LOUISIANA DEPARTMENT OF EDUCATION

Academic Content

Instructional Materials Evaluation Tool

(IMET) for Alignment in Science Grades K-12 Full Curriculum

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: **BSCS Biology: Understanding for Life**

Grade/Course: **Biology**

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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 and 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 light orange. 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 Unit 1, Chapter 1, Lesson 3, students investigate bacterial growth through a simulation and look at data and graphs of bacterial growth. Students engage in Analyzing and Interpreting Data (SEP) as they examine the growth of actual bacterial colonies and then compare what they observed to what happens in a simulated population with uncontrolled growth to learn about carrying capacities (DCI, HS.LS2A.a). During this activity, they engage in Using Mathematics and Computational Thinking (SEP) to create graphs of the population's growth and discuss where they see the least and greatest growth. They then make predictions about how changes to the environmental conditions would affect population growth as they broaden their understanding of the interaction of Systems and System Models (CCC, Systems and System Models). In Unit 2, Chapter 4, Lesson 4, students engage in Asking Questions and

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			Defining Problems (SEP). At the beginning of the lesson, students reflect on what they have learned in previous lessons especially as it relates to the relationship between amino acid sequence and protein structures. Then, they expand that line of thought to consider what causes some people to have heart disease while others do not (CCC, Cause and Effect: Mechanism and Prediction). Through a class discussion, they develop a question to guide their investigation into what causes proteins to have different amino acid sequences. Later in the lesson, students use DNA models (SEP, Developing and Using Models) to determine how DNA codes for proteins which in turn determines traits (DCI, HS.LS1A.c). Students also explore how changes in DNA sequences code for different amino acid sequences, which can cause proteins to function differently. At the end of the lesson, students developed the idea that changes to the structure of DNA are mutations that change protein functions (CCC, Structure and Function, Stability and Change; DCI, HS.LS3B.b). In Chapter 6, Lesson 13, students in groups read abstracts from published articles to obtain information (SEP, Obtaining, Evaluating, and Communicating Information) on various environmental factors that could affect heart diseases (DCI, LS3B.c). The groups then share their findings with each other to attempt to determine if there is a causal or corollary relationship (CCC, Cause and Effect) between environmental factors and heart disease. In Unit 4, Chapter 10, Lesson

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			3, students consider the changes in populations of coyotes and wolves in the U.S. by reading about and discussing the differences in the way each species interacts with other members of its own species and with other species. They consider how these interactions affect other species in the ecosystem (CCC, Systems and System Models). They then create a mathematical model to predict the population growth of coyotes over several generations (SEP, Using Mathematics and Computational Thinking) based on these differences and whether this model would hold up over many generations eventually applying the concept of limiting factors and carrying capacity (CCC: Stability and Change) to help them understand the relationships and dependencies within ecosystems (DCI, HS.LS2C.a). Later, in Unit 4, Chapter 11, Lesson 8, students investigate (SEP, Planning and Carrying out Investigations) the changes in allele frequency within populations under different conditions through simulations to explore how sources of variation affect the genetic variation in a population (DCI, HS.LS4B.b). They also consider the advantages and disadvantages of the model. One advantage is that it allows students to study changes in the gene pool that would happen too slowly for them to study otherwise (CCC, Scale, Proportion, and Quantity). Students then compare their population models to real populations such as the tuskless elephants, which were previously

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			explored in Lesson 7.
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. The materials provide appropriately complex phenomena in the form of common experiences at the beginning of each unit that spark student questions and motivate learning about the core ideas of the unit. They provide a purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the phenomenon. Students are not able to progress through the learning material without engaging with the phenomenon. Each unit begins with an anchoring phenomenon lesson to spark student interest and provide the purpose for the following investigative lessons in which they explore current connections to the phenomenon, engage in investigations, gather evidence, develop explanations or design solutions, engage in argument, and generate new ideas all for the purpose of sensemaking around the anchoring phenomenon. Students engage in Synthesizing Lessons when the class has figured out several science ideas that help explain the phenomenon. During these lessons, students come to a consensus, make connections between ideas, and use developed science concepts to receive their initial explanations and/or models or to revise solutions to problems. During the Culminating Task Lesson,

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			students used their revised models, explanations, or solutions to explain a relevant phenomenon or propose a solution to a relevant problem. For example, Unit 1, Chapter 1, Lesson 1 begins with an anchoring phenomenon about Zach, a boy experiencing knee pain that turns into a major medical issue. After watching a video about a teenager who gets a life-threatening MRSA infection, students record what they notice and wonder about the boy's story. Students then use the questions this generates to create a class Driving Question Board. At the end of the lesson, students create a model of Zach's body over time to show how and why he got so sick. In Chapter 2, Lesson 7, students continue to refer back to the questions they asked in Lesson 1 and use them as a springboard to investigate body temperature data as an indication of health as they learn about feedback mechanisms and homeostasis. In this lesson, students graph data taken from a study of average body temperature for a group of people as well as the body temperature from one person over the course of a 24-hour period to help them draw conclusions about variations in normal body temperature and when the variations are outside of the normal range which they compare to the details from the sick teenager's story, the anchor phenomenon. By the end of Chapter 2, students develop an understanding that the body responds to bacterial infections by an increased immune response. Students reflect on the Driving

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			Question Board and update the Class Consensus Model that explains the body's response to bacterial infection. In addition, students also figure out that some infections can be life-threatening if the body can not effectively respond to the bacteria population. This idea leads to Chapter 3 in which students determine why antibiotics are not working as well as they used to. Throughout the chapter, students engage in investigations and develop models to represent and determine how antibiotics work, why antibiotics sometimes do not work, how antibiotic-resistant bacteria become more common over time, and how to explain the increasing incidence of antibiotic-resistant infections. In Lesson 15, students reflect on the Driving Question Board and consider how the bacteria that infected Zack came to be antibiotic-resistant. Students work together to revise their Class Model Consensus to explain how some populations of bacteria have become antibiotic-resistant. During the Culminating Task in Lesson 16, students determine what they can do to contribute to "antibiotic stewardship" to promote the idea that antibiotics should be used "sparingly and responsibly." In Unit 4, Chapter 10, students observe and analyze a series of headlines and consider whether they think that species loss is a natural trend or if something else might be happening. Students discuss notices and wonders and use this information to develop questions about the phenomenon which leads students to investigate what has happened to

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			different species throughout time. Students develop an initial model to explain why so many species are declining while so few are expanding. Students then work as a class to develop an initial Class Consensus Model by finding patterns of individual ideas. Throughout the chapter, students explore various factors that could affect a species' population, such as removing the top predator, human-caused habitat conversion, and environmental changes. Then, in Chapter 11, students investigate why scientists are concerned about experiencing a 6th mass extinction. They explore the evidence and factors contributing to this phenomenon and through this examination come to understand the significant ecological and environmental impacts of mass extinctions and the importance of biodiversity conservation. Specifically, in Lesson 8, students begin by testing their models from the simulations to see if they accurately explain real populations. They revisit the case studies from Lesson 7, with one or two assigned by the teacher for closer examination. As they discuss their assigned scenarios, they evaluate whether any additional updates are needed to their models to better align with the observed outcomes and collaborate with a partner to assess how well their models accounted for the events in their case study, identify any possible modifications, and explore any new questions or uncertainties that have emerged. The phenomenon of the 6th mass extinction drives student learning by

