Math Problem Solving: Grade 3 Scope and Sequence

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Grade 3 Major Work

The Major works of grade 3 fall into four concepts. Major works of the grade represent the most important content as outlined by the Common Core Standards. The scope and sequence prioritizes these major concepts and weaves in Additional/Supporting content as an avenue to deepen understandings and fluencies with these four major concepts. Below are the four major works of the grade for 3rd grade: (Descriptions from [CCSS](.).)

(1) **Multiplication and Division within 100:** developing understanding of multiplication and division and strategies for multiplication and division within 100;

Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

(2) **Fraction Meanings:** developing understanding of fractions, especially unit fractions (fractions with numerator 1);

Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

(3) **Area:** developing understanding of the structure of rectangular arrays and of area; and

Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

(4) **Classifying 2D Shapes:** describing and analyzing two-dimensional shapes.

Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

Grade 3 Content

The list below shows all of Grade 3 content, by cluster. Clusters summarize groups of related standards.

Domain   Cluster   Major Work of the grade   Additional/Supporting Work of the grade

Operations and Algebraic Thinking

- 3.OA.A Represent and solve problems involving multiplication and division.
- 3.OA.B Understand properties of multiplication and the relationship between multiplication and division.
- 3.OA.C Multiply and divide within 100.
- 3.OA.D Solve problems involving the four operations, and identify and explain patterns in arithmetic.

Number and Operations in Base Ten

- 3.NBT.A Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions

- 3.NF.A Develop understanding of fractions as numbers.

Measurement and Data

- 3.MD.A Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- 3.MD.B Represent and interpret data.
- 3.MD.C Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- 3.MD.D Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

Geometry

- 3.G.A Reason with shapes and their attributes.

Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Math SDL Standards by Mission

Zearn is the primary program we use in self-directed learning. Our problem solving scope and sequence is tightly aligned with Zearn to create a cohesive learning experience for students. Units in Zearn are called Missions. The table below lists all the standards for each Mission in Zearn. Generally, when students are working on standards in Zearn they will work on the same standards in Problem Solving. Sometimes, when Problem Solving and Zearn are not tightly aligned, students will see a standard within two weeks (either two weeks earlier or later) from when it appears in Math SDL.

4 weeks	4 weeks	4 weeks	3 weeks	6 weeks	2 weeks	3 weeks
Mission 1: Multiply and Divide Friendly Numbers	Mission 2: Measure It	Mission 3: Multiply and Divide Tricky Numbers	Mission 4: Find the Area	Mission 5: Fractions as Numbers	Mission 6: Display Data	(Grade 4) Mission 4 Construct Lines, Angles, and Shapes
3.OA.A.1 3.OA.A.2 3.OA.A.3[+] 3.OA.A.4[+] 3.OA.B.5[+] 3.OA.B.6 3.OA.C.7[+] 3.OA.D.8[+]	3.NBT.A.1 3.NBT.A.2 3.MD.A.1 3.MD.A.2	3.OA.A.3 3.OA.A.4 3.OA.B.5 3.OA.C.7 3.OA.D.8 3.OA.D.9 3.NBT.A.3	3.MD.C.5 3.MD.C.5.a 3.MD.C.5.b 3.MD.C.6 3.MD.C.7 3.MD.C.7.a 3.MD.C.7.b 3.MD.C.7.c 3.MD.C.7.d	3.NF.A.1 3.NF.A.2 3.NF.A.2.a 3.NF.A.2.b 3.NF.A.3 3.NF.A.3.a 3.NF.A.3.b 3.NF.A.3.c 3.NF.A.3.d 3.G.A.2	3.MD.B.3 3.MD.B.4	4.MD.C.5 4.MD.C.5a 4.MD.C.5b 4.MD.C.6 4.MD.C.7 4.GA.1 4.GA.2 4.GA.3

[+] Partially mastery expected because the standard will show up in a later mission

Problem Solving Standards Prioritization

The SBAC divides standards into four claims: Claim 1 – Concepts & Procedures, Claim 2 - Problem Solving, Claim 3 - Communicate Reasoning, Claim 4 - Modeling and Data Analysis. This organizing framework represents the range of mathematical thinking assessed on standardized assessments, so we use it in all of our regions. While NY and RI state tests do not use Claims, their problems all align with the four SBAC claims, so we use the SBAC claims in order to have common language.

