DEPARTMENT of EDUCATION
Louisiana Believes

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

FULL CURRICULUM
Instructional Materials

Strong science instruction requires that students:

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

Title: **OpenSciEd**

Grade/Course: **6-8**

Publisher: **Kendall Hunt Publishing**

Copyright: **2022**

Overall Rating: **Tier 1, Exemplifies quality**

Tier 1, Tier 2, Tier 3 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 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.

Click below for complete grade-level reviews:

Grade 6 (Tier 1)   Grade 7 (Tier 1)   Grade 8 (Tier 1)

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Title: **OpenSciEd** Grade/Course: **6**

Publisher: **Kendall Hunt Publishing** Copyright: **2022**

Overall Rating: **Tier 1, Exemplifies quality**

Tier 1, Tier 2, Tier 3 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	
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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 **engage students** in integrating the science and engineering practices (SEP), crosscutting concepts (CCC), and disciplinary core ideas (DCI) 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 the Light and Matter unit, students develop knowledge of light interactions to explain how a one-way mirror works by engaging in many science practices and by making connections across multiple cross-cutting concepts. In Lesson 1, students investigate a mirror system and build the practice of Developing and Using Models (SEP) by using systems thinking (CCC, Systems and Systems Models) as they grapple with initial explanations of phenomenon that involve the role of light in the reflective nature of materials (DCI, MS.PS4B.a). Students engage in the practice of modeling by developing a list of important components and using it to create an initial model and by investigating the phenomenon through a scale model to observe how the role light plays with materials within the system

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			(CCC, Systems and Systems Models) to make them reflective or transparent (DCI, MS.PS4B.a). In Lessons 2-4, students develop and refine experimental questions as well as plan and conduct investigations to further explore the relationship between light reflection/transmission and the structure of different materials (SEP, Asking Questions and Defining Problems, Planning and Carrying Out Investigations; CCC, Structure and Function; DCI, MS.PS4B.a). In Lesson 5, students utilize revised models and science ideas developed through investigation about the way light travels to construct an explanation of what causes the one-way mirror phenomenon (SEP, Constructing Explanations and Designing Solutions; CCC, Cause and Effect; DCI, MS.PS4B.a, MS.PS4B.b). In the Contact Forces unit, Lesson 2, students engage in creating and using mathematical models through a series of investigations to determine the relationship between mass, speed, and kinetic energy (SEP, Planning and Carrying out Investigations, Analyzing and Interpreting Data; CCC, Scale, Proportion, and Quantity; DCI, MS.PS3A.a). In Lesson 7, students plan and conduct an investigation (SEP, Planning and Carrying Out Investigations) on how doubling the speed or mass affects the damage done in a collision and analyze data (SEP, Analyzing and Interpreting Data) and

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			make connections to scale factors (CCC, Scale, Proportion, and Quantity) to motivate the need for a mathematical model. Students then utilize a simulation to see how a cart behaves at different masses and interpret the results of investigations to make and explain predictions about how changes in the mass and speed will impact kinetic energy (SEP, Analyzing and Interpreting Data; CCC, Scale, Proportion, and Quantity; DCI, MS.PS3A.a). In the Sound Waves Unit, Lesson 1, students investigate the movement of instruments when they make sounds and relate that back to graphical representations of aptitude and frequency. They use models (SEP, Developing and Using Models) to describe the repeating Pattern (CCC) of a simple wave (DCI, MS.PS4A.a) and discover that louder sounds are caused by waves that have a higher amplitude and deeper sounds that have a larger wavelength.
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 a coherent sequence of learning a majority of the time. Phenomena provide students with authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow.	**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, and provide purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			phenomenon. The Cells and Systems unit begins with a scenario of a boy who fully recovered after dropping a weight on his foot in PE and being unable to walk for months. Over the course of the unit, students work toward figuring out how this student's foot healed and, more generally, to answer the big question, "How do living things heal?" In Lesson 1, students engage with medical reports, co-construct a definition of healing, and create a healing timeline. They also create an initial model to explain what happened in his recovery before generating questions for the driving question board and ideas for how they might investigate their questions. The class arrives at the idea that exploring how parts work together in an uninjured foot will help them explain why they do not work in one that is injured. For the next few lessons, they investigate bones, muscles, and skin. This investigation motivates the need for a deeper exploration of blood and nerves to eventually determine that all living things are made of cells. After putting this idea together, the class comes to realize that they need to look more deeply at what happens to cells during an injury and spend the next several lessons figuring out that our bodies need to make new cells to heal and that cells need certain things in order to reproduce. Each lesson includes a guiding question that connects to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			student-generated questions and navigation designed to maintain coherence in exploring the healing phenomenon. Throughout the unit, there are several ways that students track progress toward explaining the phenomenon including revisiting and revising the model, individually adding notes to a Progress Tracker, and engaging in discussions designed to take stock of what the class can already explain and what they still need to investigate. In Lessons 12 and 13, students use what they have learned about what happens inside the body to explain how structures and systems work together to heal an injury and apply these ideas to explain growth in the body. In the Forces at a Distance unit, students revisit the speaker model from the Sounds and Waves unit and take it further to investigate the cause of the speaker vibrations. Over the course of Lesson 1, students view a short video of a speaker in slow motion, brainstorm how to investigate the force inside the speaker that causes it to vibrate, observe the teacher dissecting a speaker to isolate its components, work to generate a model of how the parts work together to create sound, and create a homemade speaker using their models. As the unit moves forward, students investigate components of the system, energy transfer, and forces within the system, as well as other ideas based

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			on the questions they generate in Lesson 1 in order to incrementally explain the speaker phenomenon. In the Contact Forces unit, students explore the problem of cell phone screens that sometimes break when they are dropped. Through the next several lessons they explore reasons why and the conditions when things break, eventually returning to the issue with their cell phones. Students spend the last few lessons in the unit working to design ways to better protect objects like their cell phones in collisions.
	Required **2b)** Materials are designed to provide sufficient opportunities for students to **design and engage in investigations at a level appropriate to their grade band** to explain phenomena. This includes testing theories or models, generating data, and using reasoning and scientific ideas to provide evidence to support claims.	**Yes**	Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Material, when appropriate, allows students to engage directly with experiments designed to discover the phenomena. Students interact with the Science and Engineering Practices authentically and engage in designing or performing an investigation in more than half of the total lessons within the course. In the Earth and Space unit, Lesson 4, students examine data related to seasonal temperature and distance relative to the sun and conduct an investigation with a physical model that demonstrates the patterns between the angle of light and the amount of energy to explain how changes in the angle of sunlight affect the temperature on Earth. Later in the unit, in Lesson 11,

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			students explore conditions under which white light becomes a rainbow by planning and conducting an investigation where they shine light through different shaped glass and explain what happens to each. In the Forces at a Distance unit, Lesson 2, students conduct a series of investigations to determine the relationship between mass, speed, and kinetic energy. Later, in Lesson 7, students plan and conduct an investigation on how doubling the speed or mass affects the damage done in a collision and analyze data to motivate the need for a mathematical model. Students then utilize a simulation to see how a cart behaves at different masses, and interpret the results of investigations to make and explain predictions about how changes in the mass and speed will impact kinetic energy. In the Earth in Space unit, Lesson 4, students use paper plates and pipe cleaners to create a three-dimensional model of the path of the sun in the sky during the seasons. They then use this model to investigate the amount of light energy applied to an area during each season of the year.
	2c) Materials provide frequent opportunities for students to **make meaningful connections** to their own knowledge and experiences as well as those of their community during sense-making about the phenomena.	**Yes**	Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. Sensemaking supports the materials' framework and the flow of

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			learning. Investigation and exploration provide students the ability to individually and collaboratively put different pieces together to make sense of phenomena. Many of the units utilize phenomena that may be familiar to students and all units include the opportunity for students to generate related phenomena based on their own experiences and prior knowledge. The Cells and Systems unit begins with students sharing their experiences of being injured and not being able to do something they enjoy. They then explore a case study of a middle school student who suffers a foot injury which anchors their learning for the unit. Later in Lesson 1, students draw upon their experiences and previous knowledge to co-construct a class community definition of healing. The lesson concludes with students determining that the first step in investigating this injury and healing phenomenon is to explore how parts work together as a whole. In Lesson 2, students do this by analyzing the dissection of a chicken wing. The students look at how all of the parts of the wing work together, discuss what would happen if there were an injury to occur, and watch a video on an injured wing. This leads back to the phenomenon of the broken foot and to begin to build understanding together as the body as a system of smaller subsystems. In the

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			Earth in Space unit, Lessons 1-3, students explore a phenomenon called "Manhattanhenge," where the sun perfectly lines up between two buildings during sunset on a particular day in a particular place. After generating ideas about what might be happening to cause this, they brainstorm other patterns in the sky that they have seen themselves or heard about, then engage in home learning where they ask their families or other community members about their experiences with patterns or phenomena in the sky. The theme of investigating patterns to explain the "Manhattanhenge" phenomenon continues throughout the unit. Students explore how things move in the solar system and how this keeps happening consistently over time. They identify patterns and analyze data to model large systems on earth and illuminate the reason for the "Manhattanhenge" phenomenon. In the Contact Forces unit, students build knowledge about forces and collisions by exploring the familiar scenario of a broken cell phone screen and eventually use what they have learned to design a way to protect cell phone screens from breaking. During the course of the unit, students also explore related phenomena such as car crashes and breaking everyday objects like paint stirrers, noodles, and crackers.

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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**	The majority (14 out of 19) of the Grade 6 Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards. Standards that are not fully addressed in the materials include: LSSM 6-MS-LS2-1, 6-MS-LS2-2, 6-MS-LS2-3, 6-MS-PS1-1, and 6-MS-ESS3-4. While Disciplinary Cores Ideas (DCIs) from the standards listed are not integrated into the materials, identified Science and Engineering Practices (SEPs) and Crosscutting Concepts (CCCs) are often integrated and explored throughout multiple units. For LSSS 6-MS-LS2-1**,** DCIs MS.LS2A.a, MS.LS2A.b, and MS.LS2A.c are not addressed. Analyzing and Interpreting Data is a supported practice in all but one of the Grade 6 units and is deeply integrated into the Contact Forces, Earth in Space, and Cells and Systems units. Cause and Effect is a lens utilized in all Grade 6 units and deeply explored in the Forces at a Distance unit. For LSSS 6-MS-LS2-2**,** DCI MS.LS2A.d is not addressed. Constructing Explanations and Designing Solutions is a supported practice in the Contract Forces, Forces at a Distance, and Cells and Systems units and is also deeply integrated into the Light and Matter unit. For LSSS 6-MS-LS2-3, DCIs MS.LS2B.a, MS.LS2B.b, MS.LS2B.c, & MS.LS2B.d are not addressed. Developing and Using Models is a supported practice in all of the Grade 6 units and is deeply explored in the Light and Matter and Forces at a

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			Distance unit. Energy and Matter concepts appear in the Contact Forces, Sound Waves, and Forces at a Distance units. For LSSS 6-MS-PS1-1, DCIs MS.PS1.A.a and MS.PS1A.e are not addressed. Developing and Using Models is a supported practice in all of the Grade 6 units and is deeply explored in the Light and Matter and Forces at a Distance units. Scale, Proportion, and Quantity is deeply explored in the Light and Matter, Earth in Space, Cells and Systems units, and also supported in the Forces at a Distance unit. For LSSS 6-MS-ESS3-4, DCIs MS.ESS3C.b, MS.ESS2.E.a, and MS.EVS1B.a are not addressed. Engaging in Argument from Evidence is supported in the Contact Forces, Sound Waves, and Cells and Systems units.
	Required **3b)** 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 80 total lessons with most being multi-day in the units slated for Grade 6. If taught as presented, all six units require 161 days to teach without the necessary unit on ecosystems required to address all the standards. Included within many lessons are extension readings, videos, simulations, or activities offered as alternates, home learning, or extended learning. For example, in the Earth in Space unit, Lesson 4, two readings, *The Equator, the Midnight Sun, and the Analemma* and the other is *Meteorological vs Astronomical Seasons*, can be used either in class or

