Instructional Materials Evaluation Tool for Alignment in Science Grades K – 12 (IMET)

FULL CURRICULUM
Instructional Materials

Strong science instruction requires that students:

- Apply content knowledge to explain real world phenomena and to design solutions,
- Investigate, evaluate, and reason scientifically, and
- Connect ideas across disciplines.

Title: **Louisiana Essential Chemistry**

Grade/Course: **Chemistry**

Publisher: **PASCO Scientific**

Copyright: **2018**

Overall Rating: **Tier III, Not representing quality**

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

STRONG	WEAK
	1. Three-dimensional Learning (Non-Negotiable)
	2. Phenomenon-Based Instruction (Non-Negotiable)

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. If there is a "Yes" for all required indicators in Column 2, then the materials receive a "Yes" in Column 1. If there is a "No" for any required indicator in Column 2, then the materials receive a "No" in Column 1. Submissions must meet Criteria 1 and 2 for the review to continue to Criteria 3 and 4. Submissions must meet all of the non-negotiable criteria in order for the review to continue to Section II.

For Section II, begin by reviewing the required indicators in Column 2 for each criterion. If there is a "Yes" for all required indicators in Column 2, then the materials receive a "Yes" in Column 1. If there is a "No" for any required indicators in Column 2, then the materials receive a "No" in Column 1.

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 Column 1 for the remaining criteria.
Tier 3 ratings receive a "No" in Column 1 for at least one of the non-negotiable criteria.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
SECTION I: NON-NEGOTIABLE CRITERIA: Submissions must meet Criteria 1 and 2 for the review to continue to Criteria 3 and 4. Submissions must meet all of the non-negotiable criteria in order for the review to continue to Section II.			
Non-Negotiable **1. THREE-DIMENSIONAL LEARNING:** Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions. ☐ Yes ☒ No	**REQUIRED** **1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of the materials teach the science and engineering practices (SEP), crosscutting concepts (CCC) and disciplinary core ideas (DCI) separately when necessary but they are most often integrated to support deeper learning.	**No**	The materials are not designed so that students develop scientific content knowledge and scientific skills through interactions with the three dimensions of science a majority of the time. The materials introduce concepts through vocabulary terms, present information through teacher-led presentations and note-taking, and then apply new concepts during the section or chapter review. Students are not provided with adequate opportunities to engage in three-dimensional learning. For example, in Unit 1, Matter and Energy, Chapter 4, Temperature and Heat, Section 4.2, Specific Heat, students read about specific heat and how to calculate the variables associated with a specific heat equation, which is a Disciplinary Core Idea (DCI) linked to HS.PS3A.a, HS.PS3B.a, HS.PS3B.b, HS.PS3B.c, and HS.PS3B.d. Students then complete practice problems, but do not directly engage in Science and Engineering Practices (SEP), Using Mathematical and Computational Thinking, or in Crosscutting Concepts (CCC), Systems and System Models, to build a deeper understanding. While Chapter 4 provides a heat investigation and a culminating project to "Design an Insulator," these assignments are not inquiry-based. Instead, students receive step-by-step instructions, rather than engage in and apply their knowledge through the three dimensions. In Unit 5, Rates and Equilibrium, Chapter 14, Reaction Rates, Section 14.1, Reaction Rates students read about how temperature and concentration affect reaction rates. However, they are not asked to apply the scientific principles and evidence in Constructing Explanations and Designing Solutions (SEP) about the effects of changing the temperature or about the concentration of the

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			reacting particles on the rate at which a reaction occurs which is linked to Disciplinary Core Idea (DCI), HS.PS1B.a. There is an optional investigation (14.A, Part 2) within the chapter; however, the lab is centered around using SPARKvue equipment with discussion questions that tell the students which theory to use when answering. In addition, Patterns (CCC) are not present. In Unit 6, Redox and Energy, Chapter 17, Oxidation and Reduction, Section 17.2, Determining Oxidation Numbers students complete seven practice problems after learning how to determine the oxidation numbers for elements in compounds. While this partially covers DCI, HS.PS1B.c., it is not three-dimensional, and there is no evidence of SEP or CCC.
Non-Negotiable **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions drive student learning. ☐ Yes ☒ No	**REQUIRED** **2a)** Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time.	**No**	No evidence was found to support student engagement in observing and explaining phenomena and designing solutions to provide purpose and opportunity for learning.
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **3. ALIGNMENT & ACCURACY:** Materials adequately address the Louisiana Student Standards for Science.	**REQUIRED** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the full **depth of the standards**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	REQUIRED **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

