Instructional Materials Evaluation Review 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: **PhD Science** Grade/Course: **3-5**

Publisher: **Great Minds, LLC** Copyright: **2018, 2019**

Overall Rating: **Tier I, Exemplifies 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)	
3. Alignment & Accuracy (Non-negotiable)	
4. Disciplinary Literacy (Non-negotiable)	
5. Learning Progressions	
6. Scaffolding and Support	
7. Usability	
8. Assessment	

Each set of submitted materials was evaluated for alignment with the standards beginning with a review of the indicators for the non-negotiable criteria. If those criteria were met, a review of the other criteria ensued.

Tier 1 ratings received a "Yes" for all Criteria 1-8.
Tier 2 ratings received a "Yes" for all non-negotiable criteria, but at least one "No" for the remaining criteria.
Tier 3 ratings received a "No" for at least one of the non-negotiable criteria.

Click below for complete grade-level reviews:
Grade 3 (Tier 1) Grade 4 (Tier 1) Grade 5 (Tier 1)

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: **PhD Science** Grade/Course: **3**

Publisher: **Great Minds, LLC** Copyright: **2019**

Overall Rating: **Tier I, Exemplifies 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)	
3. Alignment & Accuracy (Non-negotiable)	
4. Disciplinary Literacy (Non-negotiable)	
5. Learning Progressions	
6. Scaffolding and Support	
7. Usability	
8. Assessment	

To evaluate instructional materials for alignment with the standards and determine tiered rating, begin with **Section I: Non-negotiable Criteria**.

- Review the **required**[1] Indicators of Superior Quality for each **Non-negotiable** criterion.
- If there is a "Yes" for all **required** Indicators of Superior Quality, materials receive a "Yes" for that **Non-negotiable** criterion.
- If there is a "No" for any of the **required** Indicators of Superior Quality, materials receive a "No" for that **Non-negotiable** criterion.
- Materials must meet **Non-negotiable** Criteria 1 and 2 for the review to continue to **Non-negotiable** Criteria 3 and 4. Materials must meet all of the **Non-negotiable** Criteria 1-4 in order for the review to continue to Section II.
- If materials receive a "No" for any **Non-negotiable** criterion, a rating of Tier 3 is assigned, and the review does not continue.

If all Non-negotiable Criteria are met, then continue to **Section II: Additional Criteria of Superior Quality.**

- Review the **required** Indicators of Superior Quality for each criterion.
- If there is a "Yes" for all **required** Indicators of Superior Quality, then the materials receive a "Yes" for the additional criteria.
- If there is a "No" for any **required** Indicator of Superior Quality, then the materials receive a "No" for the additional criteria.

Tier 1 ratings receive a "Yes" for all Non-negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality.
Tier 2 ratings receive a "Yes" for all Non-negotiable Criteria, but at least one "No" for the Additional Criteria of Superior Quality.
Tier 3 ratings receive a "No" for at least one of the Non-negotiable Criteria.

[1] **Required Indicators of Superior Quality** are labeled "**Required**" and shaded yellow. Remaining indicators that are shaded white are included to provide additional information to aid in material selection and do not affect tiered rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
Section I: Non-negotiable Criteria of Superior Quality **Materials must meet Non-negotiable Criteria 1 and 2 for the review to continue to Non-negotiable Criteria 3 and 4. Materials must meet all of the Non-negotiable Criteria 1-4 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.	**Yes**	The instructional 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 materials integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI) to support deeper learning. In Module 1, Lessons 16, students identify weather hazards and examine their potential effects. Students first discuss weather related phenomena. Then, from observing and analyzing photographs of varying severe weather conditions (SEP, Obtaining, Evaluating, and Communicating Information), students create a class severe weather chart describing severe weather hazards (DCI, UE.ESS2B.a) and their effects (CCC, Cause and Effect). In groups, students analyze the class Severe Weather Chart and identify similarities and differences (CCC, Patterns). In Lesson 17, they investigate scales designed to rate severe weather systems. Students use what they learned about hurricane scales to determine the possible effects (CCC, Cause and Effect) of Hurricane Katrina with a scale of Category 5. In Lesson 18, students investigate how people protect themselves from weather hazards by observing several photographs of solutions for each type of severe weather (SEP, Obtaining, Evaluating, and Communicating Information). Students update the severe weather chart from Lesson 16, identifying and creating solutions to help reduce the impact of severe weather hazards, including a blizzard, hurricane, drought, severe thunderstorm and tornado. (DCI UE.ESS3B.a).

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			In Module 2, Lesson 15, students Use a Model (SEP) of a meerkat system to construct and support an argument (SEP, Engaging in Argument from Evidence) that some animals form groups that help members survive (DCI, PE 3-LS2-1). In this lesson, students participate in a modeling activity of a meerkat system including: meerkats, their burrows, their food, and the area near their burrows where they look for food. One student portrays a predator entering the meerkat system. Other students model the behaviors of the meerkats as they respond to a change in the system (CCC, System and System Models). This activity demonstrates how meerkats use the advantage of their group to cope with the change of the addition of a predator to their system (DCI, UE.LS2D.a). In Module 3, Lesson 9, students engage in several investigations (SEP, Planning and Carrying Out Investigations) while rotating through Trait Influence Stations. Throughout the stations, students read and analyze text, observe photographs, and use hands-on models to identify variations in traits of organisms of the same species (CCC, Patterns). Students record variations and their causes (CCC, Cause and Effect) in their Science Logbooks (DCI, UE.LS3A.a). In Lesson 10, students share Science Logbook responses to create a class cause/effect chart by identifying the organism, its change in trait, and the cause of the change (CCC, Cause and Effect). For example, the variation in color of the American flamingos' feathers is caused by eating different types and amounts of food. In a class discussion, students use the chart to provide evidence to support the explanation (SEP, Constructing Explanations) that changes in traits can be caused by environmental influences (DCI, UE.LS3A.b). In Lesson 11, students construct a written explanation (SEP, Constructing Explanations) in their Science Logbooks, determining if the traits of two puppies that changed overtime were influenced by their growth or by the environment (CCC, Cause and Effect; DCI, UE.LS2A.b) .

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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.	**Yes**	Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. The materials have an anchor phenomenon for each module and students engage in investigations and activities that lead to generating questions and defining solutions to problems as they work individually and in groups to explore the anchor phenomenon in depth. Each module is then broken into sections called "Concepts," which use smaller phenomenon-based questions to continue to provide the purpose for students to engage in the investigations and lessons that follow as they grapple with both the smaller concepts and the larger anchoring phenomenon. For example, in Module 1, students are introduced to the phenomenon of the 1900 Galveston Hurricane by observing photographs depicting the destruction of structures it caused. This Anchoring Phenomenon helps to introduce students to the module's essential question, "How can we prevent a storm from becoming a disaster?" This sets the stage for students to use additional phenomenon questions to learn the 3 Module Concepts: Weather Conditions, Climate, and Weather Hazards. As students engage with text, data, media, and hands-on investigations throughout the module, they develop the knowledge needed to design a solution to help prevent a disaster caused by weather hazards such as hurricanes. In Module 3, the variation in humpback whales is the anchor phenomenon. Students build knowledge to answer the essential question, "What makes an individual humpback whale unique?" In Lessons 1 and 2, students build a foundation for understanding individual variation by describing patterns in the characteristics that humpback whales have in common. After establishing these commonalities, students begin to ask questions about the differences between individuals. This builds upon the Phenomenon Question: How do we

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			know if an organism is a humpback whale? Students look at photographs to identify humpback whales by distinguishing their unique characteristics. In Lesson 3, students develop an anchor evidence organizer to begin describing what makes an individual humpback whale unique. They also build a driving question board that guides their learning throughout the rest of the module as they investigate four concept sequences: Describing Organisms, Growth, Development; Environmental Influences; Inherited Traits; and Advantages of Traits. At the end of the module, students participate in a Socratic Seminar in which they apply their understanding to describe factors that influence traits and explain how traits affect an individual's life. Finally, students revisit the anchor phenomenon by constructing a written response to the essential question for the unit. In Module 4, students study and observe motion in space in comparison to motion on Earth, which serves as the anchor phenomenon for the unit. The anchor is supported by the essential question, "Why do objects move differently in space than they do on Earth?" The unit is broken down into three concept sequences: Motion; Forces; and Magnetic and Electric Forces. In Concept 1, Motion, the sequence in Lessons 1-9 is driven by the focus question, "How can an object's motion be described and predicted?" Student activities and investigations such as, developing a model comparing the motion of a soccer ball on Earth to that of a soccer ball in the Space Station, observing and measuring the motion of different objects, and investigating how increasing a pendulum's release distance affects the motion of a toy car, provide the purpose and opportunity for learning. In Concept 2, Forces, the sequence in Lessons 10-18 is driven by the focus question, "What can cause the motion of an object to change?" In this sequence, students use Atwood Machines to model both the effects of changing forces and the effects of multiple forces on the motion of a block. These investigations provide the

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			purpose and opportunity for learning. In Concept 3, Magnetic and Electric Forces, the sequence in Lessons 19-22 is driven by the focus question, "How can an object move without being touched?" Student activities provide opportunities for students to explore the effects that a magnet's strength, orientation, and distance have on other magnets or objects, as well as the effects that statically charged objects have on other objects. In Lessons 23-26, students apply what they have learned about forces to design a device to prevent a toolbox from floating away from astronauts in space, connecting back to the anchor phenomenon.
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**.	**Yes**	All of the Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards and integrate the DCIs, SEPs, and CCCs of the standards (i.e., 15 out of 15). In Module 1, Lessons 21 - 25, students engage in an engineering challenge in order to answer the phenomenon question, "How can people design better solutions to reduce the impact of weather hazards?" In Lessons 21 - 25, students apply the engineering design process to design a structure (SEP, Designing Solutions) that reduces the impact of flooding caused by storm surge (CCC, Cause and Effect). In Lesson 26, students explore modern solutions that reduce the impact of weather hazards related to hurricanes (UE.ESS3B.a). The integration of the three dimensions, provides the opportunity for students to gain a deep understanding of LSSS 3-ESS3-1. LSSS 3-LS4-2 is fully covered in Module 3, beginning with Lesson 21, in which students begin to develop an understanding of how traits can help a species survive in exploratory statins where students act like Brown Pelicans, Ruby-Throated Hummingbirds, and Prickly Pear Cacti to see how traits help the organisms survive. These stations help students prepare for the learning in Lesson 22 in which students model a predator-prey relationship of how

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			an owl hunts for pocket mice. Through a model of this relationship, students are able to use evidence to Construct Explanations (SEP) as to why the difference in fur color between pocket mice helps the mouse in surviving (DCI, UE.LS4B.a). In a discussion, students explain how the color of the fur had a direct effect (CCC, Cause and Effect) on the survival of the mouse. In Module 4, Lesson 4, students participate in Planning and Carrying Out an Investigation (SEP) as they suggest procedures to follow and measurements to take to investigate motion using provided materials. Students participate in a Motion Station rotation in which they observe and record measurements of motion such as a pendulum swinging, a top spinning, and a ball bouncing (Lesson 4 Activity Guide). In Lesson 5, students use their observations to describe the direction and speed of motion or to note whether the object was at rest (DCI, UE.PS2A.c). In Lesson 6, students use their observations and measurements from the Motion Station rotation activity in Lesson 4 to identify patterns of motion (CCC, Patterns) such as a pendulum swings back and forth, a ball bounces up and down, and a top spins in a circle, fast at first, then more slowly (Lesson 6 Activity Guide). Finally, students use the patterns they have identified to predict the motion of objects pictured on motion cards (Lesson 6 Resource). The integration of the three dimensions, provides the opportunity for students to gain a deep understanding of LSSS 3-PS2-2.
	Required **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Yes**	The content was accurate, up-to-date, and aligned with the most current and widely accepted explanations. No evidence of incorrect or out-of-date science explanations could be found.
	3c) In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Yes**	Instructional materials spend minimal time on content outside of the course, grade, or grade band.

