Mathematics Grade-Level Instructional Materials Evaluation Tool

Quality Review

GRADE

5

Council of the Great City Schools™

Textbooks and their digital counterparts are vital classroom tools but also a major expense, and it is worth taking time to find the best quality materials for students and teachers. While there is no perfect set of materials or textbooks, this Grade-Level Instructional Materials Evaluation Tool-Quality Review (GIMET-QR) is designed for use by professionals as a framework for evaluating the quality of instructional materials and choosing materials that are best suited to provide a coherent learning experience for students.

The district should begin its textbook adoption process by screening an entire publisher series with the Instructional Materials Evaluation Toolkit (IMET), developed by Student Achievement Partners, to see which ones are worthy of deeper consideration. The GIMET-QR can then be used to evaluate materials *for each individual grade*. But rather than providing an exhaustive list of grade-level standards, GIMET-QR starts with the progression to algebra continuum as the major area of focus, allowing for the in-depth review of a smaller set of mathematical concepts covered in the Common Core State Standards Mathematics (CCSS-M) at each grade level.

The GIMET-QR focuses on both the quality of the *content* and the instructional *design* of materials—with a specific focus on evaluating whether materials contain a balance of the three components of rigor (conceptual understanding, applications, and fluency) called for in CCSS-M. Unlike many tools that evaluate the presence or absence of required content, the GIMET-QR prompts reviewers to ask, "How *well* do the materials and assignments reflect and support the rigor of the CCSS-M?"

To answer this question, GIMET-QR contains Guiding Statements along with references to the CCSS for each statement. In response to each Guiding Statement, reviewers are asked to cite specific supporting evidence from the materials themselves, rather than relying on the table of contents or the topic headings. This supporting evidence can then be used to rate whether and to what degree the criteria have been met so that all students have access to a quality mathematics program.

It is important to keep in mind that quality is not defined as "compliance" or a mere checklist of topics. The GIMET-QR aims to help schools and districts choose materials that will provide the best overall learning experience for their students. The distinctive features of instructional materials, like style and appeal that contribute to engaging students in mathematics, should therefore be considered along with the mathematical content and cognitive demand.

The review process culminates with a summary in which reviewers cite strengths and weaknesses of the product, thus providing explicit details for the overall assessment. The summary may also indicate, prior to making a recommendation for purchase, any areas that district curriculum leaders may need to augment or supplement.

Please note: Acrobat Reader or Adobe Acrobat is required to complete this form electronically and save any data entered by users.

THE STRUCTURE OF GIMET-QR

The GIMET-QR for Mathematics is divided into four sections:

I. "CCSS-M" clusters and standards along the "progression to algebra continuum" for grade five

This first section focuses on the content of the materials under review and on the quality of the explanations and connections that develop the concepts and skills for the algebra continuum in grade five. This section features "guiding statements" that require reviewers to examine the quality of the materials, as well as the assignments that address the level of rigor in CCSS-M. The statements about materials and assignments are similar, but their focus is different. While the materials statements ask the reviewer to show evidence about the quality of how concepts and skills are attended to in the text or digital resource under review, the assignments statements ask the reviewer to cite evidence that students are given the opportunity to apply their understanding of those concepts and skills.

The statements in bold print in GIMET-QR refer to the CCSS-M clusters, i.e., 5.OA.1-2 for reviewers to use in considering the quality of materials and assignments. The reviewer may notice that the wording of the cluster heading is somewhat different than what is written in CCSS-M. This was done to address what materials and assignments could offer in support of the cluster standards. However, the essential wording of the cluster headings is maintained. The standards indicated within GIMET-QR are listed as written in CCSS-M. In grade five, the "CCSS progression documents," from the Institute of Mathematics,[1] were used to provide additional specificity and clarity for the reviewers about what to look for in *Number and Operations in Base-Ten* and *K-5 Number and Operations - Fractions*. This progression information within the document is indicated using an indentation and preceded by the symbol (▶).