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			during home learning as deemed appropriate for the class and include handouts. The Light and Matter unit includes an extension activity that supports students in investigating scattering and specular reflection in order to explain everyday experiences. Instructional suggestions are included with each unit for lengthening or shortening lessons as needed to accommodate differences in required coverage of science standards or days available for instruction. If taught as presented, the Light and Matter unit takes 18 days total. This unit does make some assumptions that students have knowledge that may need to be reviewed by the teacher and could require additional time to address, extending instructional time. Conversely, some content could be reduced without affecting the impact of the unit on student learning, thus reducing the time needed to cover all significant content. If taught as presented, the Contact Forces unit takes 33 days to address. This unit does have a significant number of experiments that can be either extended in time or reduced to adjust that timeframe without impacting student learning.
	Required **3c)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Yes**	All reviewed content is accurate, up-to-date, and aligned with the most current and widely accepted explanations. Incorrect or out-of-date science

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			explanations are not evident in the materials. Information in the units is up to date with current video links and experiments that are relevant to current science principles. Each of the units have been revised within the last two years ensuring that all information has been updated, as noted by the revision date located at the bottom of the page of each unit. In the Earth in Space unit, students observe a modern day phenomenon in New York City, called "Manhattanhenge," which is the alignment of the sun between particular buildings twice a year. Students investigate this and other observable patterns in the sky from multiple perspectives at various scales in order to arrive at widely accepted scientific explanations for the movements within the Earth, Moon, and Sun systems. In the Contact Forces unit, Lessons 11-16, students design a protective device and critically read a scientific text about how concussions result in memory loss and how helmets protect the brain. In addition to this reading, they are directed to the CDC website for the up-to-date information about concussions in athletes.
	3d) 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. Instructional materials spend the majority of time within the grade band but do expose students to minimal materials above

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			grade bands to maintain coherence in relation to the phenomenon. For example, students engage with content from the Grade 7 (LSSS 7-MS-LS1-3) in the Cells and Systems unit in order to explore the relationship between body systems and healing in the body. Additionally, standard MS-LS1-8 is not included in the Grade 6 LSSS and is addressed in Lesson 1 of the Light and Matter unit. In Sound Waves, Lesson 5, students are exposed to graphs of high and low pitch sounds as well as loud and soft sounds. These graphs, depending on when the unit is taught in the school year, could be present before time vs position graphs are presented in math class.
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 materials incorporate a variety of authentic sources including primary source documents, photographs, and authentic data sets. In the Cells and Systems unit, Lesson 10, after analyzing data from an investigation and determining the need for more information, students review strategies for obtaining information from scientific texts and then read one of four sourced, age-appropriate texts about single-celled organisms. In the Sound Waves unit, Lesson 4, students look at authentic data from a harp string to identify patterns and discover that waves have amplitude and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			frequency. In the Light & Matter unit, Lesson 6, students read "How do eyeglasses help people see better?" which explains the concepts of nearsighted and farsighted vision in relation to light entering the eye. The reading then goes on to expose students to how eyeglasses correct the issue to help people see clearly in an age-appropriate and scientific way in relation to light, lenses and vision. Later, in Lesson 8, students develop experimental questions and identify the independent and dependent variables while planning an investigation.
	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. Students regularly engage in productive science discourse to generate driving questions, build understanding, and come to a consensus. They also present and revise designs, gather evidence from multiple sources, and explain findings. In the Contact Forces unit, Lesson 6, the assessment includes an opportunity for students to demonstrate their ability to write an argument that uses "ideas related to kinetic energy, peak forces, and breaking point for these structures in the brain and axons." Later in the unit, students develop and revise criteria and constraints as well as design

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			and revise a protective device based on materials testing. In the Light and Matter unit, Lesson 2, students answer questions about the path of light in each scenario presented, what the person would see, and are asked to think about why they would see that particular image. They engage in a discussion to build consensus about the role light plays within the phenomenon and how to represent that light in a model. This sparks students thinking about the way light travels and reacts to materials very early in the unit. In the Cells and Systems unit, Lesson 10, after analyzing data from an investigation and engaging in a jigsaw reading about single-celled organisms, students independently develop an argument based on evidence about what cells need to heal a wound.
	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. Within each module, students produce and revise models of the anchoring phenomenon. Across the materials, students regularly engage in a variety of tasks, such as constructing written explanations, planning and conducting investigations, making observations and collecting data with simulations, reading scientific texts, and designing using criteria and constraints. In the Contact Forces unit, students engage in a variety of tasks such as recording observations, developing questions, modeling and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			investigating using different objects, and analyzing videos. This variety of tasks helps to keep students engaged and culminates in Lessons 11-16 as students design an object that will help in a collision and revise the design in the engineering process. This design challenge supports students in fulfilling the standards requirements and engages them in critical thinking. In the Cells and Systems unit, students revise a timeline for healing in which they explain why each event occurs in addition, continue to revisit and revise models throughout and later in the unit, read stories about people with different needs, and brainstorm ways to make the world more accessible. In Lesson 13 of the Earth and Space unit, students gather information from a text to identify connections and observations others have made about Venus. They also identify and document additional patterns in other observations of Venus, adding any additional new questions to investigate. Students show the relative position of motion of Venus and Earth in the system to explain the additional patterns using a model then analyze the scale properties of other planets to Venus to identify even more patterns.
	Required **4d)** Materials provide a coherent sequence of learning experiences that **build scientific vocabulary** and knowledge over the course of study. Vocabulary is	**Yes**	The materials provide a coherent sequence of authentic science sources that build scientific vocabulary and knowledge over the course of study.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	addressed as needed in the materials but not taught in isolation of deeper scientific learning.		Vocabulary is addressed as needed, but only after students have first had the opportunity to build a conceptual understanding of the term. The materials refer to new terms as “words we earn” and are added to the word wall without definitions. Students co-create the definitions as they are discovered in the lessons. The materials suggest that each class period creates its own, but accurate, definitions on a separate wall, if possible, or at least in individual notebooks. Vocabulary lists are not given at the beginning of a lesson. Some terms appear throughout the materials and are reinforced in each unit or lesson. In the Sound Waves unit, Lesson 4, students record observations of sound graphs. After they have discussed and analyzed these graphs, they add their shared definition of amplitude to the word wall. In the Light and Matter unit, Lesson 3, students earn the words reflect and transmit. Students encounter these concepts in Lessons 1 and 2 as they view the anchoring phenomenon of the musician seeing himself in the one-way mirror and the observer seeing the musician through the mirror. Until they know the scientific words to explain how the light is moving in these situations, they can use their own words to explain the concept.
Section II: Additional Criteria of Superior Quality			

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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 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. Teacher guidance includes a unit overview and storyline that outlines how asking questions and investigations drive student learning as they figure out things throughout the unit. The overview also includes what the students will figure out, how they will represent what they learned, and how they will engage with all three dimensions in each lesson. A section of background knowledge is included that provides additional guidance for adjusting the sequence. These resources support student mastery of the Performance Expectations and maintain coherence. In the Forces at a Distance unit, students view short videos, read articles, use computer simulations to develop questions for an investigation, revise models according to data collected from investigations, and construct a scientific explanation for the unit phenomenon. The unit anchoring phenomenon is the vibration of a speaker and investigations aim to determine what causes the vibration. This builds upon concepts and skills developed in the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Sound Waves unit and builds student understanding of how sound waves are reflected, absorbed, or transmitted through different materials and how light travels and is reflected or absorbed by different materials. The Forces at a Distance unit begins with a video of a truck playing loud music, causing the windows of a building across the parking lot from the truck to visibly shake. Students develop initial models, investigate speakers and musical instruments, use motion sensors to collect data on vibrations, and produce graphs to illustrate and identify patterns to construct an explanation for how frequency/amplitude of sound waves determine sounds we can hear. They also investigate the role of magnets in the internal structure of a speaker by exploring pushes, pulls, and coils. In the Cells and Systems unit, students develop an explanation for how things heal by investigating an injured student's foot that healed over a few months as the anchoring phenomena. They analyze chicken wings to develop an understanding of the body as a system and analyze images of parts of the body's system such as bones, blood vessels, nerves, and tissue to further explore how these systems work together to heal an injury. They later expand on these ideas to think about growth and to shift thinking about people with disabilities. In

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			the Light and Matter unit, students begin by developing an understanding of the way light travels in the air, then how light travels through and reflects off of surfaces. Through revisiting and revising models, they later identify how the path of light enters the human eye and interacts with the parts of the eye system. The ongoing investigation of the unit phenomenon provides evidence for students to construct an explanation for how one-way and two-way mirrors work.
	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. Across the majority of the materials, students are not introduced to math skills that go beyond the Louisiana Student Standards for Mathematics for (LSSM) Grade 6. Students regularly are called to apply mathematics skills and understanding to engage in Using Mathematics and Computational Thinking (SEP) appropriately in the context of their learning. In the Sound Waves unit, Lesson 4- 6 and 13 students compare functions expressed graphically (LSSM 8.F.A.2) and describe the relationship between two quantities (LSSM 8.F.B.5). These concepts would naturally come up when investigating amplitude and frequency for LSSS 6-MS-PS4-1, and guidance is provided in the teacher materials for supporting students. In the Cells and Systems unit, Lesson 4, students use Grade 5 math skills (LSSM 5.NBT.A.2)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			while multiplying with microscopes and scale. In the Light and Matter unit, Lesson 3, students measure the amount of light that several different materials reflect or transmit. They rank those materials on a number scale from least to most amount of light transmitted (LSSM 6.SP.A.2 and LSSM 5.NBT.A.1.). In the Contact Forces unit, Lesson 7, students create a table and a graphical representation of the data they collect during their investigation (LSSM 6.RP.A.3).
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). Support also includes teacher guidance in the materials' **approach to phenomenon based instruction** and provides explicit guidance on how the materials address, build, and **integrate the three dimensions**.	**Yes**	There are separate teacher support materials provided. Support materials include extensive teacher guidance with a Unit Overview and Storyline, a Teacher Background section (scientific background about the Disciplinary Core Ideas of the unit), 3-D Strategies sections that detail explicit techniques to further support the development of SEPs, DCIs, and CCCs, and an Assessment System Overview. Each unit in the teacher manual has a step-by-step flow from lesson to lesson and gives support, questions, discussions, talking points, and common preconceptions that students might have about the science concepts. Each lesson includes a detailed learning plan as well as a section that clarifies where the lesson is going and where it is not going, guiding how deep into the content material the students should go. Also included in each lesson are editable PowerPoint presentations to guide the lesson step-by-step, the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Learning Plan Snapshot that details how much time each section of the lesson should take, a Lesson Overview that details how many days the lessons will take, and Learning Objectives that describe what the students should be expected to figure out. The unit folders provide all of the unit-specific resources needed to teach the units and lessons including a Teacher Handbook, Teacher Edition, Student Edition in English and Spanish, Unit Planning resources, and Remote Learning resources. The teacher manuals also show how to set up notebooks and labs with pictures and materials.
	Required **6b)** Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is **developmentally appropriate**.	**Yes**	Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in a way that is developmentally appropriate. Within each lesson, support materials include: a Teacher Background section (scientific background about the Disciplinary Core Ideas of the unit), 3D Strategies sections that detail explicit techniques for highlighting SEPs, DCIs, and CCCs further, and sample prompts and conversation guides for class discussions. The materials include teacher reference sheets with additional information and pictures of how investigations should look. Each unit includes a section that outlines how each SEP and CCC develops throughout the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			unit. The units also include posters and handouts for communicating in scientific discourse, classroom norms, and discussion skills to support students with sensemaking about phenomena and demonstrating scientific knowledge and skills. In the Light and Matter unit's teacher edition, two pages explain to teachers where to go and where not to go when guiding students in the investigations. One specific piece from the Where to Go section discusses how to address light interacting with a surface. It instructs teachers not to use the word hit because "it implies there is a force involved." This helps both teachers and students watch language to avoid misconceptions. In the Contact Forces unit, Lesson 7, Additional Guidance is provided to teachers to listen for key ideas to help students see that relative increase in the distance the box in the investigation is pushed is a measure of the relative increase in the kinetic energy of the object. This helps the teacher know specifically what students should be learning from this section of the lesson.
	Required **6c)** Support for **English Learners and diverse learners** is provided. Appropriate suggestions and materials are provided for **supporting varying student needs** at the unit and lesson level. The language in which questions and problems are posed is not an obstacle to understanding the content, and if it is, additional supports are included (e.g., alternative teacher	**Yes**	Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. Each unit overview includes a pacing guide in which teachers can utilize to plan opportunities for students who need additional experiences and time developing core