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☐ Yes ☐ No	**3c)** In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy. ☐ Yes ☐ No	**REQUIRED *Indicator for grades 4-12 only** **4a)** Students regularly engage with **authentic sources** that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	REQUIRED **4b)** Students regularly engage in **speaking and writing** about scientific phenomena and engineering solutions using authentic science sources; e.g., authentic data, models, lab investigations, or journal excerpts. Materials address the necessity of using **scientific evidence** to support scientific ideas.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	REQUIRED **4c)** There is **variability** in the tasks that students are required to execute. For example, students are asked to produce solutions to problems, models of phenomena, explanations of theory development, and conclusions from investigations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	4d) Materials provide a coherent sequence of authentic science sources that build scientific **vocabulary** and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation of deeper scientific learning.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

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SECTION II: ADDITIONAL INDICATORS OF QUALITY			
Additional Criterion **5. LEARNING PROGRESSIONS:** The materials adequately address Appendix A: Learning Progressions. They are coherent and provide natural connections to other performance expectations including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the the Louisiana Student Standards for Math. ☐ Yes ☐ No	**REQUIRED** **5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are coherent within and across units. The **progression of learning** is coordinated over time, clear and organized to prevent student misunderstanding and supports student mastery of the performance expectations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	5b) Students apply mathematical thinking when applicable. They are not introduced to math skills that are beyond the applicable grade's expectations in the Louisiana Student Standards for Mathematics. Preferably, **math connections** are made explicit through clear references to the math standards, specifically in teacher materials.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
Additional Criterion **6. SCAFFOLDING AND SUPPORT:** Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking. ☐ Yes ☐ No	**REQUIRED** **6a)** There are separate **teacher support** materials including: scientific background knowledge, support in three-dimensional learning, learning progressions, common student misconceptions and suggestions to address them, guidance targeting speaking and writing in the science classroom (i.e. conversation guides, sample scripts, rubrics, exemplar student responses).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	6b) Appropriate suggestions and materials are provided for **differentiated instruction** supporting varying student needs at the unit and lesson level (e.g., alternative teaching approaches, pacing, instructional delivery options, suggestions for addressing common student difficulties to meet standards, etc.).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

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Additional Criterion **7. USABILITY:** Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year. ☐ Yes ☐ No	**REQUIRED** **7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	7b) Materials help students build an understanding of standard operating procedures in a science laboratory and include **safety** guidelines, procedures, and equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	7c) The total amount of content is **viable** for a school year.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
Additional Criterion **8. ASSESSMENT:** Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards. ☐ Yes ☐ No	**REQUIRED** **8a) Multiple types** of formative and summative assessments (performance-based tasks, questions, research, investigations, and projects) are embedded into content materials and assess the learning targets.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	REQUIRED **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

FINAL EVALUATION

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 Column 1 for the remaining criteria.
Tier 3 ratings receive a "No" in Column 1 for at least one of the non-negotiable criteria.

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-Negotiables	1. Three-dimensional Learning	**No**	The materials are not designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The materials do not provide students with the opportunities needed to master the science and engineering practices and

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			crosscutting concepts. In addition, the materials do not integrate three-dimensional learning to support a deeper understanding of the standards.
	2. Phenomenon-Based Instruction	**No**	There is no evidence of students observing and explaining phenomena and designing solutions.
	3. Alignment & Accuracy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	4. Disciplinary Literacy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
II: Additional Indicators of Quality	5. Learning Progressions	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	6. Scaffolding and Support	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	7. Usability	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	8. Assessment	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
FINAL DECISION FOR THIS MATERIAL: **Tier III, Not representing 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 2018-2019 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Ascension, Bossier, Caddo, Central, Desoto, East Baton Rouge, Einstein Charter Schools, Iberia, InspireNOLA, Jefferson, KDHSA (Jefferson Parish Charter), Lafayette, Lincoln, Livingston, Orleans, Ouachita, Pointe Coupee, Rapides, Recovery School District, RSD - Choice Foundation, RSD – FirstLine, RSD – NOCP, St. Charles, St. Mary, St. Tammany, Tangipahoa, Vermilion, West Baton Rouge, West Feliciana, Zachary. This review represents the work of current classroom teachers with experience in grades K-12.

Appendix I.