II. Decision Recording Sheets: Quality Criteria for Conceptual Understanding, Applications, and Fluency with an accompanying rubric for high quality/exciting materials and assignments

The second section asks the reviewer to reflect on the findings from the first section to answer the question of how well the materials reflect and support the rigor of the CCSS-M. Reviewers are asked to consider how well the materials support teachers and engage students. Judgments are made after organizing the evidence around each of three dimensions of rigor—**conceptual understanding, applications,** and **fluency**. Reviewers assign one of three ratings: **High Quality/Exciting, Good Quality** or **Minimal Quality**. The section also includes a rubric which describes high quality/exciting materials and establishes the highest criteria for both materials and assignments.

III. Adoption Committee Recommendation Form

The third section, to be completed after reviewing multiple submissions for adoption, is an *Adoption Committee Recommendation Form*. This provides reviewers with an opportunity to list their top three choices and cite specific strengths and weaknesses for all of the materials being reviewed.

IV. Appendix

The fourth section is an Appendix that includes two items: The *Progression to Algebra Continuum* and a table of *Common Multiplication and Division Situations*.[2]

GIMET-QR does not attend to all the grade five standards but rather only those listed within the progression to algebra continuum. GIMET-QR does not attend to coherence across grade levels but does look for coherence within a grade when considering the quality of materials and assignments. Similar to CCSS-M, GIMET-QR operates at a very fine grain size, while individual lessons and units under review might work across clusters. GIMET-QR is not a checklist that would fragment the CCSS-M, rather the "fine grain size" deliberately focuses on how well the materials reflect the intent of the CCSS-M.

1 University of Arizona Institute of Mathematics, http://ime.math.arizona.edu/progressions/

2 From pages 89-90 of the Common Core State Standards for Mathematics. Adapted from Box 2-4 of *Mathematics Learning in Early Childhood*, National Research Council (2009, pp. 32-33).

GETTING STARTED

Completing the GIMET-QR entails a five-step process. Reviewers are expected to read through each of the steps and their explanations, and locate all the pertinent tables and pages before starting. Then complete each step.

Step one – Individual reviewers will evaluate how well the materials and their accompanying assignments develop the algebra continuum content for each grade level. Use the tables that start on page four to capture the evidence of how and where the materials do this. The purpose for noting specific examples as evidence is to contribute to discussions with other reviewers in steps two through four. Cite specific examples of the explanations, diagrams, and pictorial representations in the materials and assignments that prompt students to show their understanding. Additionally, reviewers should consider the interaction of students with the materials in two areas: 1) students as receptive learners (interactions with the explanations and illustrations in the materials) and 2) students producing and showing their understanding (interacting and completing the assignments in the materials).

Step two – Discuss your findings and evidence with other reviewers. Reviewers should discuss the evidence cited and use it to confirm or assist you (individually) in reviewing and revising your findings.

Step three – Next, reviewers need to consider the interaction of students and teachers with the content of the materials along three dimensions of rigor—**conceptual understanding**, **applications**, and **fluency**—to assign a judgment of quality to each dimension. Reviewers should answer the question: How well do the materials reflect and support the rigor of the CCSS-Mathematics overall? Reviewers will use the guiding questions found in the **Decision Recording Sheet** together with the rubric describing **high quality** to assign ratings. Consider the totality of the collected evidence along the dimensions of rigor, and record your rating at the bottom of each table.

The highest level of quality is described using the words "**High Quality/ Exciting**." We use these words to indicate a high degree of excitement about the materials and the assignments. As the reviewer considers the descriptors, keep in mind that these criteria apply to each dimension of rigor for both the materials and the assignments they present to students. To earn this rating, the evidence must demonstrate grade-level rigor of the CCSS-M in an engaging way.

The other levels represent varying degrees of quality. For example, **"Good Quality"** indicates that the materials and assignments are workable or sufficient. **"Minimal Quality,"** meanwhile, indicates that the materials are sufficient on their own, but would not be conducive to motivating students.

These descriptions will be used for rating the overall quality of the program.

Step four – Discuss your findings and conclusions with other reviewers. Include the following questions as a part of the discussion:

- What are the top three strengths of the texts?
- What areas need improvement?
- What additional supports would be needed to implement the textbook series or digital materials?