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			emphasizing the urgency of biodiversity loss and its far-reaching impacts, encouraging students to engage deeply with ecological and environmental issues.
	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. Students are given opportunities to explain phenomena by participating in activities that build their ability to engage in science practices. In Unit 1, Chapter 2, Lesson 8, students engage in Constructing Explanations and Designing Solutions (SEP) regarding the changes in the human body during an immune response. In this lesson, they work together as a class to use an Argument Tool to help them support their argument with evidence. Later in Unit 1, Chapter 2, Lesson 10, students use the same Argument Tool individually to support an explanation for how failure to follow up on medical test results could result in poor patient outcomes. In Unit 2, Chapter 6, Lesson 16, students think about what environmental factors they can control in order to prevent disease. Later in the lesson, they brainstorm ideas to create an environment that promotes health and then provide peer feedback to other groups on their designs. This builds on the middle school SEP of designing solutions by incorporating a design for a complex, real-world problem based on scientific knowledge, student-generated sources of evidence,

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			prioritized criteria, and tradeoff considerations. Students also evaluate other students' solutions as well as refine their own based on the feedback they receive. In Unit 4, Chapter 12, Lesson 15, students begin by reviewing the Driving Questions Board and identifying questions that have been answered and those that still need exploration. This reflective activity encourages them to engage critically with their prior learning and consider how their investigations connect to larger ecological themes. In this activity, students collaboratively discuss what needs to be included in their explanatory model of biodiversity's effects on ecosystems, articulating their understanding and collaboratively building a framework that captures complex interactions, demonstrating their ability to reason scientifically. Later, students read and analyze case studies about conservation trade-offs (e.g., condor conservation and spotted owl management). By comparing the cases, they engage in critical thinking about ecological management decisions and the trade-offs involved. This activity requires them to synthesize information and apply it to real-world scenarios, reinforcing their understanding of how changes in biodiversity impact ecosystems and the difficult decisions that must be made.
	2c) Materials provide frequent opportunities for students to **make meaningful connections** to	**Yes**	Materials provide frequent opportunities for students to make meaningful connections to

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	their own knowledge and experiences as well as those of their community during sense-making about the phenomena.		their own knowledge and experiences as well as those of their community during sense-making about the phenomena. The materials foster connections between students' personal experiences and larger ecological and community concepts. By engaging in collaborative activities and discussions, students deepen their understanding of how human activities impact ecosystem health and local food systems. These opportunities for reflection enable students to apply their own knowledge and community contexts to evaluate and design solutions, enhancing their engagement and critical thinking. In Unit 1, Chapter 1, Lesson 1, students think about and discuss personal experiences with illness and, later, reflect back on this in Unit 1, Chapter 2, Lesson 7. In Unit 2, Chapter 6, Lesson 16, students reflect on their own health and that of their communities. They look at the barriers people experience as they try to make healthy choices and apply what they have learned to develop a plan for improving their environment so that it better supports the community's health. In this activity, they reflect on their own lives and choices as well as the environment in which they live and consider how the decisions on behalf of the community can affect the well-being of those who live in it. In Unit 3, Chapter 7, Lesson 2, students consider what happens to food when we eat it. This investigative phenomenon is relatable to the students' everyday life. In Lesson 3, students learn how matter from food

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			becomes part of their body. Again, the investigative phenomenon makes meaningful connections to students' own knowledge and experiences. Students also read an article about how the body breaks down, absorbs, and uses protein which includes a section about the ways different cultures obtain protein from their traditional diets. In Unit 4, Chapter 12, Lesson 14 students reflect on their previous learning about different perspectives driving actions, encouraging them to connect their personal viewpoints to their scientific investigations. This supports a broader understanding of how individual actions can impact ecosystems. Throughout the lesson, students engage in Turn and Talk activities where they discuss how changes in human behavior can mitigate negative impacts on ecosystems. This dialogue helps them connect classroom learning with real-world applications, reinforcing the relevance of scientific concepts to their lives. By analyzing case studies on Marine Protected Areas and Salmon-safe Dams, students relate real-world examples of human impact on ecosystems to their own experiences. This not only contextualizes the information but also emphasizes the importance of community engagement in environmental stewardship.
Non-Negotiable **3. ALIGNMENT AND ACCURACY:**	**Required** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the **full depth of the standards**.	**Yes**	The materials effectively integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI), ensuring that students engage with

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Materials adequately address the Louisiana Student Standards for Science. ☒ Yes ☐ No			scientific content in a meaningful and comprehensive way. The majority, 14 out of 20 (70%), of the Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards while 6 standards are partially addressed. When each part of the Performance Expectation is assessed individually, only 8 of the 47 (12%) DCIs are not fully addressed. Of these DCIs, 6 (12%) are partially addressed and 2 (4%) are not addressed. All eight (100%) of the Science and Engineering Practices are fully addressed as are all seven (100%) Cross Cutting Concepts. Standards only partially addressed include the following: LSSS HS-LS1-3, HS-LS1-4, HS-LS1-8, HS-LS2-4, HS-LS3-1, HS-LS4-4. For HS-LS1-3, the SEP (Planning and Conducting Investigations) is not addressed in connection with the DCIs and CCC of the standard, but it is addressed elsewhere in the materials. For example, students learn that feedback mechanisms maintain a living system's internal conditions but they do not plan or conduct an investigation to provide evidence for those feedback mechanisms. LSSS HS-LS1-4 is only partially addressed because students do not engage with one of the related DCIs (LSSS HS.LS1B.a) connecting cancer and the cell cycle. However, the other two DCIs (HS.LS1B.b and HS.LS1B.c) are both fully addressed as is the SEP of Developing and Using Models and the CCC of Systems and System Models. Similarly, LSSS HS-LS1-8 is not fully addressed because two of the five DCIs

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			(HS.LS1E.a and HS.LS1E.b) are not addressed. These are the DCIs that require students to understand virus replication and vaccination respectively. LSSS HS-LS2-4 is also only partially addressed because two of the three DCIs are only partially addressed. DCI HS.LS2B.c requires students to understand the carbon cycle including the roles of photosynthesis, cellular respiration, decomposition, and combustion. Photosynthesis and cellular respiration are addressed in Unit 3 Chapter 8, but the decomposition and combustion are omitted. DCI HS.LS2B.a is also only partially addressed since students do not learn about aerobic and anaerobic respiration. However, this DCI is labeled a suggested extension rather than a required part of the materials. LSSS HS-LS3-1 does not fully address complex inheritance patterns (DCI, HS.LS3A.a). While students analyze polygenic inheritance in Unit 2, Chapters 4 and 5, they do have the opportunity to learn about codominance and incomplete dominance which are included in the DCI. Finally, LSSS HS-LS4-4 is only partially addressed because one of the four DCIs (HS.LS4B.b) is not fully addressed. Students investigate how changes in the genetic variation of a population affect the occurrence of phenotypes in that population which addresses the idea of genetic drift, but the concept of gene flow is not introduced.

