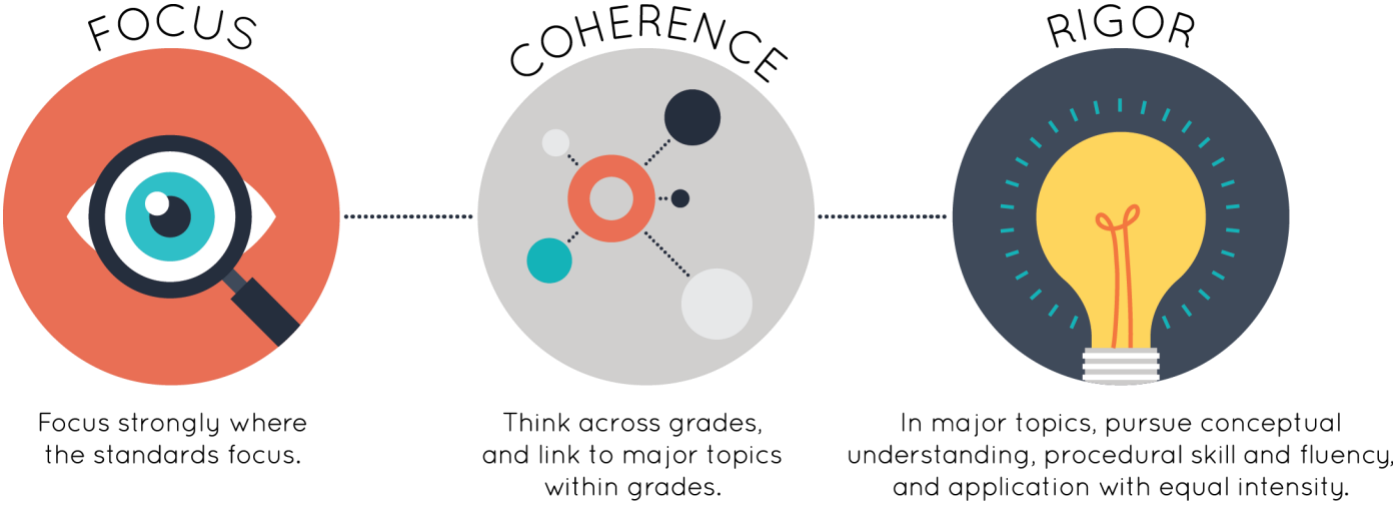
DEPARTMENT of EDUCATION
Louisiana Believes

Assessment Evaluation Tool for Alignment in Mathematics Grades K – HS (AET)

BENCHMARK ASSESSMENTS

Strong mathematics instruction contains the following elements:



Title: **CASE Benchmark Assessment** Grade: **4**
Publisher: **TE21, A Certica Solutions Company** Copyright: **2017**

Overall Rating: **Tier I, Exemplifies quality**

Tier I, Tier II, Tier III Elements of this review:

STRONG	WEAK
1. Alignment of Test Items (Non-negotiable)	
2. Focus on Major Work (Non-negotiable)	
3. Focus (Non-negotiable)	
4. Rigor and Balance (Non-negotiable)	
5. Practice-Content Connections	
6. Calling for Variety in Item Type and Student Work	
7. Constructing Forms Without Cueing Solution Processes	
8. Quality Materials	

To evaluate each set of submitted materials for alignment with the standards, begin by reviewing the indicators listed in Column 2 for the non-negotiable criteria in Section I*. If there is a "Yes" for all indicators in Column 2 for Section I, then the materials receive a "Yes" in Column 1. If there is a "No" for any indicator in Column 2 for Section I, then the materials receive a "No" in Column 1. In Section II, review each indicator individually.

Tier 1 ratings receive a "Yes" in Column 1 for Criteria 1 – 8.
Tier 2 ratings receive a "Yes" in Column 1 for all non-negotiable criteria but at least one "No" in Section II.
Tier 3 ratings receive a "No" in Column 1 in Section I.