Step five – After discussion, reach consensus and make final recommendations on the **Adoption Committee Recommendation Form.**

I. CCSS-M CLUSTERS AND STANDARDS

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.NBT.1-4. Materials demonstrate the place value system by showing and explaining how: ■ In a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and *1/10* of what it represents in the place to its left. ■ Patterns in the number of zeros of the product when multiplying a number by powers of 10, in the placement of the decimal point when a decimal is multiplied or divided by a power of 10, and using whole-number exponents to denote powers of 10. ▶ Multiplying by 10^4 is multiplying by 10 four times. Multiplying by 10 once shifts every digit of the multiplicand one place to the left in the product (the product is ten times as large) because in the base-ten system the value of each place is 10 times the value of the place to its right. So multiplying by 10 four times shifts every digit 4 places to the left. Patterns in the number of zeroes in products of whole numbers and a power of 10 and the location of the decimal point in products of decimals with powers of 10 can be explained in terms of place value. ▶ Link the academic language of multiples to powers to connect understanding of multiplication with exponentiation. ■ To read, write, and compare decimals to thousandths. ■ To use place value understanding to round decimals to any place.	
5.NBT.1-4. Assignments ask students to demonstrate their understanding of the place value system by: ■ Reading and writing decimals to thousandths using base-ten numerals, number names, and expanded form, *e.g.*, 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). ■ Comparing two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. ■ Rounding decimals to any place. ▶ Explaining patterns when multiplying whole numbers or decimals by a power of 10.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.NBT.5-7. Materials demonstrate how to perform operations with multi-digit whole numbers and decimals to hundredths by showing and explaining how to: ▪ Multiply multi-digit whole numbers using the standard algorithm. ▪ 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. ▪ Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. ▪ Add, subtract, multiply, and divide decimals to hundredths, 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 and explain the reasoning used.	
5.NBT.5-7. Assignments ask students to perform operations with multi-digit whole numbers and decimals to hundredths by: ▪ Fluently multiplying multi-digit whole numbers using the standard algorithm. ▪ Finding 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. ▪ Illustrating and explaining the calculation by using equations, rectangular arrays, and/or area models. ▪ Adding, subtracting, multiplying, and dividing decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relating the strategy to a written method and explaining the reasoning used.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.NF.1-2. Materials demonstrate how to use equivalent fractions as a strategy to add and subtract fractions by showing and explaining how to: ■ Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example: 2/3 + 5/4 = 8/12 + 15/12 = 23/12 (in general a/b + c/d = (ad+bc)/bd).* ■ Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. ■ Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + ½ = 3/7, by observing that 3/7 < ½.*	
5.NF.1-2. Assignments ask students to use equivalent fractions as a strategy to add and subtract fractions by: ■ Adding and subtracting fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. ■ Solving word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. ■ Using benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.NF.3-7. Materials demonstrate how to apply and extend previous understandings of multiplication and division to multiply and divide fractions by showing and explaining how to: ■ Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). ▶ Materials connect the interpretation of a fraction as division of the numerator by the denominator to an understanding of division as equal sharing. ■ Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. ■ Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. ■ Interpret multiplication as scaling (resizing) by: ▶ Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. ▶ Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1. ▶ When students multiply fractions in general, products can be larger or smaller than either factor, and multiplication can be seen as an operation that "stretches or shrinks" by a scale factor. This view of multiplication as scaling is an appropriate notion for reasoning multiplicatively with continuous quantities (continues the work from grade four). ■ Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. ■ Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.NF.3-7. Assignments ask students to apply and extend previous understandings of multiplication and division to multiply and divide fractions by: ■ Solving word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example interpret ¾ as the result of dividing 3 by 4, noting that ¾ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size ¾. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?* ● Interpreting the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b. *For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = (ac/bd.)* ● Finding the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. ● Multiplying fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas. ▶ Connect fraction multiplication to finding the area of a rectangle. ■ Interpret multiplication as scaling (resizing) by: ● Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. ● Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (nxa)/(nxb) to the effect of multiplying a/b by 1. *continued on next page >*	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
continued from previous page > ■ Solving real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. ■ Applying and extending previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. ● Interpreting division of a unit fraction by a non-zero whole number and computing such quotients. *For example, create a story context for (1/3) ÷4 and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4* = 1/12 because (1/12) x *4 = 1/3.* ● Interpreting division of a whole number by a unit fraction, and computing such quotients. *For example, create a story context for 4 ÷ (1/5) and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 x (1/5) = 4.* ● Solving real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins*?	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.MD.3-5. Materials illustrate concepts of volume and relate volume to multiplication and addition by showing and explaining how: ■ Volume is an attribute of solid figures. ● A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. ● A solid figure, which can be packed without gaps or overlaps using *n* unit cubes, is said to have a volume of *n* cubic units. ■ To measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. ■ To relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume.	
5.MD.3-5. Assignments ask students to illustrate concepts of volume and relate volume to multiplication and addition by: ■ Measuring volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. ■ Finding the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and showing that the volume is the same as would be found by multiplying the edge lengths, or by multiplying the height by the area of the base. ■ Applying the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. ■ Finding volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, and applying this technique to solve real-world problems. ▶ *Students might design a science station for the ocean floor that is composed of several rooms that are right rectangular prisms and that meet a set criterion specifying the total volume of the station. They draw their station (e.g., using an isometric grid) and justify how their design meets the criterion.*	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
5.G.1-2. Materials illustrate how to graph points in the coordinate plane to solve real-world and mathematical problems by showing and explaining how to: ■ Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. ■ Graph points on the coordinate plane knowing that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate). ■ Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. ▶ *Develop a plan to draw a symmetric figure using computer software in which students input coordinates that are then connected by line segments.*	
5.G.1-2. Assignments ask students to graph points in the coordinate plane and to solve real-world and mathematical problems by: ■ Showing that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate). ■ Representing real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpreting coordinate values of points in the context of the situation.	