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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.	**N/A**	
	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.	**Yes**	Students regularly engage in speaking and writing about scientific phenomena and engineering solutions using authentic sources. Materials address the necessity of using scientific evidence to support ideas. Throughout the modules, students are regularly provided with opportunities to ask, organize, and refine questions using the Driving Question Board. Materials additionally promote speaking about scientific ideas through discussion strategies such as Socratic Seminars. Student Logbooks provide students with a place to record observations and communicate scientific thinking supported by evidence. In Module 2, students participate in an “inside-outside circle” discussion where they use knowledge developed throughout the unit to provide scientific evidence to support their understanding of how to “prevent a storm from becoming a disaster,” the essential question for the unit. In Module 3, Lesson 1, students act as whale watchers. They watch a few videos of whales then add notes to the notice and wonder charts in their Science Logbooks (Lesson 1 Activity Guide) as they watch them. After each video, students are to share what they noticed and wondered. In Module 4, Lesson 28, students participate in a Socratic Seminar to answer the essential question, “Why do objects appear to move differently in space

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			than on Earth?" Students respond to each other directly, asking for evidence, and posing questions to extend the learning conversation.
	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.	**Yes**	There is variability in the tasks that students are required to execute. Students are regularly engaged in a variety of tasks such as, modeling phenomena, conducting investigations to explain phenomena, and designing solutions to problems. In Module 1, Lesson 3, students work in pairs or small groups to complete a Frayer model graphic organizer in their Science Logbooks (Lesson 12 Activity Guide A). The teachers constructs a class Frayer model as students share their work from each section of the model. In Module 2, Lesson 13, students model one effect of organisms living in groups by investigating the temperature difference between a single test tube, placed in a bag of ice, to that of a test tube placed within a bundle of other test tubes and placed in a bag of ice. The teacher records the corresponding initial and ending temperatures in a class data chart. Students analyze the data and conclude that the test tube within the bundle has a higher ending temperature than the single test tube. In a class discussion, students explain that the model represents penguins living in groups and explains that doing so helps them stay warm. In Module 3, Lesson 22, students participate in a simulation to learn how the color of fur can aid or hinder an animal in hiding from a predator. Students act like the predator to pick up "mice" (pieces of paper) in a certain time limit. Students use their experience to deepen their understanding of how organisms can have advantages in surviving that are different from other organisms of the same species. In Module 4, Lessons 23-27, students work through the engineering design process to design, construct, and refine a device that uses magnets to solve the

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			problem of a tools floating away from an astronaut in space.
	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.	**Yes**	The 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, but only after students have first had the opportunity to build conceptual understanding of terms. Modules have key terms that students learn through investigations, models, explanations, class discussions, and other experiences. For example, in Module 1, Lesson 12, students learn the formal definition of "climate" only after having had multiple experiences in previous lessons analyzing data related to weather in an area over time. Students then use their understanding of the term climate and create a Frayer model that includes the definition, characteristics, examples, and nonexamples of the term climate. In Module 3, Lesson 2, after students sort photographs of whales into different groups based on common characteristics, the teacher introduces students to new vocabulary "species" and explains that organisms with common characteristics usually belong to the same species. Then students apply their understanding of the new terminology by using common characteristics to classify other organisms according to their species. In Module 4, Lesson 1, students watch a video about movement in space. Before the students watch the video, the teacher prompts students to "focus on movement, or motion, of the soccer ball," and then explains that motion "describes the act or process of movement." Once students finish watching the video, they write what they noticed and wondered about the motion of the soccer ball. Throughout Concept 1, students continue to develop their understanding of the term "motion" as they learn more about speed, direction, and rest.

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Section II: Additional Criteria of Superior Quality			
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.	**Yes**	The lessons within and across each unit are organized to support learning through a natural progression. Students engage with and build an understanding of the three dimensions of the standards at increasing levels of complexity and sophistication and engage in a coherent progression of learning that is coordinated over time, clear, and organized. The module lessons are organized so disciplinary core ideas, science and engineering practices and crosscutting concepts build upon each other throughout the course of study. Throughout each module, the class creates a driving question board to relate concept questions and guide upcoming lessons. The driving question board helps to focus the progression of learning for the anchor phenomenon. The science and engineering practices, crosscutting concepts, and disciplinary core ideas are coherently sequenced across all of the lessons and continuously reinforced throughout the modules. Lessons are organized around a storyline, such as the 1900 Galveston Hurricane in Module 1. In this module, students employ the three dimensions as they “explore the Cause and Effect (CCC) relationship between weather hazards and resulting damage (DCI, UE.ESS3.Ba) as they Develop a Model (SEP) to describe what happened during the 1900 Galveston hurricane.” In Lesson 2, students work together to generate an anchor model including weather conditions and events associated with hurricanes to help explain what caused the destruction and loss of life in Galveston. As they gain understanding while working through the module, they update the anchor model to include evidence to support the explanation. In Lesson 10, students add that weather conditions are affected by seasonal changes. In Lesson 15, students add that identifying the weather patterns of a location’s

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			climate can help people predict future weather events. In Lesson 19, students provide evidence of weather hazards that damaged the city. In Lesson 26, students provide evidence of solutions that warn people of weather hazards and prevent or reduce their impact. Throughout the module, students build an understanding of the CCCs as they identify weather Patterns and Cause and Effect relationships between weather patterns and destruction. While doing so, they additionally deepen their understanding of DCIs ESS2D.a, ESS2D.b, ESS3B.a, and ETS.UE.1B.a. Motion in space provides the anchor and storyline for Module 4. In this module, students employ the three dimensions as they engage in Asking Questions and Carrying Out Investigations (SEP), to observe, measure, and describe motion (DCI, UE. PS2.A.a and UE.PS2A.b) to find patterns that help predict future motion (CCC, Patterns). In Lesson 3, students generate an anchor model to compare the movement of a soccer ball on Earth to that of a soccer ball in space. In Lesson 6, students update the anchor module with newly learned descriptions of motion. In Lesson 9, students update the anchor model to include a new understanding that patterns of motion exist on Earth and that these patterns make it possible to predict future motion, but patterns of motion are more difficult to observe in space making it more difficult to predict motion in space. In Lesson 13 and 14, after investigating forces using an Atwood machine, students update the anchor model to include the effects balanced and unbalanced forces have on objects. Students add gravity as a force that affects the motion of objects on Earth. In Lesson 17 and 18, after using the Atwood machine to investigate forces that cause an object to remain at rest, students update the anchor model to include friction as a force that opposes motion. In Lesson 21, after investigating the effects of noncontact forces like magnets, students wonder if magnets could be used as a force to secure objects that float in space. In Lessons 24-27, students use

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			the knowledge gained throughout the module to design and create a prototype that uses a magnet to secure an astronaut's tools to a toolbox in space. Throughout the module, students repeatedly use SEPs and CCCs to investigate, measure, observe, describe, and predict motion, deepening their understanding of DCIs UE.PS2A.a, UE.PS2A.b, UE.PS2A.c, UE.PS2B.b, and UE.PS2B.b. Consideration of the Louisiana Science Learning Progressions is provided under the heading Building Knowledge Across Levels in the module preface. In this section, the materials provide an explanation of how students' Level 2 learning of the Louisiana Student Standards for Science supports Level 3 learning and beyond. This provides teachers with an understanding of how learning is coordinated over time to support student mastery of the standards before and within Level 3.
	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.	**Yes**	Students apply mathematical thinking when applicable. Students are regularly called on to apply mathematical skills appropriate in the context of their learning and math connections are made explicit through clear references. In Module 1, Lesson 8, the materials suggest that students use academic language to compare values in bar graphs. The materials provide sentence stems to assist students in making comparisons such as, "(Month) had _____ inches more precipitation than (Month)." This supports Louisiana Student Standards for Mathematics (LSSM) 3.MD.B.3, solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. In Module 1, Lesson 13, there is an opportunity for teachers to have students make a connection between the CCC of Patterns and the Standard Mathematical Practice 8, Look for and Express Regularity in Repeated Reasoning. The materials provide teachers with sentence stems for students

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			to use to make generalizations about climate patterns. Students should be familiar with the language of the stems from working with Mathematical Practice 8. In Module 4, Lesson 19, there is a teacher note which gives teachers a suggestion to "provide a ruler at the Orientation Station to allow students to generate measurement data." This connects with the LSSM 3.MD.B.4, measure lengths using rulers marked with halves and fourths of an inch. Occasionally, the materials introduce students to math skills beyond their grade level. However, the materials provide suggestions to assist teachers in supporting students when applying complex skills. For example, in Module 2, Lesson 19, students are asked to measure the height of a plant to the nearest half centimeter. The materials explain that students should have had experience using a ruler to record measurements of length in halves or fourth of an inch (LSSM 3.MD.B.4) and representing fractions on a number line (LSSM 3.NBT.A.2); however, they may not be familiar with recording measurements in centimeters. Therefore, the materials suggest teachers provide students with rulers showing only whole and half centimeters.
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 (e.g. conversation guides, sample scripts, rubrics, exemplar student responses).	**Yes**	There are separate teacher support materials provided. Each module provides a Teacher Edition that includes a Module Overview with an Introduction, Module Map, Focus Standards, Three Dimensions at a Glance and In Detail, Key Terms, Advanced Materials Preparation, Safety Considerations, Background Knowledge, and Additional Reading for Teacher. The Teacher Background section provides scientific background about the DCIs of the unit. The 3-D Strategies sections detail explicit techniques for highlighting the SEPs, DCIs, and CCCs. Sample prompts and conversation guides for class discussions and Teacher Notes are also provided. The Teacher Note sections offer guidance to teachers on how to

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			implement strategies to engage student thinking, as well as on how students should respond to certain questions or activities in lessons. The Introduction provides the essential question of the module along with an overview of the Concept Focus Questions and lessons that guide student learning. For example, in Module 1, Weather and Climate, the essential question is "How can we prevent a storm from becoming a disaster?" The Concept Focus Questions are: Concept 1, "How do we describe weather?" Concept 2, "How do people know what weather to expect?" and Concept 3, "How can we plan for severe weather?" For additional content support and to build background knowledge, the materials suggest that teachers read materials such as "Air, Water, and Weather: Stop Faking It! Finally Understanding Science So You Can Teach It," by William C. Robertson. An explanation of the integration of the three dimensions, specific to the module and an explanation of the learning progression is also provided. Teacher Notes are provided throughout the lessons in the sidebar for additional guidance. For example, in Module 2, Lesson 2, as the students are discussing what they notice about a fossil of a butterfly, the teacher is directed to additional resources to support understanding of the differences between butterflies and moths. At the end of each module's Teacher Edition, appendices provide teachers with support before and during instruction. Appendix A, Module Resources, includes a set of lesson-specific resources to aid instruction, such as full-size photographs, informational texts, investigation procedure sheets, materials preparation, and supplemental information. Appendix B, Module Storyline, includes a more detailed version of the Module Map in the Module Overview that summarizes the progression of concepts in the module. Appendix C, Module Glossary, includes

