Guidance Document - *GO Math!* Grade 4

Part Four: Chapter-Level Guidance for *GO Math!* (Grade 4)

How can teachers implement each chapter of Grade 4 to make instruction more aligned by making minor modifications and supplementing Open Educational Resources (OER)?

Grade 4 / Chapter 1: Place Value, Addition, and Subtraction to One Million			
Lesson	**Action**	**Details for the Action**	**Rationale**
1.1 Model Place Value Relationships	As is		
1.2 Read and Write Numbers	As is		
1.3 Compare and Order Numbers	As is		
1.4 Round Numbers	As is		
1.5 Rename Numbers	As is		
1.5.1	Add	Practice recognizing that a digit in one place represents ten times what it represents in the place to its right: EngageNY, Module 1, Lesson 2	4.NBT.A.1 requires students to 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 Lessons 1.1 and 1.5 aren't enough to fully address standard.
1.6 Add Whole Numbers	As is		
1.7 Subtract Whole Numbers	As is		

1.8 Comparison Problems with Addition and Subtraction	Modify	Modify lesson to include multi-step word problems involving addition and subtraction. Additional Resource: EngageNY, Module 1, Lesson 18	Lesson only includes one problem type. Modify lesson to give students more practice solving multi-step word problems, as per 4.OA.A.3.

Chapter 1 Rule of Thumb	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	

Grade 4 / Chapter 2: Multiply by 1-Digit Numbers			
Lesson	**Action**	**Details for the Action**	**Rationale**
2.1 Multiplication Comparisons	As is		
2.2 Comparison Problems	Delete		4.OA.A.2 requires students to multiply or divide to solve world problems involving multiplicative comparison; lesson goes beyond this expectation.
2.2.1	Add	Lesson about all the different types of multiplicative comparison problems: Illustrative Mathematics, Comparing Money Raised	4.OA.A.2 requires students to solve different problem types involving multiplicative comparisons. See Table 3: Multiplication and divisions situations (CC/OA Progression, p. 23).
2.3 Multiply Tens, Hundreds, and Thousands	Delete		4.NBT.B.5 requires students to use strategies based on place value and the properties of operations; this lesson encourages a rule to "add 0 at the end of the number."
2.3.1	Add	Practice that allows students to multiply using strategies based on place value: Engage NY Module 3, Lesson 5	4.NBT.B.5 requires students to use strategies based on place value and the properties of operations.
2.4 Estimate Products	Delete		4.NBT.B.5 does not specifically require estimation. Students should be estimating to make sure their answers are reasonable throughout the chapter. (See Rule of Thumb.)
2.5 Multiply Using the Distributive Property	Modify	Throughout the lesson, have students break up the larger factor of the multiplication expression into tens and ones.	4.NBT.5 requires students to use strategies based on place value. Having students break up the larger factor into tens and ones will help them connect this strategy to larger numbers in 2.6.
2.6 Multiply Using Expanded Form	Modify	Do not use "On Your Own" problems, use "Reteach" instead.	"On Your Own" problems align to 4.OA.A.3 and the rest of the lesson aligns to 4.NBT.B.5.

2.7 Multiply Using Partial Products	As is		
2.8 Multiply Using Mental Math	Modify	Skip multiplication problems that exceed the magnitude of numbers in the grade 4 standard, e.g., 3-digit by 2-digit, 5-digit by 1-digit, etc.	4.NBT.B.5 limits multiplication to up to 1- by 4-digit numbers and 2- by 2-digit numbers.
2.8.1	Add	Practice finding partial products: LearnZillion, Unit 3, Lesson 2	Students need more practice with the strategies required by 4.NBT.B.5 in order to be able to relate their strategies to the standard algorithm.
2.9 Multistep Multiplication Problems	Delete		4.OA.A.3 requires that students solve a variety of multi-step word problems. Lesson addresses only one problem type.
2.9.1	Add	Lesson about solving a variety of multi-step word problems: EngageNY, Module 3, Lesson 13	4.OA.A.3 requires a variety of problem types. See Table 3: Multiplication and divisions situations (CC/OA Progression, p. 23).
2.10 Multiply 2-Digit Numbers with Regrouping/ 2.11 Multiply 3-Digit and 4-Digit Numbers with Regrouping	Modify	Condense these 2 lessons and allow students to use a strategy of their choice.	4.NBT.B.5 does not require a specific strategy.
2.12 Solve Multistep Problems Using Equations	Delete		Aligns to 5.OA.A.1
2.12.1	Add	Practice multiplying with a 1-digit number. Students should choose the strategy of their choice: EngageNY, Module 3, Lesson 9 *[Note: Remove directions that ask students to use a specific strategy]*	More practice is needed to reach the full expectations of 4.NBT.5 which requires students to 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