Publisher Response

Strong science instruction requires that students:

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Grade/Course: **Chemistry**

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Non-Negotiable **1. THREE-DIMENSIONAL LEARNING:** Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions. ☐ Yes ☒ No	**REQUIRED** **1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of the materials teach the science and engineering practices (SEP), crosscutting concepts (CCC) and disciplinary core ideas (DCI) separately when necessary but they are most often integrated to support deeper learning.	**No**	The materials are not designed so that students develop scientific content knowledge and scientific skills through interactions with the three dimensions of science a majority of the time. The materials introduce concepts through vocabulary terms, present information through teacher-led presentations and note-taking, and then apply new concepts during the section or chapter review. Students are not provided with adequate opportunities to engage in three-dimensional learning. For example, in Unit 1, Matter and Energy, Chapter 4, Temperature and Heat, Section 4.2, Specific Heat, students read about specific heat and how to calculate the variables associated with a specific heat equation, which is a Disciplinary Core Idea (DCI) linked to HS.PS3A.a, HS.PS3B.a, HS.PS3B.b, HS.PS3B.c, and HS.PS3B.d. Students then complete practice problems, but do not directly engage in Science and Engineering Practices (SEP), Using Mathematical and Computational Thinking, or in Crosscutting Concepts (CCC), Systems and System Models, to build a deeper understanding. While Chapter 4 provides a heat investigation and a culminating project to "Design an Insulator," these assignments are not inquiry-based. Instead, students receive step-by-step instructions, rather than engage in and apply their knowledge through the three dimensions. In Unit 5, Rates and Equilibrium, Chapter 14, Reaction Rates, Section 14.1, Reaction Rates students read about how temperature and concentration affect reaction rates. However, they are not asked to apply the scientific principles and evidence in Constructing Explanations and Designing Solutions (SEP) about the effects of changing the temperature or about the concentration of the	.Disagree. We would like to propose a deeper analysis of our materials and a possible meeting to determine why our materials are evaluated so poorly when the evidence is clear that they are written around 3D learning. We know this to be true since other NGSS states have reviewed and found these materials to meet the 3D requirements and have been adopted in other NGSS locations. We are happy to provide greater details and to hopefully determine how these materials are being evaluated and the standards for evaluation in this state. These materials were constructed around the 3-dimensional approach. Each topic is aligned to the content (DCI) with opportunities to practice a variety of engineering practices (SEP). The text does not call out "remember" or "recall" when dealing with cross cutting concepts, but rather ensures that the concepts are embedded and addressed in the teacher materials to bring to the attention of the student (instructor discretion). We agree that there are opportunities to develop vocabulary terms, and we have prepared a vast wealth of teacher materials that are editable based on the student population and instructor discretion. We disagree that new concepts are introduced during the section review. We fully believe that student are provided with adequate opportunities to engage in three-dimensional learning. Rebuttal: Chapter 4 To illustrate – and using the examples provided in the analysis: Unit 1, Matter and Energy, Chapter 4, section 4.2. 1. DCI Evidience: HS.PS3A.a, HS.PS3B.a, HS.PS3B.c, HS.PS3B.a

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			reacting particles on the rate at which a reaction occurs which is linked to Disciplinary Core Idea (DCI), HS.PS1B.a. There is an optional investigation (14.A, Part 2) within the chapter; however, the lab is centered around using SPARKvue equipment with discussion questions that tell the students which theory to use when answering. In addition, Patterns (CCC) are not present. In Unit 6, Redox and Energy, Chapter 17, Oxidation and Reduction, Section 17.2, Determining Oxidation Numbers students complete seven practice problems after learning how to determine the oxidation numbers for elements in compounds. While this partially covers DCI, HS.PS1B.c., it is not three-dimensional, and there is no evidence of SEP or CCC.	2. SEP Evidence: SEP: Alignment to the 8 practices. The evaluation shows no connection to the SEPs and we are able to demonstrate a relationship to all 8 of the science and engineering practices in this chapter. Most of these are addressed in the section and we wish to emphasize that this is a chapter built around NGSS – taking a section without examining the connections to sections prior and after examines them out of context. Section 4.2 is part of chapter 4 and all aspects of the 3D approach are visible in all aspects of this chapter including the SEPs Students are DIRECTLY engaged in the SEPs as shown below: 2a. Asking questions (for science): Please know that these questions are pulled from the lab book – embedded in the ebook, or separate lab book to accompany the hard cover text: • Question: what is the difference between thermal energy and temperature? Found on page 20 of the lab book - embedded in ebook- choose "labs" in navigation bar for chapter • Question: What is specific heat? Found on page 25 lab book - embedded in ebook- choose "labs" in navigation bar for chapter 4 • Question: How much energy is stored in food? Found on page 30 - embedded in ebook- choose "labs" in navigation bar for chapter 4 • Question: What is heat of fusion? Found on Page 34 -embedded in ebook- choose "labs" in navigation bar for chapter 4 2b. defining problems (for engineering) • How can you design an insulator that will keep a heated solution from losing less than 2 degrees C over 2 minutes? Found on page 37 - embedded in ebook- choose "labs" in navigation bar for chapter 4. 2c. Developing and using models: • Graphical models are used in: • Lab A page 20