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	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. Materials include 160 days of instruction, which does not include any supplemental lessons teachers will need to add to address the missing DCIs or non-instructional school days such as semester exam days and other days dedicated to statewide tests. According to the Course Pacing Guide, Unit 1 takes 9-10 weeks, Unit 2 takes 8-9 weeks, Unit 3 takes 7-8 weeks, and Unit 4 takes 7-8 weeks, resulting in 31-34 weeks of instruction. The school year spans about 37-39 weeks. The time estimates for each unit are based on 50 minutes of instructional time per day. The scope and sequence provide ample time to address each standard to the full depth and rigor of the standard.
	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. Unit 1 focuses on how cells within an organism work together to create systems that carry out the functions of the body necessary for survival. Students learn how DNA codes for proteins and how selection pressures including disease act on variation of these proteins. The materials provide current information in Lesson 1 through excerpts from articles originally published by The New York Times in 2019, Frontline in 2013, Infectious Diseases Society of America in 2021, and

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			Community for Open Antimicrobial Drug Discovery in 2015. As the unit progresses in Lesson 5, students model how policies proposed by Drs. Neha Nanda and Brad Spellberg to prevent the spread of pathogens in various environments and lower infection rates. In Unit 3, Chapter 8, Lesson 6, Student Sheets 3.6.H and I provide accurate science content explaining the use of habitable land for food production according to the UN Food and Agriculture Organization. They also provide a graph of land used per 100 g of protein across various food products according to a study done in 2018 by J. Poore and T. Nemecek from the Department of Zoology at Oxford University. In Unit 3, Chapter 7, Lessons 1-3 students learn about the flow of energy through ecosystems, trophic levels, and the cycling of nutrients. This topic is addressed thoroughly through explanations of energy transfer using established ecological principles, such as the first and second laws of thermodynamics, and the role of producers, consumers, and decomposers in ecosystems. Lessons 4-6 in Chapter 8 address the impacts of human activities like deforestation, pollution, and overfishing on ecosystems. These lessons reflect contemporary scientific concerns regarding climate change and habitat destruction. The unit discusses how human activities contribute to climate change, species extinction, and the disruption of ecological processes, in line with the latest research on human-environment interactions.

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	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. The majority of materials are directly tied to LSSS for Life Science. Some of the lessons incorporate LSSS for Earth and Space Science, and Engineering, Technology, and Applications Standards, but they are woven into learning activities that also address and support Life Science Standards that are part of the course description. The majority of the content in each unit is spent on content within the course, grade, and grade band. The only time that content-specific standards are not addressed is the first lesson of each unit in which the anchor phenomenon is presented. Even in lessons in which only ETS standards are addressed they still relate to standards-based information and are appropriate for the high school grade band. Each lesson in Units 1 and 2 addresses LSSS for Life Science. Unit 1 addresses several standards related to how systems function to maintain an organism's health, protein synthesis, and natural selection. Unit 2 dives more deeply into these concepts of genetics, heredity, and natural selection by having students look at meiosis, mitosis, and the structure and function of proteins. No lessons introduce material extraneous to the course according to the LSSS. Unit 3 begins to incorporate Engineering, Technology, and Application Standards. For example, in Unit 3, Chapter 7, Lesson 5, students try to develop explanations for why humans have basic nutritional

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			requirements and how the food humans consume meets them through a variety of eating patterns. They develop models to trace the nutrients from their sources to their use in our bodies to support the claim that different eating patterns can support human nutritional needs. As part of this activity, students identify a nutrition-related issue in their community and propose solutions (DCI, ETS.HS.1A.b). Unit 4 again focuses on LSSS for Life Science. Lessons in Chapter 11, such as Lesson 6 on extinction versus speciation and Lesson 7 on how environmental changes affect adaptation, explore core concepts of evolution and natural selection that are essential for students to grasp. These topics are not only appropriate for high school students but are critical for understanding the ongoing environmental changes and the potential for a Sixth Mass Extinction. There is no significant deviation to content outside the grade band, and the materials explore evolutionary processes in a way that is both challenging and accessible for high school learners.
Non-Negotiable **4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop	**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. Students are exposed to and interact with authentic sources on a regular basis as they progress in figuring out the phenomenon of the

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scientific literacy. ☒ Yes ☐ No			unit. The sources come from scientific journals and videos of science experts in their respective fields to name just a few examples. For example, in Unit 2, Chapter 4, Lesson 2, students learn about cholesterol using nutritional labels, lipid panel results from patients, and an article about coronary artery disease. Although the article uses accurate medical terminology, several diagrams, and an authentic cellular image of a blood vessel with a blockage from plaque buildup, it is written to be grade-appropriate for high school students who are unfamiliar with this topic. In Unit 3, Chapter 7, Lesson 1, Student Sheet 3.1.A, students analyze Harvard's Healthy Eating Plate which gives data about healthy balanced meals. The experts used scientific research to develop the nutrition data. In Unit 4, Chapter 11, students investigate the potential 6th mass extinction by analyzing case studies of species at risk. These case studies are derived from authentic scientific research and include citations to actual studies and data sets used by conservation biologists. Lesson 8 includes an in-depth examination of simulated extinction scenarios where students test their models using authentic data from endangered species, demonstrating how scientists might use similar models to predict extinction events. This exercise further immerses students in the language and reasoning of scientific inquiry, helping them understand how data, hypotheses, and models are used to explain complex biological phenomena.

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	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 engage in discussions about science content frequently throughout each unit. They are also given opportunities to write explanations, but they engage in this less often than they explain through discussions or modeling. Many times, the discussions and writing students engage in are in response to articles, data sets, and other authentic sources of scientific information. In Unit 1, Chapter 3, Lesson 11, students discuss an article they read about variation among bacteria to explain how the traits contribute to the survivorship of individuals within a population. Then they work together to gather data and draw conclusions about how traits and location affect bacterial survival when the organisms are exposed to antibiotics. Later, in Lesson 12, they use the information from the articles and the data they collected as evidence in their written explanations for how antibiotics work. These explanations are expanded in Lesson 13, when students include why antibiotics sometimes fail to work. In Unit 3, Chapter 7, Lesson 1, students analyze Harvard's Healthy Eating Plate and a natural resource guide developed from scientific sources in order to devise a meal plan. Students write their meal plan and revise it as they receive more information. Students participate in a class discussion to

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			discuss the similarities and differences to the revisions made to their meal plan. The class then develops an initial model after discussing the constraints and criteria for the meal plan. In Unit 4 Chapter 12, Lesson 14, students construct an argument about the effectiveness of a design solution to promote biodiversity. They review case studies, such as those about marine protected areas and species conservation efforts, to evaluate how real-world conservation strategies impact ecosystems. Students write and speak about the implications of these strategies, using evidence from scientific research and data to support their conclusions. This lesson highlights the importance of scientific evidence in making decisions about biodiversity conservation and ecosystem management.
	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 participating in discussions, reading, identifying patterns, generating explanations through models, and interpreting data. For example, Unit 1, Chapter 2, Lesson 10 opens with students reflecting on the Class Consensus Model showing how the human body responds to infection created at the end of Chapter 1. Through collaborative discussions, students decide how the model