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			level-appropriate definitions for new terms in the module and the lesson in which the definition appears. Appendix D, Domain-Specific Words, General Academic Words, and Spanish Cognates, includes a list of key terms in the module and their Spanish cognates to support English language development.
	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.).	**Yes**	Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. Module overviews include a pacing guide with alternative suggestions for differentiation and diverse learner supports promoting equitable participation. The sidebar in lessons of all modules contain notes on differentiation strategies the teacher can incorporate to support learners who may need additional support or more of a challenge. For example, in Module 1, Lesson 23, the materials suggest that English learners may benefit from additional scaffolding in the form of sentence frames such as, "We can improve our seawall by ______." In the same lesson, an extension suggestion is provided for an additional challenge for successful groups. The extension note suggests that these groups "retest their seawall designs under different conditions… by [providing] students with more water or ask them to increase the incline of their ramp." In Module 2, Lesson 10, a differentiation note suggests that teachers "consider assigning the columbine flower poster to a group of students performing above grade level as it can be more difficult to identify the characteristics of plants and explain how they help a plant survive." In Module 4, Lesson 9, a differentiation note suggests that some students may benefit from additional support with interpreting the line plot. It is suggested that the" teacher should meet with

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			these students in a group to review the process the class followed in the previous lesson and help them apply that thinking to the new line plot.”
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.	**Yes**	Text sets, laboratory, and other scientific materials are readily accessible through vendor packaging. The online teacher’s manual may be downloaded as a PDF file or used online. The modules contain the information to teach the lesson including links to relevant videos and reading materials. The material laboratory kits can be purchased from an external source. In some cases, the additional reading materials would need to be accessed separately. For example: in Module 1, “Hurricanes!” by Gail Gibbons, “Tornadoes!” by Gail Gibbons, and “Marvelous Mattie: How Margaret E. Knight Became an Investor” by Emily Arnold McCully; in Module 2, “A Butterfly if Patient” by Dianna Hutts “Aston and Amos and Boris” by William Steig; in Module 3, “Here Come the Humpbacks” by April Pulley Sayre; and in Module 4, “Moonshot: The Flight of Apollo 11 by Brian Floca.”
	Required **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.	**Yes**	The 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. General safety guidelines provided as the start of each module include safety measures, such as reviewing safety guidelines with students before each activity, students wearing safety goggles during investigations involving equipment, and students never placing investigative materials in their mouths. In Module 1, students complete hands-on, minds-on activities that involve the use of devices to gather weather data and the use of clay and water to build a seawall prototype in an engineering challenge. In addition to safety notes, important safety measures

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			to implement in Module 1 include the following: 1. Teachers must explain to and review safety expectations with students before each activity. 2. Students must listen carefully to and follow all teacher instructions. Instructions may be verbal, on classroom postings, or written in the Science Logbook or other handouts. 3. Students must demonstrate appropriate classroom behavior (e.g., no running, jumping, pushing) during science investigations. Students must handle all supplies and equipment carefully and respectfully. 4. Students and adults must wear personal protective equipment (e.g., safety goggles) during investigations that require the use of such equipment. In Module 2, Lesson10, students learn the seriousness of working with and observing live organisms. Students are reminded that organisms can be harmed or die if not treated with respect and care. In Module 4, Lesson 10, it is suggested that teachers consult with the school's physical education teacher prior to the lesson to identify safety rules for students to follow before participating in the Scooter Board Station activity. It is additionally recommended that teachers and students watch for objects on the floor that could cause slips or falls, make an effort to control the scooter at all times so as not to collide with other students, avoid standing on a scooter board, and avoid holding a pencil while on a scooter board.
	7c) The total amount of content is **viable** for a school year.	**Yes**	The total amount of content is viable for a school year. There are 4 modules within the grade level. Each module includes between 28-30 lessons which are approximately 45 minutes in length but may extend past one class period of science. Additionally, extension activities are provided within units to deepen understanding, as time permits.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Module 1 includes 29 lessons, Module 2 contains 28 lessons, Module 3 contains 28 lessons, and Module 4 contains 30 lessons. There is a total of 115 lessons which allows teachers flexibility with time and accounts for interrupted days that may occur during the school year. Extension opportunities are suggested, as time permits, to extend the learning. For example, In Module 1, Lesson 23 states, "Based on time available, consider having groups create visual aids to use during their presentation." In Module 2, Lesson 25, another suggestion is provided to allow groups to revise their design solutions if time permits.
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.	**Yes**	Multiple types of formative and summative assessments are embedded into the content materials and assess the learning targets. The modules contain a variety of performance based tasks, investigations, projects in which students must design solutions to real-world problems, and formative assessment questions embedded in lessons. Formative assessments include nonverbal signaling, teacher observation, and Conceptual Checkpoints. For example, in Module 1, Lesson 9, teachers may formatively assess student understanding as students use nonverbal signals to represent if they agree or disagree with shared student responses. In Module 4, Lesson 9, students participate in a Conceptual Checkpoint to demonstrate their learning about patterns of motion. The teacher plays the slingshot ride video, and allows students to observe the motion of the ride. Then the teacher displays the Conceptual Checkpoint scenario, reads the scenario aloud to students, and instructs them to carefully observe the diagram. The teacher asks them to record responses in their Science Logbooks (Lesson 9, Activity Guide B). Conceptual Checkpoints assesses the mastery of knowledge identified in each concept's standard(s). There is one checkpoint per concept and includes evaluation guidance.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Summative assessments include performance tasks and End-of-Module Assessments. For example, each module concludes with either an Engineering Challenge or a Science Challenge to assess student ability to apply conceptual knowledge to solve a real-world problem. There is one challenge per module and rubrics are provided. For example, in Module 4, Lessons 23 -27, students participate in a summative performance task in which they design a prototype toolbox that will secure tools for astronauts in space. Each module provides an End-of-Module Assessment that gives students the opportunity to demonstrate the knowledge and skills they have acquired throughout the module in the context of one or more phenomena. There is one assessment per module, and rubrics are provided. In Module 2, students finalize a Module Concept Statement which allows for summative assessment of student knowledge of how the DCIs and CCCs of the unit are linked. The materials provide a sample Module Concept Statement which shows an example of what a student might complete for this Module.
	Required **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	**Yes**	Assessment items and tasks are structured on the integration of the three dimensions. The End-of-Module Assessments and the tasks ensure that students use the Science and Engineering Practices to fully integrate their understanding of the Disciplinary Core Ideas and the Crosscutting Concepts. In Module 1, Lessons 21-26, students engage in an Engineering Challenge in which they use the engineering design process as they engage in Designing Solutions (SEP) to reduce the impact of a storm surge. In developing the design, students must consider different criteria and constraints. Students apply what they have learned about weather, climate, and the effects weather hazards (DCI, UE.Ess3B.a) to design a seawall that can help

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			reduce the problems caused by coastal flooding (CCC, Cause and Effect). In Module 2, Lessons 22-25, students engage in Defining Problems (SEP) that are affecting (CCC, Cause and Effect) the monarch population to decline, then engage in Developing and Using Models (SEP) to design a solution to help monarchs survive in a changing environment (DCI, UE.LS4D.a). Students then Engage in Argument from Evidence (SEP) supporting the merit of a design solution. In Module 3, the End-of-Unit Assessment includes questions that integrate the application of the three dimensions. For example, question #4 requires that students Analyze and Interpret Data (SEP) to identify Patterns (CCC) in traits) to determine which trait, thin or thick shell, is most beneficial to a sea snail's survival (DCI, UE.LS4.Ba). In the Engineering Task that begins in Lesson 23 of Module 4, students watch a video of an astronaut who loses a tool bag while on a spacewalk and identify the problem (SEP, Defining Problems) faced by the astronaut. Then students use the design process to design a toolbox that can be used to secure the astronaut's tools while considering the criteria that the solution must accomplish, as well as the possible constraints. Students use the materials provided, including magnets, to plan and build their design. In Lesson 26, students test their prototypes, designed in the previous lessons, to see if the magnetic interactions (DCI.UE.PS2B.b) work to solve the problem. In the Land section of Lesson 27, students must finalize the integration of the DCI and CCC (Systems and System Models) to explain how the various parts of their design worked together using the properties of magnetism to solve the problem.
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Yes**	Scoring guidelines and rubrics for assessments align to performance expectations

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			and incorporate criteria that are specific, observable and measurable. For example, question 1 of Module 1, End-of-Module Assessment, asks students to analyze temperature and precipitation graphs to predict future weather conditions in New Orleans, Louisiana and to use evidence from the graphs to support their prediction. The context of this question is aligned to LSSS 3-ESS2-1, "Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season." A scaled rubric for assessing student performance on this question is provided. Question 2b of Module 2, End-of-Module Assessment, asks students to analyze photographs of otters and state an argument supported by evidence as to which otter is the most likely to survive in the given environment. This question is aligned to LSSS 3-LS4-3, "Construct and support an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all." An exemplar student response is provided and a scaled rubric for assessing student performance is also provided. The scoring guidelines for Question 2, End of Module Assessment for Module 3, relates to LSSS 3-LS1-1. Students label a model of the stages in the life cycle of a plant and the life cycle of a ladybug (2a). The answer key shows that both organisms have birth, growth and development, and death as commonalities in their respective life cycles. In Module 4, End Of Module Assessment, students observe distance traveled and make a prediction of how far a sled might go based on the data (3b). For the rubric category labeled as "correct or reasonable response with sufficient detail or evidence provided," the student must "record a reasonable distance for all three sleds" (3a) and "correctly predict the motion of the sled and provide sufficient

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			evidence to support their response" (3b). This relates to LSSS 3-PS2-2 as students make observations and/or take measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

FINAL EVALUATION

Tier 1 ratings receive a "Yes" for all Non-negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality.

Tier 2 ratings receive a "Yes" for all Non-negotiable Criteria, but at least one "No" for the Additional Criteria of Superior Quality.

Tier 3 ratings receive a "No" 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-negotiable Criteria of Superior Quality[2]	1. Three-dimensional Learning	**Yes**	Students have multiple opportunities to consistently demonstrate the application of the three dimensions of the science standards. The majority of the materials integrate the Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas to support deeper learning.
	2. Phenomenon-Based Instruction	**Yes**	The majority of instructional time is centered around students observing and explaining phenomena and/or designing solutions. Students are asked to observe and explain phenomena and design solutions, which provides the purpose and opportunity for learning.
	3. Alignment & Accuracy	**Yes**	All (15 out of 15) of the Louisiana Student Standards for Grade 3 are appropriately addressed by the instructional materials with minimal time spent on content that is outside of the grade level.
	4. Disciplinary Literacy	**Yes**	Students regularly engage in a variety of tasks which require students to speak and write about scientific phenomena and engineering solutions. Materials address the necessity of using scientific evidence to support ideas. Vocabulary is introduced only after students have had an opportunity to build conceptual understanding through investigative, analytical, hands-on learning.
	5. Learning Progressions	**Yes**	The lessons within and across each unit are organized to support learning through a natural progression. Students engage with and build an

[2] Must score a "Yes" for all Non-negotiable Criteria to receive a Tier I or Tier II rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
II: Additional Criteria of Superior Quality[3]			understanding of the three dimensions of the standards at increasing levels of complexity and sophistication and engage in a coherent progression of learning that is coordinated over time, clear, and organized. Students apply mathematical skills when applicable.
	6. Scaffolding and Support	**Yes**	Lessons include support materials for strengthening Teacher Background Knowledge, 3-D Strategies detailing explicit techniques for highlighting the SEPs, DCIs, and CCCs, sample prompts and conversation guides for class discussions, Teacher Notes, and appropriate suggestions for differentiating instruction for diverse learners.
	7. Usability	**Yes**	The total amount of content is viable for the school year and safety guidelines are embedded in the curriculum. The modules contain the information needed to teach including links to relevant videos and reading materials. Laboratory kits and text sets can be purchased from an external source.
	8. Assessment	**Yes**	Assessment items and tasks are structured on the integration of the three dimensions. Scoring guidelines and rubrics are aligned to performance expectations and incorporate criteria that are specific, observable and measurable.
FINAL DECISION FOR THIS MATERIAL: **Tier I, Exemplifies quality**			

[3] Must score a "Yes" for all Additional Criteria of Superior Quality to receive a Tier I rating.