II. DECISION RECORDING SHEET

Completed by: ______________________________ Date: ______________________________

Use the evidence that you collected for grade five to begin judging the overall quality of the program. Begin by answering the overarching question: ***How well do the materials reflect and support the rigor of the CCSS-M?*** *Use the accompanying rubric which describes the criteria for high quality/exciting materials and assignments that engage both students and teachers.*

Rigor requirement (balance): A program that emphasizes only fluency is not rigorous. Likewise, a program that only focuses on applications or conceptual understanding is not rigorous. For a program to be rigorous, there must be a balance of all three (conceptual understanding, applications, and fluency) as indicated in the grade level standards. By the end of grade five, there are specific fluency requirements for students (multiply multi-digit whole numbers using the standard algorithm), and standards addressing procedural skill (procedural skill refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing procedures flexibly, accurately, and efficiently).

Criteria for Rigor and Quality in Conceptual Understanding, Applications, and Fluency

CONCEPTUAL UNDERSTANDING: **CONNECTIONS**	
Materials: ■ How well do the materials develop conceptual understanding of operations and algebraic thinking as defined in the CCSS-M and in the *Progression to Algebra (Appendix A)*? ■ How well do the materials connect to and extend prior knowledge? • The materials present and describe explicit connections to prior knowledge, connections among mathematical ideas, and connections among different mathematical representations, using appropriate academic language. ■ How well do the materials develop academic language (including words, phrases, and sentences using symbols, graphs, and diagrams)?	**Assignments:** How well do the assignments prompt students to produce explanations and viable arguments? • The set of assignments challenge students to use their mathematical knowledge, academic language, and skills to solve problems and formulate mathematical models in a variety of contexts. ■ How well do the assignments ask students to make explicit connections to prior knowledge, connections among mathematical ideas, and connections among different mathematical representations?