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			should be revised to include new learning. They create a checklist of components the model should include and interactions and relationships the model should show, and then they revise the model to include missing information. Then they participate in a discussion about how the data they have been collecting helps them model what is changing and what is constant over time when people experience various levels of health. Students use this data to support a written argument for why missing follow-up medical appointments could result in poor health outcomes for patients. In Unit 3, Chapter 7, Lesson 2, Student Sheets 3.2.D, E, F, students develop a model to demonstrate that carbon and nitrogen in the proteins of food end up forming new bonds in the organism and in the waste that is excreted by the organism. Later, in Lesson 3 students carry out an investigation to simulate the digestion of lactose in the small intestine. Students compare the amount of glucose before and after regular milk and lactose-free milk that enters the small intestine by adding intestine drops to each type of milk. Additionally, in Chapter 8, Lesson 7, Student Sheet 3.7.B, students use an argument tool to make a claim answering the question, “Why do plant-based foods tend to require less land to produce?” The students then provide relevant evidence to support their claim. In Unit 4, Chapter 10, Lesson 3, students engage in developing models to predict coyote population growth. They analyze data and use

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			systems thinking to represent the relationships between species and their environment. This task involves model creation, where students must synthesize scientific data to visualize ecological dynamics and predict future trends. The use of models as a tool for understanding ecological processes is central to this activity. As they continue their studies in Chapter 12, Lesson 14, students construct an argument about biodiversity loss and ecosystem management based on case studies. This task encourages students to make evidence-based conclusions, fostering their ability to explain complex ecological processes and propose solutions. They must use data and research from case studies to support their arguments, requiring both scientific reasoning and communication skills.
	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 a conceptual understanding of the term. Vocabulary is not pre-taught nor taught in isolation. Instead, teachers are guided to facilitate class discussions around creating a Word Wall that is divided into two sections including “words we encounter” and “words we earn.” As students encounter unfamiliar words, they add them to the “words we encounter” section of the Word Wall, offering examples of how the

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			word was used and beginning to make meaning from the context. Words that students have actively learned and developed more complete definitions for are included in the “words we earned” section of the wall. Often, students understand a concept or process before they are given the word for it. The materials in the Teach eBook offer guidance on which words students might identify as ones that should be added to the encountered words section as well as when to move them to the earned words side. For example, in Unit 1, Chapter 2, Lesson 9, students read an article about cell communication and then participate in discussions about what they learned. After this activity, students add words including signal, target, and receptor to their earned word wall. The concepts were introduced in Lesson 8 when students read about specialized cells. Lesson 8 did not use the words signaling or receptor, but introduced the idea of cells that were able to detect, destroy, and mobilize. After reading the article and discussing it with classmates, students apply the scientific vocabulary words to the specialized cells. Later in the chapter, in Lesson 12, students define antibiotics and add it to their earned word wall after analyzing data describing the effect antibiotics have on bacterial populations. In this lesson, students also analyze diagrams showing cell structures that antibiotics target and the mechanisms by which antibiotics attack. Although students

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			have used the words antibiotics throughout the lesson, it is not until after they constructed an understanding of what antibiotics do that they attempt to define the word. In Unit 3, Chapter 7, Lesson 1, after students have been exposed to scientific sources concerning food nutrition and environmental impact of food sources, developed and revised a meal plan, and then created a consensus model, students begin to develop a word wall and personal glossary of relevant vocabulary. Lesson 4 introduces students to the term cellular respiration only after they have a firm grasp of the process, including the inputs and outputs, from reading and investigation. The vocabulary word, cellular respiration, is integrated into deeper scientific learning rather than being introduced in isolation without context. Then, in Lesson 6, students work together as a class to decide how to represent the terms producer and consumer after having been given a conceptual understanding of how they get matter and energy. In Unit 4, Chapter 10, Lesson 3, students develop models to predict coyote population growth, where terms related to population dynamics, such as "carrying capacity" and "species adaptation," are introduced. These terms are woven into the activity itself, as students analyze ecological data and model systems. The vocabulary is integrated into the process of understanding and modeling ecological interactions, giving students a deeper grasp of the concepts

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			before formalizing the terms in their discussions and presentations.
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 lessons are well-organized and support a coherent progression of learning. By revisiting earlier concepts and incorporating diverse perspectives, the lesson prevents misunderstandings and supports mastery. For example, in Unit 1, Chapter 1, Lesson 3, students begin to explore the idea of ecosystems and the abiotic and biotic resources that influence population size and carrying capacity (DCI, HS.LS2A.a) by using simulations, interpreting data through graphs, and creating and applying models. They begin the lesson by watching a video of bacteria replicating over time to draw conclusions about bacterial growth. They then participate in a simulation using beads to model and graph population growth under various conditions (SEP, Using Mathematics and Computational Thinking; CCC: Cause and Effect). Students build upon this investigation in Lessons 4 and 5 as they consider why unrestricted bacterial growth could pose problems for other

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			organisms, and, in Chapter 3 Lessons 11-13, they learn how abiotic factors such as antibiotics can limit bacterial population growth (CCC, Cause and Effect). Students build knowledge of the same DCI (HS.LS2A.a), deepen their computational thinking (SEP) skills, and practice applying the concept of cause and effect (CCC, Cause and Effect) in Unit 4, Chapter 10 as they study the populations of coyotes and wolves. In Lesson 3, students compare the two populations and determine how the reduction of the wolf population contributed to the changes in populations of other species, including coyotes, in the same area. Students think back to what they learned about bacterial population growth and the assumptions made during that investigation and compare the assumptions made about the populations studied in this unit. Students interpret data to draw conclusions. In Unit 2, Chapter 6, Lesson 11, students expand upon what they previously learned in Chapter 5. In Unit 2, Chapter 5, students figured out that genes inherited from parents through both monogenic and polygenic methods of inheritance could contribute to high LDL levels and coronary heart disease. In Unit 2, Chapter 6, however, students progress in their learning when they examine identical twins and realize that even though they have the same genotypes they have differing phenotypes. Students figure out that health outcomes are affected by both genetic and environmental factors. This