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: **PhD Science**

Grade/Course: **4**[4]

Publisher: **Great Minds**

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Overall Rating: **Tier I, Exemplifies 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)	
3. Alignment Accuracy (Non-Negotiable)	
4. Disciplinary Literacy (Non-Negotiable)	
5. Learning Progressions	
6. Scaffolding and Support	
7. Usability	
8. Assessment	

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.

[4] The Grade 4 review was conducted during the 2017-2018 round and originally published 5/18/2018.

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, crosscutting concepts and disciplinary core ideas separately when necessary but they are most often integrated to support deeper learning.	**Yes**	The instructional materials are designed so that students can develop scientific content knowledge and skills by interacting with the three dimensions. Students have multiple opportunities throughout each module to consistently demonstrate application of the three dimensions, and the three dimensions are most often integrated with one another to support a deeper learning of the performance expectations. Throughout the modules, students interact with several different science and engineering practices, disciplinary core ideas, and crosscutting concepts. Module 1, The Changing Earth, addresses Standard 4-ESS2-1. The crosscutting concept, cause and effect, is addressed several times throughout the module. For example, students view a photograph of Deer Creek Falls (page 51) and are asked what may have caused the holes in the rocks. In the module, they also investigate various forces of erosion to determine the cause and effect relationships between rocks and erosion (page 70). Cause and effect relationships are routinely identified, tested, and used to explain change as called for by standard 4-ESS2-1. Module 2, Energy, addresses Standard 4-PS3-1. The disciplinary core idea UE.PS3A.a is appropriately addressed in Lessons 6 and 7 (page 49). In the lessons, students

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			explore the relationship between speed and energy when they use various amounts of energy to pull back a car, windmill, and soccer ball. The science and engineering practice, constructing explanations and designing solutions, is also appropriately addressed throughout the lessons (pages 49-58). In Lesson 7, students learn how to quantify speed before they conduct an investigation. Students also participate in stations, make observations about the impact that energy has on various objects, and answer questions to construct an explanation such as, "Where do you think the energy came from at the stations?" Module 3, Sensing the Environment, addresses standard 4-LS1-1. In the module, the disciplinary core idea UE.LS1A.a is appropriately addressed. In Lesson 4, before students experience sense stations, the teacher explains that a structure is part of an animal's body and it serves a function (page 42). Once students experience the stations and have an understanding of this idea, they write a response in their science logbooks. For example, they explain how skunks might sense insects underground and use structure and function, crosscutting concept, to explain the skunk's body parts. Module 4, Light: Sight and Communication, addresses Standard 4-PS4-2. The science

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			and engineering practice, developing and using models, is appropriately addressed. In Lesson 9, How Color Affects What We See Investigation, students develop a model to describe the interactions between color of light and how the color of an object affect what we see (pages 23-24). Students connect this information to what Amelia Earhart saw during her final flight as an aviator pilot.
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.	**Yes**	The majority of instructional time is centered around students observing and explaining phenomena and/or designing solutions. In each module, students are asked to observe and explain phenomena and design solutions, which provides the purpose and opportunity for learning. Each module includes anchor and investigative phenomena; the investigative phenomena help students explain how and why the anchor phenomena occurs in the real world. For example, the anchor phenomenon for Module 1, The Changing Earth, is "How did the Grand Canyon's features form?" In Lessons 1 and 2, the focus question is, "What can we discover in an unknown canyon?" In Lessons 3 and 4, the focus question is, "What do the Grand Canyon rock layers reveal?" Both questions lead students to understand how the Grand Canyon's features were formed.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			The modules' investigative phenomena are related to the anchor phenomena and aide students in explaining how and why the anchor occurs in the real world. For example, in Module 2, Energy, students explore an anchor phenomenon, "How Do Windmills Change Wind into Light?" The lessons throughout the module are centered around several investigative phenomena and structured to help students explain how windmills work. Students make observations and generate questions about how windmills harness the wind, how windmills generate electricity, how energy is transferred in hand-crank flashlights, and how energy is transformed in various devices. After students complete the investigations, they use the information that they learned to explain how a windmill changes wind into light. Students are also asked to design solutions, compare various solutions, and make improvements to their design solutions using feedback from their peers. For example, in Module 4, Light: Sight and Communication, students investigate the phenomenon of Amelia Earhart's famous flight and the reasons that she did not complete her journey. After learning about how we see and how light affects vision, students design a runway that could be seen in various conditions. Students use the engineering process to refine and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			revise their models and present them to their peers for feedback. Students are asked to think about which solutions worked better (page 140) and look for patterns in successful designs.
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**.	**Yes**	93% (13 out of 14) of the Louisiana Student Standards for Grade 4 are appropriately addressed by the instructional materials. Standard 4-ESS2-3 is not addressed in the curriculum. Module 1, The Changing Earth, addresses Standards 4-ESS1-1, 4-ESS2-1, 4-ESS2-2, 4-ESS3-1, 4-ESS3-2. In the module, students explore the anchor phenomenon, "How did the Grand Canyon's Features form?" For example, standard 4-ESS2-2 is fully addressed when students analyze and interpret data (SEP) from a volcanic map (page 114), examine plate tectonics and large-scale system interactions (DCI) by interpreting a relief map, and identify patterns (CCC) in the location of mountains and occurrences of earthquakes. Students also engage in a writing task when they predict where a canyon might be located using a relief map (page 122). Module 3, Sensing the Environment, addresses Standards 4-LS1-1 and 4-LS1-2. During the module, students visit "Sense Stations" and conclude that humans and animals can sometimes sense and respond

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			to information in their environment in different ways. Students are asked to use the evidence gathered at the stations to construct an explanation (page 42). As students visit the stations, they also recognize that animals have structures that have a specific function (DCI). Throughout Lesson 5 (pages 46-50), students understand how an animals' sensory system is different from that of humans, which addresses the crosscutting concept, systems and system models. For example, they explore what causes elephants to sense a rainstorm. Likewise, Modules 3 and 4 addresses standards 4-PS4-1 and 4-PS4-2. Students develop models (SEP) to explore and observe patterns (CCC) in waves as called for by the standards.
	REQUIRED **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Yes**	All reviewed content was accurate, up-to date and aligned with the most current and widely accepted explanations. No evidence could be found of incorrect or out of date science explanations.
	3c) In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Yes**	The instructional materials spend minimal time on content outside of the course or grade-band. 81% of the addressed standards focus on Louisiana Student Standards in 4th grade. The three standards that do not fall within the current Standards are 3-5ETS1-2, 3-5ETS1-3, 4-PS4-3. These standards are addressed in Module 1, Changing Earth,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			and Module 4, Light: Sight and Communication. For example, in Module 1, Lessons 11-16 focus on Standard 3-5-ETS1-2. Students complete an engineering challenge to design a structure to reduce the damage of erosion. Module 4 Lesson 20 -23 includes engineering design challenges that target standards 3-5-ETS1-2 and 3-5ETS1-3 asking students to develop and build a solution to increase visibility. Although these activities do not explicitly address Louisiana Student Standards for Science, they enhance teaching and learning, are connected to other standards, and do not distract from the overall learning targets.
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.	**Yes**	Students have multiple opportunities to regularly engage with authentic resources that represent the language and style that is used and produced by scientists. Authentic photographs, media content, graphs, and articles are regularly included in the materials. In Module 1, Changing Earth, students engage with authentic photographs that show the Grand Canyon in the past and present. For example, a photograph of Powell's 1871 Expedition Team to the Grand Canyon is included (page 19) to help students gain an understanding of how the Grand Canyon's features were formed.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Likewise, in Module 2, Energy, students examine photographs from FEMA after Hurricane Harvey in Houston (page 126). While learning about wind energy, students look at a diagram of a windmill (page 22) that is generating electricity in homes. In Model 2 (page 68), after completing an investigation and gathering data, students create a bar graph to assist with analyzing data and understanding the relationship between speed and energy. In Module 3, Sensing Their Environment, students view a video, GCSE Science Revision- Types of Waves, to get an idea of how waves caused by earthquakes and ocean waves. Authentic locations, scientists, and research are presented in the video. Also, in Module 3 (page 21) students read an excerpt from a "Popular Science" article to understand how elephants are able to detect rainstorms.
	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.	**Yes**	Students regularly engage in speaking and writing about scientific phenomena and engineering solutions. Students discuss scientific phenomena using authentic sources and use scientific evidence from the sources and investigations to support scientific claims and ideas. Throughout the modules students have multiple opportunities to speak and write the phenomena. In Module 1, The Changing Earth, students speak and write

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			about how Earth's processes have changed the Grand Canyon's features over time, the anchor phenomenon. In Lesson 1, students review authentic photographs of the Grand Canyon, complete a "Notice and Wonder" chart in a science log book, and record observations based on what they notice about the rock layers. In Lesson 4, students make a claim about which layer of rock was formed first and which layer was formed last. In Lesson 5, students make claims about how the holes formed in the rocks. Students discuss their claims while considering the question, "How did the Grand Canyon's Features Form?" In Module 2, Using Science Logbook, students are asked reflection questions after completing investigations. For example, students are asked to identify patterns in data, explain the differences using evidence from the experiment, and draw conclusions about the relationship between speed and energy (page 14). In Module 3, Sensing the Environment, students complete a research project to determine how plants respond to their environment. During the project, students are asked to make claims and use scientific evidence to support their claims. In Module 4, Light: Sight and Communication, students participate in a class discussion about Amelia Earhart's