The standards mastery report shows standards and clusters. Generally, standards mastered indicates mastery of content assessed at Claim 1; clusters mastered indicate mastery of content assessed at Claims 2-4. Additionally, we generally assess standards with 4 items, which allows for Proficient to be at 75% mastery (3 of 4 items). However, in order to prioritize Major works of the grade and have students appropriately engage with all grade-level content prior to Crescendo, there are a few exceptions to how we assess some grade-level standards:

- ***Standards assessed with two items at Claim 1:*** *These standards are only assessed with two items because their scope of content requires less instructional time. 100% mastery (2 of 2 items) is needed to be Proficient.*
- ***Standards only assessed at Claims 2-4:*** *These standards are only assessed at Claims 2-4 because they are application of Claim 1 understandings and fluencies.*
- ***Standards spiraled from the previous year:*** *Students engaged with these standards, in SDL and PS, in the previous grade level, post state tests. This content is not formally assessed this year but appears in problem contexts.*
- ***End of Year Standards:*** *Students will engage with select standards, in SDL and PS, for the next grade level post state tests.*
- ***Greenfield standards:*** *Not all standards are created equal. We took some of the meatier standards and subdivided them into substandards to give them more instructional time.*

Assessed with four items at Claim 1		Assessed with two items at Claim 1	Only Assessed at Claims 2-4	Spiraled from previous year	End of Year Standards	Greenfield Standards
3.OA.A.1 3.OA.A.2 3.OA.A.4 3.OA.B.6 3.OA.C.7 3.OA.D.9 3.NBT.A.1 3.NBT.A.2 3.NBT.A.3	3.NF.A.2 3.NF.A.3.d 3.MD.B.3 3.MD.C.7.c 3.MD.C.7.d	3.NF.A.1 3.NF.A.3.c 3.MD.B.4 3.MD.C.6 3.MD.C.7.Area 3.G.A.2	3.OA.A.3 3.OA.D.8 3.MD.C.5	3.MD.D.8 3.G.A.1	4.MD.C.6.AngleMeasures 4.MD.C.7 4.G.A.2.ShapesLines	3.OA.B.5.CommAsso 3.OA.B.5.Distributive 3.NF.A.3.Equivalent 3.MD.C.7.Area 3.MD.A.1.TellTime 3.MD.A.1.Elapsed 3.MD.A.2.AddSub 3.MD.A.2.MultDiv

Year at a Glance

PS Units	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9
Problem Solving	Multiplication and Division Meanings	Properties and Time	Rounding, Adding, and Subtracting Large Numbers	Multiplication and Division Properties and Fluency	Multiplication and Division Properties and Problems	Area	Fraction Meanings and Models	Fraction Equivalencies and Comparisons	Angles and Lines Properties in Shapes
Zearn	Mission 1: Multiply and Divide Friendly Numbers		Mission 2: Measure It	Mission 3: Multiply and Divide Tricky Numbers		Mission 4: Find the Area	Mission 5: Fractions as Numbers	Mission 6: Display Data	(Grade 4) Mission 4: Construct Lines, Angles, and Shapes
CCSS Major Clusters	3.OA.A 3.OA.B	3.OA.B 3.MD.A	3.MD.A	3.OA.A 3.OA.B 3.OA.C	3.OA.D 3.MD.A	3.MD.C	3.NF.A	3.NF.A	N/A
CCSS Addtl/ Supporting Clusters	N/A		3.NBT.A	N/A	3.NBT.A	N/A	3.G.A	3.MD.B	4.MD.C 4.G.A

Unit By Unit Outline

Note: Some Zearn missions don't perfectly align with the start and end dates of each units, see table above to note where that's the case.

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Unit 1: Multiplication and Division Meanings (4 weeks: school weeks 1&2 are treated as one instructional week)	
Concurrent Zearn Mission	**Problem Solving Unit Assessment Standards**
M1: Multiply and Divide Friendly Numbers Topic A: Multiplication and the Meaning of Factors Topic B: Division as an Unknown Factor Problem Topic C: Analyzing Arrays to Multiply Using Units of 2 and 3 Topic D: Division Using Units of 2 and 3	**3.OA.A.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. **3.OA.A.2** Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8. **3.OA.B.6** Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. **3.OA.A** Represent and solve problems involving multiplication and division.

Unit 2: Properties and Time (3 weeks)

Concurrent Zearn Mission	Problem Solving Unit Assessment Standards
M1: Multiply and Divide Friendly Numbers Topic E: Multiplication and Division Using Units of 4 Topic F: Distributive Property and Problem Solving Using Units of 2-5 and 10 *M2: Measure It* Topic A: Time Measurement and Problem Solving	**3.OA.B.5.CommAsso** Apply properties of operations as strategies to multiply and divide.2 Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) ~~Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)~~ **3.MD.A.1.TellTime** 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.~~ **3.MD.A.1.Elapsed** ~~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. **3.MD.A** Solve problems involving measurement and estimation.

