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: **OpenSciEd, Carolina Certified Version**
Grade/Course: **Biology**
Publisher: **Carolina Biological Supply Co**
Copyright: **2024**
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 |
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| **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**<br>**1. THREE-DIMENSIONAL LEARNING:**<br><br>Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions.<br><br>☒ Yes ☐ No | **Required**<br>**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. The materials provide multiple opportunities for students to engage with three-dimensional learning in an integrated manner. Students actively apply SEPs, analyze CCCs, and deepen their understanding of DCIs through hands-on investigations, data analysis, and model development. Some of the lessons address DCIs outside of the course level standards; however, they correlate to the students' overall understanding of the unit phenomenon. For example, in Unit 1, Ecosystems Interactions and Dynamics, Lesson 3, students analyze the wildebeest migration model and information on the wildebeest data cards (SEP, Developing and Using Models), looking for Patterns (CCC) that can be used as evidence to support an explanation for wildebeest migration. Students use the patterns they identify from the wildebeest data cards to determine which of the factors, such as disease, bone marrow |

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| | | | health, nutritional health, and/or cause of death, support or limit the size of the wildebeest population (DCI, HS.LS2A.a). Students then create data displays with their group based on the patterns they identified previously and share their data displays with the other groups (SEP, Evaluating and Communicating Information; CCC, Patterns). In Unit 2, Ecosystem: Matter and Energy, Lesson 4, students work together to create a model (SEP, Developing and Using Models) of how matter and energy move during photosynthesis (DCI, HS.LS1C.a; CCC, Systems and System Models). Then students analyze world maps showing solar radiance and gross primary production to determine the relationship between the two (CCC, Cause and Effect) and read an article (SEP, Obtaining and Evaluating and Communicating Information) about how changes in the climate of the Earth contributed to the growth of plants that became arctic peat. In Unit 4, Natural Selection and Evolution of Populations, Lesson 1, students engage in Developing and Using Models (SEP) by creating an initial consensus model illustrating how urbanization affects nonhuman populations to begin to make sense of the anchor phenomenon. They explore Cause and Effect (CCC) by examining the relationship between increasing urbanization and adaptations in hawksbeard, juncos, and rats. As students analyze the dependency of species survival on environmental changes, they learn about relationships in ecosystems |

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| | | | (DCI, HS.LS2.A.b). Lesson 2 builds on this understanding as students engage in Planning and Carrying Out Investigations (SEP) by conducting experiments on seed dispersal in hawksbeard and comparing their findings with published studies. Students analyze Patterns (CCC) in how urban environments shape genetic traits. Students demonstrate how natural selection favors specific seed dispersal strategies by making connections between their observations from the investigation and the adaptations found in the seeds of urban plant populations (DCI, HS.LS4.C.a and HS.LS4.C.b). |
| **Non-Negotiable**<br>**2. PHENOMENON-BASED INSTRUCTION:**<br><br>Explaining phenomenon and designing solutions drive student learning.<br><br>☒ Yes ☐ No | **Required**<br>**2a) Observing and explaining phenomena** and designing solutions provide the purpose and opportunity for students to engage in a coherent sequence of learning a majority of the time. Phenomena provide students with authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow. | **Yes** | Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. Phenomena in the form of common experiences at the beginning of each unit spark students to generate questions and define problems to motivate learning about the core ideas of the unit, and this provides purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the phenomenon. At the start of each unit, students observe and analyze the phenomenon and work towards making sense of the phenomenon by recording initial thoughts in a Notice and Wonder table, brainstorming investigative questions recorded on a Driving Question Board (DBQ), and collaborating to develop an initial model which is updated and refined as they continue |

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| | | | their study. Students track their learning in a science notebook where they record Notice and Wonder tables, personal glossaries, and models, revising these throughout the unit. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 1 introduces students to the anchor phenomenon, the 30 by 30 conservation initiative to preserve land and water in the United States. The unit question is "How do ecosystems work and how can understanding them help us protect them?" Students begin by brainstorming a list of criteria people use to motivate conservation. Students then look at four different conservation areas and develop initial models of what happened in these places over time. They participate in a Gallery Walk, looking for similarities and differences between the models, and write questions for a DBQ about how the ecosystems in the conservation profiles work and how they were protected. Students then generate ideas for investigating their questions. In Unit 1, Lesson 2 introduces students to another related phenomenon, the Serengeti conservation area. They engage in a scavenger hunt to gather information about the Serengeti and then reach consensus through a whole-class discussion about why the Serengeti was protected and how it was protected. In Lessons 3-5, students investigate the migration of wildebeests, determining the limiting factors in the ecosystem that affect the carrying capacity of their population. In Lesson 6, students complete a Transfer Task |

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| | | | about a population of wild dogs, using what they have learned about how ecosystems work. After the Transfer Task, students revisit their DQB and identify which questions they can answer using the Serengeti as a model conservation area. Observing the phenomenon of the migrating wildebeest in the Serengeti provides students with the opportunity to engage in a coherent sequence of learning about ecosystems. In Unit 2, Ecosystem: Matter and Energy, Lesson 1, students begin to investigate arctic zombie fires by looking at maps of where fires break out, reading about them, and looking at images of the area where these fires are found. They develop an initial model of the phenomenon and a DBQ to guide investigations throughout the rest of the unit. In Lesson 2, students investigate peat, the fuel for the zombie fires, which lays the foundation for the upcoming lessons in which students develop a model for how carbon and energy cycle through the environment. In Lesson 7, students conduct an experiment to gather data about the consequences of increased carbon dioxide in the atmosphere, which they use to develop a hypothesis about the relationship between carbon dioxide levels and temperature in Lesson 8. In Lesson 9, students work collaboratively to develop a model of the effects of increased atmospheric carbon dioxide from burning carbon sinks on other systems. In Unit 5, Common Ancestry and Speciation, Lesson 1 introduces students to the anchor phenomenon of three bear species, |