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			promotes the progression of learning towards the Performance Expectation (PE) LS3-2, in which students make and defend a claim based on evidence that inheritable genetic variations may result from not only new genetic combinations from meiosis but also through mutations caused by environmental factors. Students determine a Cause and Effect (CCC) relationship between environmental factors and inheritable genetic variations (DCI, LS3B.c). In Chapter 9, Lesson 11, students build on prior learning with references to decisions made in Lesson 1, Chapters 7 and 8, and an article from Lesson 6. This approach supports continuity and a coherent progression of learning. Students revisit and apply concepts learned earlier through the Class Consensus Models and the Human Decision Model Connection Chart, emphasizing the integration of knowledge over time. The lesson uses multiple modalities such as class discussions, individual reflection, paired activities, and video analysis, to develop a nuanced understanding of decision-making in the context of food systems.
	5b) Students **apply grade-appropriate mathematical** thinking in meaningful ways, when applicable. They are not introduced to math skills that are beyond or far below the applicable grade level expectations in the Louisiana Student Standards for Mathematics. Preferably, math connections are made explicit through clear references to the math standards,	Yes	Students apply grade-appropriate mathematical thinking when applicable. When applicable in the materials, students are introduced to math skills aligned with the Louisiana Student Standards for Mathematics (LSSSM) for high school. Students are called to apply mathematics skills and understanding to engage in Using Mathematics and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	specifically in teacher materials.		Computational Thinking (SEP) appropriately in the context of their learning. For example, in Unit 1, Chapter 3, Lesson 12, students analyze graphs describing changes in bacterial population when exposed to high temperatures and bleach. The data is used to spark curiosity about other ways we control bacterial growth including hand sanitizer and the use of antibiotics. They then use data about the typical number of bacterial cells found on a person's hand and the effectiveness of hand sanitizer to calculate the number of cells that would survive the average person's use of hand sanitizer. They use this data to support their predictions of the number of cells that would remain on the agar plates from their investigation of bacterial growth in previous lessons. Later in the lesson, students consider graphical data regarding the effectiveness of various antibiotics on different species of bacteria including how the effectiveness changes with dosage, and answer questions based on their interpretation of the data and consider the limitations of their data analysis. In Unit 2, Chapter 5, Lesson 8, students observe the parental genotypes of the Miles family and the Robinson family. Students then simulate the process of meiosis to determine causes of variation in potential gametes as well as possible arrangements of alleles inherited by offspring. Students then calculate how many different potential gametes could come from cells with 23 pairs of chromosomes in order to grasp the magnitude of variability

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			due to the meiotic sorting of chromosomes in humans. Throughout this lesson, students apply mathematical concepts of statistics and probability to explain the variation and distribution of expressed traits in a family (PE LS3-3). Students apply the CCC, Scale, Proportion, and Quantity by using algebraic thinking to examine scientific data and predict the effect of a change in one variable (parental genotypes) on another variable (offspring genotypes). In Chapter 10, Lesson 3, students analyze the impact of predator removal on population dynamics. Students identify variables, interpret graphs, and make data-driven decisions through activities requiring them to develop a mathematical model to predict coyote population growth. Later in the lesson, they calculate the carrying capacity of a defined area (10,000 square miles) using proportional reasoning, aligning with LSSM expectations for ratios, and proportional relationships, and interpreting data from graphs.
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	**Required** **6a)** There are separate **teacher support materials** including: scientific background knowledge, support in three-dimensional learning, learning progressions, strategies for addressing diverse emerging conceptions, guidance targeting speaking and writing in the science classroom (i.e., conversation guides, rubrics, exemplar student responses). Support also includes teacher guidance in the materials’	**Yes**	There are separate teacher support materials provided. Within each lesson, support materials include the following: an estimate of the number of class periods the lesson will take, unit alignment to NGSS, a materials list, a summary of the navigation between lessons, an overview of what students are expected to figure out in the lesson as well as what they are not yet expected to know and boundary statements, suggestions for assessment

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
experiences to build scientific thinking. ☒ Yes ☐ No	**approach to phenomenon-based instruction** and provides explicit guidance on how the materials **address, build, and integrate the three dimensions**.		opportunities, an outline of the lesson, links to the required resources, and additional background for the teacher. The Teacher eBook includes both unit-level resources and lesson-level resources for the teacher. Each unit begins with a Skeleton that includes the overarching question and Big Idea for each chapter as well as the progression and navigation from lesson to lesson as well as an overview of each lesson including the lesson-level question, what students will figure out, and the type of lesson. The next resource is an outline of the Storyline that the unit is taught through which provides more details on what students figure out, how it is represented, examples of the model at that point in the unit, and how lessons are connected to drive students towards sense-making. There is also a Teacher Background section for each unit that describes the phenomenon and the background information a teacher may need if they are unfamiliar with the chosen phenomenon or need more content support. An Assessment Overview is also included in the unit resources. This offers suggestions for both formative and summative assessments the teacher can use in each lesson. Most units include at least one formative assessment in each lesson and a summative assessment at the end of each chapter. Each unit has three chapters. The Teacher eBook also provides detailed resources for each lesson. The lesson begins with a reminder of the suggested number of class periods and the navigation

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			between the previous, current, and next lessons. The Lesson Goals are color-coded to show the Three-Dimensional nature of the goal and to indicate which part of the goal corresponds with each of the dimensions (DCI, SEP, and CCC). There is also a detailed list of what the students are expected to figure out in the lesson, what they are not yet expected to know, boundary statements, relevant common student ideas and misconceptions, and key literacy and sense-making strategies. All of this is provided before details of the lesson activities are described so that the teacher understands where the lesson is and is not going. The lesson is then outlined, giving the teacher a summary of each lesson activity, its purpose, and a link to any relevant resources. Below the outline, the lesson is described in detail including suggested prompts the teacher can use to help the students make connections and ask relevant questions as well as expected student responses. Keys to student worksheets are also often provided along with examples of the class consensus models being created along the way. For example, in Unit 3, Chapter 8, Lesson 8 of the Teacher eBook, the teacher is given a color-coded three-dimensional lesson objective along with a lesson guiding question. The teacher is told what the students should figure out and the boundaries of what students are not expected to know. In the materials, teachers are given a key for the student plant experimental results worksheet and the home

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			learning worksheet about what the results of the investigation tell them about their model. Teachers are given additional content background knowledge about photosynthesis, especially the importance of energy. Teachers are warned about the common student misconception that energy is a substance that is passed between objects and stored in objects, so the teacher is given more accurate language to describe what happens to energy during photosynthesis. Teacher guidance notes that it is important to articulate the idea of energy as part of the lesson question so that both energy and matter in photosynthesis can be investigated. The materials include explicit guidance on how the photosynthesis investigation addresses and integrates the SEP, Planning and Carrying Out Investigations. As the students develop their model of photosynthesis, the materials provide explicit guidance on how the model addresses the SEP, Developing and Using Models, and the CCC, Matter and Energy. At the end of the lesson, an example of possible student responses to the lesson question and the model of photosynthesis is provided as a reference for teachers. Unit 4, Chapter 10, Lesson 1 includes detailed teacher resource materials, such as species population data, timelines, and explanations of biodiversity changes over time, which provide a strong foundation for understanding the scientific background. Chapter 10, Lesson 1 also includes robust scientific context, such as the history of mass