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			flight, and they are asked to cite evidence from their experiments to explain their thinking (page 14). Opportunities for students to engage in speaking and writing about phenomenon are made meaningful through the consistent use of an anchor phenomenon setting a purpose for learning in each module.
	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.	Yes	There is variability in the tasks that students are required to execute throughout the instructional materials. Students are asked to engage in a variety of tasks including making observations, making claims, creating models, and designing solutions to problems. In Lesson 2, Module 1, The Changing Earth, the teacher leads the class in developing an anchor model (page 25) of how the Grand Canyon was formed. Likewise, in Module 4, Light: Sight and Communication, students draw models to explain different aspects of sight (page 7, Model 4 Activity guide). In Module 2, Energy, students complete an investigation plan to determine which objects use a little energy (page 48) and which objects use a lot of energy. After the investigation, students conduct a race to investigate speed (page 58).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Module 3, Sensing the Environment, Lessons 4 and 5, students make observations as they visit sense stations (page 42).
	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.	**Yes**	The materials provide students ample opportunity to build scientific vocabulary over the course of study. Vocabulary is used throughout the materials as the students complete their investigations and participate in class discussions for deeper learning. For example, in Module 1, The Changing Earth, students have multiple experiences with describing rock layers. The teacher explains that geologists refer to the big stripes on rocks as layers. Students continue to explore the concept of layers through investigations and begin to construct an understanding of the concepts as they progress through the module. In Module 2, Energy, students are asked to construct a model of how to harness the wind from a windmill (pages 27 and 28). The teacher asks the question, "What could be moving through the wires?" The text prompts the teacher to introduce the students to the term energy and then explains how energy is useful.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Module 3, Sensing the Environment, the term wave is not introduced to students until they experience the concept and draw a model of it. Students create ripples in water and draw what the ripples look like. Later in the module, the teacher throws a piece of paper and asks students to observe what happens. After this discussion, the terms response and behavior are discussed.
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 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.	**Yes**	The overall organization of the materials support student mastery of the standards. The progression of learning is coordinated over time, clear and organized to prevent student misunderstanding. Throughout each module, the class creates a driving question board to relate concept questions and guide upcoming lessons. The driving question board helps to focus the progression of learning for the anchor phenomenon. The science and engineering practices, crosscutting concepts, and disciplinary core ideas are coherently sequenced across all of the lessons and continuously reinforced throughout the modules. For example, in Module 1, students explore rock layers in Lessons 1-4, which focuses on Standard 4-ESS1-1. Throughout the lessons, students identify patterns (CCC) in rock formations and develop an explanation (SEP) about how they formed.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Lessons 5-13, students investigate the concepts of weathering and erosion, which focuses on Standard 4-ESS2-1. Students investigate (SEP) the effects (CCC) of water, ice, and wind on weathering and erosion. In Module 3, Lesson 1-3, students explore elephants and how they sense rainstorms. Next, in Lessons 4-6, they develop an understanding of animal and elephant senses, which addresses Standards 4-LS1-1 and 4-LS1-2. The science and engineering practice of developing and using models is presented several times throughout Module 3. Eventually, students independently create models. For example, students investigate a wave tank and the motion of a boat in the tank and later create a wave model in groups using a slinky.
	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.	**Yes**	Students apply mathematical thinking when applicable, and in some cases, mathematical standard correlations are explicitly stated. For example, the Module 2, Lesson 4, Interdisciplinary Connection: Mathematics, addresses math Standards 4.OA.A.1 and 4.MD.A.1. Students use estimation to determine the distance a car is pulled back during the investigations that are centered around speed and they use comparative phrases and measure.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Module 3, Lesson 1, addresses math Standard 4.MD.2, solve word problems involving distance. Students are asked to think about what the environment is like in a town 150 miles away. Module 4, Sight: Light and Communication, addresses math Standard 4.GA.1. Students determine that light travels in rays and connect it to the mathematical geometry term "ray."
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).	**Yes**	There are separate teacher support materials, including support in three-dimensional learning, scientific background knowledge, suggestions for diverse learners, and understanding learning progressions. The modules have sections, Spotlight on the Three Dimensions, to help teachers develop a deeper understanding of the science and engineering practices, crosscutting concepts, and disciplinary core ideas that are addressed in the module. For example, Module 2, Spotlight on the Three Dimension states, "Each lesson in the module identifies the components of three-dimensional teaching and integration. However, simply representing the three dimensions in the lessons does not constitute three-dimensional teaching and integration...At the end of the module, students draw on everything they have learned about energy

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			and use the three dimensions to create a device that harnesses energy." The "Teacher Note" sections throughout the modules also offer guidance to teachers on how students should respond to certain questions or activities in the lesson and how to address common student misconceptions. In the Spotlight on Disciplinary Core Ideas, Module 2, teachers are provided with information on how to reduce misconceptions regarding the types of energy (page 39). Likewise, the Module 2, Formative Assessment Opportunity, prompts the teacher to meet with students individually or in a small group to address misconceptions about energy before the End-of-Module Assessment (page 153). The materials include speaking and listening supports and resources to deepen scientific knowledge for both the teacher and students. The Implementation Guide includes question stems to support student discussion, and background content knowledge to support teachers' understanding of the concepts. For example, in the guide there are Collaborative Conversation Prompts (page 27) and an Energy overview to assist teachers with content background information (page 29). Likewise, in Module 2, there is an additional reading for teachers, "Energy: Stop Faking It" and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			"Teaching Energy Across the Sciences (page 11)."
	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.).	**Yes**	There are appropriate suggestions and materials for differentiated instruction which support varying student needs. The teacher's manual provides suggestions for instructing diverse learners, suggestions for addressing common student difficulties to meet the standards, and learning progress/pacing guides. For example, in Module 2, there are boxes that provide information on how to support diverse learners (page 40). One suggestion differentiates the lesson by allowing students to arrange their ideas on sentence or stick notes. The materials also provide guidance for addressing student misconceptions. For example, Module 3, Formative Assessment Opportunity, prompts the teacher to meet with students individually or in a small group to address misconceptions about sensing and responding to information before the End-of-Module Assessment (page 207). Learning progressions supports are also included in the materials. For example, in Module 1, Building Knowledge Across Grades, teachers are provided with

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			information on what students learned in grade 3 and how to connect that information to Earth's History, which is addressed in grade 4 (page 11).
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.	**Yes**	Text sets, laboratory materials, and other scientific materials are readily accessible through vendor packaging. The teacher's manual is online and may be downloaded as a PDF file or used online. The modules contain the information needed to teach the lesson including links to relevant videos and reading materials. The material laboratory kits can be purchased from an external source. For example, in Module 1, The Changing Earth, students complete an investigation that is centered around stations. The student's Science Logbook includes detailed instructions and a guide on how to complete the stations (pages 13-15). The teacher materials also include detailed set up instructions (pages 224-226) and procedure sheets that students can use as they complete the activity. According to the implementation guide, the material kits include all of the necessary materials to complete the lessons and can be purchased from an external source. However, additional reading materials are included at times but require extra effort on the part of the teacher at times. For example, in Module 1, Lesson 19, the teacher reads a passage to the students

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			titled “How the Grand Canyon Was Formed,” which is included in the materials. In some cases, the additional reading materials would need to be accessed separately. Such as in Module 2, Lesson 2, where students read Wind Turbine Service Technician by Wil Mara (2013) at http://gmscience.link/1039. The link requires a registration to Epic and purchase of the book after 30 days.
	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.	**Yes**	The 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. For example, in Module 2, Lesson 10, the teacher is directed to discuss safety directions with students such as not looking directly into a light bulb or touching a hot lamp (page 85). There are also Safety Considerations for the teacher (page 13). The information includes guidance for safety procedures in a science classroom provided by NSTA. The Implementation Guide provides a detailed description of safety in the science classroom including addressing how students should behave and what they should wear (pages 10-12).
	7c) The total amount of content is **viable** for a school year.	**Yes**	The total amount of content is viable for the school year. The four modules are

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			divided into lessons which are expected to last 45 minutes. For example, Module 1 includes 25 lessons, Module 2 includes 26 lessons, Module 3 includes 31 lessons, and Module 4 includes 27 lessons. There is a total of 109 lessons, which allows teachers flexibility with time and accounts for the interrupted days that may occur during the school year. Module 1, Page 88, states "The design process should take approximately three days but may vary as materials, redesign, and time allotted can impact the timeline for completion."
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.	**Yes**	Multiple types of formative and summative assessments are in the instructional materials. In each module, conceptual checkpoints are embedded within the lessons and teachers have opportunities to address any misconceptions. At the end of each module, students complete an end of module assessment, which addresses all of the standards within the module. For example, in Module 3, Sensing the Environment, students learn about plant and animal structures. A formative assessment is included in the conceptual checkpoint (page 23). Students are asked to compare one plant and animal structure. Students are given "look for" tasks, and suggestions are given on how to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			address student misconceptions if they to do not master the concept. In Module 2, Energy, the end of module assessment includes assessment items that address each standard in the module. For example, standard 4-PS3-4 is addressed in number 3 of the end of module assessment. Students are asked to explain a model of a laptop that is powered by a solar panel. Students must use knowledge gained from experiences in the module as evidence to support thinking. Also, at the end of each module, there is an "End-of-Module" assessment which includes Socratic Seminars, Assessments, and Debriefs. Multiple types of formative and summative assessments are embedded into the content materials and assess the learning targets. In Module 2, students participate in a discussion about the stations that they complete in an investigation (page 37). The teacher is provided with guidance on to assess the students understanding in the "Formative Assessment Opportunity" box.
	REQUIRED **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	Yes	Assessment items and tasks are structured on the integration of the three-dimensions. For example, the Module 1 End-of-Module Assessment assesses students' scientific understanding of the anchor phenomenon.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Students are required to explain how Earth's processes shape some of the Earth's features. Module 1 addresses standard 4-ESS2-1. In Lesson 5 the teacher materials include a formative assessment opportunity (page 49). Students explain how interactions between materials cause changes. Students are being assessed on their ability to describe changes as well as the cause and effect. This formative assessment task integrates the three-dimensions through the (SEP) constructing an explanation and the (CCC) by explaining what caused the changes and understanding how weathering causes changes (DCI). Module 3 addresses standard 4-LS1-2. Students analyze field notes from a team that is observing the responses of a serval in the wild (DCI). The students are instructed to construct an explanation of what sense the serval used to find its prey (SEP). Students are also asked to use cause and effect relationships (CCC) to determine why the serval responds in certain ways to the information received through its senses. In Module 4, while addressing standard 4-PS4-2, students develop models of Howland Island and revise the models as they obtain new information and understanding. Students develop the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			models (SEP) and investigate light through a shadow box and light reflection on various surfaces (page 72). As new information is discovered, the class adds to the anchor chart (page 57) detailing how light allows objects to be seen (DCI). Students use cause and effect relationships (page 31) as light reflects off of surfaces (CCC).
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Yes**	Scoring guidelines and rubrics reflect performance expectations and give detailed specific criteria used in the grading of each item. For example, the end of module assessment in Module 1, The Changing Earth, addresses standard 4-ESS2-2. Question three asks students to analyze and interpret a map to describe areas that canyons may be located. According to the rubric that is included with the assessment, students must correctly select two possible canyon sites and explain how overlapping patterns (CCC) in mountain ranges (DCI) and volcanoes may indicate the presence of canyons. If the student correctly selects one possible canyon site and explains how overlapping patterns in mountains and volcanoes may indicate the presence of canyons or the student correctly selects two possible canyon sites, the student partially meet the performance expectations (page 182).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Module 3, Sensing the Environment, addresses Standard 4-LS1-2. Question 1 requires students to explain how they can hear a door slam using their knowledge of energy, waves, and receptors (page 214). Students must have an understanding of structure and function (DCI) to answer the question and explain the cause and effect of how something happens (CCC). A rubric is included and states, "If the student can successfully make the connection between energy, waves, and receptors the student's answer has met expectations (page 219)."