** The criteria in Section I apply to fixed form or CAT assessments, whether summative assessments or a set of interim/benchmark assessments. Item banks also should reflect the full intent of the indicators.*

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
SECTION I: Non-negotiable Criteria: Submissions must meet all of the non-negotiable criteria in order for the review to continue.			
Non-negotiable **1. ALIGNMENT OF TEST ITEMS**: Test items and/or sets of items elicit direct, observable evidence of the degree to which a student can independently demonstrate the targeted Standard(s) ☒ Yes ☐ No	**1a)** Items exhibit alignment to the full intent of the LSSM for that grade/course.	**Yes**	The items exhibit alignment to the full intent of the Louisiana Student Standards for Math (LSSM) for Grade 4. The assessment is broken down by domains and ends with Benchmark Assessment and Constructed Response sections. The Operations and Algebraic Thinking (OA) section includes items that assess each of the standards within the OA domain, with the exception of LSSM 4.OA.B.4b. This standard is, however, addressed in the Benchmark Assessment. The standards are addressed across multiple questions in the item bank. For example, in accordance with LSSM 4.OA.A.1, students interpret a multiplication equation as a comparison and a verbal statement in Items 1 through 7. Students identify equations that represent situations involving multiplicative comparisons, identify statements that describe multiplication equations, and identify situations that are represented by multiplication equations. In this same assessment, LSSM 4.OA.C.5 (generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself) is fully addressed across Items 24, 25, and 26. In addition, each question addresses a different part of

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			the standard. For example, in Question 25, students generate a number pattern that follows a given rule. In Question 26, students then generate a shape pattern that follows a given rule. Question 24 aligns with the last part of this standard as students identify apparent features of the pattern that were not explicit in the rule itself. Another example of this is found in the Numbers and Operations in Base Ten section, where LSSM 4.NBT.A.2 (Read and write multi-digit whole numbers less than or equal to 1,000,000 using base-ten numerals, number names, and expanded form. The requirement to compare two multi-digit numbers based on the meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons) is fully addressed in Questions 9 through 16. For example, in Questions 9 and 11, students read and write multi-digit whole numbers using base-ten numerals and number names. In Question 10, students use expanded form to read and write numbers. Questions 12-16 address the remaining portion of this standard to compare the numbers based on meanings of digits in each place. This is evidenced throughout the item bank assessment as each section aligns with the full intent of the standards within each domain through a combination of

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			multiple questions.
	1b) Items adhere to content limitations outlined in the LSSM and the Assessment Guides. All limitations for all grades K-HS provided in footnotes of the LSSM are also followed.	**Yes**	The items adhere to the content limitations outlined in the LSSM. In the Number and Operations - Fractions section, all addition and subtraction fraction problems include fractions problems with like denominators, as called for by LSSM 4.NF.B.3, with the exception of items that align to LSSM 4.NF.C.5. For example, in Items 18-26, students add and subtract fractions with like denominators of 4, 5, 6, 8, 10, and 12. In Items 35-41, students add two fractions with unlike denominators of 10 and 100, aligning to LSSM 4.NF.C.5, which requires students to "express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100; however, adding with unlike denominators isn't mastered until 5th grade." In the assessment items, students are expected to use their knowledge of equivalent fractions to add fractions with denominators of 10 and 100. For example, in Item 39, students are given a chart with 4 different student responses to 2/100 + 3/10. Students decide who answered the question correctly. According to LSSM 4.MD.A.2, students are expected to "use the four operations to solve

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			word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving whole numbers and/or simple fractions (addition and subtraction of fractions with like denominators and multiplying a fraction times a fraction or whole number), and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale." The limitation states that it is not a necessary skill for the students to be able to add fractions with unlike denominators or multiply a fraction times a fraction. In the Measurement and Data section of the test, none of the problems require adding or multiplying fractions and therefore adhere to the content limitations of the standard. In accordance with LSSM 4.OA.A.2, students are expected to multiply and divide involving multiplicative comparisons. This is addressed in the Operations and Algebraic Thinking section, Items 8-14 and in the Benchmark Assessment Items 5 and 24. None of the questions go beyond multiplicative comparisons. For example, on Item 24 of the Benchmark Assessment, students are expected to solve a word problem by

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			selecting the correct equation to match the multiplicative comparison in the word problem. The equation involves equal groups with the product unknown. This does not exceed the limitations of this standard.
	1c) Items use the number system appropriate to the grade/course. For example, in grade 3 there are some items involving fractions greater than 1; in the middle grades, arithmetic and algebra use the rational number system, not just the integers.	**Yes**	The items use the number system appropriate to Grade 4. For example, in the Numbers and Operations in Base Ten section, Question 5 states, "The value of the digit 9 in the number 12,948 is 10 times the value of the digit 9 in which number?" addressing LSSM 4.NBT.A.1 (Recognize that in a multi-digit whole number less than or equal to 1,000,000, a digit in one place represents ten times what it represents in the place to its right). The question adheres to the footnote in the standard that states that Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000. The items do not ask students to work with any number over 1,000,000. The LSSM states that students in Grade 4 should be able to develop an understanding of fraction equivalence and operations with fractions. None of the assessment items go beyond denominators of 2, 3, 4, 5, 6, 8, 10, and 12, adhering to the appropriate number system expectations for Grade 4. When addressing LSSM 4.NF.A.1, on the constructed-response section of the

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			assessments, Item 1, Parts A and B, students generate equivalent fractions for 4/12, ⅓, and 2/6. Item 2 on the Benchmark Assessment, has students convert 9/10 to a fraction with the following answer choices: "A. 0.09 yard B. 0.9 yard C. 9.0 yards D. 9.10 yards." The item aligns with LSSM 4.NF.C.6, "use decimal notation for fractions with denominators 10 or 100," and adheres to the limitations and guidelines to ensure that the number system and context are appropriate for Grade 4.
Non-negotiable **2. FOCUS ON MAJOR WORK:** The large majority of items in each grade/course are devoted to the major work of the grade. ☒ Yes ☐ No	**2a)** Each grade/course's item set **meets or exceeds** the following distributions for the major work of the grade. • 85% of the items in grades K–2 align exclusively to the major work of the grade. • 75% of the items in grades 3–5 align exclusively to the major work of the grade. • 65% of the items in grades 6–12 align exclusively to the major work of the grade/course.	**Yes**	The assessment meets the required distributions for the major work of the grade. Overall, 149 of the 198 items (75%), align to major standards, 22 (11%) align to supporting standards, and 27 (14%) align to additional standards. The assessment sections are separated by Item Banks by domain, a Benchmark Assessment, and a Constructed-Response. For example, in the Operations and Algebraic Thinking section, 77% of the items align to major standards of the grade. In the Numbers and Operations in Base Ten section, 100% of the items align to major standards. In the Number and Operations - Fractions section, 100% of the items align to major standards. The Measurement and Data section, as well as the Geometry section, do not include any items aligning to major standards since these two domains

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			include only the additional and supporting standards. In the Benchmark Assessment, 68% of the items align with major standards and in the Constructed-Response section, 100% of the items align to major work of the grade.
Non-negotiable **3. FOCUS:** No item assesses topics directly or indirectly before they are introduced in the LSSM. ☒ Yes ☐ No	**3a)** 100% of items address only knowledge of topics found in the LSSM in the specified grade/course.	**Yes**	One hundred percent of the items address only knowledge of topics found in the LSSM for Grade 4. For example, Item 24 in the Number and Operations in Base Ten section assesses LSSM 4.NBT.B.4 (fluently add and subtract multi-digit whole numbers, with sums less than or equal to 1,000,000, using the standard algorithm). On Item 9 of the Number and Operations-Fractions section, students compare two fractions with different numerators and different denominators by comparing to the benchmark fraction ½ (LSSM 4.NF.A.2). Item 39 of the Benchmark Assessment asks students to find the area of the floor of a birdhouse. This item directly addresses standard 4.MD.A.3, "apply the area and perimeter formulas for rectangles in real-world and mathematical problems." On Item 36 of the Numbers and Operations in Base Ten section, students solve 9,428 x 5, aligning to LSSM 4.NBT.B.5 which states that students in Grade 4 should be able to