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	approaches, pacing and instructional delivery options, strategies or suggestions for supporting access to text and/or content, suggestions for modifications, suggestions for vocabulary acquisition , etc.).		ideas of the unit. Each unit overview also includes a Phenomenon Relevance Note with suggestions for modifying the anchoring phenomenon to increase accessibility or local and cultural relevance for students, as needed. The Teacher Handbook provides materials' design to promote equitable access to high-quality science learning experiences for all students by focusing on relevance, collaborative sensemaking, and involving all students in the learning process. The materials utilize a universal design for learning principles to meet the needs of all learners and emphasize classroom culture and norms. The materials also provide a Spanish Student Edition and teacher guides for each unit. Teacher guides incorporate support and guidance assistance through the Attending to Equity sidebar callout boxes and the Supporting Emerging Multilingual Learners and Supporting Universal Design for Learning subheadings. For example, in the Contact and Forces Unit, Lesson 9, Attending to Equity - Emerging Multilingual Learners guidance states, "It may be helpful to intentionally pair emerging multilingual students with peers whose English language development is similar to theirs to explain their home learning results. Encourage students to express their ideas using linguistic and nonlinguistic modes such as drawings, symbols, and gestures. If possible provide

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			hands-on materials (e.g., shoe, rubber band, carpet square, index cards) for students to demonstrate their ideas.”
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 (when applicable), as well as laboratory and other scientific materials are readily accessible through vendor packaging. The information needed for activities are readily available. Teachers have access to student and teacher books, as well as all the student worksheets, and slides for each lesson. Materials lists outline what is needed for investigations and include items that are readily accessible. In the Light and Matter unit, Lesson 1, a materials list is provided for the lesson and lesson activity. The teacher manual shows how each of the materials are set up through pictures. In the Contact Forces unit, Lesson 7, the lesson resources for the lesson and the design project are in one place, which include data sheets, readings, pictures, prototype sheets, and the Spanish language versions for all sheets.
	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**	Materials help students build an understanding of standard operating procedures in a science laboratory and include safety guidelines, procedures, and equipment. Students are exposed to a variety of different types of investigations/experiments requiring various safety equipment and procedures. Each time a learning opportunity of this type is presented, a Safety Precaution box appears in the teacher manual and is

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			designated with a yellow triangle containing an exclamation mark. The information contained in the box is specific to that investigation. The Unit Overview provides a section of lab safety recommendations for any lesson with an investigation in the unit, such as wearing safety goggles, wiping up spilled water, proper disposal of waste materials, and other standard Lab safety precautions. In the Teacher Notes for the lesson, teachers are made aware of safety precautions, such as the Sound waves unit, Lesson 3, which cautions the use of lasers as it is prohibited in some states. In the Contact Forces unit, Lesson 1, a Safety Precautions box instructs the teacher to review safety guidelines. It also instructs the teacher to have students wear safety goggles while demonstrating collisions and while standing or sitting near the collisions. The box explains that setting up strong boundaries and expectations with this first demonstration is key to future demonstrations staying safe.
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. Assessments are embedded in the lessons and allow students to show the progress they make and the knowledge that they gain through the unit. In lessons, formative assessments are structured as questions and discussion prompts. In the Contact

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
☒ Yes ☐ No			Forces unit, the summative assessment includes an investor pitch developed by students at the end of the unit to present their Cheerleading Headgear. This headgear is a device conceptually developed by student groups using knowledge obtained during the course of the unit and displays their understanding of all unit standards as well as the rationale for trade-offs to optimize specifics of their chosen designs. In the Cells and Systems unit, assessments are embedded in Lessons 7, 10, 12, and 13. In Lesson 7, students make claims about cells based on evidence. In Lesson 10, the assessment expands to include ideas with bacteria. In Lesson 11, the students show how the systems interact. All of this knowledge culminates in Lesson 12 as students explain how things grow for the unit's final assessment. In the Sound Waves unit, the assessments are included in Lessons 6, 13, and 14. In Lesson 6, students look at data and make scientific claims based on evidence. In Lesson 13, they build on this concept and explain a sonic fire extinguisher. Lesson 14 includes the unit assessment where students explain how musicians experience hearing loss more often
	Required **8b)** Assessment items and tasks are structured on integration of the **three dimensions** and include opportunities to engage students in applying understanding to new contexts.	**Yes**	Assessment items and tasks are structured on the integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. The unit

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			assessments integrate SEPs in assessments by allowing students to use data, writing, explanations, and models to address the anchor phenomena. In Contact Forces, Part 1 of *Cheerleader Headgear Designs*, students read and interpret Data (SEP, Analyzing and Interpreting Data) to model (SEP, Developing and Using Models) and explain the structural properties of the designs (CCC, Patterns), addressing the full intent of LSSS MS-PS2-1. In the Earth in Space unit, Lesson 14, students engage in a formative assessment in which they investigate (SEP, Planning and Carrying Out Investigations) a two-object system using a computer simulation. They answer a question they asked (SEP, Asking Questions and Defining Problems) in the previous handout with a model (SEP, Developing and Using Models) of the moon and earth system (CCC, Systems and System Models) addressing the full intent of LSSS MS-ESS1-3.
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Yes**	Scoring guidelines and rubrics align to performance expectations, and incorporate criteria that are specific, observable, and measurable. The Rubrics provided are in the teacher reference section and go through step by step for answers students will give and what shows a mastery of the subject. Graded and non-graded assessments are included as well as the models students will be building. Rubrics for teacher and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			peer feedback are also provided. In the Cells and Systems unit, the development of Our Body as a System poster is explained and fully completed lesson by lesson on what the students should be adding as a class. In the same unit, the timeline answers are also provided with extensive responses in the teacher materials. In the Sound Waves unit, several rubrics allow the teacher to make sure that students understand what is needed for a sound to happen to check the model that they came up with. The Interactions Between Components shows what CCC is being developed or mastered. A similar checklist is also provided in Lesson 11 that students use to check if their models have been completed fully. In the Light and Matter unit, the end-of-unit assessment scoring guidance provides the teacher with both a written response and a drawn response that students could provide. For both responses, the materials provide a set of ideas marked with + signs which signify what students need to master.

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
	1. Three-dimensional Learning	**Yes**	The instructional materials are designed so that students develop scientific

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
I: Non-negotiable Criteria of Superior Quality[2]			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.
	2. Phenomenon-Based Instruction	**Yes**	Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena.
	3. Alignment & Accuracy	**Yes**	The majority (14 out of 19) of the Grade 6 Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards. Standards that are not fully addressed in the materials include: LSSM 6-MS-LS2-1, 6-MS-LS2-2, 6-MS-LS2-3, 6-MS-PS1-1, and 6-MS-ESS3-4. The total amount of content is viable for a school year. All reviewed content is accurate, up-to-date, and aligned with the most current and widely accepted

[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
			explanations. Instructional materials spend minimal time on content outside of the course, grade, or grade-band.
	4. Disciplinary Literacy	**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 primary source documents, photographs, and authentic data sets. 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. There is variability in the tasks that students are required to execute. 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.
II: Additional Criteria of Superior Quality[3]	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 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,

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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			clear, and organized. Students apply mathematical thinking when applicable. Across the majority of the materials, students are not introduced to math skills that go beyond the Grade 6 Louisiana Student Standards for Mathematics.
	6. Scaffolding and Support	**Yes**	There are separate teacher support materials provided Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in a way that is developmentally appropriate. Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level.
	7. Usability	**Yes**	Text sets (when applicable), as well as laboratory and other scientific materials are readily accessible through vendor packaging. Materials help students build an understanding of standard operating procedures in a science laboratory and include safety guidelines, procedures, and equipment.
	8. Assessment	**Yes**	Multiple types of formative and summative assessments are embedded into content materials and assess the learning targets. Assessment items and tasks are structured on integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. Scoring guidelines and rubrics align to performance expectations, and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			incorporate criteria that are specific, observable, and measurable.
FINAL DECISION FOR THIS MATERIAL: **Tier 1, Exemplifies quality**			

DEPARTMENT of EDUCATION
Louisiana Believes

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

FULL CURRICULUM
Instructional Materials

Strong science instruction requires that students:

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

Title: **OpenSciEd** Grade/Course: **7**

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Overall Rating: **Tier 1, Exemplifies quality**

Tier 1, Tier 2, Tier 3 **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 **engage students** in integrating the science and engineering practices (SEP), crosscutting concepts (CCC), and disciplinary core ideas (DCI) 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 the Matter Cycling and Photosynthesis Unit, students engage in a series of science and engineering practices to develop knowledge about where matter and energy come from in plants. In Lesson 1, students explore breakfast foods and generate questions (SEP) about food molecules in plants, and use an Energy and Matter lens (CCC) to develop initial models (SEP, Developing and Using Models) to describe how plants obtain food molecules (DCI; MS.LS1C.a). In Lessons 2-8, students plan and conduct investigations (SEP, Planning and Carrying Out Investigations), analyze data (SEP, Analyzing and Interpreting Data), obtain information from scientific texts (SEP, Obtaining, Evaluating, and Communicating Information) and construct and compare arguments based on evidence (SEP, Engaging in Argument from Evidence), to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			determine where plants get the Energy and Matter (CCC) required for chemical reactions to make glucose (DCI, MS.LS1C.a), the source of food calories (DCI, MS.PS3D.a) during photosynthesis. In one of the investigations that students plan and carry out (SEP, Planning and Carrying Out Investigations) in Lesson 6, they use a simulation to look at molecules going into and coming out of leaves to figure out what happens in leaves that allows plants to make food molecules. The students conduct experiments in the simulation and analyze the data (SEP, Analyzing and Interpreting Data) to explain how water, carbon dioxide, and the chloroplast work together to form new molecules (DCI, MS.PS3D.a) and revise their initial models (SEP, Developing and Using Models) to show the flow of Energy and Matter (CCC) that allows plants to obtain food. In Lessons 9-13, students conduct additional investigations (SEP, Planning and Carrying Out Investigations) and utilize models to develop ideas about the flow of Energy and Matter (CCC) in Earth's systems such as the way that plants and other organisms obtain energy from food molecules through cellular respiration (DCI, MS.LS1C.c), and the role of decomposers in the recycling matter and energy. These ideas culminate in Lessons 14 and 15 with a fully developed model (SEP, Developing and Using Models) to explain the cycling of Energy and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Matter (CCC) through the rearrangement of atoms (DCI, MS.LS1C.b) among inputs and outputs in a system (CCC, Systems and System Models) of living and nonliving components. In the Chemical Reactions and Matter Unit, students engage with the chemical makeup of bath bombs throughout the unit by creating and revising models (SEP, Developing and Using Models) of their findings to demonstrate how their learning has progressed and repeatedly looking for Patterns (CCC) in the chemical make-up of bath bombs that could explain the formation of gas bubbles when bombs are placed in water (DCI, MS.PS1B.a). In Lesson 3, students plan and carry out investigations (SEP, Planning and Carrying Out Investigations) with bath bomb ingredients to help further explore where gas bubbles come from when the bath bombs are dropped into water. Students begin by Analyzing and Interpreting Data (SEP) for bath bombs, both store-bought and homemade, to see if there are Patterns (CCC) found across all ingredient lists. Students then test each ingredient individually (SEP, Planning and Carrying out Investigations) to see if they create gas bubbles when mixed with water (DCI, MS.PS1B.a). In the Weather, Climate, and Water Cycling Unit, students observe and investigate what causes hail storms and other storms (DCI, MS.ESS2D.a, MS.ESS2C.b) by analyzing weather data to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			construct explanations and by modeling the transfer of energy in the system at multiple scales (SEP, Analyzing and Interpreting Data, Constructing Explanations, Developing and Using Models; CCC, Systems and System Models, Energy and Matter, Scale, Proportion, and Quantity).
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 a coherent sequence of learning a majority of the time. Phenomena provide students with authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow.	**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, and this provides purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the phenomenon. Each unit starts with a real concept and includes a question meant to be answered throughout the unit. In the Thermal Energy Unit, Lesson 1, students explore the phenomenon of liquids remaining cold longer in some types of cups than others. A short video clip shows how the red food coloring in a peppermint candy dissolves at different rates in hot, warm and cold water. They generate an initial model of the cup system and brainstorm ideas for investigations to test which cup types will keep liquids cold longer. In Lesson 2, students choose their materials and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			methods of investigation to discover which types of cups (such as paper, Styrofoam, plastic) and the design types of those cups will allow less transfer of energy from the cold liquid inside the cup to the warmer air outside of the cup. Students document their findings as well as share and analyze data for patterns to rank the cups by performance and identify important features that might play a role in the rankings. In Lessons 3-5, students continue to plan and conduct investigations to explore different claims about the cup system. In Lessons 6-14, students explore the transfer of energy within the cup system at the particle level through modeling, simulations, and investigations to explain the relationship between energy and temperature within the cup system. Lessons 15-17 provide students the opportunity to apply their learning about the cup system in an engineering design challenge where they create and test cup systems designed to keep liquids cold. The Chemical Reactions & Matter Unit introduces students to the phenomenon of bubbles created when a bath bomb is placed in water. This helps set the stage for the overarching student question of "How can we make something new that was not there before?" Students return to this phenomenon over and over again throughout the unit as they investigate where the gas is coming from, the make-up of the gas, and the chemical