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| | | | including polar, brown, and black, being observed together in Wapusk National Park for the first time. They create a Notice and Wonder chart where they record observations and questions. Then, they investigate the phenomena by analyzing maps of the typical ranges of these species and climate data, and reading about the lifestyles of the bear species. They develop initial models, predicting what will happen to each species under two conditions, seasonally available ice and permanently available ice, and create a DBQ. In Lesson 3, students investigate similarities and differences between the three species using anatomical and DNA evidence to determine the evolutionary history of the species. By the end of Lessons 4 and 5, students write arguments for what caused polar and brown bears to split into separate species and revise their initial model from Lesson 1. In Lesson 6, students continue to consider what will happen to polar bears in the future and read about evidence suggesting that polar and brown bears can mate, and, through analysis of data gathered during a simulation, determine the likelihood that a hybrid of these species would be successful in the arctic environment of the future. Continuing through the end of the unit, students analyze extinction data from past mass extinction events, apply their findings to current conditions, and write arguments for or against taking action to protect polar bears from possible extinction. |

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| | **Required**<br>**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. The lessons provide students with authentic and developmentally appropriate opportunities to engage in investigations that use scientific reasoning, model-based exploration, and data analysis to explain real-world phenomena. These opportunities directly support the SEPs aligned to the high school level expectations outlined in the Louisiana Student Standards for Science (LSSS). For example, in Unit 2, Ecosystems: Matter and Energy, Lesson 2, students develop an investigation plan to compare the amount of energy and matter released when peat burns compared to other fuel sources, such as dead leaves and wood. Students determine what evidence to gather and the tools that would be necessary to gather the evidence (SEP, Planning and Carrying Out Investigations). During the next lesson, students develop a data table to collect the evidence about matter and energy released during the burning of the peat and other fuel sources. Students conduct the experiment (SEP, Planning and Carrying Out Investigations) and gather evidence in their data table. Students then participate in a building understanding discussion about the evidence they collected during the burning investigation (SEP, Analyzing and Interpreting Data). Students figure out that peat releases carbon from stored energy when it burns. In |

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| | | | Lesson 3, students engage in Planning and Carrying Out Investigations (SEP) to produce evidence of changes in the flow of matter and energy in and out of a system during cellular respiration. In order to plan the investigation, students work in small groups to identify the variables. Students work towards answering the following question: "How does ___ affect the flow of matter and energy from ___ to ___ by decomposers in the zombie fire system?" The teacher then leads a class discussion. Ultimately, the students test the effect of changing temperatures on the process of cellular respiration in decomposers. During the next lesson, students conduct the experiment, collect data, and make sense of the questions (SEP, Analyzing and Interpreting Data, Planning and Carrying Out Investigations). Students recognize that the colder temperatures decrease the amount of sugar that is converted to carbon dioxide during cellular respiration. In Unit 3, Inheritance and Variation of Traits, Lesson 1, students analyze and interpret cancer data (CCC, Scale, Proportion, and Quantity) to create an initial model (SEP, Developing and Using Models) to explain who gets cancer and why. Later, in Lesson 4, students engage in using a simulation model to investigate how the rate of cell division is related to the chances of developing cancer, and, in Lesson 5, construct an explanation (SEP, Constructing Explanations) of how cancer cells develop chromosomal differences and the role p53 |

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| | | | plays in preventing these changes based on the evidence they collected from previous lessons. In Unit 4, Natural Selection and Evolution of Populations, Lesson 3, students engage in a model-based investigation exploring how genetic variations affect rat populations' resistance to poison, mimicking the process of natural selection. The activity uses red and blue pony beads as a manipulable model to simulate gene distribution and inheritance. Students gather data from this hands-on investigation, and then connect it to scientific research, Rat Poison Explanation handout, moving from model-based reasoning to evidence-based explanation. The materials state that "Students use self-generated data from group models to construct explanations and then later revise explanations using data from published studies." (SEP, Constructing Explanations and Designing Solutions). |
| | **2c)** Materials provide frequent opportunities for students to **make meaningful connections** to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. | **Yes** | Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. Each unit provides students opportunities to use their lived experiences and prior knowledge to help them learn the new content. At the end of each unit, students engage in a lesson in which they apply what they have learned to their own communities. For example, in Unit 1, Lesson 9, after learning about conservation efforts in the Serengeti, students begin to think about how |

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| | | | humans interact with ecosystems. Students engage in a Stop and Jot and answer the following questions: “How do you interact with an ecosystem when you visit a park or other protected space?” and “How do you interact with the land or water where you live?” Students relate their personal interactions with ecosystems to human interaction with the Serengeti ecosystem. Students also relate this to the other conservation areas they studied at the beginning of the unit. Thinking about ways in which they interact with ecosystems supports students’ understanding and motivations for conservation efforts. In Unit 2, Lesson 1, students connect with their community by engaging in home learning. Students ask in what ways their community has been directly or indirectly affected by fires. They also ask about whether a fire in another community could impact their community either directly or indirectly. This activity prepares the students to think about the impacts of fires on people and the environment. In Unit 3, Inheritance and Variation of Traits, Lesson 11, students learn about how cancer can be treated. The lesson begins with students discussing what they already know about cancer treatments and then investigating various treatments through case studies, articles, and an interactive game. |
| **Non-Negotiable**<br>**3. ALIGNMENT AND** | **Required**<br>**3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the | **Yes** | The majority (16 out of 20) of the Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards. |

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| **ACCURACY:**<br><br>Materials adequately address the Louisiana Student Standards for Science.<br><br>☒ Yes ☐ No | **full depth of the standards.** | | The materials consistently integrate Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs) and follow coherent learning progressions. Each unit is built around authentic phenomena and problems that drive student engagement and support conceptual development. The materials partially address LSSS HS-LS1-8, HS-LS1-6, HS-LS1-7, and HS-LS3-1. All SEPs and CCCs within these standards are addressed across the five units; however, there are 9 out of 38 DCIs within the Biology LSSS that are not fully addressed within the materials. All DCIs for HS-LS1-8 (HS.LS1E.a, HS.LS1E.b, HS.LS1E.c, HS.LS1E.d, and HS.LS1E.e) are not addressed within the materials. These DCIs address the topics of viruses, vaccines, and disease-causing microorganisms. LSSS HS-LS1-6 is not fully addressed because the materials do not fully address a part of DCI HS.LS1C.b about how the carbons from sugar are used in the formation of macromolecules such as amino acids and DNA. However, the other DCI (HS.LS1C.a), the SEP (Constructing Explanations and Designing Solutions), and the CCC (Energy and Matter) are fully addressed for this standard. LSSS HS-LS1-7 is only partially addressed because one of the two DCIs is not fully addressed. While students conduct an experiment to determine how temperature affects the rate of respiration, the materials do not address the energy released by respiration, which is used to maintain body temperature (DCI, HS.LS1C.d). |