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			multiply a four-digit number by a one-digit number.
Non-negotiable **4. RIGOR AND BALANCE:** Each grade/course's assessments reflect the balances in the Standards and help students meet the Standards' rigorous expectations by helping students develop conceptual understanding, procedural skill and fluency, and application. ☒ Yes ☐ No	**4a)** ***For Conceptual Understanding:*** ***K–High School*:** At least 20% of the items for each grade or course explicitly require students to demonstrate conceptual understanding especially where called for in specific content standards.	**Yes**	There is an appropriate balance of the items in the Grade 4 Item Bank by domain and Benchmark Assessment that requires students to demonstrate conceptual understanding especially when called for in specific content standards. For example, 73% (144/198) of the questions require students to demonstrate conceptual understanding. Item 3 on the Benchmark Assessment requires students to multiply a 3-digit number by a one-digit number using a strategy derived from an array to match expressions. This addresses the conceptual understanding called for in LSSM 4.NBT.B.5, "Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models." Item 23 on the Benchmark Assessment asks students to demonstrate conceptual understanding by using multiplicative reasoning and their understanding of multiplication as a comparison as they select a comparison statement that is represented by the given equation

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			(LSSM 4.OA.A.1). Benchmark Assessment, Item 25 assesses the conceptual understanding of LSSM 4.NF.A.1. This standard states that students will understand that a "fraction a/b is equivalent to a fraction (nxa)/(nxb) by using fraction models."
	4b) ***For Procedural Skill and Fluency:*** ***K–High School*****:** At least 20% of the items for each grade or course explicitly require students to demonstrate procedural skill and fluency, especially where called for in specific content standards.	**Yes**	An appropriate balance of the items in the Grade 4 Item Bank by domain and Benchmark Assessment requires students to demonstrate procedural skill and fluency. Of the 198 questions, 55% require students to demonstrate procedural and fluency skills. Item 2 on the Benchmark Assessment addresses the procedural skill required by LSSM 4.NF.C.6, "Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram; represent 62/100 of a dollar as $0.62." Students identify the answer choice that shows the fraction 9/10 as a decimal. LSSM 4.NBT.B.4 states, "Fluently add and subtract multi-digit whole numbers, with sums less than or equal to 1,000,000 using the standard algorithm." Item 14 on the Benchmark Assessment aligns with LSSM 4.NBT.B.4 as students find the total price of a van and a car by adding two multi-digit whole numbers. Item 22 on the Operations and Algebraic Thinking assessment aligns with LSSM 4.OA.B.4a,

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			which calls for procedural skill and fluency by finding all factor pairs for a given whole number, as students must show all factor pairs for the number 66.
	4c) ***For Applications*** • ***K–5:*** At least 20% of the items for each grade explicitly assess solving single- or multi-step word problems. • ***6–8:*** At least 25% of the items for each grade explicitly assess solving single- and multi-step word problems and simple models. • ***High School:*** At least 30% of the items for each high school course explicitly assess single- and multi-step word problems, simple models, and substantial modeling/application problems.	**Yes**	An appropriate balance of the items on the Grade 4 Item Bank by domain and Benchmark Assessment requires students to solve single- and multi-step word problems and simple models. Of the 198 items, 23% explicitly assess solving single- or multi-step word problems. For example, Item 19 on the Benchmark Assessment assesses LSSM 4.OA.A.3 (Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations) as students solve a multi-step word problem using place value understanding. Items 21 & 22 on the Benchmark Assessment address LSSM 4.NF.B.3d (Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem) by having students engage in a two-part multi-step word problem. The Constructed-Response items at the end of the assessment also provide the opportunity for students to engage in application-type problems with each item composed of 3 parts. Specifically, Item 2 includes a scenario involving