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	**Yes**	Students have multiple opportunities throughout each module to consistently demonstrate application of the three dimensions, and the three dimensions are most often integrated with one another to support a deeper learning of the performance expectations.
	2. Phenomenon-Based Instruction	**Yes**	The majority of instructional time is centered around students observing and explaining phenomena and/or designing solutions. Students are asked to observe and explain phenomena and design solutions, which provides the purpose and opportunity for learning.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	3. Alignment & Accuracy	**Yes**	93% (13 out of 14) of the Louisiana Student Standards for Grade 4 are appropriately addressed by the instructional materials and minimal time is spent on content that is outside of the course.
	4. Disciplinary Literacy	**Yes**	Authentic photographs, media content, graphs, and articles are regularly included in the materials. Students discuss scientific phenomena using authentic sources and use scientific evidence from the sources and investigations to support scientific claims and ideas. Vocabulary is used throughout the materials as students complete their investigations and participate in class discussions for deeper learning.
II: Additional Indicators of Quality	5. Learning Progressions	**Yes**	The overall organization of the materials support student mastery of the standards and the progression of learning is coordinated over time, clear and organized to prevent student misunderstanding. Students also apply mathematical thinking when applicable, and in some cases, mathematical standard correlations are explicitly stated in the materials.
	6. Scaffolding and Support	**Yes**	There are separate teacher support materials, including support in three-dimensional learning, scientific background knowledge, suggestions for diverse learners, and understanding learning progressions.
	7. Usability	**Yes**	Text sets, laboratory materials, and other scientific materials are readily accessible through vendor packaging. The materials

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			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, and the total amount of content is viable for the school year.
	8. Assessment	**Yes**	Assessment items and tasks are structured on the integration of the three-dimensions. Scoring guidelines and rubrics reflect performance expectations and give detailed specific criteria used in the grading of each item.
FINAL DECISION FOR THIS MATERIAL: **Tier I, Exemplifies quality**			

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: **PhD Science** Grade/Course: **5**

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Overall Rating: **Tier I, Exemplifies 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)	
3. Alignment & Accuracy (Non-negotiable)	
4. Disciplinary Literacy (Non-negotiable)	
5. Learning Progressions	
6. Scaffolding and Support	
7. Usability	
8. Assessment	

To evaluate instructional materials for alignment with the standards and determine tiered rating, begin with **Section I: Non-negotiable Criteria**.

- Review the **required**[5] Indicators of Superior Quality for each **Non-negotiable** criterion.
- If there is a "Yes" for all **required** Indicators of Superior Quality, materials receive a "Yes" for that **Non-negotiable** criterion.
- If there is a "No" for any of the **required** Indicators of Superior Quality, materials receive a "No" for that **Non-negotiable** criterion.
- Materials must meet **Non-negotiable** Criteria 1 and 2 for the review to continue to **Non-negotiable** Criteria 3 and 4. Materials must meet all of the **Non-negotiable** Criteria 1-4 in order for the review to continue to Section II.
- If materials receive a "No" for any **Non-negotiable** criterion, a rating of Tier 3 is assigned, and the review does not continue.

If all Non-negotiable Criteria are met, then continue to **Section II: Additional Criteria of Superior Quality.**

- Review the **required** Indicators of Superior Quality for each criterion.
- If there is a "Yes" for all **required** Indicators of Superior Quality, then the materials receive a "Yes" for the additional criteria.
- If there is a "No" for any **required** Indicator of Superior Quality, then the materials receive a "No" for the additional criteria.

Tier 1 ratings receive a "Yes" for all Non-negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality.
Tier 2 ratings receive a "Yes" for all Non-negotiable Criteria, but at least one "No" for the Additional Criteria of Superior Quality.
Tier 3 ratings receive a "No" for at least one of the Non-negotiable Criteria.

[5] **Required Indicators of Superior Quality** are labeled "**Required**" and shaded yellow. Remaining indicators that are shaded white are included to provide additional information to aid in material selection and do not affect tiered rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
Section I: Non-negotiable Criteria of Superior Quality **Materials must meet Non-negotiable Criteria 1 and 2 for the review to continue to Non-negotiable Criteria 3 and 4. Materials must meet all of the Non-negotiable Criteria 1-4 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.	**Yes**	The instructional 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 materials integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI) to support deeper learning. Within Module 1, Matter, students have multiple opportunities to engage with the three dimensions throughout a variety of lessons and activities. In Lesson 3, students begin exploring the properties of materials (DCI, UE.PS1A.c) and have opportunities to measure the weight of objects (SEP, Using Mathematics and Computational Thinking). In Lesson 13, students investigate what happens when substances are mixed together (DCI, UE.PS1B.a). Students record the weight of each item (SEP, Using Mathematics and Computational Thinking) prior to mixing and then after comparing the measurements (CCC, Cause and Effect). By analyzing the mixtures to determine if the items can be separated, students engage in Planning an Investigation (SEP) to separate the mixtures using heat to add energy to the mixture (CCC, Energy and Matter). In Lesson 16, students investigate how the amount of mass in matter is conserved when it changes form. Students engage in Planning and Carrying out Investigations (SEP) and Using Mathematics and Computational Thinking (SEP) as they plan and implement an investigation to trap and measure the gas produced when mixing baking soda and vinegar. Students build to the understanding that Energy and Matter (CCC) can be tracked in terms of mass of the substances before and after a process occurs, and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			that the amount of matter is conserved when it changes form (DCI, UE.PS1A.b). In Module 3, Lesson 4, students investigate the amount of water on Earth in comparison to land and then the distribution of saltwater and freshwater on earth. During the Launch, students use fractional amounts (SEP, Using Mathematics and Computational Thinking) to represent the amount of water on Earth compared to the amount of land. Students use fractional data from a provided chart and use a 10 x 10 grid (CCC, Scale Proportion, and Quantity) to demonstrate how much water is saltwater (97 squares) and how much water is freshwater (3 squares), and then a second graph to demonstrate the various reservoirs where freshwater can be found on earth (DCI, UE.ESS2C.b). In Lesson 14, students learn about the Dust Bowl. Students analyze precipitation data (SEP, Analyze and Interpret Data) of various U.S. cities before and after the Dust Bowl and develop the understanding that human activities have had major effects on the land (DCI, UE.ESS3C.a). This understanding reinforces the idea that systems (CCC, Systems and System Models) can be described in terms of their components and interactions.
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.	**Yes**	Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. Phenomena, in the form of common experiences at the beginning of each unit, spark students to generate questions and define problems to motivate learning about the core ideas of the unit. This provides purpose for students to engage in investigations and lessons that follow as they engage in constructing explanations and designing solutions in relation to the phenomena. In Module 1, Matter, students investigate why the appearance of the Statue of Liberty has changed from the time that it was built in 1886, which serves as the anchor phenomenon. Throughout the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			module, students develop an understanding of matter and how it changes to construct an explanation as to why the Statue of Liberty changes over time. For example, in Module 1, Lessons 5-7, students investigate how air particles move in an open and closed system. Students then investigate how this links back to the anchor phenomena in Lesson 8. Students add to anchor models by depicting how gas particles could affect the Statue of Liberty. In Lesson 9 and 10, students investigate how temperature affects different substances and then apply this idea to the Statue of Liberty as they investigate the effects of temperature change on the same materials used in the statue in Lessons 11 and 12. In Lesson 13 and 14, students mix substances and use the properties to determine if a new substance if formed. In Lesson 17, students apply knowledge from a copper investigation to explain how the interactions of substances in and around the Statue of Liberty formed verdigris, causing the green color. Students update their anchor models and then explore ways to prevent rust formation in Lessons 18-22. Finally, in Lessons 23-26, students engage in a Socratic Seminar explaining what happened to the Statue of Liberty, connecting back to the anchor phenomenon. The modules' investigative phenomena are related to the anchor phenomenon and aid students in explaining how and why the anchor occurs in the real word. For example, in Module 2: Ecosystems, students explore an anchor phenomenon, "How can trees support so much life?" The lessons throughout the module are centered around several investigative phenomena and structured to help students explain how mangrove trees in Eritrea can support so much life. Students make observations and generate questions about how plants grow, where life's matter comes from, and where life's energy comes from. After students complete the investigations, they use the information they learned to explain the roles different organisms play

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			in the mangrove tree ecosystem, connecting back to the anchor phenomenon. Similarly in Module 4, Orbit and Rotation, the anchor phenomenon, "Views from Earth and Space," and the essential question, "How can we explain our observations of the Sun, Moon and stars from Earth?" drive instruction and provide opportunities for students to design solutions. Students engage in lessons to identify patterns that can be observed in the sky such as the sun's appearance of movement across the sky (Lessons 5-6), changes in the appearance of the moon (Lesson 13), and the recurring patterns in stars (Lesson 18-19). Finally, students use the observations gathered as evidence to support a claim answering the essential question (Lessons 24-26).
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**.	**Yes**	All of the Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards and integrate the DCIs, SEPs, and CCCs of the standards (i.e., 13 out of 13). Module 1, Matter, addresses LSSS 5-PS1-1, 5-PS1-2, 5-PS1-3, 5-PS1-4 through the anchor phenomenon, "What caused the Statue of Liberty to change over time?" In this unit, standard 5-PS1-4 is fully addressed in Lessons 13-16 as students engage in Carrying Out Investigations (SEP) by mixing two or more substances to determine if a new substance with different properties has been formed (DCI, UE.PS1B.a). Students routinely identify cause (mixing two substances) and effect (a new mixture is formed) to explain changes they are observing (CCC, Cause and Effect). In Module 2, Lessons 3-5, LSSS 5-LS1-1 is addressed. The performance expectation guides teachers to "ask questions about how air and water affect the growth of plants." Students first look at a picture of a sequoia tree and its cones, and then ask questions (SEP) about how sequoia seeds grow into such a massive tree. In Lessons 4 and 5, students conduct

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			an investigation to determine where plants get the matter they need for growth (CCC, Energy and Matter). Students measure the plant's growth throughout the investigation. At the end of the investigation, students discover that the plant with just air and water grows just as the plant with air, water, and soil. Using Patterns (CCC) of evidence, the conclusion is made that plants need air and water for growth (DCI, UE.LS1C.b).
	Required **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Yes**	The content was accurate, up-to-date and aligned with the most current and widely accepted explanations. No evidence of incorrect or out of date science explanations could be found.
	3c) In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Yes**	Instructional materials spend minimal time on content outside of the course, grade, or grade band.
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.	**Yes**	Students regularly engage with authentic sources that represent the language and style used and produced by scientists. The instructional materials incorporate a variety of authentic sources including authentic data sets, photographs, examples of models, topographical maps, and diagrams. Authentic photographs are utilized in every module as a source of student inquiry. For example, in Module 1, Lesson 1, students look at photographs of the present-day Statue of Liberty, as well as images of the statue created at the time it was erected to investigate the phenomenon, "What caused the statue of liberty to change over time?" In addition, in Module 4, Lesson 18, students examine a photograph of the nighttime sky. The photograph is taken at an angle that is upward towards the sky. The skyline of trees is visible, as well as stars of varying brightness. Students observe the photograph and discuss what they notice about the stars. Students compare sizes of the stars to the size of earth. Throughout this lesson, the teacher continuously brings back a photograph of the nighttime sky to introduce how stars appear to differ in brightness. Later, in Lesson 19, students engage with an authentic photograph taken by the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Hubble Telescope to help craft an argument relating a star's appearance to its distance from Earth. Graphs and data sets are also utilized in the modules. In Module 2, Lesson 8, students analyze graphs of historical precipitation and the average weight of adult grizzly bears from Yellowstone National Park. Students use this data to make a claim about how animals use matter from the environment. In Module 3, Lesson 2, students analyze data about global rice consumption and production. Students use a bar graph that displays rice consumption per person in the world versus rice consumption in the United States. Students analyze this data and formulate more questions based on the graph provided. Students then look at a table of total rice consumption in kilograms for various countries in 2018. They work in partners to analyze the table, and then compare it to another table that shows how many rice patties were produced in 2018. In Module 3, Lesson 8, students use data from a map showing the number of days of rain in major U.S. cities as evidence to explain how water moves through Earth's atmosphere.
	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.	**Yes**	Students regularly engage in speaking and writing about scientific phenomena and engineering solutions using authentic sources. Materials address the necessity of using scientific evidence to support ideas. Throughout the modules, students are regularly speaking, drawing models, and writing about science which supports the standards being taught to the full depth. In Module 1, Lesson 1, students look at photographs of the Statue of Liberty as their anchor phenomena. Students look at each photo, they write what they notice and what they wonder about each photo in their Science Logbook. Students then share their ideas as a class. Students have the opportunity to both speak and write about science.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Module 2, Lesson 15, students begin the lesson with a class discussion on how they use the matter they get from food and begin to develop ideas for why an adult needs food if they are no longer growing. Students are given data from an experiment with mice and write in their logbooks any patterns they identify. Students explain the differences using evidence from the experiment and draw conclusions about the relationship between food and energy in a class discussion to better understand the anchor phenomenon, "How can trees support so much life?" In Module 4, Lessons 11 and 12, students have the opportunity to speak and write about science. In Lesson 11, students are given time to create a presentation to explain their space-view sundial model from the previous lesson. Students are asked to explain not only how the sun appears to move across the sky in their selected city, but also how they used the observations to determine a pattern of apparent motion. Students choose the best way to present their explanations (e.g., a speech, a video, a visual presentation, or a website). Students begin the presentations in Lesson 11 and finish in Lesson 12.
	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.	**Yes**	There is variability in the tasks that students are required to execute. Students are regularly engaged in a variety of tasks such as, examining photographs, completing hands on activities, class discussions, partner discussions, writing, and reading. In Module 2, Lesson 4, students complete an investigation plan to determine where plants get the matter they need for growth. In Lesson 8, students begin the lesson by examining photographs of a bear at two different times of year. The bear is different sizes in each photo. Students discuss changes they see in the bear and think about the questions they have about the changes. Students make a claim about where they think bears get their matter. This leads them back to the phenomenon