Unit 3: Rounding, Adding, and Subtracting Large Numbers (3 weeks)

Concurrent Zearn Mission	Problem Solving Unit Assessment Standards
M2: Measure It Topic B: Measuring Weight and Liquid Volume in Metric Units Topic C: Rounding to the Nearest Ten and Hundred Topic D: 2- and 3- Digit Measurement Addition Using the Standard Algorithm Topic E: 2- and 3- Digit Measurement Subtraction Using the Standard Algorithm	**3.MD.A.2.AddSub** 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. **3.NBT.A.1** Use place value understanding to round whole numbers to the nearest 10 or 100. **3.NBT.A.2** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. **3.NBT.A** Use place value understanding and properties of operations to perform multi-digit arithmetic.

Unit 4: Multiplication and Division Properties and Fluency (3 weeks)	
Concurrent Zearn Mission	**Problem Solving Unit Assessment Standards**
M3: Multiply and Divide Tricky Numbers Topic A: The Properties of Multiplication and Division Topic B: Multiplication and Division Using Units of 6 and 7 Topic C: Multiplication and Division Using Units up to 8 Topic D: Multiplication and Division Using Units of 9	**3.OA.B.5.Distributive** Apply properties of operations as strategies to multiply and divide. Examples: ~~If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.)~~ Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) **3.OA.C.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers. **3.OA.A.4** Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ? **3.OA.A.3 (Claim 2-4 Only)** 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.

Unit 5: Multiplication and Division Properties and Problems (3 weeks)	
Concurrent Zearn Mission	**Problem Solving Unit Assessment Standards**
M3: Multiply and Divide Tricky Numbers Topic E: Analysis of Patterns and Problem Solving Including Units of 0 and 1 Topic F: Multiplication of Single-Digit Factors and Multiples of 10 *M4: Find the Area* Topic A: Foundations for Understanding Area Topic B: Concepts of Area Measurement	**3.NBT.A.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.OA.D.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends. **3.MD.A.2.MultDiv** 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.2 **3.OA.D.8 (Claim 2-4 Only)** 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.

Unit 6: Area (3 weeks)	
Concurrent Zearn Mission	**Problem Solving Unit Assessment Standards**
M4: Find the Area Topic C: Arithmetic Properties Using Area Models Topic D: Applications of Area Using Side Lengths of Figures *M5: Fractions as Numbers* Topic A: Partitioning a Whole Into Equal Parts	**3.MD.C.6 (2 items)** Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units). **3.MD.C.7.Area (2 items)** (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. **3.MD.C.7.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 × b and a × c. Use area models to represent the distributive property in mathematical reasoning. **3.MD.C.7.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. **3.MD.C.5 (Claim 2-4 Only)** Recognize area as an attribute of plane figures and understand concepts of area measurement.

Unit 7: Fraction Meanings and Models (3 weeks)

Concurrent Zearn Mission	Problem Solving Unit Assessment Standards
M5: Fractions as Numbers Topic B: Unit Fractions and their Relation to the Whole Topic C: Comparing Unit Fractions and Specifying the Whole Topic D: Fractions on the Number Line	**3.G.A.2 (2 items)** 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. **3.NF.A.1 (2 items)** 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. **3.NF.A.2** Understand a fraction as a number on the number line; represent fractions on a number line diagram. **3.NF.A.3.Equivalent** (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. **3.NF.A** Develop understanding of fractions as numbers.

Unit 8: Fraction Equivalencies and Comparisons (3 weeks)

Concurrent Zearn Mission	Problem Solving Unit Assessment Standards
M5: Fractions as Numbers Topic E: Equivalent Fractions Topic F: Comparison, Order, and Size of Fractions *M6: Display Data* Topic A: Generate and Analyze Categorical Data Topic B: Generate and Analyze Measurement Data	**3.NF.A.3.c (2 items)** 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. **3.NF.A.3.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. **3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. **3.MD.B.4 (2 items)** 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. **3.MD.B** Represent and interpret data.

Unit 9: Angles and Lines Properties in Shapes (3 weeks)

Concurrent Zearn Mission	Problem Solving Unit Assessment Standards
(Grade 4) M4: Construct Lines, Angles, and Shapes Topic A: Lines and Angles Topic B: Angle Measurement Topic C: Problem Solving with the Addition of Angle Measures Topic D: Two-Dimensional Figures and Symmetry Topic E: Decomposition and Fraction Equivalence	**4.MD.C.6.AngleMeasures** (5) Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement (6) Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure. **4.MD.C.7** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure. **4.GA.2.ShapesLines** (1) Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures (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. (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. **4.MD.C** Geometric measurement: understand concepts of angle and measure angles.