2.12.2	Add	Practice multiplying with a 1-digit number. Students should choose the strategy of their choice: EngageNY Module 3, Lesson 10 *[Note: Remove directions that ask students to use a specific strategy]*	calculation by using equations, rectangular arrays, and/or area model.

Chapter 2 Rules of Thumb	**Rationale**
When working with multiplicative comparison problems, ensure that a variety of symbols are used for the unknown and that students are being exposed to a variety of problem types.	4.OA.A.2 requires students to solve different problem types involving multiplicative comparisons. See Table 3: Multiplication and divisions situations (CC/OA Progression, p. 23).
Do not expect students to use and master every multiplication strategy introduced.	4.NBT.B.5 requires that students focus on using strategies they can illustrate and explain. "Students should use methods they understand and can explain" (NBT Progression, p. 14) using a variety of models and written numerical work. Continually making connections between visual models and written numerical work will help students understand and make connections between multiplication strategies, including the traditional algorithm.
Encourage students to estimate throughout their work, in order to connect to place value strategies and think about the reasonableness of their work.	4.NBT.B.5 requires students to use place value strategies. MP.5 requires students to use estimation to detect possible errors.

Grade 4 / Chapter 3: Multiply by 2-Digit Numbers

Lesson	Action	Details for the Action	Rationale
3.1 Multiply by Tens	As is		
3.2 Estimate Products	As is		
3.3 Area Models and Partial Products	Modify	Apply "Unlock the Problem" Rule of Thumb to the "Investigate" throughout the lesson; have students break up the factors of the multiplication expression into tens and ones.	4.NBT.B.5 requires students to use strategies based on place value. MP.1 requires students to make sense of problems and persevere in solving them.
3.4 Multiply Using Partial Products	As is		
3.5 Multiply with Regrouping	As is		
3.6 Choose a Multiplication Method	As is		
3.7 Multiply 2-Digit Numbers	As is		

Chapter 3 Rule of Thumb	**Rationale**
Do not expect students to use and master every multiplication strategy introduced.	4.NBT.B.5 requires that students use strategies they can illustrate and explain.

Grade 4 / Chapter 4: Divide by 1-Digit Numbers			
Lesson	**Action**	**Details for the Action**	**Rationale**
4.1 Estimate Quotients Using Multiples	Delete		This lesson requires students to use estimation to divide numbers of up to 3-digits by 1- or 2-digits. Since this is the first lesson with division in Grade 4, it exceeds the expectations of division work students did as required by 3.OA work.
4.2 Remainders	As is		
4.3 Interpret the Remainder	Delete		Students are being asked to interpret remainders as fractions. This aligns to 5.NF.B.3.
4.3.1	Add	Lesson about solving word problems with remainders: EngageNY, Module 3, Lesson 15	4.NBT.6 requires students to find whole-number quotients and remainders, and to illustrate and explain their calculation using equations and/or arrays.
4.3.2	Add	Lesson about interpreting remainders in the context of word problems: EngageNY, Module 3, Lesson 14	4.OA.A.3 requires students to interpret remainders.
4.4 Divide Tens, Hundreds, and Thousands	As is		
4.5 Estimate Quotients Using Compatible Numbers	As is		
4.6 Division and the Distributive Property	As is		
4.7 Divide Using Repeated Subtraction/ 4.8 Divide Using Partial Quotients	Modify	Condense these lessons. Use one example from 4.7 to introduce repeated subtraction using larger multiples of the divisor and devote the majority of the time to the work of 4.8.	4.NBT.B.6 requires students to find quotients using strategies based on place value and properties of operations. Both lessons use repeated subtraction as a strategy to divide, which is not the expectation of the standard.

4.8.1	Add	Practice dividing using partial quotients: LearnZillion, Unit 3, Lesson 7	More practice is needed to reach the fluency requirements of 4.NBT.B.6 and application requirements of 4.OA.A.3.
4.9 Model Division with Regrouping	As is		
4.10 Place the First Digit	As is		
4.11 Divide by 1-Digit Numbers	Modify	Allow students to use the strategy of their choice.	4.NBT.B.6 does not require a specific strategy. Students are expected to find whole-number quotients and remainders using a variety of strategies.
4.12 Multistep Division Problems	As is		

Chapter 3 Rule of Thumb	**Rationale**
Do not expect students to use and master every multiplication strategy introduced.	4.NBT.B.5 requires that students use strategies they can illustrate and explain.

Grade 4 / Chapter 5: Factors, Multiples, and Patterns			
Lesson	**Lesson**	**Lesson**	**Lesson**
5.1 Model Factors	As is		
5.2 Factors and Divisibility	As is		
5.3 Common Factors	Delete		4.OA.B.4 does not require application.
5.4 Factors and Multiples	As is		
5.5 Prime and Composite Numbers	As is		
5.6 Number Patterns	As is		

 **Chapter 5 Rule of Thumb**	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	

Grade 4 / Chapter 6: Fraction Equivalence and Comparison			
Lesson	**Action**	**Details for the Action**	**Rationale**
6.1 Equivalent Fractions	Delete		4.NF.A.1 requires students to explain equivalency which this lesson does not require students to do.
6.2 Generate Equivalent Fractions	As is		
6.3 Simplest Form	Delete		The Standards do not require students to find simplest form. While the topic might come up in class discussion in other lessons, it does not merit a lesson.
6.3.1	Add	Lesson about connecting visual models students have been working with to the rule of multiplying or dividing the numerator and denominator by the same number: EngageNY, Module 5, Lesson 9	4.NF.A.1 requires students to explain a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$.
6.3.2	Add	Lesson about connecting visual models students have been working with to the rule of multiplying or dividing the numerator and denominator by the same number: EngageNY, Module 5, Lesson 10	
6.3.3	Add	Lesson about relating a number line and bar model to the use of multiplication and division: EngageNY, Module 5, Lesson 11	
6.4 Common Denominators	Delete		The Standards do not require students to find common denominators as a specific strategy. While the topic might come up in class discussion in other lessons, it does not merit a lesson.

6.5 Find Equivalent Fractions	Delete		4.NF.A.1 does not require application.
6.5.1	Add	Practice for students to recognize equivalent fractions using their knowledge from previous lessons: LearnZillion, Unit 5, Lesson 10	It is necessary to meet the full depth of 4.NF.A.1.
6.6 Compare Fractions Using Benchmarks	As is		
6.7 Compare Fractions	As is		
6.8 Compare and Order Fractions	As is		

Chapter 6 Rules of Thumb	**Rationale**
Relate bar model to number line when using visual models.	Using the number line will reinforce the understanding of fractions as numbers (3.NF.A). Connecting the models will help students understand the mathematical concepts are true, regardless of the model used.
Ask students to justify fraction comparisons using visual models toward the beginning of the unit and encourage more reasoning-based strategies toward the end of the chapter.	4.NF.A.2 requires that students justify their conclusions when comparing fractions.

Grade 4 / Chapter 7: Add and Subtract Fractions

Lesson	Action	Details for the Action	Rationale

7.1 Add and Subtract Parts of a Whole 7.3 Add Fractions Using Models	Modify	Combine these two lessons to connect visual models to equations.	4.NF.3d suggests using visual fraction models and equations to solve problems involving addition and subtraction of fractions.
7.2 Write Fractions as Sums	Modify	Encourage students to decompose fractions in more than one way. Follow chapter Rule of Thumb to include fractions greater than one.	4.NF.3b requires that students decompose a fraction into a sum of fractions with like denominators in more than one way.
7.4 Subtract Fractions Using Models	As is		Note: Lesson is actually aligned to 4.NF.3a.
7.5 Add and Subtract Fractions	Delete		4.NF.3d requires application problems.
7.5.1	Add	Lesson about solving word problems involving addition and subtraction: EngageNY, Module 5, Lesson 19 *[Note: Change mixed numbers in lesson to fractions greater than one. Do not expect students to rename yet.]*	4.NF.3d requires application problems.
7.6 Rename Fractions and Mixed Numbers	Modify	Make connections to decomposing fractions work students did for 4.NF.3b in prior lessons by switching "Example" and "Unlock the Problem" so that "Example" is introduced first.	4.NF.B.3 requires that students understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.
7.7 Add and Subtract Mixed Numbers	As is		
7.8 Subtraction with Renaming	As is		

7.9 Fractions and Properties of Addition	Delete		4.NF.B.3c gives suggested strategies; this lesson only allows students to use one given strategy based on a specific property, rather than use their understanding to add and subtract mixed numbers
7.10 Multistep Fraction Problems	Delete		Aligns to 5.NF.B.7
7.10.1	Add	Practice with application problems involving adding and subtracting fractions: LearnZillion, Unit 10, Lesson 9	4.NF.B.3d requires application problems

Chapter 7 Rules of Thumb	**Rationale**
Make sure students have many opportunities to work with fractions greater than one.	Standards in 4.NF require students to work with fractions greater than one.
Have students justify their answers by using visual models, equations, and other strategies.	4.NF.B.3b and MP3 require that students justify their answers and conclusions.

Grade 4 / Chapter 8: Multiply Fractions by Whole Numbers

Lesson	Action	Details for the Action	Rationale
8.1 Multiples of Unit Fractions	As is		
8.2 Multiples of Fractions	As is		
8.3 Multiply a Fraction by a Whole Number Using Models	As is		

8.4 Multiply a Fraction or Mixed Number by a Whole Number	As is		
8.5 Comparison Problems with Fractions	As is		

 **Chapter 8 Rule of Thumb**	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	

Grade 4 / Chapter 9: Relate Fractions and Decimals

Lesson	Action	Details for the Action	Rationale
9.1 Relate Tenths and Decimals	As is		
9.2 Relate Hundredths and Decimals	As is		
9.3 Equivalent Fractions and Decimals	As is		
9.4 Relate Fractions, Decimals, and Money	As is		
9.5 Money	Delete		Some of the problems go beyond the Grade 4 expectation for computation with decimals in 4.NF.C.5.
9.6 Add Fraction Parts of 10 and 100	As is		
9.7 Compare Decimals	As is		

 **Chapter 9 Rule of Thumb**	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	

Grade 4 / Chapter 10: Two-Dimensional Figures

Lesson	Action	Details for the Action	Rationale
10.1 Lines, Rays, and Angles	As is		
10.2 Classify Triangles by Angles	As is		
10.3 Parallel Lines and Perpendicular Lines	As is		
10.4 Classify Quadrilaterals	As is		
10.5 Line Symmetry	As is		
10.6 Find and Draw Lines of Symmetry	As is		
10.7 Shape Patterns	As is		

 **Chapter 10 Rule of Thumb**	**Rationale**
Students should be using precise vocabulary to describe the attributes of shapes when naming 2-dimensional figures (e.g., rhombus, trapezoid, etc.).	Geometry domain requires students to classify shapes by properties of their lines and angles.

Grade 4 / Chapter 11: Angles

Lesson	Action	Details for the Action	Rationale
11.1 Angles and Fractional Parts of a Circle	As is		
11.2 Degrees	As is		
11.3 Measure and Draw Angles	As is		
11.3.1	Add	Practice with measuring and sketching angles: EngageNY, Module 4, Lesson 7	Students need more practice to reach the full expectations of 4.MD.C.6.
11.4 Join and Separate Angles	As is		
11.5 Unknown Angle Measures	As is		

 **Chapter 11 Rule of Thumb**	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	

Grade 4 / Chapter 12: Relative Sizes of Measurement Units			
Lesson	**Action**	**Details for the Action**	**Rationale**
12.1 Measurement Benchmarks	As is		
12.2 Customary Units of Length	As is		
12.3 Customary Units of Weight	As is		
12.4 Customary Units of Liquid Volume	As is		
12.5 Line Plots	Delete		As a Supporting standard, 4.MD.B.4 should support the Major Work of the grade. Fractions greater than one and mixed numbers are not included in this lesson. "Make a line plot to display a data set of measurements in fractions of a unit (½ , ¼ , ⅛). 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" (MD Progression, p. 4).
12.5.1	Add	Lesson about plotting fractions on a line plot, including fractions greater than 1: EngageNY, Module 5, Lesson 28	4.MD.B.4 requires students to make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8), and to solve problems involving addition and subtraction of fractions by using information presented in line plots.
12.6 Metric Units of Length	Delete		4.MD.A.1 requires students to express larger units in terms of a smaller unit, but this lesson asks students to express smaller units in terms of a larger unit.

12.6.1	Add	Lesson about converting measurements into smaller units, including application problems: EngageNY, Module 2, Lesson 1.	Meets the expectations of 4.MD.A.1 and connects to 4.MD.A.2 to reinforce major work of solving word problems.
12.7 Metric Units of Mass and Liquid Volume	As is		
12.8 Units of Time	Delete		Goes beyond the expectation of 4.MD.1 by including days, weeks, and years.
12.8.1	Add	Lesson about solving application problems involving units of time: EngageNY, Module 7, Lesson 3	Meets the expectations of 4.MD.A.1 and connects to 4.MD.A.2 to reinforce Major Work of solving word problems.
12.9 Elapsed Time	Delete		Lessons 12.11.1 and 12.11.2 include problem types required by 4.MD.A.2, including intervals of time.
12.10 Mixed Measures	Delete		Lessons include units that go beyond the expectation of 4.MD.A.2.
12.11 Patterns in Measurement Units	Delete		
12.11.1	Add	Practice solving a variety of measurement problems, including multi-step word problems: Engage NY, Module 7, Lesson 10	Meets the expectations of 4.MD.A.2 and connects to Major Work (4.OA.A.3).
12.11.2	Add	Practice solving a variety of measurement problems, including multi-step word problems: Engage NY, Module 7, Lesson 11	

Chapter 12 Rule of Thumb	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	

Grade 4 / Chapter 13: Algebra: Perimeter and Area			
Lesson	**Action**	**Details for the Action**	**Rationale**
13.1 - 13.5	Delete		Aligns to 3.MD.D.8
13.1 (2 days)	Add	Lesson about understand and apply the formulas for area and perimeter: EngageNY, Module 3, Lesson 1	4.MD.A.3 is the first time in the Standards that students are expected to use the formulas for area and perimeter.
13.2	Add	Lesson about solving area and perimeter problems, including multiplicative comparison: EngageNY, Module 3, Lesson 2	4.MD.A.3 requires students to apply the formula and since this is Supporting Work; it also connects to Major Work topics (4.OA.A.2).
13.3	Add	Lesson about solving area and perimeter problems, including multi-step problems: EngageNY, Module 3, Lesson 3	4.MD.A.3 requires students to apply the formula and since this is Supporting Work; it also connects to Major Work topics (4.OA.A.3).

 **Chapter 13 Rule of Thumb**	**Rationale**
There are no chapter-specific Rules of Thumb. Be sure to still apply grade- and program-level Rules of Thumb from Part Two and Part Three of this document.	