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			question, “Where do animals get the matter they need for growth?” Students then look at a photo of bears at Yellowstone National Park when the park first opened. The photo is of an area where people would dump their garbage so visitors had a place to see the bears. Students learn that the park later closed this area. Students conclude that the bears main source of food during this time was probably the food in the dump. Students then look at data that represents rain before and after they had the food dumps for bears. They also look at the average weight of bears in the area before and after the food dumps. Students revisit their claim from earlier and give reasoning behind their claim. Students examine photographs, make a claim, examine data, and reexam their claim and add reasoning. In Module 3, Lesson 5, students observe a lake model and record the changes in water from vapor to liquid, and then back again as water cycles. In Lesson 10, students make models of mountains collecting water in different spots to investigate what happens to water after it falls as precipitation. In Lesson 19, students design and test an irrigation system to aid in conserving fresh water. In Module 4, Lesson 1, students make observations of the sky during different times of day in order to develop an anchor model to explain observations of the Sun, Moon, and stars from Earth. In Lesson 10, students consider if sundials can help keep track of time in any location on earth and use evidence to support their thoughts. Students then discuss the apparent movement of the sun across the sky, what sundials might look like from space, and how to create a mode to demonstrate how Earth’s rotation causes the motion of sundial’s shadow. Students create a model of the earth with a small foam ball, and use a lantern to model the sun. Students place toothpicks in various locations to demonstrate how the sun affects shadows on different parts of the earth.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	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.	**Yes**	The 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, but only after students have first had the opportunity to build conceptual understanding of the term. For example, in Module 1, Lesson 9, students investigate the properties of water as it boils and condenses. These terms are not used until students make observations and gather an understanding of what they mean. In Module 2, Lesson 20, students are introduced to the term "invasive species." Throughout the lesson, students look at the affects the ash borer has on the North American forest ecosystem. After students discover the negative effects this animal has on the ecosystem, the teacher then introduces the word invasive species to the students, and discusses what it means as it pertains to what they have just learned. Later in the module, in Lesson 11, students read an article about decomposers and the role they play in breaking down matter. After reading, students are asked to explain what a decomposer is and include examples. In Module 4, Lesson 3, the vocabulary word "orbit" is not introduced and defined until after students had developed their anchor model of how the Sun and Earth appear in space. It is introduced in relation to a photograph taken from the International Space Station, which orbits the Earth.
Section II: Additional Criteria of Superior Quality			
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	**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	**Yes**	The lessons within and across each unit are organized to support learning through a natural progression. Students engage with and build an understanding of the three dimensions of the standards at increasing levels of complexity and sophistication and engage in a coherent progression of learning that is coordinated over time, clear, and organized.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
practices, crosscutting concepts, and disciplinary core ideas; the content complements the the Louisiana Student Standards for Math. ☒ Yes ☐ No	prevent student misunderstanding and supports student mastery of the performance expectations.		The module lessons are organized so disciplinary core ideas, science and engineering practices and crosscutting concepts build upon each other throughout the course of study. Throughout each module, the class creates a driving question board to relate concept questions and guide upcoming lessons. The driving question board helps to focus the progression of learning for the anchor phenomenon. The science and engineering practices, crosscutting concepts, and disciplinary core ideas are coherently sequenced across all of the lessons and continuously reinforced throughout the modules. Throughout Module 1, students progressively build knowledge about gases, liquids, and metals and apply this understanding to determine why the Statue of Liberty has changed over time (CCC, Scale, Proportion, and Quantity). In Lesson 2, students develop an anchor model (SEP, Develop and Use Models) to show how the Statue of Liberty has changed over time. In Lesson 3, students investigate various metals by making observations and taking measurements of those metals (DCI, UE.PS1A.c). In Lesson 4, students begin to investigate various liquids. In Lessons 5 and 6, students investigate the nature of air (DCI, UE.PS1A.a) and determine that air is made of tiny particles too small to be seen. Then in Lessons 7 and 8, they extend this idea to solids and liquids as well. Students update the model of the Statue of Liberty to include the particle nature of air, liquids, and solids. In Lessons 11 and 12, students investigate the effects that heating and cooling can have on substances. This knowledge is built upon in Lessons 15 and 16 as students investigate how two or more substances can be mixed to form new substances with different properties (UE.PS1B.a). In Lesson 17, students update the model of the Statue of Liberty to explain how the copper of the statue interacted with a gas in the air to form a new substance, verdigris (CCC, Cause and Effect).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Throughout Module 2, students progressively build knowledge towards the concept that matter flows into, out of, and within systems, emphasizing the interactions between organisms and the environment. In Lesson 1, students engage with the anchor phenomenon of how trees can support so much life by observing how a mangrove tree interacts within its ecosystem. In Lesson 2, students create an anchor model (SEP, Develop and Use Models) of the mangrove tree with other organisms in its ecosystem (DCI,UE.LS2B.s), to show the relationships between the organisms that live within that ecosystem (CCC, Systems and System Models). By the end of Lesson 7, and through several investigations, students gain an understanding that organisms interact (CCC, Systems and Models) with each other by exchanging gases between each other (CCC, Energy and Matter) and within the environment (DCI, UE.LS2B.a). Students add to this model throughout Module 2 in lesson 9, lesson 14, and lesson 19. By the end of Lesson 19, students Develop a Model (SEP) to demonstrate the flow of energy (CCC, Energy and Matter) through the mangrove tree ecosystem linking the sun as the original source of energy (DCI, UE.PS3D.b). The CCC of Patterns is presented in Module 4, Orbit and Rotation to allow students to build an understanding of patterns within the sun, moon, and stars. In Lesson 1, students observe the sun and identify patterns based on those observations. Students use data by recording the length of shadows to continue looking for patterns in the movement of the sun in Lesson 6. Students observe patterns of the moon and then use data to analyze those patterns in Lesson 14. In Lesson 20, students explain the apparent motion of stars by looking for patterns. Consideration of the Louisiana Science Learning Progressions is provided under the heading Building Knowledge Across Levels in the module preface. In this section, the materials provide an explanation of

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			how students' Level 2 learning of the Louisiana Student Standards for Science supports Level 5 learning. This provides teachers with an understanding of how learning is coordinated over time to support student mastery of the standards before and within Level 5.
	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.	**Yes**	Students apply mathematical thinking when applicable. Students are regularly called on to apply mathematical skills and understanding to engage in Using Mathematics and Computational Thinking (SEP) appropriately in the context of their learning. For example, Module 1, Lesson 15 addresses LSSM 5.NBT.B.7 as students add and subtract numbers with decimals as they investigate how matter is conserved when mixing substances. In Module 2, Lesson 4, students observe and measure the weight and height of plants to determine growth. In Lesson 20, the text suggest that students should use rounding to find the difference between the population of trees at a given time within a data table. This skill aligns to LSSM 4.NBT.A.3, use place value understanding to round multi-digit whole numbers to any place. In Module 3, Lesson 16, students find the mass of soil with a digital scale. Students must find the mass in grams and to the nearest tenth of a gram. Students record their data in a table. This aligns to LSSM 5.NBT.AA3, read, write, and compare decimals to thousandths. Occasionally, students are introduced to math skills that go beyond the Louisiana Student Standards for Mathematics (LSSM) for Grade 5. For example, Module 3 touches on three different sixth grade math standards: LSSM 6.NS.C.6 in Lesson 7, LSSM 6.SP.B.5.c in Lesson 9, and LSSM 6.RP.A.3.a in Lesson 20. Even though students are introduced to the sixth grade concepts such as averages and percentages, students are not asked to calculate these. In

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			addition, the introduction of negative numbers is in the context of how the atmosphere influences ecosystems through weather and climate (5-ESS2-1).
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 (e.g. conversation guides, sample scripts, rubrics, exemplar student responses).	**Yes**	There are separate teacher support materials provided. Each module provides a Teacher Edition that includes a Module Overview with an Introduction, Module Map, Focus Standards, Three Dimensions at a Glance and In Detail, Key Terms, Advanced Materials Preparation, Safety Considerations, Building Knowledge across level, and Additional Reading for Teacher. Sample prompts and conversation guides for class discussions, and Teacher Notes are also provided throughout the modules. The Focus Standards section includes a Spotlight on the Three-Dimensional Learning section to help teachers develop a deeper understanding of the SEPs, CCCs, and DCIs that are addressed in the module. For example, in Module 2 the Spotlight on Three-Dimensional Learning section states, "students use the three dimensions as they draw on everything they have learned about matter and energy in organisms and ecosystems to develop solutions that may reduce the impact of an invasive species." Each module has suggestions for additional reading for teacher background knowledge. For example, in Module 1, teachers are directed to the book, "Chemistry Basics: Stop Faking It!" to support their own background knowledge. Additionally, a brief overview on student's background knowledge based on the K-4 science standards they have encountered is included in the Building Knowledge Across Levels section. The "Teacher Note" sections throughout the modules offer guidance to teachers on how to implement strategies to engage student thinking, as well as on how students should respond to certain questions or activities in lessons. In Module 1,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Lesson 3, a Teacher Note instructs teachers on what questions to ask if students do not notice the relative weights of the cubes they are observing. Likewise, the “Check for Understanding” in Lesson 6 instructs teachers to give students who have misconceptions about the nature of air additional time for comparing their model with the final class model of air. The materials include speaking and writing support for the teacher to uncover student thinking. The Implementation Guide includes question stems to support student discussion. For example, the guide includes Collaborative Conversation Prompts, such as “What do you mean by____?” “What difference does that make?” and “How did you come to that conclusion?” In addition, the modules include sample student work. For example, Module 4, Lesson 19 includes a sample student ray diagram and explanation for why stars that are closer to Earth appear to be brighter. At the end of each module’s Teacher Edition, appendices provide teachers with support before and during instruction. Appendix A, Module Resources, includes a set of lesson-specific resources to aid instruction, such as full-size photographs, informational texts, investigation procedure sheets, materials preparation, and supplemental information. Appendix B, Module Storyline, includes a more detailed version of the Module Map in the Module Overview that summarizes the progression of concepts in the module. Appendix C, Module Glossary, includes level-appropriate definitions for new terms in the module and the lesson in which the definition appears. Appendix D, Domain-Specific Words, General Academic Words, and Spanish Cognates, includes a list of key terms in the module and their Spanish cognates to support English language development.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	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.).	**Yes**	Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. The sidebar in lessons of all modules contain notes on differentiation strategies the teacher can incorporate to support all learners who may need additional support or more of a challenge. For example, in Module 1, Lesson 4, a differentiation note suggests challenging students working above grade level to "create a Venn Diagram showing which properties can be used to identify solids, liquids, or both." In Module 2, Lesson 1, a differentiation section provides an alternative instructional delivery option by suggesting teachers provide a transcript for "The Mangrove Tree" for students who have difficulty with auditory processing. In Module 2, Lesson 3, students list the characteristics of a fair test. A suggestion for English Language Development is provided, and states "sharing the Spanish cognate 'caracteristicas' may be helpful. Discuss the meaning of characteristics in different contexts, such as physical and internal characteristics of people." In Module 3, Lesson 12, a differentiation section provides an alternative teaching approach by instructing teachers to provide a claim for low-level writing students, who then provide the evidence and reasoning to support the claim. In Module 4, Lesson 1, students work in pairs to complete a Boxes and Bullets text-based routine to capture the main ideas and key details. A differentiation note suggests, "for students who would benefit from additional scaffolding as they identify the main idea and key details of the test, provide the following questions to guide their thinking: Who is the focus of this article? What did

