**Guidance Document - *GO Math!* Grade 4**

This document provides guidance on how teachers can adjust their implementation of *GO Math!* to better meet the requirements of the Common Core State Standards or other College- and Career-Ready (CCR) standards. Guidance is provided at both the program and chapter levels and was developed through a collaboration between districts currently using *GO Math!* and Student Achievement Partners. Student Achievement Partners worked with districts across the country that appreciate the promise and potential of the *GO Math!*(K-5) comprehensive mathematics program from Houghton Mifflin Harcourt and that sought to align *GO Math!* more closely to the expectations of rigorous college- and career-ready standards. Student Achievement Partners worked with Houghton Mifflin Harcourt and teams of teachers from these districts to create guidance documents that leverage the program's strongest elements and, when used alongside *GO Math!*, provide teachers the resources to deliver aligned instruction in order to drive student outcomes.

*Part 1: About Go Math!*

Provides a summary of the program and an overall assessment of its strengths as well as areas that require attention to improve alignment.

*Part 2: Program-Level Rules of Thumb*

Program-level Rules of Thumb (RoT) provide alternate ways to use features that appear across the Go Math! program K-5. Some districts may want to begin by just sharing Part 2 with teachers and supporting them in making the RoT a part of their daily instructional practice.

*Part 3: Grade-Level Rules of Thumb*

Grade-level RoT provide grade-specific alternate ways to use features in each grade-level of GO Math!. It also includes a reference to the Fluency documents which provide supplemental resources to help students meet the fluency expectations at each grade level. Teachers may want to consult these at the beginning of the school year as they are mapping out their year.

*Part 4: Chapter-Level Guidance*

Chapter-level guidance includes recommendations for each lesson in all chapters for each grade-level K-5. Lessons can be deleted, modified or left as is. Sometimes, additional lessons are needed to fully reach the expectations of the standards; in these cases a link to a free resource is provided. Keep in mind that these lessons are often pulled from comprehensive programs and teachers will need to make decisions about which parts of the lessons to use. Rationale is provided for why each change has been suggested. By studying this rationale teachers can gain a better understanding of the standards and how to use the suggested resources. Teachers may want to consult each chapter-level guidance as part of a PLC before starting to teach the chapter.

Part One: About *GO Math!* (K-5)

*A description of the strengths in alignment and implementation recommendations*

*GO Math!* *K-5*, written to the Common Core State Standards, was first published by Houghton Mifflin Harcourt in 2012. Since its initial publication, a number of updates have been made in addition to the creation of some state-specific versions. For the most part, however, all of these editions and versions have very similar content and the same instructional approaches.

*GO Math!* has created a sequence of chapters and lessons in each grade that allows for the large majority of time to be on the Major Work of the grade. Generally, the content is aligned to the progression that is outlined in College and Career Ready (CCR) standards with little off-grade-level content and little material that unduly interferes with grade-level learning. Students using *GO Math!* will generally get the right content for the grade level, as outlined by the Standards.

Many lessons that focus on operations provide a mix of strategies and models to help students make sense of the work; however, these strategies and models are rarely connected to each other or used to advance student understanding towards later work they will be doing. For instance, work with addition and subtraction in 1st and 2nd grades includes a variety of representations and strategies that students must learn but does not highlight those strategies which are place-value based and will further students’ understanding of the meaning and properties of the operations.

*GO Math!* provides opportunities for students to experience each aspect of Rigor (Conceptual Understanding, Procedural Skill and Fluency, and Application) required in instruction for students to be college- and career-ready[[1]](#footnote-1). Two components of *GO Math!* that attempt to target Conceptual Understanding are “Math Talk” and “Unlock the Problem.” “Math Talk” generally provides quality conceptual discussion question for students. “Unlock the Problem,” however, is often overly scaffolded which means that students are not having authentic opportunities to make sense of problems and engage with mathematical ideas within lessons that address standards calling for Conceptual Understanding. Overall, the lessons attend to Fluency with addition/subtraction and multiplication/division facts as the focus of chapters and there is a “Fluency Builder” activity that shows up several times a week. However, the Fluency Builder activities do not always correlate to the fluency expectations of the grade level. More work is needed throughout the program to ensure that students meet the required fluencies of each grade. Application problems are provided in each lesson in the Problem Solving **◆** Application section. Many of these problems provide opportunities for students to apply mathematical ideas to real-world or mathematical problems. In addition, the “Problem of the Day” provides other opportunities for Application.