CONNECTIONS: CRITERIA FOR MEETING THE RATING OF "HIGH QUALITY/EXCITING"		
	Materials *The materials present and describe explicit connections to prior knowledge, connections among mathematical ideas, and connections among different mathematical representations, using appropriate academic language.*	**Assignments** *The assignments in the materials encourage and challenge students to use their mathematical knowledge, academic language, and skills to solve problems and formulate mathematical models in a variety of contexts.*
Student	*Using high quality/exciting materials, my students will:* ■ comprehend the concepts and connections in the materials. ■ make sense of the mathematics. ■ be excited to try the problems and learn from working on them. ■ want to learn the mathematical concepts and gain confidence that effort to learn will pay off.	*Using high quality/exciting assignments, my students will:* ■ engage in the challenge of comprehension and discussion. ■ make sense of the mathematics. ■ be excited to try the problems and learn from working on them. ■ want to learn the mathematical concepts and gain confidence that their effort to learn will pay off.
Teacher	*Using high quality/exciting materials will help me:* ■ see and understand the mathematical goals of the lesson/unit. ■ understand better the mathematics that I am teaching, learn more mathematics from the materials, and want to learn more from interacting with students. ■ be excited about teaching the lessons and see how students respond to the connections in the lesson/unit. ■ focus students' efforts on the mathematical connections and give them feedback on how to do better. ■ anticipate typical misconceptions, missing connections, and which struggles will be most productive for students. ■ be confident students will be motivated to learn from and connect the mathematics, as well as gain confidence that their efforts to learn will pay off.	*Using high quality/exciting assignments will help me:* ■ want to learn more from interacting with students, analyzing their work on assignments, and re-engaging them in the concepts related to the assignments. ■ use students' responses to focus their efforts on the mathematical connections and give them feedback on how to do better. ■ anticipate typical misconceptions, missing connections, and which struggles will be most productive for students. ■ know students will be motivated to learn from and connect the mathematics as well as gain confidence that their efforts to learn will pay off.
RATING – Compared to the criteria listed above, the materials I have just reviewed would be considered: ☐ 3) High Quality/Exciting ☐ 2) Good Quality ☐ 1) Minimal Quality		

CONCEPTUAL UNDERSTANDING: **EXPLANATIONS**	
Materials: ■ How well do the materials provide example explanations connecting different representations to show why a statement or steps in an argument or solution is true and under what conditions it is true? ● The materials provide example explanations, using appropriate concepts and academic language for the grade level, to show how a way of thinking about a problem makes sense using several representations and explicitly identifying correspondences across representations. ■ How well do the materials use abstractions and generalizations to communicate the mathematical structure that organizes seemingly scattered individual events or results?	**Assignments:** How well do the assignments require that student provide explanations using appropriate content and grade-level academic language? ● The set of assignments requires students to use appropriate content and grade-level academic language to explain why reasons and justifications for steps in a solution or an argument are valid and how the mathematical structure represents generalizations about a problem situation (context) mathematically to their peers and the teacher. ■ How well do the assignments ask students to use the mathematical structure to organize individual, seemingly scattered statements or results to represent generalizations mathematically to their peers and the teacher?

EXPLANATIONS: CRITERIA FOR MEETING THE RATING OF "**HIGH QUALITY/EXCITING**"		
	Materials *The materials provide example explanations, using appropriate concepts and academic language for the grade level, to show how a way of thinking about a problem makes sense using several representations and explicitly identifying correspondences across representations.*	**Assignments** *The assignments require students to use appropriate grade-level concepts and academic language to explain why reasons and justifications for steps in a solution or an argument are valid and how the mathematical structure represents generalizations about a problem situation (context) mathematically to their peers and the teacher.*
Student	*Using high quality/exciting materials, my students will:* ■ comprehend the explanations presented in the materials. ■ make sense of the mathematics of the lesson/unit. ■ be excited to try the problems and learn from working on them. ■ want to learn the related mathematical concepts and gain confidence that their effort to learn will pay off.	*Using high quality/exciting materials, my students will:* ■ engage in the challenge of comprehension and explanation with their peers and with me. ■ make sense of the mathematics of the lesson/unit. ■ be excited to try the problems and learn from working on them. ■ want to learn the related mathematical concepts and gain confidence that their effort to learn will pay off.

Teacher	*Using high quality/exciting materials will help me:* - see and understand the mathematical goals of the lesson/unit. - understand better the mathematics that I am teaching, learn more mathematics from the materials, and want to learn more from interacting with students. - be excited about teaching the lessons and see how students respond to the explanations in the lesson/unit. - focus students' efforts on the mathematical explanations and give them feedback on how to do better. - anticipate typical misconceptions, struggles that are most productive for students, and ways to help students to revise their explanation.	*Using high quality/exciting materials will help me:* - want to learn more from interacting with students, analyzing their work on assignments, and re-engaging them on the concepts related to the assignments. - use students' responses to focus their efforts on the mathematical connections and give them feedback on how to do better. - anticipate typical misconceptions, struggles that are most productive for students, and ways to help students revise their explanations. - know students will be motivated to learn from and connect the mathematics as well as gain confidence that their efforts to learn will pay off. - prompt students to make their mathematical explanations clear in a way that others can understand and critique them.