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			processes that lead to its formation to explain the reaction of the bath bomb in water. In the Matter and Photosynthesis Unit students start the unit by remembering a meal they ate and tasting maple syrup. This provides a common experience for students to begin asking questions about what is in food. Throughout the unit, students analyze nutritional data for patterns, conduct and series of investigations, explore the make-up of food on the molecular level, and create and revise models to describe the cycling of matter and energy to explain where our food comes from.
	Required **2b)** Materials are designed to provide sufficient opportunities for students to **design and engage in investigations at a level appropriate to their grade band** to explain phenomena. This includes testing theories or models, generating data, and using reasoning and scientific ideas to provide evidence to support claims.	**Yes**	Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Materials, when appropriate, allow students to engage directly with experiments designed to discover the phenomena. The materials provide frequent opportunities for students to authentically engage with the Science and Engineering Practices by designing and conducting investigations around student-generated questions and analyzing data needed to support a claim or develop an explanation related to a phenomenon. In the Chemical Reactions Unit, students plan and conduct multiple investigations and synthesize the information from these and other sources to figure out how molecules from several

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			substances combine together to make a bath bomb. In the Weather, Climate, and Water Cycling Unit, Lesson 4 students decide what data to collect, which tools they will use, and how they will take measurements to determine if there is a pattern between the temperatures of the ground and the air above it. Later, in Lessons 7 and 8, students also investigate the humidity in the air above different surfaces and what happens when sir that has water vapor cools. They use this information, as well as data from an investigation in later lessons, simulation data, models, and focused scientific text to explain why some storms produce hail.
	2c) Materials provide frequent opportunities for students to **make meaningful connections** to their own knowledge and experiences as well as those of their community during sense-making about the phenomena.	**Yes**	Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. Sense-making is crucial to the OpenSciEd framework and the flow of learning. The discovery of the phenomena gives students the ability to put different pieces together in lesson sets. By the end of the unit, those pieces make sense as a whole as students work towards explaining the phenomenon. In the Ecosystem Dynamics Unit, Lesson 18, the culminating assignment, students test out how their designs would work in the real world. This is the sense-making culmination of what they have learned in Lesson Set 4, Lesson 14-18 about mixed-

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			use farming and sustaining farms and other living things. The teacher overview makes this clear through the storyline and unit structure. In the Chemical Reactions Unit, Lesson 6, the Attending to Equity box in the Navigation section of the lesson suggests teachers return to previously listed related phenomena and how it can be explained with the information learned so far. Related phenomena are compiled by students in previous lessons based on personal experiences and observations students may have had. In the Weather Climate and Water Cycling Unit, the student notebook on pages 97-98, includes weather data and a map of the New Orleans, LA area that identifies various hail sizes that fell in that area by different shaded areas on a recent date. An alternative activity suggestion for this lesson found on page 9 of the Teacher Edition for this unit is to research short videos of falling hail in locations relevant to the student, such as within the same city, county (parish), or climate region to help students create a connection to the hail event.
Non-negotiable (only reviewed if Criteria 1 and 2 are met) **3. ALIGNMENT & ACCURACY:** Materials adequately address the Louisiana Student Standards for Science.	**Required** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the full **depth of the standards**.	**Yes**	The majority (12 out of 16) of the Louisiana Student Standards for Science are incorporated to the full depth of the standards. Standards that are not fully addressed in the materials include: LSSS 7-MS-ESS3-5, 7-MS-LS3-2, 7-MS-LS4-4, and 7-MS-LS4-5. While Disciplinary Cores Ideas (DCIs) from the standards listed are not

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
☒ Yes ☐ No			integrated into the materials, identified Science and Engineering Practices (SEPs) and Crosscutting Concepts (CCCs) are often integrated and explored throughout multiple units. LSSS 7-MS-LS1-6 and 7-MS-ESS2-4 are fully addressed with the exception of Louisiana-specific DCI component MS.EVS1A.a. LSSS 7-MS-LS1-3 is fully addressed with the exception of the DCI component MS.LS1D.a.
	Required **3b)** The total amount of content is **viable** for a school year.	**Yes**	The total amount of content is viable for a school year. The six units combined contain 104 Lessons ideally taught over 196 days. Addressing the total content in a school year is possible if units are condensed or shortened using guidance in the teacher edition.
	Required **3c)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Yes**	All reviewed content is 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. In Weather, Climate & Water Cycling, Lesson 14, students use a collection of videos and authentic weather data to work toward investigating the question, "Why does a lot of hail, rain, or snowfall at some times and not others?" These include a weather report from 2019, authentic videos of hail events, and a Hail Frequency Map from the National Weather Service. In the Matter and Photosynthesis Unit, students read "Stevia," an example of up-to-date content with information from the U.S. National Library of Medicine's "The

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Journal of Nutrition" from 2018. In Metabolic Reactions, Lessons 2, 7, 8, 10, and 13 all look at medical data including endoscopy videos, images of the human body burning fat over time, and zoomed-in images of the small intestine.
	3d) 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 grade or grade-band. Time spent on material outside of the grade serves to maintain coherence in relation to the phenomenon. For example, Metabolic Reactions builds toward MS-LS1-5. While this is not a Louisiana state standard, it is important for students to have some understanding of how environmental and genetic factors influence the growth of organisms. The unit does not make this standard a main focus of the unit but does have students consider these factors as possible reasons why their student patient could be ill at this point in her life. Matter Cycling and Photosynthesis include standards that are outside of Grade 7 in the LSSS. However, LSSS 6-LS2-3 is addressed as a review and is important to bring the concepts full circle in understanding. In addition, while LSSS 8-PS1-3 is addressed, it is not covered in so much depth that it takes away from the unit.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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 primary source documents, photographs, authentic data sets, and readings with information from scientific journals. In the Matter Cycling and Photosynthesis Unit, students read grade-level appropriate content adapted from the article, "How do Scientists Measure Food" from Scientific American. In the Thermal Energy Unit, students analyze data collected from hands-on scientific investigations as well as computer simulations. In Lesson 1-10, students investigate the relationship between energy changes and temperature change by gathering evidence from different types of cups, then utilize a computer simulation in Lessons 11-13 to explore the rates of movement of molecules when they are hot and when they are cold. The remainder of the unit allows students to use the acquired information to design and test a cup that deters the transfer of energy and keeps a liquid cold.
	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. In all units students regularly engage with Driving Question Boards, allowing all

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			students to generate questions that guide their learning experience. In addition to engaging in productive science talk to generate questions, students also develop the ability to respectfully argue from evidence by building understanding and coming to consensus in Scientist Circles. Students utilize a Scientist Circle in Lesson 13 of the Weather, Climate & Water Cycling Unit to come to a consensus for the 'Gotta-Have-It Checklist' of necessary components for their class model to explain hail. The students return to their Driving Question Board to take stock of their answered and unanswered questions. Students also regularly engage in turn and talk with peers. In the Matter Cycling and Photosynthesis Unit, students discuss what evidence would help prove the food molecule sources in the hydroponics system. Students also frequently write in a science notebook for each unit. In Lesson 1 of the Thermal Energy Unit, students jot their ideas for how to collect evidence to investigate a claim about which cup keeps a drink colder longer, enter observed data into a chart for the change in temperature over time for two different types of cold cups of liquid, and draw initial models in their notebooks to illustrate their observations.
	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,	**Yes**	There is variability in the tasks that students are required to execute. Within each module, students produce and revise models of the anchoring phenomenon.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	explanations of theory development, and conclusions from investigations.		Across the materials, students regularly engage in a variety of tasks, such as constructing written explanations, planning and conducting investigations, making observations and collecting data with simulations, reading scientific texts, and designing using criteria and constraints. In the Weather, Climate & Water Cycling Unit, students engage with the phenomenon through hands-on lab activities, videos, images, data sets, readings, and computer interactives/simulations. In Lesson 1, students observe video clips of hail falling in different areas of the United States on different days and generate questions about what can cause different types of precipitation. In Lesson 2, students look for patterns in data and images of hail events to create explanations. Later, in Lesson 9, students engage in a reading about cloud formation, patterns, and composition to determine how they are related to weather phenomena. In the Matter Cycling and Photosynthesis Unit, Lesson 2, students answer the following question: “Do plants get food molecules by taking them in?” They do this with a wet lab where students observe and record data and test plants for different organic molecules. They study this hydroponic system based on inputs to see what is going into the plants from below the surface.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	Required **4d)** Materials provide a coherent sequence of learning experiences 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. This is done by building a word wall and words the students earn, encounter, or reinforce. There is a "Guidance for Developing your Word Wall" in each teacher's section. Students discuss and investigate the phenomenon without vocabulary frontloading. Once they develop an understanding of a concept through investigation, they engage with applicable scientific terms by creating a working definition as a class and posting to the Word Wall. The materials recommend that, whenever possible, to place a visual representation near the word to help students develop a connection between the concept and the vocabulary word. For example, in the Ecosystem Dynamics Unit Lesson 7, after students engage with a Story Map and participate in an Initial Ideas Discussion which will surface the term population, teachers add the term to the Word Wall and encourage students to continue to use it during the discussions that follow.
Section II: Additional Criteria of Superior Quality			

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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 lessons within and across each unit are organized to support learning through a natural progression. Students engage with and build 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 teacher guidance documents begin with the Unit Overview and Storyline. Through this storyline, it is evident that student-driven investigations and discovery drive how students develop science concepts through the unit. This clearly outlines what the students will figure out and how they will represent what they learn. Students use all three dimensions throughout the lessons and lesson sets. A section of background knowledge provides teacher guidance if units are taught out of sequence to support student mastery of the Performance Expectations and to maintain coherence. In the Chemical Reactions Unit, students begin by observing gas formation from dropping a bath bomb in water, then spend the rest of the unit progressively researching the ingredients in bath bombs and testing those ingredients to see which ones would create the gas. Students develop and revise models of what is happening inside the bath bombs at a level we are unable to see with the naked eye to build a gradual understanding of how different