Part Two: Program-Level Rules of Thumb for *GO Math!* (K-5)

*How should teachers use the features of the book to make instruction more aligned?*

The Rules of Thumb below provide general guidance for how to leverage certain features of *GO Math!* to align the program to CCR standards with an emphasis on the Standards for Mathematical Practice (SMPs).  Because the practice of teaching is about so much more than what is provided in instructional materials, the Rules of Thumb serve as general guidance. They are not meant to replace teacher judgement about exactly how to use the materials in every case. There may be times when the Rules of Thumb suggest omitting a certain feature but a teacher still chooses to use that feature sparingly based on the specific content or learning goal for a particular lesson. Note: Some of these features may be slightly different in the Kindergarten materials, as the program is structured a bit differently.

The Rules of Thumb are intended to help users make decisions about how to use the program in a way that is true to the intent of the SMPs. The current references to the SMPs in the program are sometimes inconsistent or inaccurate.  By incorporating the recommendations below, it is much more likely that classroom instruction will allow opportunities for students to engage in the SMPs.

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| **Rule of Thumb** | **Rationale** |
| **1) Daily Routines:**  **Fluency Builder**: Use only activities that are related to grade-level fluency expectations. See specific guidance on how to supplement in each grade-level document.    **Vocabulary Builder**: Rather than doing this as a separate activity, incorporate vocabulary, where appropriate in daily lessons. | Fluency builder does not consistently match grade-level expectations for fluency. More consistent practice is needed to ensure students meet the fluency expectations of each grade level.  MP.6: Vocabulary should be embedded in the lesson as students use and understand precise mathematical vocabulary. |
| **2) Unlock the Problem/Listen and Draw:** Present the problem to students without the scaffolding provided on the student-facing worksheet (e.g., project the problem on the board and have students solve in a math notebook.) Use the scaffolding to drive questions for students as they work and use strategies presented, including those in “Another Way” section as a frame for driving class discussion about student work. It may be also necessary to remove the scaffolding and prompts from the Share and Show that follow these features. | MP.1 requires students to make sense of and solve problems. MP.4 requires students to have opportunities to use mathematics to model problems. |
| **3) Math Talk:** These bubbles should be used for class discussion or writing prompts for students, especially when lessons align to standards that require Conceptual Understanding. | Students need opportunities to respond to conceptual discussion questions to meet the Standards’ expectations for Conceptual Understanding. |
| **4) Problem Solving ◆ Application (Real World):** Make sure to allow time for students to do these problems, particularly when addressing standards that require Application. **Go Deeper/Think Smarter** generally provide problems that make a good basis for conceptual discussions. Use these for discussion, particularly when addressing standards that require Conceptual Understanding. | MP.3 requires that students have opportunities to construct arguments and critique the reasoning of others which can happen during discussions about these problems. |
| **5) Approach to Strategies and Models for Operations:**Provide more opportunities than are currently offered for students to choose which strategies, representations, and models they use to solve problems. In some cases, this may mean presenting problems that require specific strategies, representations, and models without suggesting or providing those supports outright. [See Chapter Rules of Thumb for more specific guidance at each grade level.]    **Note:** This Rule is not saying that strategies, representations, and models should be excluded from instruction. Consistent with the Standards, all are helpful in building students’ understanding of the mathematics. The Rule is intended to incorporate the language of MP.5 and ensure that students ultimately are expected to make choices about which tools to use to solve problems instead of too often being given specific tools within the problems. | Many standards offer examples or choices for models or representations to use to perform operations or solve problems (e.g., 2.NBT.B.7: Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method). As articulated in MP.5, students should “make sound decisions about when...tools might be helpful.” |
| **6) General Approach to Vocabulary:** Do not use the **Developing Math Language** section in the front matter of each chapter. While the listed vocabulary words may be useful in some cases, definitions can be inaccurate or go above grade-level expectations. **Vocabulary Strategy** sections distract from the work of the grade. Vocabulary instruction should be integrated into the work of the lesson.  Skip **Vocabulary Builders/Games/Write Way** at the beginning of each chapter. This distracts from the work of the grade. | MP.6 requires attending to precision. The program tends to treat vocabulary as a topic to be taught separately rather than as part of the work of the content standards and MPs. Integrating vocabulary work into the lessons will allow students to communicate precisely and accurately about their mathematical ideas. |
| **7) Assessment:**   * Eliminate any questions aligned to lessons/content that has been deleted. * Add in vetted questions that are aligned to lessons that have been added. * Remove any directions in questions that require a specific strategy or model. | Alignment to content standards |

Part Three: Grade-Level Rules of Thumb for *GO Math!* (Grade 4)

*What should teachers think about throughout the course of the year specifically for Grade 4 to make instruction more aligned?*