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				• Lab B page 25 • Lab C page 30 • Lab D page 34 • using simulated models are used with simulations page 96 • constructing an engineering model is conducted during the engineering application Page 34 of the lab book. • Mathematical models are used throughout the section with the relationships provided as an overview on page 100. 2d. Planning and carrying out investigations • How can you design an insulator that will keep a heated solution from losing less than 2 degrees C over 2 minutes? Page 37 - embedded in ebook- choose "labs" in navigation bar for chapter 4 2e. Analyzing and interpreting data • what is the difference between thermal energy and temperature? page 20 of the lab book - embedded in ebook- choose "labs" in navigation bar for chapter 4 • What is specific heat? Page 25 lab book - embedded in ebook- choose "labs" in navigation bar for chapter 4 • How much energy is stored in food? Page 30 - embedded in ebook- choose "labs" in navigation bar for chapter 4 • what is heat of fusion? Page 34 - embedded in ebook- choose "labs" in navigation bar for chapter 4 2f. Using mathematics and computational thinking • Mathematical models are used throughout the section with the relationships provided as an overview on page 100. • An example of math application is on page 99 2g. Constructing explanations (for science) and designing solutions (for engineering) • How can you design an insulator that will keep a heated solution from losing less than 2 degrees C over 2 minutes? Page 37 -embedded in

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				ebook- choose "labs" in navigation bar for chapter 4 • Lab F is a research presentation to present data and findings and to construct explanations. 2h. Engaging in argument from evidence • Lab F is a research presentation to present data and findings and to construct explanations. It asks the question, does research suggest a link between materials and health issues. It opens the dialog for argument from evidence. The assignment requires evidence to be provided and statements supported from evidence. 2i. Obtaining, evaluating, and communicating information • Lab F is a research presentation to present data and findings and to construct explanations. It asks the question, does research suggest a link between materials and health issues. It opens the dialog for argument from evidence. The assignment requires evidence to be provided and statements supported from evidence. 3. Cross Cutting Concepts (CCC) Regarding the CCCs, we fully disagree with the statement, "instead, students receive step by step instructions" is totally untrue. The students DO receive instructions on how to collect data from their design, but there is no instruction on the creation and testing of their design – only the collection of the data. The engineering process is fully inquiry with some guidelines provided for the final product. And finally, regarding the cross cutting concepts (CCC), the teacher lesson plan clearly indicates that SEP focus (Mathematics and computational thinking) with the cross cutting concept of "energy and matter". This allows the teacher to draw the parallel without asking the student to "recall" or "remember". It is important to recognize that these materials use the CCCs beyond what is mentioned. Chapters within the text are written in a "cause and effect" manner, scale is often referenced when discussing large numbers or small measurements and system models are typically referenced where

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				applicable. In all cases, the content is linked to the CCCs. Rebuttal: Chapter 14 As a second example, and using the feedback provided, Chapter 1, section 14.1 lesson plan shows the relationship with the SEP (constructing explanations and designing solutions) with the DCI (HS.PS1.B) and the CCC (patterns). In this case, for the CCC, students observe patterns in systems and cite patterns as empirical evidence for causality in supporting their explanations of phenomena (some reactions happen more quickly). These patterns are reinforced in the laboratory activities. Additionally, as discussed above, the book is written around the cross cutting concepts and this chapter clearly demonstrates cause and effect as well as patterns. 1. DCI evidence: HS.PS1.B 2. SEP Evidence: Regarding the SEPs: As reinforcement for the Science practices, two labs are offered and tied to the content of 14.1: 14A Optimum conditions and 14B Catalysts. 3. CCC evidence We are in complete disagreement with the review of lab 14A as not providing opportunities for 3D learning and open inquiry. While a theory may be suggested to help develop an answer, the activity also requires students to create models/drawing, explain relationships, calculate, and as a final step asks student to openly create their own procedure without any input or guidelines. The teacher book provides examples of what those procedures may look like, but there is not student assistance. Sample data is provided, but all graphs are empty and only the

