
<p>COMMENTS: *Geometry is a minor emphasis area in Grade 3 and so has been included within the major emphasis area of Measurement.</p>	

Teacher Notes:

Special Education Accommodations Notes:

Assessment Notes: