Guidance Document - *GO Math!* Grade 5

Part Four: Chapter-Level Guidance for *GO Math!* (Grade 5)

How can teachers implement each chapter of Grade 5 to make instruction more aligned by making minor modifications and supplementing Open Educational Resources (OER)?

Grade 5 / Chapter 1: Place Value, Multiplication, and Expressions			
Lesson	**Action**	**Details for the Action**	**Rationale**
1.1 Place Value and Patterns	As is		
1.2 Place Value of Whole Numbers	Delete		Aligns to 4.NBT.A.2
1.3 Place Value of Whole Numbers	Delete		Aligns to 3.OA.B.5
1.4 Powers of 10 and Exponents	As is		
1.5 Multiplication Patterns	As Is		
1.6 Multiply by 1-Digit Numbers	As Is		
1.7 Multiply by Multi-Digit Numbers	As Is		
1.7.1	Add	Practice multi-digit multiplication: Engage NY, Module 2, Lesson 8	Students need more practice to reach the expectation of 5.NBT.B.5 which requires fluently multiplying multi-digit whole numbers using the standard algorithm.

1.8 Relate Multiplication to Division	As is		
1.9 Multiplication and Division	Delete		5.NBT.B.6 requires students to use strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. The lesson focuses on a strategy that does not align to these expectations.
1.10 Numerical Expressions	As Is		
1.11 Evaluate Numerical Expressions	As is		
1.12 Grouping Symbols	Delete		5.OA.A.1 does not require nested parentheses, brackets, and braces.

👍 Chapter 1 Rules of Thumb	Rationale
Follow program Rules of Thumb and integrate vocabulary, including properties of operations, throughout the chapter where appropriate.	MP.6 requires students to be precise in their mathematical language.
Connect standard algorithm to the area model to connect the procedural skill requirement of Grade 5 to conceptual understanding developed in previous grades.	Students have been working to connect place value understanding to the operations in the NBT and OA domains. 5.NBT.B.5 and 5.NBT.B.6 provide a capstone of this work.

Grade 5 / Chapter 2 Divide Whole Numbers

Lesson	Action	Details for the Action	Rationale
2.1 Place the First Digit	Delete		5.NBT.B.6 requires students to use strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. The strategy presented in this lesson does not meet those expectations.
2.2 Divide by 1-Digit Divisors	As is		
2.2.1	Add	Practice division with dividends up to 4-digits and 1-digit divisors using any strategy: Divide 2-to-4 Digit by 1-Digit Number	Students need additional practice to meet the expectations of 5.NBT.B.6 which requires students to 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.
2.3 Division with 2-Digit Divisors	Delete		5.NBT.B.6 requires conceptual understanding. This lesson creates a procedure using base ten blocks that doesn't allow student to use strategies named in the standard.
2.3.1	Add	Lesson using area models for multi-digit division: LearnZillion, Use an Area Model of 4-digit dividends by 2 digit divisors	5.NBT.B.6 suggests an area model for students to use to illustrate and explain their work of dividing two-digit dividends by two-digit divisors.
2.3.2	Add	Use Lesson 2.5	Moving Lesson 2.5 here will allow students to use estimation as a strategy as they work with partial quotients in Lesson 2.4.
2.4 Partial Quotients	As is		

2.5 Estimate with 2-Digit Divisors	Delete		Moved prior to Lesson 2.4.
2.6 Divide by 2-Digit Divisors	As is		
2.7 Interpret the Remainder	As is		
2.8 Adjust Quotients	As is		
2.9 Division	As is		

Chapter 2 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 5 / Chapter 3: Add and Subtract Decimals

Lesson	Action	Details for the Action	Rationale
3.1 Thousandths	As is		
3.2 Place Value of Decimals	As is		
3.2.1	Add	Lesson about naming decimals in expanded, unit and word form: EngageNY, Module 1, Lesson 5	Additional lesson supports deeper conceptual understanding required in 5.NBT.A.3a.
3.3 Compare and Order Decimals	As is		
3.4 Round Decimals	Delete		5.NBT.A.4 requires students to use place value understanding to round; this lesson uses a trick.
3.4.1	Add	Lesson about using number lines and place value to round a given decimal number. EngageNY Module 1, Lesson 7	5.NBT.A.4 requires students to use place value understanding to round.
3.5 Decimal Addition	As is		
3.6 Decimal Subtraction	As is		
3.7 Estimate Decimal Sums and Differences	Delete		5.NBT.B.7 does not require estimation.
3.8 Add Decimals	As is		
3.9 Subtract Decimals	As is		
3.10 Patterns with Decimals	Delete		5.NBT.B.7 does not require pattern work.

3.11 Add and Subtract Money 3.12 Choose a Method	Modify	Condense these lessons. Emphasize the work of 3.12 and use 1-2 problems from 3.11. *[Note: The title and essential question for 3.12 are misleading, as the actual point of the lesson is to provide extra practice using strategies or algorithms.]*	5.NBT.B.7 does not require application.

👍 **Chapter 3 Rules of Thumb**	**Rationale**
Apply the program Rule of Thumb for general approach to vocabulary. In this chapter, emphasize correct meaning and use of key vocabulary: digits, value, place, and place value. **Note**: The concept of place value provides us with a way to write numbers in a succinct manner (i.e., instead of writing that I have 3 hundredths and 4 tenths, I can write .43). In the number .43, the "3" is a digit; it is in the hundredths place, and it carries a value of .03.	5.NBT.B.7 suggests students use strategies based on place value. By attending to precision as required by MP.6, students will connect their addition and subtraction work to place value concepts. .
Throughout the unit, encourage students to think about the value of the digits in each number. Use the guidance from *Teaching in Depth*: "Tell students to 'line up [digits that have the same] place values' when they compute with decimals. Do not tell them to 'line up decimal points' - that is just a result of lining up [digits with the same] place values"	
Where appropriate, use concrete models or drawings, such as base ten blocks and Go Math iTools.	5.NBT.B.7 requires using concrete models or drawings.
As students are developing the concepts and skills of adding and subtracting decimals, highlight student work that uses the relationship between addition and subtraction to solve problems.	5.NBT.B.7 suggests using the relationship between addition and subtraction as a strategy for computation.

Grade 5 / Chapter 4: Multiply Decimals

Lesson	Action	Details for the Action	Rationale
4.1 Algebra Multiplication Patterns with Decimals	As is		
4.2 Multiply Decimals and Whole Numbers	As is		
4.3 Multiplication with Decimals and Whole Numbers	As is		
4.4 Multiply Using Expanded Form/ 4.5 Multiply Money	Modify	Condense these lessons. Emphasize the work of 4.4 and use 1-2 problems from 4.5.	5.NBT.B.7 does not require application.
4.6 Decimal Multiplication	As is		
4.7 Multiply Decimals	As is		.
4.8 Zeros in the Product	As is		

👍 Chapter 4 Rule of Thumb	Rationale
Provide opportunities for students to explain patterns in their computation, and to use that understanding to place decimal point in products. Encourage students to justify the reasonableness of their answers.	As students compute with decimals, they should fully engage with 5.NBT.B.7 by looking for structure in products (MP.7). 5.NBT.B.7 also requires students to explain the reasonableness of their computation (MP.3).

Grade 5 / Chapter 5: Divide Decimals

Lesson	Action	Details for the Action	Rationale
5.1 Division Patterns with Decimals	As is		
5.2 Divide Decimals by Whole Numbers	As is		
5.3 Estimate Quotients	As is		
5.4 Division of Decimals by Whole Numbers	As is		
5.5 Decimal Divisions	As is		
5.6 Divide Decimals	As is		
5.7 Write Zeros in the Dividend	As is		
5.8 Decimal Operations	Modify	"Chapter at a Glance" in some editions notes this lesson as 1-2 days. Spend only 1 day on this lesson.	5.NBT.B.7 does not specifically require application, although this is a plausible connection between the NF and OA domain. Because of this, less time should be spent on application problems.

👍 **Chapter 5 Rules of Thumb**	**Rationale**
Provide opportunities for students to explain patterns in their computation and to use that understanding to place decimal point in quotients. Encourage students to justify the reasonableness of their answers.	As students compute with decimals, they should fully engage with 5.NBT.B.7 by looking for structure in quotients. MP.7 requires students to attend to precision. 5.NBT.B.7 also requires students to explain the reasonableness of their computation. MP.3 requires students to construct viable arguments and critique the reasoning of others.
Connect students' prior work with whole number division using partial quotients to decimal division.	5.NBT.7 requires use of properties of operations and the relationship between multiplication and division when dividing decimals.

Grade 5 / Chapter 6: Operations with Fractions

Lesson	Action	Details for the Action	Rationale
6.1 Addition with Unlike Denominators	As is		
6.2 Subtraction with Unlike Denominators	As is		
6.3 Estimate Fraction Sums and Differences	As is		
6.4 Common Denominators and Equivalent Fractions	As is		
6.5 Common Denominators and Equivalent Fractions	As is		
6.6 Add and Subtract Mixed Numbers	As is		
6.7 Subtraction with Renaming	As is		
6.8 Patterns with Fractions	Delete		5.NF.A.1 does not require students to reduce fractions to the simplest form.
6.9 Practice Addition and Subtraction	As is		
6.9.1	Add	Lesson for more practice solving word problems: EngageNY, Grade 5, Module 3, Lesson 7	5.NF.A.2 is part of the Major Work of the grade. This additional day provides students with more practice solving word problems.

6.10 Use Properties of Addition	As is		

👍 **Chapter 6 Rules of Thumb**	**Rationale**
Do not require students to consistently write fractions in simplest form.	The Standards do not require the simplified form of a fraction; however, students should fluently find equivalent fractions. "There is no mathematical reason why fractions must be written in simplified form, although it may be convenient to do so in some cases." (NF Progression, p. 6).
Apply the program Rule of Thumb and encourage students to use strategies for adding and subtracting mixed numbers by replacing given fractions with equivalent fractions rather than a specific procedure.	5.NF.A requires students to use equivalent fractions as a strategy to add and subtract fractions.

Grade 5 / Chapter 7: Multiply Fractions
Grade 5 / Chapter 8: Divide Fractions

A Note on Chapters 7 and 8: Unlike other chapters, which needed minor adjustments in order to meet the Standards, the working team found several serious areas of misalignment between the expectations of the Standards and the approach of the *GO Math!* lessons for Chapters 7 and 8.

These issues included:

- A lack of opportunities for students to apply and extend previous understandings of multiplication and division to multiply and divide fractions as called for by 5.NF.B
- Introducing a standard algorithm to multiply and divide fractions without taking time to develop conceptual understanding of the operations
- Lack of time spent developing the concept of multiplication as scaling as called for by 5.NF.B.5
- Introducing models and strategies that don't build conceptual understanding (e.g., circle models for multiplying and estimating or guessing to find missing factors)
- Lack of time for students to develop the knowledge and skills needed for 5.NF.B which is Major Work of Grade 5.

Although there are lessons within these chapters that meet the expectations of the Standards, there would need to be a lot of modifying, deleting, and adding to make the chapters fully align. The decision was made to replace the chapters in order to provide a coherent learning trajectory for both teachers and students.

Note: The lessons that are added come from an EngageNY module that integrates work with measurement conversions (5.MD.A.1) with fraction operations.

Lesson	Action	Details for the Action	Rationale
Chapters 7 and 8	Delete		5.NF.B sets an expectation for students to apply previous understanding of multiplication and division to multiply and divide fractions with many of the standards focused on building students' conceptual understanding of multiplying fractions prior to moving to the standard algorithm. 5.NF.B.5 requires interpreting multiplication as scaling. The cluster does not require students to use estimation or guessing to find missing factors or use circle models. As Major Work of Grade 5, ample time must be spent on multiplying and dividing fractions.

7.0.1	Add	Lesson about interpreting a fraction in context as a numerator and denominator: EngageNY, Module 4, Lesson 2	5.NF.B sets an expectation for students to apply previous understanding of multiplication and division to multiply and divide fractions with many of the standards focused on building students' conceptual understanding of multiplying fractions prior to moving to the standard algorithm. 5.NF.B.5 requires interpreting multiplication as scaling. The cluster does not require students to use estimation or guessing to find missing factors or use circle models. As Major Work of Grade 5, ample time must be spent on multiplying and dividing fractions.
7.0.2	Add	Lesson about interpreting fractions as division: EngageNY, Module 4, Lesson 3	
7.0.3	Add	Lesson about using tape diagrams to visualize the placement of fractions: EngageNY, Module 4, Lesson 4	
7.0.4	Add	Lesson about solving word problems involving the division of whole numbers with answers in the form of fractions or whole numbers: EngageNY, Module 4, Lesson 5	
7.0.5	Add	Lesson about exploring fractions of a set and conversion of units: EngageNY, Module 4, Lesson 6	
7.0.6	Add	Lesson about multiplying any whole number by a fraction using tape diagrams: EngageNY, Module 4, Lesson 7	
7.0.7	Add	Lesson about relating a fraction of a set to the repeated addition interpretation of fraction multiplication; EngageNY, Module 4, Lesson 8	
7.0.8	Add	Lesson about finding a fraction of a measurement, and solving word problems: EngageNY, Module 4, Lesson 9	

7.0.9	Add	Lesson about comparing expressions in word and numerical forms and with parenthesis: EngageNY, Module 4, Lesson 10	5.NF.B sets an expectation for students to apply previous understanding of multiplication and division to multiply and divide fractions with many of the standards focused on building students' conceptual understanding of multiplying fractions prior to moving to the standard algorithm. 5.NF.B.5 requires interpreting multiplication as scaling. The cluster does not require students to use estimation or guessing to find missing factors or use circle models. As Major Work of Grade 5, ample time must be spent on multiplying and dividing fractions.
7.0.10	Add	Lesson about solving and creating fraction word problems involving addition, subtraction, and multiplication: EngageNY, Module 4, Lesson 11	
7.0.11	Add	Lesson about continuing to solve and create fraction word problems involving addition, subtraction, and multiplication: EngageNY, Module 4, Lesson 12	
7.0.12	Add	Lesson about multiplying unit fractions by unit fractions: EngageNY, Module 4, Lesson 13	
7.0.13	Add	Lesson about multiplying unit fractions by non-unit fractions: EngageNY, Module 4, Lesson 14	
7.0.14	Add	Lesson about multiplying non-unit fractions by non-unit fractions: EngageNY, Module 4, Lesson 15	
7.0.15	Add	Lesson about solving word problems using tape diagrams and fraction-by-fraction multiplication: EngageNY, Module 4, Lesson 16	
7.0.16	Add	Lesson about relating decimal and fraction multiplication: EngageNY, Module 4, Lesson 17	

7.0.17	Add	Lesson about continuing to relate decimal and fraction multiplication: EngageNY, Module 4, Lesson 18	5.NF.B sets an expectation for students to apply previous understanding of multiplication and division to multiply and divide fractions with many of the standards focused on building students' conceptual understanding of multiplying fractions prior to moving to the standard algorithm. 5.NF.B.5 requires interpreting multiplication as scaling. The cluster does not require students to use estimation or guessing to find missing factors or use circle models. As Major Work of Grade 5, ample time must be spent on multiplying and dividing fractions.
7.0.18	Add	Lesson about converting measures involving whole numbers, and solving multi-step word problems: EngageNY, Module 4, Lesson 19	
7.0.19	Add	Lesson about converting mixed unit measurements, and solving multi-step word problems: EngageNY, Module 4, Lesson 20	
7.0.20	Add	Lesson about explaining the size of the product, and relating fraction and decimal equivalence to multiplying a fraction by 1: EngageNY, Module 4, Lesson 21	
7.0.21	Add	Lesson about comparing the size of the product to the size of the factors: EngageNY, Module 4, Lesson 22	
7.0.22	Add	Lesson about continuing to compare the size of the product to the size of the factors: EngageNY, Module 4, Lesson 23	
7.0.23	Add	Lesson about solving word problems using fraction and decimal multiplication: EngageNY, Module 4, Lesson 24	
7.0.24	Add	Lesson about dividing a whole number by a unit fraction: EngageNY, Module 4, Lesson 25	

7.0.25	Add	Lesson about dividing a unit fraction by a whole number: EngageNY, Module 4, Lesson 26	5.NF.B sets an expectation for students to apply previous understanding of multiplication and division to multiply and divide fractions with many of the standards focused on building students' conceptual understanding of multiplying fractions prior to moving to the standard algorithm. 5.NF.B.5 requires interpreting multiplication as scaling. The cluster does not require students to use estimation or guessing to find missing factors or use circle models. As Major Work of Grade 5, ample time must be spent on multiplying and dividing fractions.
7.0.26	Add	Lesson about solving problems involving fraction division: EngageNY, Module 4, Lesson 27	
7.0.27	Add	Lesson about writing equations and word problems corresponding to tape and number line diagrams: EngageNY, Module 4, Lesson 28	
7.0.28	Add	Lesson about connecting division by a unit fraction to division by 1 tenth and 1 hundredth: EngageNY, Module 4, Lesson 29	
7.0.29	Add	Lesson about dividing decimal dividends by non-unit decimal divisors: EngageNY, Module 4, Lesson 30	
7.0.30	Add	Lesson about continuing to divide decimal dividends by non-unit decimal divisors: EngageNY, Module 4, Lesson 31	
7.0.31	Add	Lesson about interpreting and evaluating numerical expressions including the language of scaling and fraction division: EngageNY, Module 4, Lesson 32	
7.0.32	Add	Lesson about creating story contexts for numerical expressions and tape diagrams, and solving word problems: EngageNY, Module 4, Lesson 33	

👍 Chapter 7/8 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 5 / Chapter 9: Algebra: Patterns and Graphing

Lesson	Action	Details for the Action	Rationale
9.1 Line Plot	Modify	Skip all questions that ask students to calculate the average.	Finding averages aligns to 6.SP.B.5c.
9.1.1	Add	Practice with creating line plots and analyzing data that requires fraction operations: EngageNY, Module 4, Lesson 1	Allows for connecting Supporting Work (5.MD.B.2) to Major Work (5.NF).
9.2 Ordered Pairs	As is		
9.2.1	Add	Lesson about graphing and naming points on the coordinate plane, including fractional locations: EngageNY, Module 6, Lesson 3	
9.3 Graph Data	Delete		This lesson's focus on line graphs, which are not a requirement for Grade 5, and detracts from the central concern of 5.G.A.
9.4 Line Graphs	Delete		Line graphs are not a requirement of either the 5.G or 5.MD domain.
9.5 Numerical Patterns	As is		
9.6 Find a Rule	Modify	Do not ask students to write a rule to represent the pattern; focus on generating, extending, and comparing patterns.	5.OA.B.3 requires students to generate a pattern from given rules, not create a rule for a pattern.
9.7 Graph and Analyze Relationships	As is		

Chapter 9 Rule of Thumb	Rationale

Give students opportunities to graph and name coordinate points that include fractions, as well as whole numbers.	Builds coherence between 5.G.A and 3.NF and sets students up for work in middle school involving the entire rational number system.

Grade 5 / Chapter 10: Converting Units of Measurement

Lesson	Action	Details for the Action	Rationale
10.1 Customary Length/ 10.2 Customary Capacity/ 10.3 Weight	Modify	Condense these 3 lessons into 1-2 days, mixing up the problems on the different attributes of measurement.	These lessons can be combined to help students to make connections between converting, regardless of the unit, and to shorten the amount of time spent on the Additional cluster 5.MD.A.
10.4 Multi Step Measurement Problems	As is		
10.5 Multi Step Measurement Problems	As is		
10.6 Customary and Metric Conversions	As is		
10.7 Elapsed Time	As is		

👍 Chapter 10 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 5 / Chapter 11: Geometry and Volume*

Lesson	Action	Details for the Action	Rationale
11.1 Polygons	As is		
11.2 Triangles	As is		
11.3 Quadrilateral	As is		
11.4 Three-Dimensional Figures	Delete		Three-dimensional figures are not part of Grade 5 standards.
11.5 Unit Cubes and Solid Figures	As is		
11.6 Understand Volume	As is		
11.7 Estimate Volume	Delete		
11.8 Volume of Rectangular Prisms	As is		
11.9 Apply Volume Formulas	As is		
11.10 Compare Volumes	As is		
11.11 Find Volume of Composed Figures	Modify	Classroom examples and discussion should focus on the examples that recognize volume as additive rather than subtractive.	5.MD.C.5c requires student to recognize volume as additive.

| 11.11.1 | Add | Practice solving application problems involving composite figures. Resources:
• [LearnZillion, Unit 9, Lesson 8](#)
• [LearnZillion, Unit 9, Lesson 9](#)
[Note: Use problems that feature figures composed of two right rectangular prisms] | 5.MD.C.5c requires students to solve real world problems by finding the volume of solid figures composed of two right rectangular prisms. |

*Some editions of *GO Math!* Grade 5, like the Florida-specific version, have a slightly different sequence for Chapter 11. Please use the lesson titles to help determine the adaptations that need to be made.

👍 Chapter 11 Rule of Thumb	Rationale
When students are counting unit cubes to find volume, give problems where the side length are not given.	5.MD.C.3 requires students to build a conceptual understanding of volume and how cubic units define the volume of a figure.