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				guidelines of what to collect is presented. The review indicated that there is no evidence of the CCC (patterns present) and yet the entire activity is written so that students would observe patterns in systems and cite patterns as empirical evidence for causality in supporting their explanations of phenomena (some reactions happen more quickly). This is the NGSS definition of the CCC "patterns". Rebuttal: Disagree Chapter 17: The teacher lesson plan provided in section 17.2 provides the connections to the SEP (developing and using models) the DCI (HS.PS2.B) and the CCC (Energy and Matter). Those connections are apparent in the text and reinforcing materials. It is important to emphasize again that looking at 17.2 as a stand-alone section is not an appropriate way to evaluate materials. Doing so places 17.2 out of context and is not shown as being reinforced by the sections before and after. However, 17.2 as a stand-alone chapter does have evidence of the SEP and CCC: 1. DCI Evidence DCI (HS.PS2.B) 2. SEP Evidence Using mathematics and computational thinking: Student assignment 17.2 asks for students to follow a logical procedure to determine oxidation numbers. The logic is discussed on page 548 and applied to the assignment. Several examples are provided. In this lab students conduct the SEP: Analyzing and interpreting data. 3. CCC Evidence: This section is written around the CCC; the entire chapter and the reinforcement activity is written so that students would observe patterns in systems and cite patterns as empirical evidence for causality in supporting their explanations of phenomena (oxidation and reduction are observable and

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				predictable based on patterns). This is the NGSS definition of the CCC "patterns".
Non-Negotiable **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions drive student learning. ☐ Yes ☒ No	**REQUIRED** **2a)** Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time.	**No**	No evidence was found to support student engagement in observing and explaining phenomena and designing solutions to provide purpose and opportunity for learning.	Criteria Two: Phenomenon Based Instruction The State of Louisiana has adopted the NGSS philosophy of Phenomenon-based instruction. Accordingly, NGSS defines Phenomena as the real-life event or problem that may be solved using data and SEPs as a form of task-based assessment (NSTA, 2019). Essential Chemistry provides a real life example (phenomena) to start each chapter, and then uses the chapter to develop the concept around the phenomena or problem – and concludes each chapter with assessments tied to the phenomena or problem Examples include: • Chapter 1: Have you ever seen a label on a product that touts it as being chemical free? The term "chemical free" can be used to denote something as being natural or safe, but can anything really be chemical free? • Chapter 3: matter can describe the "stuff" that makes up everything in the physical world – from the rocks and trees outside, to the air you breathe, and even you! What makes up matter and how can the matter around you be so diverse? o Page 69 provides insights and data on Vinegar (relates household material to diverse nature of matter). o Page 69 provides insights on methanol (relates household material to diverse nature of matter). o Page 69 problem solving and test your knowledge using data provided for calcium carbonate and battery acid – both relevant to the phenomena and follows the definition of phenomena based learning.