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			substances react when combined. Students gather evidence and record it on their model and progress tracker then use the evidence to construct explanations and develop arguments later in the unit. In the Thermal Energy Unit, students compare and contrast the insulative properties of two different cups to determine how energy is being transferred into the drink, changing its original temperature. Students apply their findings to a design challenge to develop a drink cup that can perform as well or better than the cups they investigated. As they begin their investigations, they build upon Grade 5 understanding that explains the particle movement of solids, liquids, and gasses as they create models to illustrate this. They coherently build understanding of the Physical Science disciplinary domain for thermal energy transfer. The practices of Developing and Using Models and Planning and Carrying Out Investigations build within the unit as students plan and execute investigations that test how the parts of the cup system allow matter and energy to flow in and out of the system. Students investigate and then create models based on their findings in Lessons 1-10, plan and carry out investigations in Lessons 11-15, and design the cup prototype Lessons 16-18 (MS-PS3-3). The practices of Constructing Explanations and Designing Solutions and Engaging in Argument from Evidence as well as

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			disciplinary content from MS-PS4-2 and MS-PS3-5 are developed as students engage in scientific seminars and group discussions to present their findings of their energy movement investigations and discuss and consider the models. Cross-cutting Concepts Systems and System Models, Energy and Matter, and Structure and Function are also integrated and developed by models of the cup system that illustrate how the structure allows or inhibits the flow of energy and matter in and out of the system. Students revise their models to reduce the transfer of energy, and apply their findings about how certain cup features can slow the movement of energy into the system to allow the liquid within the cup to remain cold as long as possible.
	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. Across the majority of the materials, students are not introduced to math skills that go beyond the Louisiana Student Standards for Mathematics (LSSM) for Grade 7. Students are regularly called to apply mathematics skills and understanding to engage in Using Mathematics and Computational Thinking (SEP) appropriately in the context of their learning. In the Chemical Reactions Unit, students work towards DCI PS1.B related to the total numbers of each type of atom related to the mass which requires students to calculate the mass before and after a chemical reaction to ensure they

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			are equal. In Lesson 8, students measure, graph, and calculate density from mass and volume data (LSSM 7.RP.A.2.A, 7.RP.A.2.B). In the Weather, Climate, and Water Cycling Unit, Lesson 2, students use ratios to generate rates reflecting the number of storms per year in an area and wind speeds in miles per hour. Students apply this learning to lessons that follow in the unit (LSSM 6.RP.A.2). In Lesson 16, students calculate differences in X-values and Y-values from data points found on graphs illustrating air temperature versus the amount of water vapor in the air with air saturations of 100% and 50% relative humidity (LSSM 6.NS.C.8).
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). Support also includes teacher guidance in the materials' **approach to phenomenon based instruction** and provides explicit guidance on how the materials address, build, and **integrate the three dimensions**.	**Yes**	There are separate teacher support materials provided. Support materials include an extensive teacher edition, and each lesson includes the following: a Teacher Background section (scientific background about the Disciplinary Core Ideas of the unit), 3-D Strategies sections that detail explicit techniques for highlighting SEPs, DCIs, and CCCs further, and sample prompts and conversation guides for class discussions. The teacher handbook breaks down the instructional flow for each unit. Each unit in the teacher edition has step-by-step lesson plans that include support for meeting individual students' needs, sample questions, talking points, and "listen-fors" as well as possible preconceptions. The materials include step-by-step PowerPoints for each lesson

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			as well. The digital and pdf teacher edition includes a Unit Overview containing the following information: what students are expected to learn through the investigation process; Performance Expectations addressed by the unit; a Unit Storyline containing the lesson number, focus question, navigation, and images that show how students will engage with the phenomena. Teacher Background Knowledge sections include information about Lab Safety Requirements, the unit's Anchor Phenomenon, dimensions developed in context, unit structure, Scope and Sequence guidance, students' prior knowledge, and Math connections.
	Required **6b)** Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is **developmentally appropriate**.	**Yes**	Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is developmentally appropriate. Support materials a 3D Strategies section that details explicit techniques for highlighting SEPs, DCIs, and CCCs further. There are also teacher reference sheets with additional information and pictures of how investigations should look. Each unit has a section that outlines how each SEP and CCC develops throughout the unit. The units also have posters and handouts for communicating in science, classroom norms, and discussion skills to support students with sensemaking about phenomena and demonstrating scientific

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			knowledge and skills. In the Metabolic Reactions Unit, Lesson 5, Section 9, the Strategies for Building Understandings Discussion section helps the teacher guide the students in using investigation information to explain questions from previous lessons. In Lesson 7, Section 4, the Attending to Equity section provides a strategy for differentiation for the lesson to provide all students with ways to be successful. In the Weather, Climate, and Water Cycling Unit, downloadable Teacher Guides explain how each part of the unit contributes to student learning, what prior knowledge students will need to be successful in the lessons, and possible misconceptions students may have that need to be addressed. The Teacher Resources guide includes rubrics and examples of what student responses should include or look like while referencing the concept or standard.
	Required **6c)** Support for **English Learners and diverse learners** is provided. Appropriate suggestions and materials are provided for **supporting varying student needs** at the unit and lesson level. The language in which questions and problems are posed is not an obstacle to understanding the content, and if it is, additional supports are included (e.g., alternative teacher approaches, pacing and instructional delivery options, strategies or suggestions for supporting access to text and/or content, suggestions for modifications, suggestions for vocabulary acquisition , etc.).	**Yes**	Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. Each Unit Overview includes a pacing guide in which teachers can utilize to plan opportunities for students who need additional experiences and time developing core ideas of the unit. Each Unit Overview also includes a Phenomenon Relevance Note with suggestions for modifying the anchoring phenomenon to increase accessibility or local and cultural relevance for students,

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			as needed. The Teacher Handbook provides materials' design to promote equitable access to high-quality science learning experiences for all students by focusing on relevance, collaborative sensemaking, and involving all students in the learning process. The materials utilize a universal design for learning principles to meet the needs of all learners and emphasize classroom culture and norms. The materials also provide a Spanish Student Edition and teacher guides for each unit. Teacher guides incorporate support and guidance assistance through the Attending to Equity sidebar callout boxes and the Supporting Emerging Multilingual Learners and Supporting Universal Design for Learning subheadings.
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 (when applicable), laboratory, and other scientific materials are readily accessible through vendor packaging. The information needed for activities are readily available. The teacher portal section includes access to student and teacher books, all the student worksheets, and slides for each lesson. Kits are made for each unit, and the materials list provide what is needed for investigations. In the Matter Cycling and Photosynthesis Unit, the Unit Overview Materials include a section for advanced preparation needed with clear instructions and timeframes. In the Weather, Climate, and Water Cycling Unit, most materials are

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			provided in the kits. The materials to be obtained by the teacher, which can be locally sourced, are easily obtainable and reasonable to have on hand in a science classroom, such as rubber bands, rulers, plastic spoons, and paper towels. In the Metabolic Reactions Unit, Lesson 3, information is included about safety, disposal, and storage information for the Iodine and Benedict's solutions used during the lesson.
	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**	Materials help students build an understanding of standard operating procedures in a science laboratory and include safety guidelines, procedures, and equipment. Science Lab Safety guidance and guidelines are provided for teachers and for the students and their parents. In the Thermal Energy Unit, the teacher background knowledge section includes information for lab safety in the science classroom. With each lesson, additional safety suggestions are found relevant to the materials used in the investigations as well as information about whether they are safe to be used with students or if it is a teacher only activity. In the Chemical Reactions Unit, Lesson 5, the Safety Precaution reminds the teacher to make sure everyone wears safety goggles, to have a glass of water near to discard burnt matches and splints, and that anyone with long hair should tie it back to keep it away from the open flame. In the Metabolic Reactions Unit, Lesson 10, the Student

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Safety Precaution recommends that students wear safety goggles and stand four feet away from the demonstration.
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 content materials and assess the learning targets. Assessments are integrated within the lessons and allow students to demonstrate progress throughout the unit. Formative assessment opportunities within lessons include items such as written explanations, questions, discussion prompts, and models. Each unit includes an assessment System Overview that outlines both formative and summative assessment opportunities, student self-assessments, and lesson-by-lesson assessment opportunities with the three dimensions highlighted. The materials also include task assessments in the forms of design challenges and presentations. The Matter Cycling and Photosynthesis Unit includes many different formative and summative assessments. For example, Lessons 1, 8, and 15 provide opportunities for students to demonstrate understanding through modeling. Lessons 4, 11, 13, 14, and 15 provide opportunities for assessing student progress by communicating scientifically in the form of explanations and arguments. In addition, the unit provides many opportunities to gauge student understanding through discussions, such as Building

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			Understandings discussions in Lessons 2, 7, and 13 as well as small group discussions in Lessons 6 and 12.
	Required **8b)** Assessment items and tasks are structured on integration of the **three dimensions** and include opportunities to engage students in applying understanding to new contexts.	**Yes**	Assessment items and tasks are structured on integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. Each lesson includes at least one lesson level performance expectation (LLPE) which are three-dimensionally structured to include the SEP, DCI, and CCC. The Unit assessments of each unit integrate SEPs as students use data, construct explanations, and develop models to address the anchor phenomena. The Teacher Guide for each lesson within the Lesson-by-Lesson Assessment Opportunities section lists the LLPEs for each lesson. The SEP, DCI, and CCC that correspond are color-coded to readily identify their alignment to the assessments used with each lesson. In the Matter Cycling and Photosynthesis Unit, Lesson 15, end-of-unit assessment, students create a model (SEP, Developing and Using Models) to explain the interactions between components in the system (CCC, Systems and System Models) as they relate to matter and energy inputs and outputs (DCI, MS.PS3D.a). Students then explain (SEP, Constructing Explanations) the change in inputs and outputs over time within the system (CCC, Energy and Matter, Systems and System Models) as the whale fall is consumed

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			given seafloor conditions related to plants, light and oxygen (DCI, MS.LS1C.a). The whale fall scenario allows students to transfer the knowledge they developed by investigating where food comes from and where it goes throughout the unit.
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Yes**	Scoring guidelines and rubrics align to performance expectations, and incorporate criteria that are specific, observable, and measurable. All units include answer keys and rubrics for major assessments as well as criteria such as look fors/listen fors that call out all three dimensions of performance expectations. In Thermal Energy, an answer key and rubric are included for the assessment in Lesson 14, Icing Injuries Assessment, intended to identify student understanding about the mechanisms that drive energy transfer and the direction of the transfer between differences in temperature. The assessment scoring guide specifies in which lessons learning occurred and the level of understanding evidenced by acceptable responses. The Weather, Climate, and Water Cycling Unit includes answer keys and rubrics for the summative Hurricane Assessment Task and the Rainforest Climate Assessment Task. The rubrics and answer keys describe what student understanding and misunderstandings might look like in reference to student-created map markings, drawings, and responses.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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**	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.
	2. Phenomenon-Based Instruction	**Yes**	Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena.
	3. Alignment & Accuracy	**Yes**	The majority (12 out of 16) of the Louisiana Student Standards for Science are incorporated to the full depth of the

[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
			standards. The total amount of content is viable for a school year. All reviewed content is accurate, up-to-date, and aligned with the most current and widely accepted explanations. Instructional materials spend minimal time on content outside of the course, grade, or grade-band.
	4. Disciplinary Literacy	**Yes**	Students regularly engage with authentic sources that represent the language and style used and produced by scientists. Students regularly engage in speaking and writing about scientific phenomena and engineering solutions using authentic sources. There is variability in the tasks that students are required to execute. The materials provide a coherent sequence of authentic science sources that build scientific vocabulary and knowledge over the course of study.
II: Additional Criteria of Superior Quality[3]	5. Learning Progressions	**Yes**	The lessons within and across each unit are organized to support learning through a natural progression. Students apply mathematical thinking when applicable.
	6. Scaffolding and Support	**Yes**	There are separate teacher support materials provided. Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is developmentally appropriate. Appropriate suggestions and materials are provided for differentiated instruction supporting