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| | | | LSSS HS-LS3-1 is also only partially addressed because two of three DCIs related to this standard are not fully addressed. Students use a model to build understanding of the relationship between DNA, genes, and proteins, but the idea that DNA also includes segments that do not code for genes and whose functions are regulatory or unknown is not addressed fully (DCI, HS.LS3A.a). This DCI is briefly mentioned as a look-for in the discussion around the consensus model on page 8 in the Lesson 7 teacher guidance; however, a teacher would need to provide additional instruction to fully cover this DCI. Students also learn about Mendelian Inheritance by analyzing pedigree charts, but they are not given the opportunity to learn about more complex patterns of genetics, like incomplete or codominance (DCI, HS.LS3A.b). |
| | **Required**<br>3b) The total amount of content is **viable** for a school year. | **Yes** | The total amount of content is viable for a school year. The materials include five units each spanning 19-28 days. Each unit includes lesson condensing suggestions if needed. This does not include any supplemental lessons teachers need to add to address the missing DCIs. Units are structured to allow for deep exploration of concepts without excessive repetition or gaps. The unaccounted days in the Pacing Guide allow time for modifications, extensions, and reviews as needed, including time for the supplemental lessons required to address the missing and partially addressed LSSSS. The Pacing Guide notes Unit 1 as 26 |

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| | | | days, Unit 2 as 28 days, Unit 3 as 26 days, Unit 4 as 23 days, and Unit 5 as 19 days. |
| | **Required**<br>**3c)** Science content is **accurate**, reflecting the most current and widely accepted explanations. | **Yes** | Science 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. Across all units, the materials reflect modern understandings of biological concepts and processes, including genetics, molecular biology, ecology, evolution, and biotechnology. The materials use peer-reviewed articles along with current examples from real-world science that align with the DCIs of the LSSS. For example, in Unit 3, Inheritance and Variation of Traits, Lesson 11, students read about the relatively new CRISPR-based Therapy for cancer. The reading cites evidence from three peer-reviewed journal articles. In Unit 5, Common Ancestry and Speciation, students investigate environmental changes to the Arctic environment conditions and how these changes affect bear species. Lesson 1 introduces students to the phenomenon through accurate maps and data published by the Canadian government and articles that cite recently published sources from journals and universities. In Lesson 3, students examine photographs of authentic specimens, including skulls, claws, and jaws from different species of bears. |
| | 3d) In any one grade or course, instructional materials spend **minimal time on content** | **Yes** | Materials spend minimal time on content outside of the course. The majority of materials |

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| | **outside** of the course, grade, or grade-band. | | directly align to the Biology LSSS, maintain a course-appropriate scope and scaffolded learning progressions, and avoid excessive repetition of prior-grade content. Each unit aligns to the LSSS for Biology with content and performance expectations clearly drawn from the 9–12 DCIs, SEPs, and CCCs. Some of the lessons incorporate Earth and Space Science Standards, and Life Science standards outside of the course, but the lessons do not detract from the focus on core biology content. For example, Unit 1 addresses HS-ESS3-3, Unit 2 addresses HS-LS2-5, HS-ESS2-6 and HS-ESS3-6, and Unit 4 addresses HS-LS4-6. However, the lessons that include content beyond the scope of the course integrate course-appropriate content to support student understanding of the course-level LSSS. HS-ETS1-3 is also not in the LSSS for Biology, but very little time is spent on this within the materials. |
| **Non-Negotiable**<br>**4. DISCIPLINARY LITERACY:**<br><br>Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy. | **Required *Indicator for grades 4-12 only**<br>**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. All student-facing resources cite credible, recent sources. The tasks students engage in promote critical analysis and scientific reasoning. The consistent inclusion of journal excerpts and current research throughout the materials reinforces student engagement with primary |

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| ☒ Yes ☐ No | | | sources and strengthens connections between classroom instruction and real-world scientific inquiry. For example, in Unit 1, Lesson 3, students watch an interview with Dr. Simon Mduma, an ecologist, to understand scientific methodologies and field research on migration. They also analyze authentic field research data cards from wildebeest population studies. In Lesson 9, students investigate competing road proposals for the Serengeti, using real stakeholder reports and conservation data. In Unit 3, Inheritance and Variation of Traits, Lesson 1 introduces the anchor phenomenon by presenting students with data from the U.S. Department of Health and Human Services showing the most common cancers in the U.S in 2018. In Lesson 5, students watch a video showing human skin cells dividing from the Allen Institute of Cell Science. In Lesson 11, students read an article about CRISPR-based therapy with citations from peer-reviewed journals, including Annual Review of Cancer, Genes, and ACS Synthetic Biology. |
| | **Required**<br>**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 and prompt students to construct scientific explanations based on authentic data, models, and investigations, to use peer-reviewed science sources and case studies to support claims and reasoning, and to engage in peer |

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| | | | discussion and written argumentation to refine and defend their ideas with evidence. For example, in Unit 1 Lesson 1, students develop initial models based on four authentic conservation profiles, revise their initial models based on teacher feedback, and participate in a Gallery Walk in which some students stay to communicate the components and interactions of their model to their peers, while others in the group leave to observe the other models. As students participate in the Gallery Walk, they write down similarities and differences between the conservation profiles. In Unit 4, Natural Selection and Evolution of Populations, Lesson 10, students participate in a discussion about how fragmentation of ecosystems reduces the genetic diversity of wildlife species and read about the needs of different wildlife species that inhabit the areas around Buckeye, AZ. Then, they consider various development proposals for the city and summarize the possible effects on the wildlife populations. Through teacher facilitated discussions, students reach a consensus about the benefits and drawbacks of each proposal and share any compromise design ideas they developed. |
| | **Required**<br>**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 | **Yes** | Materials include variability in the tasks that students are required to execute. Across the materials, students regularly engage in a variety of tasks, such as discussing, reading, identifying patterns, problem-solving, developing models, generating explanations |

