Mathematics Grade-Level Instructional Materials Evaluation Tool

Quality Review

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 kindergarten

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 kindergarten. 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., K.CC.1-3), for reviewers to use in considering the quality of materials and assignments. The reviewer may notice that the wording of the cluster headings is somewhat different than what is written in CCSS-M. This was done to address what materials and assignments could offer. However, the essential wording of the cluster headings is maintained. The standards indicated within GIMET-QR are listed as written in CCSS-M. In kindergarten, 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 *Counting and Cardinality* and *Operations and Algebraic Thinking*. This progression information within the document is indicated using an indentation and preceded by (▶).

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 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 Addition and Subtraction Situations*.[2]

GIMET-QR does not attend to all the kindergarten 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
K.CC.1-3. Materials connect multiple representations of numbers to their number names and explain how to: ■ Use a variety of representations to count to 100 by ones and by tens. ■ Count forward beginning from a given number within the known sequence (instead of having to begin at 1). ■ Write numbers from 0 to 20 and explain how a number of objects can be described with a written numeral 0–20 (with 0 representing a count of no objects).	
K.CC.1-3. Assignments ask students to know number names and the count sequence by: ■ Prompting students to count to 100 by ones and by tens using a variety of materials/representations and mentally. ■ Asking them to count forward beginning from a given number within the known sequence (instead of having to begin at 1). ■ Writing numbers from 0 to 20 and representing a number of objects with a written numeral 0–20 (with 0 representing a count of no objects). ▶ Represent numbers in multiple ways (e.g., counters, drawings, manipulatives, numbers).	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
K.CC.4-5. Materials represent numbers in multiple ways and explain how to count to tell the number of objects. ■ Materials explain the relationship between numbers and quantities, connect counting to cardinality, and demonstrate how to: ● Say numbers in the standard order when counting objects, pairing each object with one and only one number name and each number name with one and only one object. ● Understand that the last number said tells the number of objects counted and that the number of objects is the same regardless of their arrangement or the order in which they were counted. ▶ The materials show how to count objects arranged in a line—the easiest arrangement—and then in more difficult arrangements, such as rectangular arrays (students need to ensure they count each object in every row or column and do not repeat rows or columns), circles (students need to stop just before the object they started with), and scattered configurations (students need to make a single path through all of the objects). ▶ Understand that each successive number name refers to a quantity that is one larger. ■ Materials demonstrate for students how to count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; and, given a number from 1-20, how to count out that many objects.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
K.CC.4-5. Assignments ask students to count to tell the number of objects by: ■ Asking students to show their understanding of the relationship between numbers and quantities and of the connection of counting to cardinality (i.e., asking them to move from saying the counting words to counting objects). ■ Prompting students to count objects, saying the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. ■ Requiring students to demonstrate that they know that the last number said tells the number of objects counted and that the number of objects is the same regardless of their arrangement or the order in which they were counted. ▶ Assignments ask students to count objects arranged in a line—the easiest arrangement; then with more practice, students are asked to count objects in more difficult arrangements, such as rectangular arrays (they need to ensure they reach every row or column and do not repeat rows or columns), circles (they need to stop just before the object they started with), and scattered configurations (they need to make a single path through all of the objects). ▶ Pushing students to show they understand that each successive number name refers to a quantity that is one larger. ■ Asking students to count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; and, given a number from 1-20, asking students to count out that many objects. ▶ Assignments ask students both perceptual and conceptual "subitizing questions" [i.e., students come to quickly recognize the cardinalities of small groups without having to count the objects. This is called *perceptual subitizing*. Perceptual subitizing develops into *conceptual subitizing*—recognizing that a collection of objects is composed of two subcollections and quickly combining their cardinalities to find the cardinality of the collection (e.g., seeing two subsets of two and saying "four")].	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