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			extinction events, biodiversity patterns, and the concept of punctuated equilibrium, which provides foundational knowledge for teachers. Chapter 10, Lesson 1 is designed as the anchor for the unit, building toward deeper exploration in subsequent lessons. The activities progressively guide students from observing phenomena to developing initial models and identifying gaps in understanding.
	Required **6b)** Teacher resources include **educative resources** that are designed to **promote teacher learning** and support the wide range of teachers who use the materials. Unit and lesson planning resources include explicit guidance designed to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in ways that are aligned to the Louisiana Student Standards for Science and associated learning progressions.	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. Each lesson includes explicit guidance for the teacher to ensure that students experience the phenomena using three-dimensional learning. Each unit and each lesson provides a teacher background knowledge section that enables teachers to align students' learning with LSSS and associated learning progressions. Support materials include, within each lesson: a Teacher Background section (scientific background about the Disciplinary Core Ideas of the unit), 3-D Strategies sections that detail explicit techniques for highlighting and SEPs, DCIs, and CCCs further, and sample prompts and conversation guides for class discussions. For example, Unit 2, Chapter 4, Lesson 4 is about the structure of proteins and includes an extensive background section for the teacher including how the DCI requirements have changed from the pre-NGSS era and explains

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			the relationships between DNA, chromosomes, genes, amino acids, and proteins. It also suggests an outside resource for teachers who would like more information about a specific topic (the role of sex chromosomes in determining sex). It also includes several boundary statements describing what students are and are not expected to be able to explain in order to meet the DCI for this lesson. This support material ensures that teachers have the depth of knowledge necessary to guide their students through the process of making connections between the phenomenon (high cholesterol) and the data and information presented in the material to draw appropriate conclusions and navigate to the next lesson. At the beginning of Unit 3 in the Teacher Background section, teachers are given explicit planning guidance designed to ensure that students experience phenomena, design solutions, and application of scientific knowledge and skills. First, background information regarding the phenomenon (preparing a nutritious meal for a community event while taking into account nutrition needs, natural resources, and social criteria guiding their decisions) is given to the teacher. As students develop their designs, they have to incorporate values-based justifications as well as scientific evidence to inform what should be done. Throughout each chapter, the engineering design process plays a progressively larger role as students develop and apply their understanding of science

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			concepts in order to create design solutions for one aspect of a local food system. Each component of the food system has inputs and outputs of energy, matter, and information that must be taken into account when developing the design. The teacher is given background information on nutrition and natural resources as well. Finally, the teacher receives background information on how the students should be making decisions and designing solutions. The entire teacher background section aligns with the high school learning progression for Constructing Explanations and Designing Solutions (SEP). As students design their meals, they must solve design problems, taking into account possible unanticipated effects as they figure out that it is not always possible to maximize all the criteria that they identified at the same time. The whole meal design process involves the student in solving a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade-off considerations. The teacher background section is a useful teacher resource that provides educational resources designed to promote teacher learning and supports a wide range of teachers, both experienced and inexperienced. In Unit 4, Chapter 12, Lesson 15, materials provided, such as Model Tracker, Gotta-Have-It Checklist, Science Notebooks, and Student Sheets, support teachers in guiding students through the process of

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			synthesizing and applying scientific concepts related to biodiversity, ecosystem disturbances, and the conservation trade-offs that affect both ecosystems and humans. The lesson further outlines specific strategies and frameworks that teachers can use to support student learning, such as using the Scientists Circle to facilitate collaborative discussions or the Class Consensus Model for consensus-building around key science ideas. The activities emphasize how to encourage students to consider different stakeholder perspectives and weigh trade-offs, and key practices in both science and engineering. In Lesson 15, the focus on biodiversity, ecosystems, and conservation decisions maps to key LSSS LS1 and ESS3 related to ecosystem dynamics and human impacts on ecosystems. Teachers have the option to use Appendix A to review the learning progressions within these areas to identify where students are expected to deepen their understanding of these scientific concepts.
	Required **6c)** Support for **diverse learners**, including English Learners and students with disabilities, are provided. Appropriate suggestions and materials are provided for **supporting varying student needs** at the unit and lesson level using an accelerating learning approach. The language in which questions and problems are posed is not an obstacle to understanding the content, and if it is, additional supports are	**Yes**	Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. Each unit's Storyline includes a list of activities for each lesson indicating activities for which alternatives are provided. Specific instructional practices and scaffolding are also described in this resource. The teacher materials include support for multilingual learners, students who need

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	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, extension activities, etc.). Materials include **teacher guidance to help support special populations** and provide the opportunities for these students to meet the expectations of the standards and enable regular progress monitoring.		literacy support, suggestions for attending to equity, and extension opportunities as well as a Lesson Snapshot that lists the routine, how long it should take, summary, and materials needed. For example, in Unit 1, Chapter 1, Lesson 2, the teacher resources describe how to extend the learning for students who have above-grade-level math skills by incorporating dimensional analysis. It also warns the teacher that students whose math skills are at or below grade level may feel anxiety about the size of the numbers used in the lesson and possible misconceptions they may have about the numbers. It also provides suggestions for reassuring students and helping them identify the point of the lesson and offers the suggestion of slowing down the pacing of part of the lesson to support students as they process the information. Later in the unit in Chapter 2, Lesson 10 provides suggestions for supporting students who need literacy scaffolding or who are multilingual. One of the suggestions is to use a scaffolding resource previously introduced and to remind them that they can use these resources at any time even if the teacher does not specifically prompt them to do so. Another is to have students use a different literacy scaffold as a whole group early in the lesson and then use it independently later in the lesson. At the end of the lesson, students discuss the consequences of missed medical appointments and how the medical community tries to help patients keep their appointments. The teacher materials

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			point out that these discussions might lead to students sharing personal experiences and suggest that teachers remind their students that they are not expected to share more than they are comfortable with. In Unit 3, Chapter 8, Lesson 8 in the Teacher eBook, teachers are given precise and accurate language to describe energy to avoid student misconceptions. The lesson materials refer to energy being transferred from a source to the outputs of the system during photosynthesis. Teachers are also warned to watch for the incorrect idea that plants get food from the soil rather than getting water and nutrients from the soil. Using precise language and correcting misconceptions will help support diverse learners such as ELs and students with disabilities. When students build their molecules with bricks, the teacher's guidance recommends that they use different size blocks instead of different color blocks to meet the needs of color-blind students. In the next lesson, Lesson 9, guidance suggests that the teacher shows a time-lapse video of a sweet corn seed germinating underground. The guidance also suggests that teachers play the video more than once to allow students time to write down their observations, which provides extra time for students with disabilities. When the teacher gives the students the students sheet on plant-soil interactions, guidance suggests that the students should use the literacy strategy of setting a purpose for reading and decide to use either the Science

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			Reading Annotation Stems or the Identify and Interpret (I2) strategy, in which instructs students to label what they see and explain what it means, to help them make sense of the text and the data on the page. The I^2 Strategy is a framework often used in problem-solving, critical thinking, and decision-making. It emphasizes the importance of gathering accurate Information and then applying thoughtful Interpretation to make sense of it and take action. An extension opportunity is provided in the lesson in which students can research more about Indigenous nations using the reliable resource Native Land Digital to learn more about their cultures and territories. In Unit 4, Chapter 11, Lesson 7 before starting the lesson, it provides glossaries or vocabulary sheets for students with specific definitions for terms like adaptation, extinction, genetic variation, and natural selection. These resources can be used in both oral and written forms to support ELs and students with disabilities. The formative assessment through T-charts and the use of the Model Tracker to monitor understanding is used. Teachers are encouraged to circulate and provide real-time feedback to ensure that all students are engaged and comprehending the material. Use of the Model Tracker Self-Assessment and Feedback Tool helps individual students reflect on their understanding and receive feedback, supporting students with disabilities.