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			they do? How did they accomplish what they set out to do?"
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.	**Yes**	Text sets, laboratory, and other scientific materials are readily accessible through vendor packaging. The online teacher's manual may be downloaded as a PDF file or used online. The modules contain the information to teach the lesson including links to relevant videos and reading materials. The material laboratory kits can be purchased from an external source. In some cases, the additional reading materials would need to be accessed separately. For example: in Module 2, Ecosystems and Module 3, Earth's Systems; in Module 2, "The Mangrove Tree" by Cindy Trumbore and Susan L. Roth; and in Module 3, "Cycle of Rice, Cycle of Life" by Jan Reynolds.
	Required **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.	**Yes**	The 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. Teachers are provided with opportunities to read about safety precautions and opportunities to incorporate safety procedures into the lessons. General safety guidelines provided as the start of each module include safety measures, such as reviewing safety guidelines with students before each activity, students wearing safety goggles during investigations involving equipment, and students never placing investigative materials in their mouths. In Module 1, Lesson 2, a Safety Note for the lesson is suggested, "to prevent injury or skin reaction, tell students to keep the cooper pieces inside the bag as they observe them." Safety Notes, such as this, are provided throughout the module.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Module 4, Lesson 6, the teacher is directed under a section titled "Safety Note" to discuss safety directions with students, such as not looking directly at the Sun. The Implementation Guide also provides a detailed description of safety in a science classroom including addressing how students should behave and what they should wear.
	7c) The total amount of content is **viable** for a school year.	**Yes**	The total amount of content is viable for a school year. There are 4 modules within the grade level. Each module includes between 26-27 lessons which are approximately 45 minutes in length but may extend past one class period of science. Additionally, extension activities are provided within units to deepen understanding, as time permits. Module 1 includes lessons 26, Module 2 contains 26 lessons, Module 3 contains 27 lessons, and Module 4 contains 26 lessons. There is a total of 105 lessons which allows teachers flexibility with time and accounts for interrupted days that may occur during the school year. Extension opportunities are suggested, as time permits, to extend the learning. For example, in Module 3, Lesson 21, and extension note suggests having groups "retest their irrigation systems under additional constraints." In Lesson 25 of the same module, another suggestion is provided to extend or shorten time by having students "research or investigate these questions independently at work stations or as optional homework."
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.	**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.	**Yes**	Multiple types of formative and summative assessments are embedded into content materials and assess the learning targets. Both formative and summative assessments are provided for each module. Students are assessed throughout the lesson and at the end of each module. The End-of-Module Assessments provide a variety of types of questions with stimuli provided for students to read and analyze to answer the questions.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
☒ Yes ☐ No			Formative assessments are embedded throughout each module to ensure students build understanding. For example, in Module 1, Lesson 8, students are presented with the task, "Imagine it is almost time for lunch at school. Create a model to explain how you can detect hot food as you walk towards the cafeteria." This serves as a conceptual checkpoint to ensure that students understand how particles move through the air. In Module 2, Lesson 7, there is a Conceptual Checkpoint in which students analyze a data set about the pounds of apples produced by a tree over five years in order to demonstrate an understanding of how plants use matter. Teachers are given next steps to take if students struggle with this task. Students complete an end of module assessment which serves as a summative assessment at the end of each module. In Module 1, the End-of-Module Assessment, students read about a baker that is looking at five different substances in his bakery. A table is provided with information about each substance. Students use this table and the reading information to answer three questions. On the same assessment, students are given information about a glass bottle and a model of the bottle on a hot plate over time. Students use this information to answer three questions. There is a variety of types of questions provided on this assessment. At the end of Module 2, students complete the End-of-Module Assessment which encompasses all of the standards covered within the module. Students answer questions about growing plants on Mars and must use the knowledge gained from investigations and reading. In Module 3, Lesson 25, the End of Module Assessment Part I has students research reasons for Mexico City sinking and develop an explanation for this new phenomenon. Students are given a text and multiple video clips about Mexico City, they

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			then discuss these resources as a class before developing an individual model to explain the various factors causing Mexico City to sink.
	Required **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	**Yes**	Assessment items and tasks are structured on the integration of the three dimensions. The End-of-Module Assessments and the tasks ensure that students use the Science and Engineering Practices to fully integrate their understanding of the Disciplinary Core Ideas and the Crosscutting Concepts. In Module 1, End of Module Assessment Part 1, students are tasked with Developing a Model (SEP) of how wind could move a ball. This requires students to understand that natural objects have different Scales, Proportions, and Quantities (CCC) and therefore air is matter made of particles too small to see (DC,I UE.PS1A.a). In Module 3, End-of-Module Assessment, students use a graph that includes data about what happens to precipitation in Mexico with three results (evaporates, becomes groundwater, and flows over the land) in fractional amounts. Students engage in Analyzing and Interpreting Data (SEP) to make a claim about what this data reveals about the amount of freshwater available (CCC, Scale, Proportion, and Quantity) to Mexico City's residents (DCI, UE.ESS2Ca.) In Module 4, Lesson 12 Conceptual Checkpoint, students are given a map of the United States and asked to identify from which city the sun would be visible if it is just rising over Denver, Colorado. Students have identified Patterns (CCC) in previous lessons to serve as evidence about the motion and relationship of the Sun and Earth (DCI, UE.ESS1B.a.) Students must provide reasoning to support the selected answer (SEP, Engage in Argument from Evidence.)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Module 4, End-of-Module Assessment, a student's model of a rocket launch in four different locations on Earth is observed. Arrows at each rocket launch indicate the student's ideas about gravitational force acting on the rockets at different points on the planet. Students must make a claim with reasoning justifying (SEP, Engage in Argument from Evidence) whether the student's idea of how gravity is acting on the rockets (CCC, Cause and Effect) in the model is correct or incorrect.
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Yes**	Scoring guidelines provided at the end of each module help teachers score questions from the End-of-Module Assessment. Each rubric gives the teacher the standard assessed along with the SEP, DCI, and CCC. For example, in Module 2, End of Module Assessment rubric, students are asked to determine if corn can be grown in a dome on Mars with air, water, and soil from Earth. Students must utilize their knowledge of how matter moves in a system to argue that corn acquires their material for growth chiefly from air and water (DCI, UE.LS1C.b). The rubric criteria states that students must correctly describe all three requirements for plant growth (air, water, and sunlight) and provide sufficient evidence from classroom investigations in order to fully meet the performance expectation. In Module 3, End-of-Module Assessment, students observe, analyze, and interpret a graph that displays information about where precipitation goes, either evaporates, in ground water, or flows over the land. The rubric gives students full credit if they can identify the missing entry on the table and provide sufficient evidence for why the entry should be included in the table. This aligns to the performance expectation to describe and graph the amount and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth (LSSS 5-ESS2-2).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In Module 4, End-of-Module Assessment, students observe a model of a rocket launch on a planet in four different points on the plant. Arrows indicate the idea that a student has about the gravitational force acting on the rockets at different points on the planet. Students must justify if the idea of how gravity is acting on the rockets in the model is correct or incorrect. The rubric provided aligns to support an argument that the gravitational force exerted by the Earth is directed down (LSSS 5-PS2-1). The rubric also gives students full credit if they include ideas that gravity pulls objects towards Earth's center and describe the relationship between the rocket and the direction gravity pulls on the rocket.
FINAL EVALUATION ***Tier 1 ratings*** receive a "Yes" for all Non-negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality. ***Tier 2 ratings*** receive a "Yes" for all Non-negotiable Criteria, but at least one "No" for the Additional Criteria of Superior Quality. ***Tier 3 ratings*** receive a "No" 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-negotiable Criteria of Superior Quality[6]	1. Three-dimensional Learning	**Yes**	Students have multiple opportunities to consistently demonstrate the application of the three dimensions of the science standards. The majority of the materials integrate the Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas to support deeper learning.
	2. Phenomenon-Based Instruction	**Yes**	The majority of instructional time is centered around students observing and explaining phenomena and/or designing solutions. Students are asked to observe and explain phenomena and design solutions, which provides the purpose and opportunity for learning.
	3. Alignment & Accuracy	**Yes**	All (13 out of 13) of the Louisiana Student Standards for Science for Grade 5 are appropriately incorporated with minimal time spent on content that is outside of the grade level.

[6] Must score a "Yes" for all Non-negotiable Criteria to receive a Tier I or Tier II rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	4. Disciplinary Literacy	**Yes**	Students regularly engage in a variety of tasks which require students to speak and write about scientific phenomena and engineering solutions. Materials address the necessity of using scientific evidence to support ideas. Vocabulary is introduced only after students have had an opportunity to build conceptual understanding through investigative, analytical, hands-on learning.
II: Additional Criteria of Superior Quality[7]	5. Learning Progressions	**Yes**	The lessons within and across each unit are organized to support learning through a natural progression. Students engage with and build an understanding of the three dimensions of the standards at increasing levels of complexity and sophistication and engage in a coherent progression of learning that is coordinated over time, clear, and organized. Students apply mathematical thinking when applicable.
	6. Scaffolding and Support	**Yes**	Lessons include support materials for strengthening Teacher Background Knowledge, 3-D Strategies detailing explicit techniques for highlighting the SEPs, DCIs, and CCCs, sample prompts and conversation guides for class discussions, Teacher Notes, and appropriate suggestions for differentiating instruction for diverse learners.
	7. Usability	**Yes**	The total amount of content is viable for the school year and safety guidelines are embedded in the curriculum. The modules contain the information needed to teach including links to relevant videos and reading materials. Laboratory kits and text sets can be purchased from an external source.
	8. Assessment	**Yes**	Assessment items and tasks are structured on the integration of the three dimensions. Scoring guidelines and rubrics are aligned to performance expectations and incorporate criteria that are specific, observable and measurable.
FINAL DECISION FOR THIS MATERIAL: **Tier I, Exemplifies quality**			

[7] Must score a "Yes" for all Additional Criteria of Superior Quality to receive a Tier I rating.

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-8.

Appendix I.

Publisher Response

The publisher had no response.

Appendix II.

Public Comments

There were no public comments submitted.