K.CC.6–7. Materials show and explain multiple ways to compare numbers by: ■ Showing how to identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies. ■ Comparing two numbers between one and 10 presented as written numerals. ▶ Compare the two numbers using a variety of ways—with real objects, drawings, counting, subitizing, etc.	
K.CC.6–7. Assignments ask students to use and explain multiple ways to compare numbers by: ■ Asking students to compare two numbers between one and 10 presented as written numerals in a variety of ways. ▶ Examples could include real objects, drawings, counting, subitizing, etc. ▶ Asking students to create two groups of objects in which one is greater than, less than, or equal to the number of objects in the other group. ▶ Prompting students to match the objects in the two groups to see if there are any extra and then to count the objects in each group and use their knowledge of the count sequence to decide which number is greater than the other (the number farther along in the count sequence). ▶ Later, asking students to demonstrate that even if one group looks as if it has more objects (e.g., has some extra sticking out), matching or counting may reveal a different result.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
K.OA.1–5. Materials present addition as putting together and adding to, and subtraction as taking apart and taking from, by demonstrating: ■ How to represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations. ▶ The materials include written expressions (e.g., 3–1) to represent operations, as well as written equations that represent the whole situation before the solution (e.g., 3 - 1 = ☐) or after (e.g., 3 - 1 = 2). Expressions like 3-1 or 2+1 show the operation, and it is helpful for students to have experience just with the expression so they can conceptually chunk this part of an equation. Equations with one number on the left and an operation on the right (e.g., 5 = 2 + 3 to record a group of 5 things decomposed as a group of 2 things and a group of 3 things) allow students to understand equations as showing in various ways that the quantities on both sides have the same value. ▶ The materials help students develop the academic language of addition and subtraction. For example, using the term "total" in addition problems instead of the term "sum." "Sum" sounds the same as "some," but has the opposite meaning. "Sum" is used to describe problem situations with one or both addends unknown, so it is better in the earlier grades to use "total" rather than "sum." Formal vocabulary for subtraction ("minuend" and "subtrahend") is not needed for kindergarten.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
(continued) ■ How to solve a range of addition and subtraction word problems and add and subtract within 10, e.g., by using objects or drawings to represent addition and subtraction problems. ▶ Add To/Take From situations are action-oriented—they show changes from an initial state to a final state. These situations are readily modeled by equations because each aspect of the situation has a representation as number, operation (- or +), or equal sign =. In kindergarten, students work with the following four types of addition and subtraction situations: "Add To with Result Unknown A + B = ☐"; "Take From with Result Unknown C – B = ☐"; "Put Together/Take Apart with Total Unknown A + B = ☐"; and "Both Addends Unknown C = ☐ + ☐" (see the dark shaded types in Table 2 included as Appendix B). ■ How to decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1). ■ For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation. ■ How to practice adding and subtracting within 5, leading to fluency.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
K.OA.1–5. Assignments ask students to add by putting together and adding to, and to subtract by taking apart and taking from, by: ■ Representing addition and subtraction in multiple ways, including with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, and/or equations. ▶ This may include explaining correspondences among different representations. ■ Solving a range of addition and subtraction word problems, and adding and subtracting within 10, e.g., by using objects or drawings to represent the problem. ▶ "Add To with Result Unknown"; "Take From with Result Unknown"; and "Put Together/Take Apart" with "Total Unknown" and "Both Addends Unknown" (see the dark shaded types in Table 2 included as Appendix B). Add To/Take From situations are action-oriented; they show changes from an initial state to a final state. These situations are readily modeled by equations because each aspect of the situation has a representation as number, operation (- or +), or equal sign (=). ▶ Mathematizing a real-world situation (MP4), focusing on the quantities and their relationships rather than non-mathematical aspects of the situation. ("Mathematizing" means turning everyday issues into mathematical problems and using mathematics to solve them.) ■ Decomposing numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and recording each decomposition with a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1). ▶ Creating and using "Put Together/Take Apart" situations with "Both Addends Unknown." These play an important role in kindergarten because they show how students understand various compositions that make each number. ▶ Using assignments to lay the foundation for operations and algebraic thinking as students explicitly show the connections between different compositions that make each number. ■ For any number from 1 to 9, finding the number that makes 10 when added to the given number, e.g., by using objects or drawings, and recording the answer with a drawing or equation. ■ Adding and subtracting within 5 with accuracy and reasonable speed.	