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| | investigations. | | through models, and interpreting data. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 3, students analyze wildebeest field research data to identify patterns and draw conclusions about why wildebeest migrate. In Lesson 5, students develop and use a kinesthetic and mathematical model to explain how food availability affects the carrying capacity of wildebeest populations. In Lesson 9, students evaluate road proposals and make recommendations regarding a possible road through the Serengeti, requiring them to apply scientific reasoning to a real-world problem. In Unit 2, Ecosystems Matter and Energy, Lesson 3, students carry out an investigation using yeast as a model organism to understand how temperature and oxygen affect decomposition and cellular respiration. They then construct an explanation based on their evidence. In Lesson 10, students investigate fire management strategies, including prescribed burning, cultural burning, and restoring grazer populations. They develop a mathematical representation to explain how these techniques alter the flow of energy and matter in ecosystems. They also propose a plan to reduce wildfire risk in their communities. In Unit 3, Inheritance and Variation of Traits, Lesson 3, students use a game-based model to learn about how human cells turn into cancer cells and form tumors. After they play the game, they record what part of mitosis each part of the game represents and discuss their |

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| | | | ideas with peers. Then they watch a video of skin cells dividing and refine their answer in determining how non-cancerous cells become cancerous cells. They play another round and consider what questions remain and how they might approach answering them. They review evidence from a graph, participate in a card sort activity, and finally reach class consensus about the differences between cancerous and non-cancerous cells. Students begin Unit 5, Common Ancestry and Speciation, Lesson 5, by talking to a partner about what they have learned about the differences between polar and brown bears. This is followed by a class discussion reviewing the class consensus model in terms of what it explains and what they can add to the model. Students then revise the class consensus model individually before comparing ideas during a class discussion and reaching a new consensus on what the model should include. |
| | **Required**<br>**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. The materials introduce vocabulary within the context of deeper conceptual understanding rather than isolated memorization. Vocabulary is addressed as needed, but only after students have first had the opportunity to build conceptual understanding of the term. Students co-construct definitions of the words they encounter and then add them to their Personal |

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| | | | Glossaries. For example, in Unit 2, Ecosystems Matter and Energy, Lesson 1, students develop a partial understanding of the word speciation by reading about different bear species that live in Wapusk Park, Canada. In Lesson 4, students explain what it means for bears to split into two species - polar and brown bears. As they read about changes to the environment that caused bear populations to adapt, students co-construct a more formal definition of speciation. In Lesson 5, students investigate how photosynthesis affects carbon storage and develop vocabulary related to chemical energy and directional hypotheses. This learning connects to future lessons where they model the carbon cycle and discuss the role of feedback loops, and, in Lesson 6, students develop a Gotta-Have-It Checklist, which helps them identify and track key concepts, interactions, and vocabulary terms needed for their models. This approach integrates terminology into the students' scientific reasoning rather than committing it to memory. In Unit 3, Inheritance and Variance of Traits, introduces terms such as mitosis and cell differentiation as students explore the biological processes that regulate cell division. Unit-based learning progressions are designed to revisit and reinforce key terms across multiple lessons and contexts, deepening student understanding. Students consistently apply scientific terminology in written explanations, data analysis, and model-building activities, promoting retention and |

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| | | | accurate usage of content-specific language throughout the course. |
| **SECTION II: ADDITIONAL CRITERIA OF SUPERIOR QUALITY** | | | |
| **5. LEARNING PROGRESSIONS:**<br><br>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.<br><br>☒ Yes ☐ No | **Required**<br>**5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are **coherent within and across** units. The **progression of learning** is coordinated over time, clear, and organized to prevent student misunderstanding and supports student mastery of the performance expectations. | **Yes** | The overall organization of the materials and the development of the disciplinary core ideas, science and engineering practices, and crosscutting concepts are coherent within and across units and 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 progression of learning supports student development of the Performance Expectations and prevents misunderstanding. For example, the first six lessons of Unit 1, Ecosystem Interactions and Dynamics, focus on DCI HS.LS2A.a. In order to support student mastery, Lesson 1 first introduces students to the idea of conservation through the 30 by 30 initiative, during which students begin to develop ecosystem models based on real-world conservation profiles and develop a model (SEP, Developing and Using Models) of a conservation profile. In Lesson 2, students explore how ecosystems can remain stable or shift based on human decisions (CCC, Stability and Change). In Lesson 3, students figure out that most wildebeest deaths are due to starvation, not predators, establishing food as |

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| | | | the main driver of migration. The understanding that food is the primary reason for migration transitions into Lesson 4, in which students analyze rainfall and food availability as limiting factors for populations. Students figure out that these factors shape population dynamics. Specifically, they discover how rainfall can cause an ecosystem to remain stable or change (CCC, Stability and Change) and use cause-and-effect reasoning to connect rainfall to grass growth, which affects (CCC, Cause and Effect) wildebeest migration. They continue their investigation in Lesson 5 as they use a kinesthetic model to construct a mathematical representation (SEP, Using Mathematics and Computational Thinking) of the relationship between limiting factors and carrying capacity using CODAP, providing students with concrete evidence of how food is the limiting factor that determines the carrying capacity of the wildebeest population. These activities prepare them for the Transfer Task in Lesson 6, in which they apply what they have figured out about limiting factors and the carrying capacity of an ecosystem to a population of African wild dogs. In Unit 3, Inheritance and Variation of Traits, Lesson 3, students play a Cell Game to model the cell cycle and learn how cancerous cells can form when cell division is not properly regulated (DCI, HS.LS1B.a; CCC, Cause and Effect). In Lesson 8, students learn about two individuals who survived multiple cancers and use pedigree charts (SEP, Developing and |