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 or certified partners.	**Yes**	All of the materials necessary to successfully implement the curriculum are readily available through the vendor. This includes texts and laboratory materials. Lab kits are available through vendor packaging. All printed materials the students and teachers need access to are provided and are linked in multiple places so that teachers and students can easily access them. In the Teacher eBook, there is a Resources tab where all print resources can be found organized by chapter and lesson. Within each lesson, the resources are also linked in several places. For example, in Unit 1, Chapter 1, Lesson 1, students need to access worksheets, a timeline, several case studies, and a video. Each of these is linked in the Materials column of the Lesson Snapshot as well as in a separate Lesson Materials section and within the Course Launch section of the teacher materials. The Course Launch section gives detailed instructions for how to implement the lesson along with suggestions for probing questions and look-fors in student responses and work. Within this description, each resource is linked each time it is referenced. In Unit 3, Chapter 8, Lesson 8, students carry out an investigation about photosynthesis. For the experiment, each small group of three to four students needs the following items: 4 large test tubes, 2 test tube racks, 50mL of bromothymol blue solution, a flask or beaker, 1 straw, aluminum foil, 2 sprigs of Elodea, plastic bag or container, and either 8 black, 16 white, and 40 red LEGO bricks or

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			paper clips. All of these items are readily available in consumable and non-consumable kits through vendor packaging. The website is easy to navigate, making it quick and easy to find the link to these materials. The materials list for Unit 4, Chapter 12, Lesson 12 provides detailed information about each material needed, with specific quantities and types for a class of 32 students. Items like science notebooks, colored pencils, chart markers, and consumables, such as sticky note pads, tape, and scissors, are easily purchased from standard classroom supply vendors or local stores. Colored pencils, fine-point black markers, scissors, and chart paper are commonly found in any classroom setting or can be easily sourced from office supply stores or educational vendors, making them readily available. The materials list also includes items like cameras for capturing electronic images, which are generally available either through school equipment or can be substituted with smartphones or tablets. No highly specialized or difficult-to-acquire materials are required for 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. Students have the opportunity to engage in investigations that use similar protocols to those of professional science laboratories and are prompted to consider the collection

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			methods of data they analyze but did not collect themselves. The materials consistently embed lab safety guidelines, procedures, and materials lists whenever students engage in lab experiments. For example, in Unit 1, Chapter 1, Lesson 2, students engage in a laboratory investigation to determine where they can find bacteria around their school. The safety guidelines from the American Society of Microbiology are referenced in the Lesson Materials section of the teacher materials, and there is a separate lab safety background section for the teacher. Safety guidance in this lesson includes a discussion of the materials students use and the safety protocols they should observe. As they move through the lesson, students review and implement the safety protocols. In the next lesson, Lesson 3, students participate in a simulation to compare reproductive time for bacteria populations at different temperatures. During the simulation, students count colonies of bacteria on a petri dish just as biologists would in a real lab. In Chapter 3, Lesson 12, students are presented with data from a laboratory investigation studying how antibiotics work. They consider how this data was collected and to consider the possible sources of error including the motivation and possible biases of the people performing the experiment and collecting the data. In Lesson 13, students participate in another simulation to demonstrate antibiotic resistance. Students run the simulation through multiple generations collecting

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			population data after each one, simulating the data collection that would happen in a research laboratory. In Unit 3, Chapter 8, Lesson 8, students carry out an investigation on photosynthesis. The lesson includes a materials list, procedures, and safety guidelines. The guidelines are embedded in the lesson and in the Teacher ebook.
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** (iterative student models, student-centered discussions, data analysis, self-reflection and peer feedback investigations, and projects) are embedded into unit materials and allow teachers to evaluate student progress toward demonstrating standards.	Yes	Multiple types of formative and summative assessments are embedded into content materials and assess the learning targets. Multiple types of assessments, including models, model trackers, investigations, and unit assessments, are embedded in the unit materials of each lesson to allow teachers to regularly evaluate student progress toward mastery of the standard. The teacher materials include suggestions for formative assessments including models, written explanations, class discussions, data analysis, and projects. Each unit includes an Assessment Overview organized by chapter and lesson that provides summaries of at least one possible summative assessment for each lesson. The teacher materials for each lesson also include notes about using discussions and student work samples as formative assessment opportunities. There is also a summative assessment provided at the end of each chapter as well as unit assessments. Both of these summative assessments require students to apply both the content knowledge and science practices developed through the

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			lessons in that chapter. For example, in Unit 1, Chapter 3, Lesson 11 includes a formative assessment of students' ability to ask testable scientific questions based on their analysis of new data regarding the use of antibiotics and antibiotic resistance. In Lesson 14, students collect population data from a simulation, graph the data, and draw conclusions about the changes in the population from the graphs. The teacher notes include a call-out box describing how to use the graph and data interpretation as a formative assessment. The Culminating Task in Unit 1, Chapter 3, Lesson 16 engages students in a project to improve the responsible use of antibiotics within the medical community. Students design surveys to gather information about what patients understand regarding antibiotic use and gather information on the perspective of medical providers about the issue. They analyze their findings and create a checklist that can be used by doctors to help guide their discussions with patients to reduce the over prescription of antibiotics. In Unit 2, Chapter 5, Lesson 9, students complete a model tracker. This is a formative assessment that the teacher can use to assess individual student progress across the chapter. Students also use Student Sheet 2.9E Blank Pedigree to record the results of an investigation, which can also be used as a formative assessment. The model tracker and the Blank Pedigree allow the teacher to evaluate student progress toward demonstrating mastery of PE 3-1 and 3-3. At

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			the end of the unit, students are given a summative unit assessment in which they apply the concepts that they have learned throughout the unit. In Unit 4, Chapter 10, Lesson 1, students develop initial models and progressively refine them through formative feedback in Lessons 2, 4, and 9. This iterative process allows teachers to track student progress in understanding ecosystem dynamics. Later in the unit, in Chapter 11, Lesson 7, students engage in peer-led discussions to identify patterns in case studies, promoting collaboration and critical thinking; and in Chapter 12, Lesson 15, students synthesize key takeaways and connect their learning to the culminating task, providing teachers with insights into their conceptual understanding. The Unit Assessment requires students to transfer their learning to new contexts, integrating knowledge of ecosystems, limiting factors, and human impacts. This aligns with performance expectations and provides a comprehensive measure of student proficiency.
	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. Both summative and formative assessments are structured to require students to demonstrate mastery of the DCI(s) while applying SEPs through the lens of CCCs. Students engage in sensemaking around new phenomena related