GUIDING STATEMENTS	SPECIFIC EVIDENCE FROM THE TEXT/MATERIALS
K.NBT.1. Materials demonstrate working with numbers 11-19 to gain a foundation for place value by explaining and showing how to: ■ Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition with a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones. ▶ This is a vital first step kindergarteners must take toward understanding base-ten notation for numbers greater than 9. (See the NBT Progression.)	
K.NBT.1. Assignments require students to work with numbers 11-19 and to explain their understanding of place value by: ■ Composing and decomposing numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and recording each composition or decomposition with a drawing or equation (e.g., 18 = 10 + 8). ■ Showing understanding that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.	

II. DECISION RECORDING SHEET

Completed by: _____ Date: _____

Use the evidence that you collected for kindergarten 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 support teachers and engage students.*

Rigor requirement (balance): A program that emphasizes only fluency is not rigorous. Likewise, a program that only focuses on conceptual understanding or applications is not rigorous. For a program to be rigorous, there must be a balance of all three (conceptual understanding, applications, and fluency). By the end of kindergarten, there are specific fluency requirements (adding and subtracting within 5) 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). While procedural skill is not as prevalent in kindergarten, it will be more important in later grades.

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 for adding and subtracting within 5? ● Materials show how procedural skills and the kindergarten standard for fluency work. Materials provide consistent opportunities for students to practice using the algorithm or procedure.	**Assignments:** ■ How well do the assignments focus on developing critical procedural skills and fluency? ● The set of assignments prompts students to develop and demonstrate fluency by recalling with accuracy and reasonable speed addition and subtraction within 5.

FLUENCY: CRITERIA FOR MEETING THE RATING OF **"HIGH QUALITY/EXCITING"**		
	Materials *Materials show how the standard for fluency, adding and subtracting within 5, works and provide opportunities for students to practice using the algorithm or procedure.*	**Assignments** *The set of assignments prompts students to develop and demonstrate fluency by recalling with accuracy and reasonable speed addition and subtraction within 5.*
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 in adding and subtracting to 5 and receive feedback on which area(s) to improve.	Using high quality/exciting assignments, my students will: ■ build skills in adding and subtracting to 5 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 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 kindergarten 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: _____

IV. APPENDIX A: PROGRESS TO ALGEBRA IN GRADES K–8

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 ADDITION AND SUBTRACTION[1]

	RESULT UNKNOWN	CHANGE UNKNOWN	START UNKNOWN
ADD TO	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? **2 + 3 = ?**	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? **2 + ? = 5**	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? **? + 3 =5**
TAKE FROM	Five apples were on the table. I ate two apples. How many apples are on the table now? **5 – 2 = ?**	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? **5 – ? = 3**	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? **? – 2 = 3**

	TOTAL UNKNOWN	ADDEND UNKNOWN	BOTH ADDENDS UNKNOWN[2]
PUT TOGETHER / TAKE APART[3]	Three red apples and two green apples are on the table. How many apples are on the table? **3 + 2 = ?**	Five apples are on the table. Three are red and the rest are green. How many apples are green? **3 + ? = 5, 5 – 3 = ?**	Grandma has five flowers. How many can she put in the red vase and how many in her blue vase? **5 = 0 + 5, 5 + 0 5 = 1 + 4, 5 = 4 +1, 5 = 2 + 3, 5 = 3 + 2**

	DIFFERENCE UKNOWN	BIGGER UNKNOWN	SMALLER UNKNOWN
COMPARE	("How many more?" version):Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy?	(Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have?	(Version with "more"):Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have?
	("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have then Julie? **2 + ? = 5, 5 – 2 = ?**	(Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? **5 – 3 = ?, ? + 3 = 5**	(Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? **5 – 3 = ?, ? + 3 = 5**

Source: http://www.corestandards.org/Math/Content/mathematics-glossary/Table-1/

1 Adapted from Box 2-4 of Mathmatics Learning in Early Childhood, National Research Council (2009, pp. 32, 33).

2 These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean, makes or results in but always does mean is the same number as.

3 Either addend can be uknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of the basic situation, especially for small numbers less than or equal to 10.

4 For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operations (the version using more for the Bigger Unknown and using less for the Smaller Unknown). The other versions are more difficult.