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| | | | Using Models) to trace their family histories of cancer and conclude that a heritable genetic mutation can result in an increased likelihood of developing cancer and that these mutations can be inherited. In Lesson 9, students read about how UV radiation can cause non-heritable mutations in cells that can also lead to the development of cancer (SEP, Obtaining, Evaluating, and Communicating Information). They synthesize this information in Lesson 10 by creating a model (SEP, Developing and Using Models) demonstrating how people develop cancer through inheritance and mutations. In Unit 4, Natural Selection and Evolution of Populations, Lesson 1, students begin investigating urban expansion using time-lapse satellite imagery from Google Earth and progress through a sequence of activities that include field observation, class discussions, and data interpretation. They build a DQB (SEP, Asking Questions; DCI, HS.LS4.C.4; CCC, Systems and System Models). The Teacher Interactive Board is employed to support whole-class collaboration as students develop a shared understanding of ecological concepts, track observations, and co-construct definitions, such as urbanization, components, and interactions. The design of the lesson provides students the opportunity to revisit and expand upon initial ideas through outdoor investigations and vocabulary notebook entries, reinforcing learning over time. By combining digital tools, structured discourse, and personal reflection, the |

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| | | | materials support students in developing increasingly sophisticated reasoning about urban ecosystems and the impact of human development. |
| | **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, specifically in teacher materials. | **Yes** | Students apply mathematical thinking when applicable. Across the majority of the materials, students are not introduced to math skills that go beyond the Louisiana Student Standards for Mathematics (LSSM) for High School. Students are occasionally called to apply mathematics skills and understanding to engage in Using Mathematics and Computational Thinking (SEP) appropriately in the context of their learning. For example, in Unit 2, Ecosystems Matter and Energy, Lesson 10, after reading about various fire management techniques, students use a mathematical model to trace the amount of carbon available at each trophic level and determine how each management technique reduces the amount of fuel available to burn in an ecosystem. In Unit 3, Inheritance and Variation of Traits, Lesson 8, students use basic probability and ratio reasoning to analyze pedigree charts in order to predict genetic inheritance patterns. On the worksheet, students respond to the following prompt, “If a parent has Li-Fraumeni syndrome (LFS), what are the chances it will be passed down to their children?” The students use Mendelian logic to determine that there is a 50% probability that the offspring will inherit LFS if the parent is heterozygous. In Lesson 9, |

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| | | | students interpret real-world data sets showing the correlation between UV exposure and melanoma incidence across regions and racial groups. Students interpret line graphs and scatter plots to determine the relationship between average UV index and melanoma rates for different populations. They explore the slope of trend lines showing the strength of correlation and compare trends across demographics (White, Black, Hispanic), applying descriptive statistics and critical data comparison. In Unit 4, Natural Selection and Evolution of Populations, Lesson 4, students compare data sets on junco boldness from two distinct experimental setups in slides I and J. This task involves interpreting and drawing conclusions from multiple quantitative distributions. Though students are not calculating specific statistical measures, they apply reasoned data interpretation to assess environmental influence on heritable behavior. Students investigate the relationship between CORT (a stress hormone) and boldness and engage in qualitative reasoning about correlation to co-construct a definition of "correlation coefficient," adding it to their glossary. Although the lesson does not yet involve calculating a coefficient, students recognize patterns of association and begin using terminology consistent with high school statistics. |
| **6. SCAFFOLDING AND** | **Required**<br>**6a)** There are separate **teacher support** | **Yes** | There are separate teacher support materials provided. Unit-level teacher support materials |

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| **SUPPORT:**<br><br>Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking.<br><br>☒ Yes ☐ No | **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' **approach to phenomenon-based instruction** and provides explicit guidance on how the materials **address, build, and integrate the three dimensions.** | | include the following: Unit Storyline, Unit Overview, Teacher Background Knowledge, Assessment System Overview, Investigation Materials, and Unit Resources. The Unit Overview begins with the guiding question of the unit, describes the unit phenomenon, what students will do across the unit to figure out the phenomenon, the LSSS addressed, how students will engage with the phenomenon, and guidance for supporting classroom discussion through the Teacher Interactive Board. The Unit Storyline describes the lesson-level phenomenon or design problem along with what students do and should figure out within each lesson set, and how each lesson connects to the next. The Storyline also includes examples of how the concepts are represented. The Teacher Background Knowledge includes Lab Safety Requirements for Science Investigations, notes where the unit falls within the scope and sequence of the materials, describes the anchoring phenomenon and why it was chosen, describes how the unit is structured and what elements of the three dimensions are developed. Additionally, this section includes an explanation of how the unit builds three-dimensional progressions across the materials, common ideas that students may have, suggestions on how to modify the unit if taught out of sequence, how to shorten or extend the unit if necessary, the mathematical concepts that students engage with, recommendations for adult-level learning resources for the unit's |

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| | | | science concepts, guidance for developing personal glossaries, and home communication. The Teacher Background section of the Teacher's Edition specifically cites the performance objectives, SEPS, DCIs, and CCCs, noting any parts of the DCIs not addressed within the unit. The Assessment Overview explains the embedded Assessment System across the unit, including a pre-assessment, formative assessments, self-assessments, and summative assessments. Investigation Materials lists all the materials needed for the unit, including materials within science kits and those not supplied. Unit Resources includes a variety of resources needed to teach the unit. Lesson-level teacher support materials include a Lesson Overview, Materials and Preparation, Learning Plan, Student Lesson Resources, Teacher Lesson Resources, and Spanish Resources. The Teacher Edition for each lesson also includes a learning progression that clearly outlines each lesson in the Where We Are Going and Where We Are Not Going sections. The brief explanation of what was learned in the previous lesson, what is learned in the current lesson, and what will be learned in the next lesson provides instructional coherence for the teacher. The Teacher Edition for each lesson also describes how the lesson fits in context with other lessons, the three-dimensional learning that students will engage in, and offers detailed instructions for implementing the lesson. These supports include teacher |