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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			varying student needs at the unit and lesson level.
	7. Usability	**Yes**	Text sets (when applicable), laboratory, and other scientific materials are readily accessible through vendor packaging. Materials help students build an understanding of standard operating procedures in a science laboratory and include safety guidelines, procedures, and equipment.
	8. Assessment	**Yes**	Multiple types of formative and summative assessments are embedded into content materials and assess the learning targets. Assessment items and tasks are structured on integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. Scoring guidelines and rubrics align to performance expectations and incorporate criteria that are specific, observable, and measurable.
FINAL DECISION FOR THIS MATERIAL: **Tier 1, Exemplifies quality**			

DEPARTMENT of EDUCATION
Louisiana Believes

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

FULL CURRICULUM
Instructional Materials

Strong science instruction requires that students:

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

Title: **OpenSciEd** Grade/Course: **8**

Publisher: **Kendall Hunt Publishing** Copyright: **2022**

Overall Rating: **Tier 1, Exemplifies quality**

Tier 1, Tier 2, Tier 3 **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 **engage students** in integrating the science and engineering practices (SEP), crosscutting concepts (CCC), and disciplinary core ideas (DCI) 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 the materials integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI) to support deeper learning. In the Rock Cycling and Plate Tectonics Unit, students develop knowledge to explain how mountain formations are the result of energy flowing and matter cycling within and among the planet's systems. In Lesson 2, students analyze data (SEP, Analyzing and Interpreting Data) using the Seismic Explorer to determine if there is a Pattern (CCC) with greater earthquake activity at mountains that are increasing in elevation (DCI, MS.ESS2A.b). In Lesson 5, students develop an argument based on evidence (SEP, Engaging in Argument from Evidence) about the Cause and Effect (CCC) relationship between plate movement and mountain movement (DCI, MS.ESS2A.b). Students look for Patterns (CCC) by examining GPS data (SEP, Analyzing and Interpreting Data) to determine land movement around Mt. Mitchell and use a physical model (SEP,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Developing and Using Models) to demonstrate that the entire North American plate moves at a constant speed and in a specific direction. (DCI, MS.ESS1C.c, MS.ESS2B.a). In the Chemical Reactions and Energy Unit, students engage in a variety of scientific practices to develop a heater to incubate turtle eggs. In Lesson 3, students investigate (SEP, Planning and Carrying Out Investigations) different reactants to determine which chemical reaction will increase temperature the most. After Analyzing and Interpreting Data (SEP) students create a model (SEP, Developing and Using Models) of the energy transfer during the chemical reaction (DCI, MS.PS1B.c, MS.PS1A.a; CCC, Energy and Matter, Scale, Proportion, Quantity). In Lesson 6, students use information gathered from previous lessons to redesign the flameless heater to better transfer energy from chemical processes to heat food. They develop models and prototypes (SEP, Developing and Using Models) using criteria and constraints then plan for design testing. This process culminates in Lesson 7, where students critique different designs of flameless heaters and determine the most promising design characteristics (SEP, Designing Solutions; CCC: Energy and Matter, Systems and System Models; DCI,MS.ETS1.C.a). In the Natural Selection and Common Ancestry Unit, students

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			engage in a variety of activities to explain changes of life forms throughout the history of life on Earth. In Lesson 4, students analyze fossil data from *Reference: Analyzing and Interpreting Fossil Data* then asked to share their interpretation of the data with their classmates. Students then compare penguin fossil body structure with today's variation of penguins and discuss why they believe these variations happened. (SEP: Mathematical and Computational Thinking, Analyzing and Interpreting Data; CCC: Scale, Proportion, and Quantity, DCI, MS.LS4A.a). In Lesson 5, students analyze data (SEP, Analyzing and Interpreting Data) from other organisms to look for Patterns (CCC) across fossils and modern organisms. They sort organisms by structures and by environments then work in groups to create a model that demonstrates the connections between the organisms. Students then share their models and record patterns that they noticed across organisms (SEP, Developing and Using Models, Analyzing and Interpreting Data; CCC, Patterns; DCI, MS.LS4A.a, MS.LS4A.b).
Non-negotiable **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions drive student learning.	**Required** **2a) Observing and explaining phenomena** and designing solutions provide the purpose and opportunity for students to engage in a coherent sequence of learning a majority of the time. Phenomena provide students with authentic opportunities to ask questions and define problems, as well as purpose to	**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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
☒ Yes ☐ No	incrementally build understanding through the lessons that follow.		define problems to motivate learning about the core ideas of the units, and this provides purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the phenomenon. Each unit starts with a big question about the phenomenon meant to be answered throughout the unit. In the Chemical Reactions and Energy Unit, students engage in several investigations to answer the question, “How can we use chemical reactions to design a solution to a problem?” The unit’s lessons are designed to build student’s knowledge about chemical reactions and heat production to develop sea turtle incubators. For example in Lesson 2, students investigate the question, “How do heaters get warm without a flame?” by revising an investigation to see how hot flameless heaters and hand warmers get and collect data to support the idea that a chemical reaction is happening when the devices heat up. This activity is followed by Lesson 3 where students engage in activities to answer the question “What other chemical reactions could we use to heat up food?” In Lessons 5-9 students design, evaluate, and redesign their homemade flameless heaters that will be used to answer the final question in Lesson 10, “How can we decide between competing designs?” Within this lesson, students develop a design for sea turtle incubators.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			In the Rock Cycling and Plate Tectonics Unit, students engage in several activities to answer the anchor phenomenon question, "What is causing Mt. Everest and other mountains to move, grow, or shrink?" As an introduction to the unit, students read about how Mt. Everest is getting taller and moving to the northeast over time. The students look at data of four other mountains and find out that they are also changing in elevation, with some shrinking. They develop an initial model, generate questions, a list of related phenomena, and information needed to figure out what is happening to these mountains. This motivates investigating the relationship between earthquakes and mountains in Lesson 2 by collecting data using a Seismic Explorer. In order to more deeply investigate the correlation of earthquakes and mountain locations in Lesson 3, students develop models and gather data about the structure and composition of materials at and below the surface of the earth. In Lessons 4-6, students further investigate what happens below the surface to develop an understanding of tectonic plates and why they could cause movement and elevation changes in mountains. Lesson 9 leads students to look back at the Driving Question Board based on the anchor phenomena and determine which questions have been answered and what they still need to find

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			out. They spend the next lessons exploring where plates and mountain ranges were located over the course of Earth's history. In Lessons 13 and 14, students work to answer a couple of lingering questions, "What causes mountains to shrink in elevation?" and "How is there an exposed marine fossil on Mt. Everest?" to successfully generate an explanation for the anchor phenomenon. In the Genetics Unit, students observe pictures of animals of the same species with very different musculature and ask questions about the extreme differences in the animals. The rest of the unit is designed to allow students the opportunity to answer the anchor phenomenon, "Why are living things different from one another?" In Lesson 4, students work on developing a consensus model about the structure of muscles and the cells that compose them to answer the question, "What is different about the food and exercise for cattle with extra-big muscles?" After the discussion of the muscle structure, students listen to an interview with a farmer who raises cattle with extra big muscles to tie the lesson back to the anchor phenomenon. In Lesson 5, students investigate the question, "Where do the babies with extra-big muscles get that trait variation?" Students develop a pedigree chart of cattle, predicting patterns of inheritance that determine the physical traits of the offspring.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	Required **2b)** Materials are designed to provide sufficient opportunities for students to **design and engage in investigations at a level appropriate to their grade band** to explain phenomena. This includes testing theories or models, generating data, and using reasoning and scientific ideas to provide evidence to support claims.	**Yes**	Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Material, when appropriate, allows for students to engage directly with experiments designed to discover the phenomena. The materials provide frequent opportunities for students to authentically engage with the Science and Engineering Practices by designing and conducting investigations around student-generated questions and analyzing data needed to support a claim or develop an explanation related to a phenomenon. In the Genetics Unit, students start off by identifying that animals have different traits by looking at animal muscles in Lesson 1 then model what they think is the cause of this difference. They then further explore this phenomenon by analyzing and interpreting data. In the Chemical Reactions and Energy Unit, Lesson 3, students use common materials such as baking soda, vinegar, root killer, cabbage juice, salt water, aluminum foil, steel wool, and Styrofoam cups to investigate exothermic reactions, seeking to determine the combination that generates the greatest amount of heat, to create a flameless heater model. In Lesson 4, they further explore this phenomenon by planning and conducting an investigation

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			to determine the most effective proportion of reactants.
	2c) Materials provide frequent opportunities for students to **make meaningful connections** to their own knowledge and experiences as well as those of their community during sense-making about the phenomena.	**Yes**	Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. Sense-making is crucial to the OpenSciEd framework and the flow of learning. The discovery of the phenomena gives students the ability to put different pieces together in lesson sets. By the end of the unit, those pieces make sense as a whole as students work towards explaining the phenomenon. In the Earth's Resources and Human Impact Unit, Lesson 1 introduces the anchoring phenomenon of droughts and flood events in different communities and the increasing occurrence of these phenomena in different areas as illustrated by news headlines from around the United States and teachers are encouraged to kick off this lesson with a connection to a "local water story" and there are suggestions for how they might do that. Later in the lesson, students add their personal "water stories" to a visual related to problems of "not enough water" and "too much water" in other communities. Students share and discuss their personal experiences and knowledge of similar events. In Lesson 2, students develop an Earth's Water System model which is revised throughout the unit to explore the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			relationships between temperature and precipitation. During this and other discussions in this lesson, prompts encourage students to make connections to where the water in their community comes from and temperature/precipitation relationships locally. In the last few lessons in the unit, students use a design matrix to evaluate different solutions to the problem behind the water issues and design a resilience plan for their local communities. In the Natural Hazards Unit, students start Lesson 1 with a video showing how a tsunami affected Japan. Later in this lesson, students consider local examples of natural hazards and their family's experiences and knowledge related to natural hazards. In Lessons 2-4, students learn about where tsunamis come from and how they impact coastal communities. In the next lesson set, 5-10, students learn how people detect tsunamis and how the community at large is warned. This leads to students discussing other natural hazards and how to better warn the public of them. The unit culminates with students analyzing patterns of hazards to determine the risk of each locally and plan communications about the risk of a chosen hazard.
Non-negotiable (only reviewed if Criteria 1 and 2 are met) **3. ALIGNMENT & ACCURACY:**	**Required** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the full **depth of the standards**.	**Yes**	The majority (14 out of 19) of the Louisiana Student Standards for Science are incorporated to the full depth of the standards (LSSS). The majority Grade 8

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
Materials adequately address the [Louisiana Student Standards for Science](). ☒ Yes ☐ No			LSSS are addressed to the full depth. The following standards are not fully addressed in the materials: LSSS 8-MS-PS 1-1, 8-MS-PS1-3, 8-MS-LS 1-4, 8-MS-ESS 3-1, 8-MS-ESS3-3. While some Disciplinary Cores Ideas (DCIs) from the standards listed are not integrated into the materials, identified Science and Engineering Practices (SEPs) and Crosscutting Concepts (CCCs) are often integrated and explored throughout multiple units. For LSSS 8-MS-PS 1-1, DCI MS.PS1A.e is not addressed. Developing and using models is supported in practice in several units, Chemical Reactions and Energy, Rock Cycling and Plate Tectonics, Genetics. Scale, Proportion and Quantity is deeply integrated into the Chemical Reactions and Energy Unit. For LSSS 8-MS-PS1-3, DCI MS.PS1A.b is not addressed. Obtaining, evaluating, and communicating information is partially supported in practice by all units. Credibility and bias of information obtained is not addressed. Structure and Function is deeply integrated in the Genetics Unit. For LSS 8-MS-LS1-4, DCI MS.ESS1C.b is not addressed. Constructing explanations and designing solutions is supported in practice by several units: Rock Cycling and Plate Tectonics, Natural resources and Human impact, Genetics, and Natural Selection. Patterns are integrated in all units. For LSS 8-MS-ESS3-1, DCI MS.ESS3A.a is partially addressed focusing