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			to the unit phenomenon and are required to utilize the three dimensions of science learning to answer the assessment questions about the new phenomenon. This allows the teacher to accurately assess whether or not students truly understand the concepts presented in the lessons. The Assessment Overview for Unit 2 includes two suggested formative assessment opportunities in Chapter 4, Lesson 3. One of these is a set of diagrams students sequence and annotate. Students observe and analyze different diagrams, each representing part of the process cholesterol undergoes as it moves through the bloodstream. They work together to annotate, caption, and determine the correct order of the diagrams (SEP, Developing and Using Models; CCC, Systems and System Models) which can be used as a formative assessment to gauge how well students understand the Structure and Function of the cells and proteins involved in this process (DCI, HS.LS1A). Students also interact with a video model of the process and then participate in a class discussion about which model they found most useful. The teacher materials for this lesson offer guidance on how teachers can use the discussion as part of their formative assessments. The other suggested assessment is a student self-assessment tool where students track changes to the model they develop and refine to explain why someone's cholesterol might be high. Through this self-assessment tool, students receive three criteria for a good model and apply those

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			criteria to their models. Teachers can use this to formatively assess how well students understand the content (DCI, HS.LS1A) and can apply the skill of Developing and Using a Model (SEP). In the Unit 2 Assessment, at the end of Unit 2, students apply what they have learned by engaging with a new, but related, phenomenon. Students use authentic scientific sources concerning the heredity of thrombophilia and a fictional patient profile of someone with a genetic predisposition to thrombophilia. Students synthesize the information and draw a model (SEP, Developing and Using Models; CCC, Systems and System Models) showing the Cause and Effect relationship (CCC) of the mutation on the patient's health, including how the mutation will affect the Structure and Function of the protein (CCC; DCI LS1A.c, LS3A.a). Students also use data (SEP, Analyzing and Interpreting Data) to infer the effects of the mutation on the patient. In Unit 3, Chapter 9, Lessons 11-15, the assessments are structured to integrate the three dimensions and provide opportunities for students to apply their understanding to new contexts. For instance, in Lesson 11, formative assessments focus on assessing how students' questioning guides their thinking, while in Lesson 12, students define and articulate measurable criteria for case studies. In Lesson 13, during small group case analyses, students connect design solutions to science concepts from earlier models. Lessons 14 and 15 use

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			tools like the Model Tracker and updated criteria to assess and refine students' understanding and ability to synthesize ideas. The Unit Assessment extends this learning as students transfer their knowledge to new phenomena in a scenario-based, three-dimensional task with scoring guidance.
	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. In both summative and formative assessments, the materials provide teacher scoring guidance or answer keys that align with performance expectations and incorporate criteria that are specific, observable, and measurable. In some cases on formative assessments, the materials provide specific look-fors or listen-fors that are either observable or measurable. For example, the End-of-Chapter Assessment for Unit 1, Chapter 2 assesses students' ability to predict the pattern of population growth that a population with limited resources will experience, aligning with LSSS HS-LS2-1. The accompanying scoring guide provides teachers with exemplar responses and scoring criteria including choosing the correct graph shape, explaining that the number of bacteria cells is increasing over time, identifying where the exponential growth ends, and identifying it as the carrying capacity. The scoring guidelines also provide examples of responses that indicate the student has a misconception or gap in

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			knowledge or skill. One example is conflating individuals and populations and thus misinterpreting the graph as depicting the size of a cell rather than the number of cells in a population. In the assessment provided at the end of Unit 1, students construct an explanation for why a particular trait increases in frequency within a beetle population over time as pesticides are sprayed in the area they inhabit and support their explanation with evidence. This prompt aligns with the LSSS HS-LS4-2. The teacher materials for this assessment include scoring guidance that provides look-fors, exemplar responses, and specific criteria which are observable and measurable. For example, the students should claim that Trait A helps the beetle survive the pesticide allowing beetles with those traits to live longer and reproduce more. In the Unit 2, Chapter 5 Assessment, the teacher is provided with scoring guidance. The scoring guidance for item 1h requires students to make a claim and support it with evidence. The teacher is given the evidence that should be included so that the criteria are specific and measurable. This specific item aligns with the LSSS HS-LS1-1 as students must demonstrate knowledge that inherited genes on the DNA determine the structure of proteins that produce differing traits. The Unit 3, Chapter 9 Assessment provides scenario-based three-dimensional tasks that explicitly align with performance expectations (PEs), requiring an understanding of DCIs, SEPs, and CCCs. The

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			scoring guidance provided is specific and measurable, allowing evaluation of how students transfer their knowledge to new contexts. Students update criteria and constraints in Lesson 15 to reflect precise language and design aspects, ensuring alignment with observable and measurable criteria.
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**	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.
	2. Phenomenon-Based Instruction	**Yes**	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

[2] Must score a "Yes" for all Non-Negotiable Criteria to receive a Tier 1 or Tier 2 rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow. 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. 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 and Accuracy	**Yes**	The majority 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. Science content is accurate, reflecting the most current and widely accepted explanations. In any one grade or course, 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 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. The frequency of engagement with authentic sources should increase in higher grade levels and courses.

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			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. 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. Materials provide a coherent sequence of authentic science sources that build scientific vocabulary and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation from deeper scientific learning.
II: Additional Criteria of Superior Quality[3]	5. Learning Progressions	**Yes**	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 support student mastery of the performance expectations. Students apply grade-appropriate mathematical thinking in meaningful ways, when applicable. They are not introduced to math skills that are beyond or far below the applicable grade level

[3] Must score a "Yes" for all Additional Criteria of Superior Quality to receive a Tier 1 rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			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.
	6. Scaffolding and Support	**Yes**	There are separate teacher support materials including scientific background knowledge, support in three-dimensional learning, learning progressions, strategies for addressing diverse emerging conceptions, and guidance targeting speaking and writing in the science classroom (i.e., conversation guides, 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. Teacher resources include educational resources that are designed to promote teacher learning and support the wide range of teachers who use the materials. Unit and lesson planning resources include explicit guidance designed to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in ways that are aligned with the Louisiana Student Standards for Science and associated learning progressions. Support for diverse learners, including English Learners and students with disabilities, is provided. Appropriate suggestions and materials are provided for supporting varying student needs at the unit and lesson level using an accelerating learning

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			approach. 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. Materials include teacher guidance to help support special populations and provide opportunities for these students to meet the expectations of the standards and enable regular progress monitoring.
	7. Usability	**Yes**	Text sets (when applicable), laboratory, and other scientific materials are readily accessible through vendor packaging or certified partners. 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
	8. Assessment	**Yes**	Multiple types of formative and summative assessments (iterative student models, student-centered discussions, data analysis, self-reflection, and peer feedback investigations, and projects) are embedded into unit materials and allow teachers to evaluate student progress toward demonstrating standards. 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.
FINAL DECISION FOR THIS MATERIAL: **Tier 1, Exemplifies quality**			

Reviewer Information

Instructional Materials Review

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 2023-2024 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Allen, Ascension, Bienville, Caddo, Calcasieu, Catholic Diocese of Baton Rouge -REACH Department, CSAL, D'Arbonne Woods Charter School, East Baton Rouge, Hynes Charter School Corporation, Iberia, Iberville, Jefferson, Lafayette, Lafourche, Lincoln, LSU Laboratory School, Madison, Natchitoches, Orleans, Ouachita, 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.