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			grocery items and prices of the items. Students solve three word problems involving the addition, subtraction, and multiplication of the items and prices. This multi-part item aligns to LEAP.III.4.1, to "solve multi-step contextual word problems with a degree of difficulty appropriate to Grade 4, requiring the application of knowledge and skills articulated by the LSSM section of the Major Content Assessable Content table."
SECTION II: Additional Criteria of Superior Quality			
5. Practice-Content Connections. Each grade/course's assessments include items that meaningfully connect the Standards for Mathematical Content and Standards for Mathematical Practice. However, not all items need to align to a Standard for Mathematical Practice, and there is no requirement to have an equal balance among the Standards for Mathematical Practice in any set of items or test forms.		**Yes**	The Grade 4 assessment includes items that meaningfully connect the Standards for Mathematical Content and Standards for Mathematical Practice (MP). For example, on the Benchmark Assessment, Item 11 connects to MP.4, Model with Mathematics. Students are given an area model to divide a four-digit dividend by a one-digit divisor. Students use the division model to determine the final step in solving the problem. Each answer choice shows several ways that the area model could be interpreted. Students have to select the correct way to add the partial quotients from the model. Item 23 of the Benchmark Assessment asks students to reason abstractly and quantitatively (MP.2) as they use multiplicative reasoning and their

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			understanding of multiplication as a comparison in order to identify the correct comparison statement. Item 1 on the Constructed-Response section connects to MP.3 (Construct viable arguments and critiques the reasoning of others). Students use a diagram and complete fractions that represent the shaded part of the diagram to make equivalent fractions. They are then asked to explain why all of the fractions from Part A are equivalent. Students justify their answers by providing evidence to explain their thinking for the answers they provided in Part A.
6. Calling for Variety in Item Type and Student Work. Assessments include a variety of item types (e.g., multiple choice, multiple select, numeric response, constructed response) that require a variety in what students produce. For example, items require students to produce answers and solutions, but also, in a grade-appropriate way, arguments and explanations (including items that explicitly assess expressing and/or communicating mathematical reasoning), diagrams, mathematical models, etc.		**Yes**	The Grade 4 assessment includes a variety of item types that require a variety of what students produce. Although the item bank is composed of 88% multiple-choice, students engage in solving multiple-choice, multiple select, numeric response, as well as constructed-response questions. For example, Item 4 on the Benchmark Assessment asks students to complete a multiple-select problem by asking, "Which three statements are true?" In the Measurement and Data portion of the assessment, Item 6 requires students to enter a numeric response into a grid for the correct measurement of jugs in millimeters. Additionally, 8 sample technology-enhanced items are provided at the end of the assessment.

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			Students are given a choice matrix where they match numbers to the correct description, a drag and drop item where students drag the appropriate numbers into boxes to complete a multiplication problem, and an ordering item, where students arrange a list of numbers in order from least to greatest based on the value of the 5 in each number.
7. Constructing Forms Without Cueing Solution Processes. Item sequences do not cue the student to use a certain solution process during problem solving and assessments include problems requiring different types of solution processes within the same section.		**Yes**	Item sequences do not cue the student to use a certain solution process during problem-solving. Assessments include problems requiring different types of solution processes within the same section. The assessment does not scaffold the questions. Items 14 and 15 of the Benchmark Assessment include two completely isolated questions based on the same information given for each item. Item 14 asks, "How much will Kevin and Chelsea spend buying both the van and the car?" Item 15 asks, "What is the difference in the price of the van compared to the car?" Items 21 and 22 of the Benchmark Assessment use the same context but are independent of each other, as well. Item 21 asks, "How many total pounds of chili do Stephanie and Jordan make for the contest?" While Item 22 asks, "After the contest, all of Stephanie's chili has been eaten. Jordan still has 1¾ pounds of chili left in his pot. How

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			many pounds of Jordan's chili were eaten during the contest?"
8. Quality Materials. The assessment items, answer keys, and documentation are free from mathematical errors.		**Yes**	The documentation, assessment items, and answer keys are free from mathematical errors. The answer keys include an alignment for each item, as well as the correct answer. Rubrics are provided at the end of the assessment for the Constructed-Response items. The rubrics include answers and example responses that are free from mathematical error.