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			only on water and air components, and DCI MS.EVS1A.b is not addressed. Constructing explanations and designing solutions is supported in practice by several units, including: Rock Cycling and Plate Tectonics, Natural resources and Human impact, Genetics, Natural Selection. Cause and Effect is deeply integrated into several units including: Rock Cycling and Plate Tectonics, Natural resources and Human impact, Genetics, and Natural Selection. For LSS 8-MS-ESS3-3 DCI's MS.ESS3C.a, MS.ESS3C.b, and ETS.MS.1B.a are partially addressed focusing only on the Carbon Cycle. Constructing explanations and designing solutions is supported in practice by several units, including: Rock Cycling and Plate Tectonics, Natural resources and Human impact, Genetics, Natural Selection. Cause and Effect is deeply integrated into several units, including Rock Cycling and Plate Tectonics, Natural resources and Human impact, Genetics, and Natural Selection.
	Required **3b)** The total amount of content is **viable** for a school year.	**Yes**	The total amount of content is viable for a school year. The six units combined include 155 days of instruction. Every unit contains a section in Teacher Background Knowledge that outlines extension opportunities within lessons.
	Required **3c)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Yes**	All reviewed content is accurate, up-to-date and aligned with the most current and widely accepted explanations. No evidence of incorrect or out of date

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			science explanations could be found. Science content is up to date and based on current science educational practices. Students engage in problem-solving, evidence-based arguments, engineering practices, and hands-on learning activities to stimulate high-order thinking. By discovering scientific principles, students have greater ownership of their learning and lessons are geared to supporting learners with multiple modalities. In the Natural Selection and Ancestry Unit, Lesson 1, students watch live feeds of animals and analyze the behavior, structure, and environment of organisms. In the Student Edition, students have access to data from scientists, who are in the top of their field, such as Dr. Sara Bertelli and Sr. Ali Altimanaro. In the Rock Cycle and Plate Tectonics Unit, students use a Seismic Explorer with the most current data throughout the unit. In the Natural Resources and Human Impact Unit, Lesson 1, students read headlines about Flooding and Droughts occurring in the United States. Two examples of Headlines came from the Milwaukee Journal Sentinel, 2020, and ABC, 2019.
	3d) 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 grade or grade-band. Time spent on material outside of the grade serves to maintain coherence in relation to the phenomenon or to build upon previous knowledge. For instance, in Natural Hazards, the Teacher

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			Edition provides information students should bring from Grade 4 and revisit in the 6-8 grade band. The Teacher Edition includes the Scope and Sequence for the two previous grade levels which provides teachers with the opportunity to know what content students should have and how teachers are to implement content when there are student learning gaps. In the Chemical Reactions and Energy Unit, Lesson 2 and Lesson 12 spend time reviewing content from the Grade 7 Cup Design Unit containing information on average kinetic energy of molecules. In the Natural Hazards Unit, for students to understand how Tsunamis develop and move, students revisit wave properties taught in the Grade 6 Sound Unit.
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 primary source documents, photographs, and authentic data sets. In the Rock Cycling and Plate Tectonics Unit, Lesson 2, students watch videos of a Mt. Everest eruption and a Ridgecrest, CA Earthquake to predict causes for the disasters. Then students use the Seismic Explorer, either confirming or denying their initial predictions of the earthquake locations based upon the presence of potential mountains and ranges. In the Genetics Unit, Lesson 9, students read two

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			interviews from real farmers and an article titled “Raising Heavily Muscled Cattle to Reduce Environmental Impacts of Cattle” to explore the idea of selective breeding in cattle. Students explore a simulation that controls bird breeding in order to create individuals with selected-for trait variations. In the Natural Selection Unit, Lesson 2, students analyze trait variation data from two resources: “Fossil evidence for evolution of the shape and color of penguin feather” and “Paleogene equatorial penguins challenge the proposed relationship between biogeography, diversity, and Cenozoic climate change,” *Proceedings of the National Academy of Sciences*.
	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. In all units, students regularly engage in Driving Question Boards, allowing all students to provide questions about real-world phenomena that help guide their learning experience. Materials address the necessity of using scientific evidence to support ideas. Students regularly engage in productive science talk to generate driving questions, build understanding, and come to a consensus. They also present and revise designs, gather evidence from multiple sources, and explain findings. Students turn and talk

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			with peers regularly and such activities are clearly marked in the materials. For example, in the Rock Cycling and Plate Tectonics Unit, Lesson 2, Day 1, students make predictions and discuss evidence to support whether earthquakes caused Mt. Everest to increase in height or change locations. Then, students make claims and gather evidence from observations on whether earthquakes can make changes to mountains. In the Natural Hazards Unit, Lesson 1, students are introduced to the anchor phenomena by reading about and watching the 2011 tsunami triggered by an earthquake off the eastern coast of Japan, causing devastating loss of life and structural damage. Students develop initial engineering ideas intended to detect tsunamis, provide warning of their approach, and reduce their impact. Students think about what makes some engineering ideas more promising or challenging than others. Students then brainstorm and share with peers other related natural hazards and ask questions to generate a list of data and information needed to better understand where these hazards occur and how people can prepare for them.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	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. Within each unit, students produce and revise models of the anchoring phenomenon. Across the materials, students regularly engage in a variety of tasks, such as labs, making observations from videos, reading headlines or articles, and science simulations. In the Rock Cycle and Plate Tectonics Unit, Lesson 1, students create an initial model to explain the reasons for changes in height and location of Mt. Everest. This model is revised throughout the unit. In Lesson 3, students investigate rocks to determine their properties. In Lesson 4, students use a Seismic Explorer, which is periodically used to locate earthquakes around the world. In Lesson 6, students create physical models to demonstrate how plates move. In the Chemical Reactions and Energy Unit, Lesson 2, students revise an investigation to see how hot flameless heaters and hand warmers get. Students collect data to support the idea that a chemical reaction is happening when the devices heat up. Students research different ingredients and observe changes in the substances as they warm up to confirm new substances are produced. Students then model energy transfer in the MRE using their evidence. In Natural Hazards, Lesson 2, students analyze the data on ArcGIS Story Map to determine patterns of where tsunami occurs. Once patterns are

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			determined in Lesson 3, students watch videos and simulation models to make observations of what happens to water during a tsunami. In Lesson 8, students engage in a close reading protocol to gather information about warning signals for a tsunami. Lastly, at the end of the unit, students design a community risk assessment for a natural disaster.
	Required **4d)** Materials provide a coherent sequence of learning experiences 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. This is done through building a word wall with words the kids earn or encounter or words that are reinforced. The materials include a Guidance for Developing your Word Wall in each teacher's section. In the Rock Cycling and Plate Tectonics Unit, Overview Materials, an explanation is provided about how to introduce vocabulary words and the difference between earned and encountered words. The materials outline which lessons students encounter and earn words. For example, in Lesson 1, students learn the vocabulary words magnitude and earthquake. In Lesson 2, students encounter the vocabulary words, earthquake depth, epicenter, causation, and correlation. In the Natural Hazards Unit, Lesson 3, students use a NOAA

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			model utilizing the words amplitude and epicenter. Although these are words from a previous year, students add the words to their word wall during the lesson discussion. In the Chemical Reactions and Energy Unit, Lesson 3, Day 2, students add the words exothermic and endothermic to the word wall but only after they have already observed and developed a model for an exothermic reaction.
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 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 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 teacher guidance documents begin with the Unit Overview and Storyline. Through this Storyline, it is evident that student-driven investigations and discovery through asking questions drive how students develop science concepts through the unit. It clearly outlines what the students will figure out and how they will represent what they learned. Students use all of the three dimensions throughout the lessons and lesson sets. A section of background knowledge provides guidance if units are taught out of sequence and what prior knowledge students might be building on.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			This supports student mastery of the Performance Expectations and provides a coherent sequence. In the Natural Hazards Unit, students explore the anchor phenomena and ways to lessen the effects of natural hazards by detecting when they are happening, warning people, and designing solutions to reduce damage. Students then design an initial solution. Throughout the lessons, students use maps, graphs, physical models, videos, and simulation to identify the causal reasons for where and how tsunamis form, move, and what happens as the tsunami reaches shore. Students then work to identify criteria and constraints across different aspects of a hazard response system, including structural design solutions to reduce damage, technologies to detect and send warning signals and communication, and communication and education plans that target stakeholders in the communities that will be impacted by a natural hazard. Students use a systematic process to evaluate different design solutions, technologies, and communication options, including how reliable types of signals are for warning people and protecting communities. In the Chemical Reactions and Energy Unit, lessons are designed to build students' knowledge about chemical reactions and heat production to develop sea turtle incubators. In Lesson 1, students develop an initial model to consider how

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			the flameless heater in an MRE works. In Lessons 2 and 3, students learn how hot flameless heaters and hand warmers can get and collect data to support the idea that a chemical reaction happens when the devices heat up. During the rest of the unit students design, evaluate, and redesign their homemade flameless heaters. In the final lessons, students apply the knowledge gained throughout the unit to design sea turtle incubators. The first half of the unit works to help students gather evidence and record it on their model and progress tracker that they use to construct an explanation and design solutions and engage in argument from Evident in the second half of the unit.
	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. Across the majority of the materials, students are not introduced to math skills that go beyond the Louisiana Student Standards for Mathematics (LSSM) for Grade 8. Students are regularly called to apply mathematics skills and understanding to engage in Using Mathematics and Computational Thinking (SEP) appropriately in the context of their learning. In the Chemical Reactions and Energy Unit, students use a variety of math skills to analyze data and build models. In Lesson 3, students calculate the maximum temperature change for three different amounts of reactants. They report this change in temperature using positive and negative numbers to show

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			the increase or decrease from the starting temperature. (LSSM 6.NS.C.5). In Lesson 4, students determine the relative proportion of each reactant that showed the optimal temperature change by calculating the percentage of each reactant. (LSSM 6.RP.A.3c) In Lesson 6 and Lesson 9, students scale up the amount of reactants to use in their homemade heaters but maintain the same proportion of reactants they found to be most efficient in previous testing (LSSM 6.RP.A.3). In the Natural Resources and Human Impact Unit, students engage in mathematical thinking, rate and ratio reasoning, and encounter many histograms, line graphs, and scatter plots. In Lesson 7, students practice writing one gas as a fraction using a parts per million measurement, and then students share how they would turn the fraction into a percent (LSSM 6.RP.A.1, 6.RP.A.3). In Lessons 9 and 10, students analyze graphs to determine carbon dioxide levels in the atmosphere. Students then annotate the graph on *Examining Data Over Time* to show human activities that have led to changes in the types of energy sources that people used over time. In Genetics, Lesson 8, students read Student Support for Probability Work so they can use mathematical thinking to simplify their predictions about the probabilities of the genotypes of the offspring of two parents. After the students read, they use either a

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Punnett square or probability calculations to make predictions about specific crosses (LSSM 7.SP.C.5, 7.SP.C.6, 7.SP.C.7, 7.RP.A.2, 5.NF.B.4).
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). Support also includes teacher guidance in the materials' **approach to phenomenon based instruction** and provides explicit guidance on how the materials address, build, and **integrate the three dimensions**.	**Yes**	There are separate teacher support materials provided. Support materials include an extensive teacher edition with a Unit Overview and Storyline, a Teacher Background section (scientific background and the Disciplinary Core Ideas for the unit), 3-D strategies sections that detail techniques to further support the development of SEP's, DCI's, and CCC's, and an Assessment System Overview. The teacher handbook breaks down how all of the instruction flows for each unit. Each unit in the teacher edition has a step-by-step flow from lesson to lesson and gives support, teacher prompts, possible student responses, class discussions, and questions. Each lesson includes a detailed learning plan as well as a section that clarifies where the lesson is going and the next lesson overview. The materials include step-by-step PowerPoints for each lesson that also help the class keep track of learning. The teacher edition includes a Unit Overview containing what students will learn through the investigation process and Performance Expectations addressed by the unit. The Unit Storyline includes the Lesson Number and Question, Phenomena, Major Lesson Points, and how they will be represented. Consistent images show how students will engage