RATING – Compared to the criteria listed above, the materials I have just reviewed would be considered:

☐ 3) High Quality/Exciting ☐ 2) Good Quality ☐ 1) Minimal Quality

APPLICATIONS

Materials

How well do the materials develop students' expertise in the application of concepts appropriate for this grade level?

- The materials show how to use mathematics to analyze problem situations, appropriate for the grade level, and provide examples of deploying the Standards for Mathematical Practice to make sense of problems.

- How well do the materials support students' understanding of how to analyze problem situations, showing how to use mathematics to help make sense of problems?

Assignments

How well do the assignments develop the application of grade-level concepts?

- The assignments prompt students to use mathematics and the Standards for Mathematical Practice to help them make sense of a variety of problems and formulate mathematical models of real-world phenomena appropriate for this grade level.

- How well do the assignments support students' understanding of how to formulate mathematical models of real-world phenomena, including explaining assumptions and explaining why the model serves its purpose in a reasonable way?

APPLICATIONS: CRITERIA FOR MEETING THE RATING OF "**HIGH QUALITY/EXCITING**"		
	Materials *The materials show how to use mathematics to analyze problem situations appropriate for the grade level and provide examples of deploying the Standards for Mathematical Practice to make sense of problems.*	**Assignments** *The assignments prompt students to use mathematics and the mathematical practice standards to help them make sense of a variety of problems, appropriate for this grade level, by asking students to formulate mathematical models.*
Student	*Using high quality/exciting materials, my students will:* ■ apply the concepts and connect them to each other and their different representations. ■ make sense of the mathematics of the lesson/unit. ■ be excited to try the problems and learn from working on them. ■ understand how to formulate and model problem situations mathematically. ■ gain confidence that their effort to learn will pay off.	*Using high quality/exciting assignments, my students will:* ■ be challenged to use their mathematics to comprehend, analyze, and make sense of the problem situation. ■ make sense of quantities and their relationship in the math problem. ■ represent the problem concretely and pictorially and represent it as an equation and explain how the two representations relate to each other. ■ identify important quantities in a practical situation and map their relationships using such tools as concrete models, diagrams, and equations. ■ formulate and model problem situations mathematically. ■ engage in discussions with their peers and the teacher to make sense of the problem and learn from them. ■ be excited to try the problems and learn from working on them. ■ gain confidence that their effort to learn will pay off.
Teacher	*Using high quality/exciting materials will help me:* ■ see and understand the mathematical goal of the lesson/unit. ■ understand better the mathematics that I am teaching, learn more mathematics from the materials, and want to learn more from interacting with students. ■ be excited about teaching the lessons and see how students respond to the problems/tasks in the lesson/unit. ■ be confident I can focus students' efforts on the mathematical tasks/problems and give them feedback on how to do better. ■ anticipate typical misconceptions, missing connections, and which struggles will be most productive for students. ■ be confident students will be motivated to learn.	*Using high quality/exciting assignments will help me:* ■ prompt students to make their mathematical thinking clear in a way that others can understand and critique it. ■ want to learn more from interacting with students, analyzing their work on problems/tasks, and re-engaging them on making use of concepts related to them. ■ use the student's responses to focus their efforts on strategic thinking and give them feedback on generalizing to other related applications. ■ anticipate typical misconceptions, missing strategies, and which productive struggles will be most beneficial for students. ■ gain confidence that their efforts to learn will pay off.
RATING – Compared to the criteria listed above, the materials I have just reviewed would be considered: ☐ 3) High Quality/Exciting ☐ 2) Good Quality ☐ 1) Minimal Quality		