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| | | | guidance on speaking and writing in the science classroom, suggested prompts, anticipated student responses, and links to resources. For example, many lessons guide teachers to support students in developing a Gotta-Have-It Checklist to help them organize key concepts that should be included in their explanations. Throughout the materials, students participate in creating consensus models and consensus discussions. The community agreement constructed by the students and teacher in the very first Lesson 1 governs the classroom norms and expectations for collaboration, respect, and discussion |
| | **Required**<br>**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 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 developmentally appropriate and aligned to the LSSS and associated learning progressions. For example, in Unit 1, Ecosystem Interaction and Dynamics, Lesson 11, teacher support is provided for the KEY: Prairie Transfer Task, which includes detailed guidance on evaluating student responses. This promotes teacher understanding of what proficiency looks like when students apply science and engineering practices to address ecosystem conservation and biodiversity loss. |

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| | | | The lesson directly references prior lessons and asks students to draw from their Progress Trackers and science notebooks, providing a clear path from prior investigations to final Transfer Tasks. In Unit 3, Inheritance and Variation of Traits, Lesson 1, teacher guidance introduces cancer as a complex but personally relevant phenomenon. In Lesson 5, the materials support teachers in facilitating student understanding of DNA replication, mutation, and protein repair mechanisms, helping teachers link these biological concepts to cancer formation. In the Where We Are Going section of Lesson 6, the materials provide teachers a clear learning progression, which states, "in this lesson, students develop a conceptual understanding of gene expression. They build on their understanding of DNA from Lesson 4 as well as a middle school level understanding" and "To support development of high school grade band ideas, students build understanding of the role of DNA in genes, including the nucleotides that make up the genetic code, how they can be altered through mutation, and how those changes affect the resulting proteins." In Unit 5, Common Ancestry and Speciation, Lesson 3, students discuss the similarities and differences between three bear species: the brown bear, black bear, and polar bear. The Learning Plan provided for the lesson guides the teacher on how to initiate this discussion, orients them to the purpose of the discussion, gives a rationale for having students work in |

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| | | | small groups before engaging in a whole-class discussion, and includes a list of six things to listen for the students to say. Then the students rotate through stations where they read about the three bear species and compare their skulls, teeth, and claws. The Lesson Planning resource offers a suggestion of how to introduce this investigation as well as how to organize the stations and group students. |
| | **Required**<br>**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 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. | Yes | Materials provide support for diverse learners, including English Learners and students with disabilities. Materials provide appropriate suggestions and materials for supporting varying student needs at the unit and lesson level using an accelerated learning approach. 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. Each Unit Overview provides a pacing guide that points to additional mini-labs a teacher may choose to include at key points for students who need additional experiences and time developing core ideas of the unit. Each Unit Overview also includes a Phenomenon Relevance Note that includes alternatives as well as suggestions for modifying the anchoring phenomenon to make it more accessible and/or locally relevant for students, if needed. Lesson materials include diverse learner support with specific tips, techniques, and points to consider to support the teacher in recognizing and valuing |

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| | | | student resources and participation. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 11, students engage in the Prairie Transfer Task as a culminating application opportunity. To ensure access for all learners, teacher guidance suggests that students use the science notebooks and complete Progress Trackers, which provide essential scaffolds for students who need additional support in recalling and applying key ideas. The accompanying answer key includes clear guidance on evaluating student responses and offering targeted feedback, which promotes individualized progress monitoring and helps teachers respond to student needs in real time. In Unit 1, Lesson 3, students engage in a multimodal exploration of the wildebeest migration phenomenon. A video interview is paired with an annotated transcript, allowing students to access content through both auditory and visual channels. Guidance prompts teachers to co-construct vocabulary definitions, such as empirical evidence and mortality factors, which support English Learners and students with language processing challenges. During the data card analysis portion, the lesson provides detailed guidance on differentiating task complexity based on student readiness. For instance, groups may begin by organizing data cards based on simpler factors like disease before tackling more complex patterns such as geographic location or seasonal change. Additional teacher guidance suggests jig |

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| | | | sawing data sets, modeling sort strategies, and using guiding questions to support students as they make sense of the data. These supports are explicit, embedded at the lesson level, and reflect best practices in differentiation, helping ensure that all students have access to high-quality science instruction. Lessons avoid presenting definitions too early. Instead, the teacher co-constructs terms, such as carbon sink, zombie fire, photosynthesis, and feedback loop, with students after shared experiences. For example, in Unit 2, Ecosystem Matter and Energy, Lesson 1, teacher guidance states that “words should be defined and recorded after your class has developed a shared understanding of their meaning.” In Lesson 3, students engage in a laboratory investigation to determine why matter doesn’t decompose in permafrost. As they prepare for this activity, they identify variables and controls. The Teacher Edition notes that multilingual students may need extra support in understanding the idea of control conditions since the way we use the term in science and in everyday life are different. Later in the lesson, students use molecule cards to trace the flow of energy and matter during cellular respiration. Guidance suggests that teachers extend this activity for students who need enrichment by asking students to determine the number of each molecule (glucose, oxygen, water, and carbon dioxide) that would be required for this process to adhere to the law |

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| | | | of conservation of mass. In Lesson 6, students work together to create a Gotta-Have-It Checklist before creating a model to explain what causes zombie fires. The teacher materials suggest a way to support students who are learning English, as well as others who struggle with language during the consensus discussion, by paraphrasing back what students say in slightly different ways. This guidance offers students multiple times and ways to engage with the content and the opportunity to hear scientific language in multiple contexts. |
| **7. USABILITY:**<br><br>Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year.<br><br>☒ Yes ☐ No | **Required**<br>**7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging or certified partners. | Yes | Text sets (when applicable), laboratory, and other scientific materials are readily accessible through vendor packaging or certified partners. The program offers a comprehensive set of instructional materials, including multimedia resources, laboratory handouts, student readings, visual inquiries, and data sets — all of which are housed and easily downloadable on the online platform. The Materials and Preparation Tab links all text sets, laboratory instructions, and other print materials for each lesson, which are free to download and print. Required materials are clearly identified along with practical substitutes or digital alternatives when possible. Materials also include preparation instructions, digital file formats, and printable versions for classroom use. Vendor packaging and certified partners offer comprehensive, classroom-ready kits specifically designed to |