FINAL EVALUATION

Tier 1 ratings receive a "Yes" in Column 1 for Criteria 1 – 4 and a "Yes" for all additional indicators 5 – 8.

Tier 2 ratings receive a "Yes" in Column 1 for all non-negotiable criteria (Criteria 1 – 4), but at least one "No" for additional indicators 5 – 8.

Tier 3 ratings receive a "No" in Column 1 for at least one criteria in Section I.

Compile the results for Sections I and II to make a final decision for the material under review.

Section	Criteria	Yes/No	Final Justification/Comments
I: Non-negotiable Criteria	1. Alignment of Test Items	**Yes**	The items in the item bank and Benchmark Assessment exhibit alignment to the full intent of the LSSM for Grade 4. The items adhere to the content limitations outlined in the LSSM and use the number system appropriately.
	2. Focus on Major Work	**Yes**	On the Grade 4 item bank and Benchmark Assessment, 149 out of 198 questions, or 75%, align to the major work of the grade.
	3. Focus	**Yes**	One hundred percent (100%) of the items in the item bank and Benchmark Assessment address only knowledge of topics found in the LSSM for Grade 4.

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	4. Rigor and Balance	**Yes**	There is an appropriate balance of the items on the Grade 4 item bank and Benchmark Assessment that requires students to demonstrate conceptual understanding and procedural skill and fluency, and to apply concepts and skills in solving single and multi-step word problems, especially when called for in specific content standards.
II: Additional Criteria of Superior Quality	5. Practice-Content Connections	**Yes**	The Grade 4 item bank and Benchmark Assessment include items that meaningfully connect the Standards for Mathematical Content and Standards for Mathematical Practice.
	6. Calling for Variety in Item Type and Student Work	**Yes**	The Grade 4 item bank and Benchmark Assessment include a variety of item types that require variety in what students produce. Students solve multiple-choice, multiple select, numeric response, as well as constructed-response questions.
	7. Constructing Forms Without Cueing Solution Processes	**Yes**	Item sequences do not cue the student to use a certain solution process during problem-solving. Assessments include problems requiring different types of solution processes within the same section.
	8. Quality Materials	**Yes**	The documentation, assessment items, and answer keys are free from mathematical errors.
FINAL DECISION FOR THIS MATERIAL: **Tier I, Exemplifies quality**			

Instructional materials are one of the most important tools educators use in the classroom to enhance student learning. It is critical that they fully align to state standards—what students are expected to learn and be able to do at the end of each grade level or course—and are high quality if they are to provide meaningful instructional support.

The Louisiana Department of Education is committed to ensuring that every student has access to high-quality instructional materials. In Louisiana all districts are able to purchase instructional materials that are best for their local communities since those closest to students are best positioned to decide which instructional materials are appropriate for their district and classrooms. To support local school districts in making their own local, high-quality decisions, the Louisiana Department of Education leads online reviews of instructional materials.

Instructional materials are reviewed by a committee of Louisiana educators. Teacher Leader Advisors (TLAs) are a group of exceptional educators from across Louisiana who play an influential role in raising expectations for students and supporting the success of teachers. Teacher Leader Advisors use their robust knowledge of teaching and learning to review instructional materials.

The 2019-2020 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Ascension, Beauregard, Bossier, Caddo, Calcasieu, Caldwell, City of Monroe, Desoto, East Baton Rouge, Einstein Charter Schools, Iberia, Jefferson, Jefferson Davis, KIPP New Orleans, Lafayette, Lafourche, Lincoln, Livingston, LSU Lab School, Orleans, Orleans/Lusher Charter School, Ouachita, Plaquemines, Pointe Coupee, Rapides, Richland, RSD Choice Foundation, St. John the Baptist, St. Charles, St. James, St. Landry, St. Mary, St. Tammany, Tangipahoa, Vermillion, Vernon, West Baton Rouge, West Feliciana, and Zachary. This review represents the work of current classroom teachers with experience in grades K-5.

Appendix I.

Publisher Response

The publisher had no response.

Appendix II.

Public Comments

There were no public comments submitted.