FLUENCY	
Materials: ■ How well do the materials focus on developing critical procedural skills and fluency in multiplying multi-digit whole numbers using the standard algorithm by the end of grade five? ● *Materials show how procedural skills and the standard for fluency for this grade level (*multiply multi-digit whole numbers using the standard algorithm*) work and provide consistent opportunities for students to practice using the algorithm or procedure.*	**Assignments:** ■ How well does the set of assignments focus on developing critical procedural skills and fluency? ● *The set of assignments prompts students to develop and demonstrate fluency by multiplying multi-digit whole numbers using the standard algorithm by the end of grade five.*

FLUENCY: CRITERIA FOR MEETING THE RATING OF "**HIGH QUALITY/EXCITING**"		
	Materials *Materials show how the standard for fluency, multiplying multi-digit whole numbers using the standard algorithm, works and provide opportunities for students to practice using the algorithm, procedure, or formula.*	**Assignments** *The set of assignments prompts students to develop and demonstrate fluency when multiplying multi-digit whole numbers using the standard algorithm.*
Student	*Using high quality/exciting materials, my students will:* ■ have a variety of different ways to practice using an algorithm, procedure, or formula to develop fluency. ■ self-assess areas of weakness and strengths when multiplying multi-digit whole numbers using the standard algorithm and receive feedback on which area(s) to improve.	*Using high quality/exciting assignments, my students will:* ■ build skills in multiplying multi-digit whole numbers using the standard algorithm flexibly, accurately, efficiently, and appropriately. ■ gain confidence that their efforts to learn will pay off.
Teacher	*Using high quality/exciting materials will help me:* ■ see and understand how the work on procedural fluency supports the mathematical goal of the lesson/unit. ■ be confident that I can focus students' efforts on building fluency, and help students understand and correct their mistakes. ■ be confident students will be motivated to learn.	*Using high quality/exciting assignments will help me:* ■ want to learn more from interacting with students. ■ use students' responses to focus their efforts on building fluency and give them feedback on how to do better. ■ see how to help students understand and correct their mistakes. ■ be confident students will be motivated to learn.

RATING – Compared to the criteria listed above, the materials I have just reviewed would be considered:

☐ 3) High Quality/Exciting ☐ 2) Good Quality ☐ 1) Minimal Quality

III. ADOPTION COMMITTEE RECOMMENDATION FORM

Based on the substantial evidence collected, please rank all the grade five materials you reviewed in the order in which you would recommend them for adoption. The program or materials with your highest recommendation should be listed as number one below. Please provide any comments you deem pertinent. Include answers to the following questions based on the evidence cited in your materials review:

- **What are the top three strengths of this text?**
- **What areas need improvement?**
- **What additional supports would be needed to implement the textbook series or digital materials?**

RECOMMENDED		
PROGRAM NAME/EDITION:		COMMENTS:
1		
2		
3		

continued >

NOT RECOMMENDED		
PROGRAM NAME/EDITION:		COMMENTS:
1		
2		
3		

Completed by: ______________________________ Date: ______________________

K	1	2	3	4	5	6	7	8
Know number names and the count sequence Count to tell the number of objects Compare numbers Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from Work with numbers 11-19 to gain foundations for place value	Represent and solve problems involving addition and subtraction Understand and apply properties of operations and the relationship between addition and subtraction Add and subtract within 20 Work with addition and subtraction equations Extend the counting sequence Understand place value Use place value understanding and properties of operations to add and subtract Measure lengths indirectly and by iterating length units	Represent and solve problems involving addition and subtraction Add and subtract within 20 Understand place value Use place value understanding and properties of operations to add and subtract Measure and estimate lengths in standard units Relate addition and subtraction to length	Represent & solve problems involving multiplication and division Understand properties of multiplication and the relationship between multiplication and division Multiply & divide within 100 Solve problems involving the four operations, and identify & explain patterns in arithmetic Develop understanding of fractions as numbers Solve problems involving measurement and estimation of intervals of time, liquid volumes, & masses of objects Geometric measurement: understand concepts of area and relate area to multiplication and to addition	Use the four operations with whole numbers to solve problems Generalize place value understanding for multi-digit whole numbers Use place value understanding and properties of operations to perform multi-digit arithmetic Extend understanding of fraction equivalence and ordering Build fractions from unit fractions by applying and extending previous understandings of operations Understand decimal notation for fractions, and compare decimal fractions	Understand the place value system Perform operations with multi-digit whole numbers and decimals to hundredths Use equivalent fractions as a strategy to add and subtract fractions Apply and extend previous understandings of multiplication and division to multiply and divide fractions Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition Graph points in the coordinate plane to solve real-world and mathematical problems*	Apply and extend previous understandings of multiplication and division to divide fractions by fractions Apply and extend previous understandings of numbers to the system of rational numbers Understand ratio concepts and use ratio reasoning to solve problems Apply and extend previous understandings of arithmetic to algebraic expressions Reason about and solve one-variable equations and inequalities Represent and analyze quantitative relationships between dependent and independent variables	Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers Analyze proportional relationships and use them to solve real-world and mathematical problems Use properties of operations to generate equivalent expressions Solve real-life and mathematical problems using numerical and algebraic expressions and equations	Work with radical and integer exponents Understand the connections between proportional relationships, lines, and linear equations Analyze and solve linear equations and pairs of simultaneous linear equations Define, evaluate, and compare functions Use functions to model relationships between quantities*