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				• Chapter 7: Chemical reactions happen all around us. Cooking and baking involves mixing ingredients and applying heat so chemical reactions can occur to create the flavors and aromas that you want. Plants take energy from the sun, causing a chemical reaction with carbon dioxide and water to produce sugar and oxygen. In fact, our bodies are an amazing chemical reaction factory. Digestion of food is a chemical reaction that extracts essential fuels and nutrients. • Chapter 20: When you look inside your refrigerator or go to the supermarket, you may see the word "organic" on many food labels. In this case, the label "organic" implies that the products were grown naturally without the use of synthetic pesticides, fertilizers or additives. Properly labeled "organic" foods are generally considered healthier, even though there is not sufficient evidence to scientifically support those claims. o Using the phenomena outlined on the opening of chapter 20, we build the phenomena with real life applications: o Page 648 Petroleum o Page 648 Gasoline o And assess using provided data on page 649. Again, this follows the phenomena-based approach to instruction. We would like to propose a deeper analysis of our materials and a possible meeting to determine why our materials are evaluated so poorly when the evidence is clear that they are written around 3D learning. We know this to be true since other NGSS states have reviewed and found these materials to meet the 3D requirements and have been adopted in other NGSS locations. We are happy to provide greater details and to hopefully determine how these materials are being evaluated and the standards for evaluation in this state.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **3. ALIGNMENT & ACCURACY:** Materials adequately address the Louisiana Student Standards for Science. ☐ Yes ☐ No	**REQUIRED** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the full **depth of the standards**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	REQUIRED **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	3c) In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific	**REQUIRED *Indicator for grades 4-12 only** **4a)** Students regularly engage with **authentic sources** that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE
literacy. ☐ Yes ☐ No	**REQUIRED** **4b)** Students regularly engage in **speaking and writing** about scientific phenomena and engineering solutions using authentic science sources; e.g., authentic data, models, lab investigations, or journal excerpts. Materials address the necessity of using **scientific evidence** to support scientific ideas.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	REQUIRED **4c)** There is **variability** in the tasks that students are required to execute. For example, students are asked to produce solutions to problems, models of phenomena, explanations of theory development, and conclusions from investigations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	4d) Materials provide a coherent sequence of authentic science sources that build scientific **vocabulary** and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation of deeper scientific learning.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
SECTION II: ADDITIONAL INDICATORS OF QUALITY				
Additional Criterion **5. LEARNING PROGRESSIONS:** The materials adequately address Appendix A: Learning Progressions. They are coherent and provide natural connections to other performance expectations including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the the Louisiana Student Standards for Math.	**REQUIRED** **5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are coherent within and across units. The **progression of learning** is coordinated over time, clear and organized to prevent student misunderstanding and supports student mastery of the performance expectations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	5b) Students apply mathematical thinking when applicable. They are not introduced to math skills that are beyond the applicable grade's expectations in the Louisiana Student Standards for Mathematics. Preferably, **math connections** are made explicit through	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE
☐ Yes ☐ No	clear references to the math standards, specifically in teacher materials.			
Additional Criterion **6. SCAFFOLDING AND SUPPORT:** Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking. ☐ Yes ☐ No	**REQUIRED** **6a)** There are separate **teacher support** materials including: scientific background knowledge, support in three-dimensional learning, learning progressions, common student misconceptions and suggestions to address them, guidance targeting speaking and writing in the science classroom (i.e. conversation guides, sample scripts, rubrics, exemplar student responses).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	6b) Appropriate suggestions and materials are provided for **differentiated instruction** supporting varying student needs at the unit and lesson level (e.g., alternative teaching approaches, pacing, instructional delivery options, suggestions for addressing common student difficulties to meet standards, etc.).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
Additional Criterion **7. USABILITY:** Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year. ☐ Yes ☐ No	**REQUIRED** **7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	7b) Materials help students build an understanding of standard operating procedures in a science laboratory and include **safety** guidelines, procedures, and equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	7c) The total amount of content is **viable** for a school year.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE
Additional Criterion **8. ASSESSMENT:** Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards. ☐ Yes ☐ No	**REQUIRED** **8a) Multiple types** of formative and summative assessments (performance-based tasks, questions, research, investigations, and projects) are embedded into content materials and assess the learning targets.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	REQUIRED **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

FINAL EVALUATION
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 Column 1 for the remaining criteria.
Tier 3 ratings receive a "No" in Column 1 for at least one of the non-negotiable criteria.

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-Negotiables	1. Three-dimensional Learning	**No**	The materials are not designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The materials do not provide students with the opportunities needed to master the science and engineering practices and crosscutting concepts. In addition, the materials do not integrate three-dimensional learning to support a deeper understanding of the standards.	
	2. Phenomenon-Based Instruction	**No**	There is no evidence of students observing and explaining phenomena and designing solutions.	
	3. Alignment & Accuracy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	4. Disciplinary Literacy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
II: Additional Indicators of Quality	5. Learning Progressions	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE
	6. Scaffolding and Support	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	7. Usability	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	8. Assessment	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
FINAL DECISION FOR THIS MATERIAL: **Tier III, Not representing 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 2018-2019 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Ascension, Bossier, Caddo, Central, Desoto, East Baton Rouge, Einstein Charter Schools, Iberia, InspireNOLA, Jefferson, KDHSA (Jefferson Parish Charter), Lafayette, Lincoln, Livingston, Orleans, Ouachita, Pointe Coupee, Rapides, Recovery School District, RSD - Choice Foundation, RSD – FirstLine, RSD – NOCP, St. Charles, St. Mary, St. Tammany, Tangipahoa, Vermilion, West Baton Rouge, West Feliciana, Zachary. This review represents the work of current classroom teachers with experience in grades K-12.

Appendix II.

Public Comments

There were no public comments submitted.