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			with the phenomena. The Teacher Background Knowledge sections include information about Lab Safety Requirements, Anchor Phenomenon information, NGSS Dimensions developed in context, Unit structure, Where the unit is within the OpenSciEd Scope and Sequence, Prior students' knowledge, and Mathematics required.
	Required **6b)** Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is **developmentally appropriate**.	**Yes**	Teacher support materials include guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is developmentally appropriate. Support materials a 3D Strategies section that details explicit techniques for highlighting SEPs, DCIs, and CCCs further. There are also teacher reference sheets with additional information and pictures of how investigations should look. Each unit has a section that outlines how each SEP and CCC develops throughout the unit. The units also have posters and handouts for communicating in science, classroom norms, and discussion skills to support students with sensemaking about phenomena and demonstrating scientific knowledge and skills. In the Genetics Unit, the storyline provides a short overview of the unit including a bullet list of what students will learn through the course of their investigations. There is also information about standards addressed by the unit, teacher background knowledge

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			with lab safety guidelines, information on the anchor phenomenon, and the structure of the unit. In the Earth's Resources and Human Impact Unit, The Middle School Program Overview contains additional links to multiple teacher resources, such as illustrations and explanations of how to use the materials in the lessons to guide the students in the development of understanding of scientific concepts. In the Natural Selection Unit, the Unit Storyline provides a short overview of the unit as well as NGSS dimensions developed in the unit, common student ideas, ways to modify the unit if it is taught out of sequence from other units, and ways to shorten or lengthen the unit.
	Required **6c)** Support for **English Learners and diverse learners** is provided. Appropriate suggestions and materials are provided for **supporting varying student needs** at the unit and lesson level. The language in which questions and problems are posed is not an obstacle to understanding the content, and if it is, additional supports are included (e.g., alternative teacher approaches, pacing and instructional delivery options, strategies or suggestions for supporting access to text and/or content, suggestions for modifications, suggestions for vocabulary acquisition , etc.).	**Yes**	Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. Each Unit Overview provides a pacing guide that provides a teacher an opportunity to include key points for students who need additional experiences and time developing core ideas of the unit. Each Unit Overview also includes a Phenomenon Relevance Note that includes alternatives as well as suggestions for modifying the anchoring phenomenon to make it more accessible and/or locally and culturally relevant for students, if needed. The OpenSciEd Teacher Handbook provides teachers with OpenSciEd's design to promote equitable

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			access to high-quality science learning experiences for all students by focusing on relevance to students and collaborative sensemaking central so that all students are involved in the learning process. The materials utilize universal design for learning principles in order to meet the needs of all learners and emphasizes classroom culture and norms. The materials also provide a Spanish Student Edition for each unit. Each unit contains teacher guides that have support and guidance assistance in sidebar callout boxes titled, “Attending to Equity,” and subheadings, such as “Supporting Emerging Multilingual Learners” or “Supporting Universal Design for Learning.” Other callout boxes with strategies include Additional Guidance, Alternate Activity, and Key Ideas, and other various discussion callouts. For example, in the Tsunami Unit, Lesson 2, the Additional Teacher Guidance provides teachers with sentence starters which helps students express what they see. The Supporting Emerging Multilingual sidebar guides teachers into intentionally grouping emerging multilingual students with certain peers who know the same languages or with peers whose English language development is slightly more advanced.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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 information needed for activities are readily available. The teacher portal section of the website allows for teachers to see student and teacher books, and provides access to all the student worksheets and slides for each lesson. Kits are made for each unit, and materials list provide what is needed for investigations. For example, in the Rock Cycling and Plate Tectonics Unit, each lesson includes the materials needed listed per student, per group, and per class, as well as a description of the activity preparation. This information is found on the lesson set up under the Plan tab. In the Chemical Reactions and Energy Unit, Teachers Edition, Lesson 3, a materials list for student investigation per student, per group, and per class is provided. Teachers are also provided with a materials preparation time of 90 minutes.
	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**	Materials help students build an understanding of standard operating procedures in a science laboratory and include safety guidelines, procedures, and equipment. The materials provide ways for students to be exposed to the safety rules. The safety procedures can be found in the teacher edition, student edition, and within the lesson slides. Safety is part of every investigation. In the Rock Cycling and Plate Tectonics Unit, Unit Overview,

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			the Teacher Background information provides lab safety requirements. For example, in the Chemical Reactions and Energy Unit, Teacher Portal, Quick Launch, Learning Plan Day One, and Safety Data Sheet, a safety protocol list for students is provided. Specific safety precautions are marked with yellow caution signs in the teacher call-out box on the side. In Lesson 6, Day 2, students use the How-To Instructions Must-Haves to craft a set of instructions for their flameless heater. In Lesson 9, Day 2, safety precautions for testing the students' prototypes are embedded in the materials. At the end of the lesson, students follow instructions on safely cleaning up after the investigation.
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 content materials and assess the learning targets. The materials provide teachers with many options to assess student learning progress, which are included in every lesson in every unit. Each Unit Overview provides an Assessment Overview that outlines the many opportunities for different types of assessments throughout the lessons, including pre-assessment, formative assessment, summative assessment, and student self-assessment. Formative assessments are embedded and called out directly in the lesson plans. Examples of these opportunities include student handouts, home learning assignments,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			progress trackers, exit tickets, or student discussions. Towards the end of each unit, students take a summative assessment in which they apply the concepts that they have learned throughout the unit. Furthermore, the investigations allow the students to carry out performance-based tasks. In the Chemical Reactions and Energy Unit, Lesson 3, Assessment Opportunity, a formative assessment check focuses on energy transfer between parts of a system. Lab handouts from the lesson's investigation can be utilized as a formative assessment. In Lesson 6, an Exit Ticket builds on what students learned in Lesson 3. Students map the idea for their specific design solution to the Energy Transfer Model. In Lesson 10, students have an opportunity to demonstrate an understanding on a summative assessment transfer task about sea turtle incubators. In Natural Selection and Ancestry, the Teacher Overview Materials include examples of unit assessments. In Lesson 13, students use their general model for natural selection to construct a scientific explanation of how modern penguins are connected by a common ancestry. Lesson 11 includes a summative assessment of their choice (oral presentation, written response, pictorial response) where students can use their general model for natural selection to explain a new phenomenon.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	Required **8b)** Assessment items and tasks are structured on integration of the **three dimensions** and include opportunities to engage students in applying understanding to new contexts.	**Yes**	Assessment items and tasks are structured on integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. At least one Lesson-Level Performance Expectation (LLPE) is included within each lesson of the units which are three-dimensionally structured to include the SEP, DCI, and CCC. The Unit assessments of each unit integrate SEPs in assessments as students use data, construct explanations, and develop models to address the anchor phenomena. The SEPs, DCIs, and CCCs are color-coded to readily identify their alignment to the assessments used with each lesson. In Genetics, Teacher Edition, Lesson 10, students complete a transfer task where students create a model (SEP, Developing and Using Models) to explain the Cause and Effect (CCC) relationship that leads to trait variation from the parent's genotypes to the offspring's phenotype using goldfish (DCI, MS.LS3A.a). In Natural Hazards, Lesson 4, a formative assessment assesses students' ability to construct an explanation (SEP, Constructing Explanations and Designing Solutions) that describes how sudden geologic forces in the ocean floor can cause a tsunami (CCC, Stability and Change; DCI, MS.ESS2C.e), how different communities may be at varying risk of damage, and which communities should be prioritized for tsunami mitigation

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			resources. In Lessons 9 and 10, the summative assessment for the unit challenges students to first investigate general regional Patterns (CCC) in risk for other natural hazards by exploring large sets of data (SEP, Analyzing and Interpreting Data), as well as the risk of each natural hazard for their local community (DCI, MS-8-ESS3-2).
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Yes**	Scoring guidelines and rubrics align to performance expectations, and incorporate criteria that are specific, observable, and measurable. The rubrics provided are in the teacher reference section and go through step-by-step for answers students might give and what demonstrates mastery. Graded and non-graded assessments are included as well as samples of models students construct. There are also rubrics for teacher and peer feedback. In Natural Hazards, Lesson 9, answer keys/rubrics are provided for the unit assessment for developing a tsunami system model. Students evaluate their models using the Engineering Self-Assess, using information from the Engineering Self-Assessment and Peer Feedback Guidelines. In the Genetics Unit, the answer key/rubric provided for the formative assessment in Lesson 7, Revise Your Model, is used to determine student's knowledge of how an animal's genotype can influence its phenotype of musculature. For Lesson 10, students use a Checklist for obtaining and evaluating

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			information from Scientific Text that will be used for a transfer task on goldfish genetics. Answer keys/rubrics are provided for both the checklist and assessment.

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**	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.
	2. Phenomenon-Based Instruction	**Yes**	Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as

[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
			those of their community during sense-making about the phenomena.
	3. Alignment & Accuracy	**Yes**	The majority (18 out of 19) of the Louisiana Student Standards for Science are incorporated to the full depth of the standards. The total amount of content is viable for a school year. All reviewed content is accurate, up-to-date, and aligned with the most current and widely accepted explanations. Instructional materials spend minimal time on content outside of the course, grade, or grade-band.
	4. Disciplinary Literacy	**Yes**	Students regularly engage with authentic sources that represent the language and style used and produced by scientists. Students regularly engage in speaking and writing about scientific phenomena and engineering solutions using authentic sources. There is variability in the tasks that students are required to execute. The materials provide a coherent sequence of authentic science sources that build scientific vocabulary and knowledge over the course of study.
II: Additional Criteria of Superior Quality[3]	5. Learning Progressions	**Yes**	The lessons within and across each unit are organized to support learning through a natural progression. Students apply mathematical thinking when applicable.
	6. Scaffolding and Support	**Yes**	There are separate teacher support materials provided. Teacher support materials include guidance to ensure that students experience phenomena, design

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

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			solutions, and apply scientific knowledge and skills in such a way that is developmentally appropriate. Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level.
	7. Usability	**Yes**	Text sets (when applicable), laboratory, and other scientific materials are readily accessible through vendor packaging. Materials help students build an understanding of standard operating procedures in a science laboratory and include safety guidelines, procedures, and equipment.
	8. Assessment	**Yes**	Multiple types of formative and summative assessments are embedded into content materials and assess the learning targets. Assessment items and tasks are structured on integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. Scoring guidelines and rubrics align to performance expectations and incorporate criteria that are specific, observable, and measurable.

FINAL DECISION FOR THIS MATERIAL: **Tier 1, Exemplifies quality**

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

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

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

The 2022-2023 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: A.E. Phillips, Ascension, Belle Chasse Academy, Bienville, Caddo, Calcasieu, Catholic Diocese of Baton Rouge -REACH Department, East Baton Rouge, Hynes Charter School Corporation, Iberia, Iberville, Jefferson, KIPP New Orleans, Lafayette, Lafourche, Lincoln, Louisiana Virtual Charter Academy, LSU Laboratory School, Orleans, Monroe City Schools, Morehouse, Orleans, Ouachita, Plaquemines, Rapides, Richland, St. Landry, St. Martin, St. Mary, St. Tammany, Tangipahoa, University View Academy, Vermillion, Webster, West Feliciana, and Zachary Community Schools. This review represents the work of current classroom teachers with experience in grades 6-12.

Appendix I.

Publisher Response

The publisher had no response.

Appendix II.

Public Comments

There were no public comments submitted.