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| | | | support the implementation of the materials. These kits are organized with features like lesson-bagging to streamline classroom implementation and are delivered in stackable, reusable totes for easy organization. Additionally, the available Kit Companion provides an online resource offering detailed information about kit contents, safety data sheets, and setup tutorials. |
| | **Required**<br>**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. Materials embed safety education into investigations, modeling real-world lab expectations. These include both general lab safety practices and activity-specific procedures, supporting students in learning how to safely operate in a science lab. The inclusion of Personal Protective Equipment requirements, chemical handling protocols, and setup safety across lessons ensures students develop a strong foundation in scientific lab safety and standard operating procedures. For example, in Unit 2, Ecosystems Matter and Energy, Lesson 2, during an investigation in which fuel is burned, materials provide students explicit safety guidelines, such as the following: "Wear safety goggles (indirectly vented chemical splash goggles), a non-latex apron, and nitrile gloves during setup, hands-on investigation, and take-down." "Never taste any substance or chemical in the |

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| | | | lab." "Wash hands with soap and water immediately after completing the activity," and "Ensure that the classroom has engineering controls (eyewash station and shower) available." When students investigate the Earth's tilt in Lesson 5, explicit safety instructions include the following: "Wear indirectly vented chemical splash goggles, a non-latex apron, and nitrile gloves during the setup, hands-on, and takedown." "Use caution when working with glassware, clamp lights, and electrical receptacles," and "Ensure materials are handled away from ignition sources." Guidance reinforces the lab procedures throughout the investigation. Materials demonstrate safe heating of solutions and proper handling of reagents, as well as the proper use of chemical indicators (iodine) and reinforcement of safe disposal practices. In Unit 3, Inheritance and Variation of Traits, Lesson 9, students experiment with yeast to learn about the relationship between environmental factors and cancer. Students use wild-type and UV-sensitive yeast and compare how each population responds under various conditions. The Teacher's Edition for this unit includes generalized safety information, and the beginning of Lesson 9 outlines the safety precautions that should be observed. The included slide deck includes two Safety Considerations slides to share and discuss with students before beginning the experiment. The Lab Safety Requirements for Science Investigations section of the Unit 5 |

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| | | | overview outlines necessary equipment, such as chemical splash goggles, non-latex gloves and aprons, and emphasizes that safety procedures must be reviewed prior to each investigation. The Teacher Guide explicitly directs teachers to follow safe storage and disposal instructions, including disposal of waste materials and safe management of sharp or glass components. |
| **8. ASSESSMENT:**<br><br>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.<br><br>☒ Yes ☐ No | **Required**<br>**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. Materials embed pre-assessments, formative assessments, self-assessments, and summative assessments throughout each unit. Each lesson provides formative assessment opportunities, including discussions, models, card sorts, simulations, laboratory investigations, and skills practice. Materials also include Transfer Tasks as summative assessments. For example, Unit 3, Inheritance and Variation in Traits, includes a pre-assessment in Lesson 1. Lessons 2-9 all provide opportunities for formative assessment through Progress Tracker Updates as well as other activities. In Lesson 3, students participate in a card sort activity and then apply that model to authentic photos of cells undergoing mitosis. Teachers can formatively assess student mastery by evaluating how well students sequence the photos to show the cell cycle and describe what each photo shows. In Lesson 5, students |

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| | | | create a Gotta-Have-It Checklist outlining the important details that should be included in their explanations of mutations and how they can cause cancer. Lesson 10 includes a Transfer Task in which students analyze data and pedigree charts to understand how lactase and celiac disease are inherited, which can be used as a summative assessment. Unit 4, Natural Selection and Evolution of Populations, Lesson 10 integrates both formative and summative assessment through the use of a  DBQ check-in, a consensus discussion, and the Buckeye Plan Evaluation Tool. The DBQ serves as a reflective tool, encouraging students to revisit what they have figured out while also surfacing unresolved questions. The consensus discussion is a formative moment where students evaluate competing city plans using criteria developed earlier in the unit. This discussion directly informs the Buckeye Plan Evaluation Tool, a summative assessment where students finalize their written evaluation of the proposals. The unit culminates in a robust end-of-unit Transfer Task in which students apply their understanding of natural selection and genetic traits to a new context of banana plants engineered to resist fungal infection. |
| | **Required**<br>**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. Materials provide evidence that assessment |

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| | | | items and tasks are structured around the integration of the three dimensions of the LSSS and offer opportunities for students to apply understanding in new contexts. These embedded assessments progressively build conceptual understanding through modeling, simulations, investigations, and Transfer Tasks. The three dimensions are evident in every assessment, whereas the application of science concepts is mostly evident in the Transfer Tasks found in each unit. For example, in Unit 3, Inheritance and Variation of Traits, Lesson 3, students play the Cell Game, modeling how cell division is regulated by p53, and what happens when that regulation fails. The game incorporates the SEP, Developing and Using Models, the DCI, and HS.LS1B.a, and the CCC, Cause and Effect. Students interpret data and revise models to understand how cancer cells emerge due to disrupted regulation mechanisms. In Lesson 6, students physically model how DNA codes for proteins, focusing on how mutations in p53 affect function. This activity incorporates the SEPs, Using Models and Obtaining and Analyzing Information, the DCIs, and HS.LS1.A.b and HS.LS3.A.a, and the CCC, Structure and Function. Students use an electronic exit ticket to apply their learning to a new context involving gene mutation and protein impact. In Unit 4, Natural Selection and Evolution of Population, Lesson 3, students use a historical case study of rats developing poison resistance to construct explanations of natural |

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| | | | selection in urban environments (DCI, HS.LS4.B, HS.LS4.C). They interpret genetic and phenotypic data (SEP, Constructing Explanations) and reflect on the ethical implications of animal studies, connecting science to real-world decision-making (CCC, Cause and Effect). In Lesson 4, students explore behavioral adaptations in juncos using field and laboratory experimental data. They analyze statistical relationships between stress hormone (CORT) levels and exploratory behavior using CODAP, a real-world data tool (SEP, Analyzing and Interpreting Data). In the assessment tasks, students determine whether traits are inherited or learned (DCI, HS.LS4.B) and link outcomes to Stability and Change (CCC). The exit ticket includes both an individual reflection and a scientific argumentation, allowing teachers to assess three-dimensional understanding and students to internalize the value of data-driven inquiry. In Unit 5, Lesson 6, students use models to make predictions (SEP, Developing and Using Models) about sea ice and how this selective pressure will affect the survival of polar bears (CCC, Cause and Effect; DCI, HS.LS4C.c). In Lesson 9, students engage in a Transfer Task in which they analyze data (SEP, Analyzing and Interpreting Data) and make claims about the future of bumblebee populations worldwide (CCC, Scale, Proportion, and Quantity). They read about the role bumblebees play in the ecosystem and use data about their historic range to explain how a disease could spread |