From the K, Counting and Cardinality; K–5, Operations and Algebraic Thinking Progression p. 9

APPENDIX B: COMMON MULTIPLICATION AND DIVISION SITUATIONS[1]

	UNKNOWN PRODUCT	GROUP SIZE UNKNOWN ("HOW MANY IN EACH GROUP?" DIVISION)	NUMBER OF GROUPS UNKNOWN ("HOW MANY GROUPS?" DIVISION)
	3 x 6 = ?	**3 x ? = 18**, and **18 ÷ 3 = ?**	**? x 6 = 18**, and **18 ÷ 6 = ?**
EQUAL GROUPS	There are 3 bags with 6 plums in each bag. How many plums are there in all? *Measurement example.* You need 3 lengths of string, each 6 inches long. How much string will you need altogether?	If 18 plums are shared equally into 3 bags, then how many plums will be in each bag? *Measurement example.* You have 18 inches of string, which you will cut into 3 equal pieces. How long will each piece of string be?	If 18 plums are to be packed 6 to a bag, then how many bags are needed? *Measurement example.* You have 18 inches of string, which you will cut into pieces that are 6 inches long. How many pieces of string will you have?
ARRAYS[2], AREA[3]	There are 3 rows of apples with 6 apples in each row. How many apples are there? *Area example.* What is the area of a 3 cm by 6 cm rectangle?	If 18 apples are arranged into 3 equal rows, how many apples will be in each row? *Area example.* A rectangle has area 18 square centimeters. If one side is 3 cm long, how long is a side next to it?	If 18 apples are arranged into equal rows of 6 apples, how many rows will there be? *Area example.* A rectangle has area 18 square centimeters. If one side is 6 cm long, how long is a side next to it?
COMPARE	A blue hat costs $6. A red hat costs 3 times as much as the blue hat. How much does the red hat cost? *Measurement example.* A rubber band is 6 cm long. How long will the rubber band be when it is stretched to be 3 times as long?	A red hat costs $18 and that is 3 times as much as a blue hat costs. How much does a blue hat cost? *Measurement example.* A rubber band is stretched to be 18 cm long and that is 3 times as long as it was at first. How long was the rubber band at first?	A red hat costs $18 and a blue hat costs $6. How many times as much does the red hat cost as the blue hat? *Measurement example.* A rubber band was 6 cm long at first. Now it is stretched to be 18 cm long. How many times as long is the rubber band now as it was at first?
GENERAL	**a x b = ?**	**a x ? = p** and **p ÷ a = ?**	**? x b = p**, and **p ÷ b = ?**

Source: http://www.corestandards.org/Math/Content/mathematics-glossary/Table-2/

1 The language in the array examples shows the easiest form of array problems. A harder form is to use the terms rows and columns: The apples in the grocery window are in 3 rows and 6 columns. How many apples are in there? Both forms are valuable.

2 Area involves arrays of squares that have been pushed together so that there are no gaps or overlaps, so array problems include these especially important measurement situations.

3 The first examples in each cell are examples of discrete things. These are easier for students and should be given before the measurement examples.