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| **Rule of Thumb** | **Rationale** |
| Use the **Grade 4 : Resources for Developing Grade-Level Fluencies** to provide distributed practice with the standard algorithm for addition and subtraction. | 4.NBT.B.4 requires students to fluently add and subtract multi-digit whole numbers using the standard algorithm. |
| For corresponding edits to the chapter tests, please see the [Chapter Test Alignment](http://www.achievethecore.org/file/3517). | |

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)?*

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| **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](https://www.unbounded.org/math/grade-4/module-1/topic-a/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](https://www.unbounded.org/math/grade-4/module-1/topic-f/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. |

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| **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. |  |

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| **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](https://www.illustrativemathematics.org/content-standards/tasks/263) | 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](https://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_oa_k5_2011_05_302.pdf)). |
| 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](https://www.unbounded.org/math/grade-4/module-3/topic-b/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 2, Lesson 2](https://learnzillion.com/lesson_plans/3492-multiplying-larger-numbers-with-arrays-and-base-ten-blocks) | 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](https://www.unbounded.org/math/grade-4/module-3/topic-e/lesson-13) | 4.OA.A.3 requires a variety of problem types. See Table 3: Multiplication and divisions situations ([CC/OA Progression, p. 23](https://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_oa_k5_2011_05_302.pdf)). |
| 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](https://www.unbounded.org/math/grade-4/module-3/topic-c/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 calculation by using equations, rectangular arrays, and/or area model. |
| 2.12.2 | Add | Practice multiplying with a 1-digit number. Students should choose the strategy of their choice: [EngageNY Module 3, Lesson 10](https://www.unbounded.org/math/grade-4/module-3/topic-c/lesson-10)  *[Note: Remove directions that ask students to use a specific strategy]* |

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| **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](https://commoncoretools.files.wordpress.com/2011/05/ccss_progression_cc_oa_k5_2011_05_302.pdf), 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](http://commoncoretools.me/wp-content/uploads/2015/03/ccss_progression_nbp_k5_2015_03_16.pdf)) 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. |

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| **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 |  |  |

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| **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. |

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| **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](https://www.unbounded.org/math/grade-4/module-3/topic-e/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](https://www.unbounded.org/math/grade-4/module-3/topic-e/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 2, Lesson 7](https://learnzillion.com/lesson_plans/3497-using-arrays-and-partial-quotients-to-solve-division-problems#fndtn-lesson) | 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 |  |  |

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| **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. |

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| **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 |  |  |

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| **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. |  |

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| **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](https://www.unbounded.org/math/grade-4/module-5/topic-b/lesson-9) | 4.NF.A.1 requires students to explain a fraction *a*/*b* is equivalent to a fraction (*n* × *a*)/(*n* × *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](https://www.unbounded.org/math/grade-4/module-5/topic-b/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](https://www.unbounded.org/math/grade-4/module-5/topic-b/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](https://learnzillion.com/lesson_plans/2619-10-generate-equivalent-fractions-with-multiplication-and-division-fp#fndtn-lesson) | 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 |  |  |

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| **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. |

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| **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](https://www.unbounded.org/math/grade-4/module-5/topic-d/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 9, Lesson 8](https://learnzillion.com/lesson_plans/9639-solving-word-problems-by-adding-and-subtracting-mixed-numbers) | 4.NF.B.3d requires application problems |

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| **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. |

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| **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 |  |  |

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| **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. |  |

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| **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 |  |  |

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| **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. |  |

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| **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 |  |  |

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| **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. |

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| **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](https://www.unbounded.org/math/grade-4/module-4/topic-b/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 |  |  |

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| **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. |  |

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| **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](https://commoncoretools.files.wordpress.com/2011/06/ccss_progression_md_k5_2011_06_20.pdf)). |
| 12.5.1 | Add | Lesson about plotting fractions on a line plot, including fractions greater than 1:  [EngageNY, Module 5, Lesson 28](https://www.unbounded.org/math/grade-4/module-5/topic-e/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.](https://www.unbounded.org/math/grade-4/module-2/topic-a/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](https://www.unbounded.org/math/grade-4/module-7/topic-a/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](https://www.unbounded.org/math/grade-4/module-7/topic-b/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](https://www.unbounded.org/math/grade-4/module-7/topic-b/lesson-11) |

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| **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. |  |

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| **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](https://www.unbounded.org/math/grade-4/module-3/topic-a/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](https://www.unbounded.org/math/grade-4/module-3/topic-a/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](https://www.unbounded.org/math/grade-4/module-3/topic-a/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 Test |  | Guidance on chapter tests is currently under development and will be made available Fall 2016. |  |

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| RuleOfThumb.png**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. |  |

1. Student Achievement Partners, The Common Core State Standards Shifts in Mathematics

   http://achievethecore.org/page/900/the-common-core-state-standards-shifts-in-mathematics [↑](#footnote-ref-1)