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| | | | between populations and how pesticides affect mortality rates to evaluate claims about the future health of bumblebee populations worldwide (DCI, HS.LS4C.d). |
| | **8c)** Scoring guidelines and rubrics **align to performance expectations**, and incorporate criteria that are specific, observable, and measurable. | **Yes** | Scoring guidelines and rubrics align with performance expectations and incorporate criteria that are specific, observable, and measurable. Each unit includes an Assessment System Overview that outlines assessment opportunities in each lesson, including a Performance Expectation and Assessment Guidance that reference the related DCIs, CCCs, and SEPs. Provided keys give specific answers, look-fors, and exemplar answers. Materials also provide in-the-moment guidance for teachers on what to look for and listen for during instruction, helping educators identify key evidence of student progress toward mastery of the objectives. These embedded prompts appear across lessons as part of formative assessment opportunities. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 3, as students analyze the wildebeest data cards, guidance prompts teachers to look and listen for specific scientific patterns students uncover, such as bone marrow health, anthrax timing, and fat content. The Teacher Edition provides the following guidance for what teachers should look for/listen for in the moment: “Live wildebeest have a higher percentage of fat in their bone marrow than dead wildebeest;” “June and July were the only months where |

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| | | | anthrax was found in the population;" and "There was no difference of anthrax infection percentages between living and dead wildebeest." It also provides the following guidance for what to do: "Use the Data Cards Patterns Key to provide feedback," and to ask, "What empirical evidence did you find to help explain why the wildebeest migrate?" At the end of Unit 2, Ecosystem, Matter and Energy, Lesson 4, students complete an exit ticket. The provided key includes the assessed Performance Expectation and aligns each question with the SEP, CCC, and/or DCI it evaluates. For the multiple choice questions, the key provides the correct response with a rationale and suggestions for how to support students who struggle with the skills or concepts required to correctly answer the question. For open-ended responses, the key includes what teachers should look for in student responses and offers suggestions for scaffolds. In Lesson 6, students write an explanation of how zombie fires burn under the ice. The associated rubric describes what teachers should look for to identify each level of response (Foundational Pieces, Linked Understanding, and Organized Understanding) along with exemplar responses, suggested feedback, and suggested instructional support for each level of response. In Lesson 12, students complete a Transfer Task in which they develop models to explain the flow of matter and energy in the Gulf of America's dead zone. The associated key provides the |

| CRITERIA | INDICATORS OF SUPERIOR QUALITY | MEETS METRICS (YES/NO) | JUSTIFICATION/COMMENTS WITH EXAMPLES |
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| | | | aligned Performance Expectation and outlines the assessed SEP, CCC, and DCI, and indicates which questions align with each dimension. Like the rubric for the explanation in Lesson 6, it provides rationales for multiple choice questions, look-fors for each level of response with exemplar student responses for constructed responses, and suggestions for feedback and support for each level of response. In Unit 5, Common Ancestry and Speciation, Lesson 6, the Future Predictions activity and associated exit ticket directly tie to lesson-level Performance Expectations that integrate all three dimensions of the standards. These assessments measure students' ability to interpret predictive sea ice models (DCI: HS.LS4.C.b), analyze bear mating behavior data to reason about hybridization, and use models to explain how genetic variation could be passed on to hybrid offspring (SEP, Developing and Using Models; CCC, Cause and Effect). The accompanying scoring guidance prompts teachers to evaluate specific reasoning patterns in student responses, such as accurate interpretation of future environmental conditions and logical predictions based on evidence. Rubrics include clear, measurable criteria such as model accuracy and inclusion of genetic mechanisms, which allow for objective evaluation of student understanding. |
| **FINAL EVALUATION**<br>***Tier 1 ratings*** receive a "Yes" for all Non-Negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality. | | | |

| CRITERIA | INDICATORS OF SUPERIOR QUALITY | MEETS METRICS (YES/NO) | JUSTIFICATION/COMMENTS WITH EXAMPLES |
|---|---|---|---|
| ***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. Materials are designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Materials provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. |

[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 |
|---|---|---|---|
| | 3. Alignment and Accuracy | **Yes** | The majority of the Louisiana Student Standards for Science (16 out of 20) 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 used and produced by scientists. Students regularly engage in speaking and writing about scientific phenomena and engineering solutions using authentic science sources. There is variability in the tasks that students are required to execute. 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 lessons within and across each unit are organized to support learning through a natural progression. Students apply mathematical thinking when applicable. |
| | 6. Scaffolding and Support | **Yes** | There are separate teacher support materials provided. Teacher support materials include |

[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 |
|---|---|---|---|
| | | | guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in a way that is developmentally appropriate. Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson level. |
| | 7. Usability | **Yes** | Text sets (when applicable), 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. |
| | 8. Assessment | **Yes** | Multiple types of formative and summative assessments are embedded into content materials and assess the learning targets. Assessment items and tasks are structured on the integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. Scoring guidelines and rubrics align with performance expectations and incorporate criteria that are specific, observable, and measurable. |
| 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 2024-2025 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Acadia, Ascension, Avoyelles, Bienville, Bossier, Caddo, Calcasieu, CSAL, East Feliciana, East Baton Rouge, Hynes Charter School Corporation, Iberia, Iberville, Jefferson, Lafayette, Lincoln, Livingston, LSU Laboratory School, Natchitoches, Ouachita, Plaquemines, Richland, St. Charles, St. Landry, St. Mary, St. Tammany, Tangipahoa, Terrebonne, University View Academy, West Baton Rouge, and Zachary Community Schools. This review represents the work of current Louisiana educators 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.