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: **Activate Learning Certified OpenSciEd Biology**

Grade/Course: **Biology**

Publisher: **Activate Learning**

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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. 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. For example, in Unit 1, Ecosystems Interactions and Dynamics, Lesson 3, students analyze information from the migration model and 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 analysis, blood analysis, and/or cause of death, support or limit the size of the wildebeest population (DCI, HS.LS2A.a). During the next lesson, students create data displays with their group based on

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			the patterns previously identified. Students then communicate 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 (CCC, Systems and System Models; DCI, HS.LS1C.a). Then, students analyze world maps showing solar radiance and gross primary production to determine the relationship between the two (CCC, Cause and Effect). Lastly, students read an article and communicate their ideas (SEP, Obtaining, 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 (DCI, HS.LS2.A.b). Lesson 2 builds on this understanding as students engage in Planning and Carrying Out Investigations (SEP) by

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			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 **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions drive student learning. ☒ Yes ☐ No	**Required** **2a) Observing and explaining phenomena** and designing solutions provide the purpose and opportunity for students to engage in a coherent sequence of learning a majority of the time. Phenomena provide students with authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow.	**Yes**	Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. Phenomena in the form of common experiences at the beginning of each unit spark students to generate questions and define problems to motivate learning about the core ideas of the unit, and this provides purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the phenomenon. 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, and collaborating to develop an initial model which is updated and refined as they continue their study. Students track their learning in a science notebook where they record Notice and Wonder tables, personal glossaries, and

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			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. Then they look at four different conservation areas related to the anchor phenomenon and develop initial models of what happened in these places over time. Students share their initial models through a gallery walk, looking for similarities and differences between the models of the conservation areas. Then, they create a Driving Question Board about how the ecosystems in the conservation profiles work and how they are protected, and generate ideas for investigating their questions. In Lesson 2, students encounter a related phenomenon, the Serengeti conservation area. Students participate in a scavenger hunt to gather information about the Serengeti and reach a consensus about why the Serengeti was protected and how it was protected through class discussions. 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 5, students complete a transfer task about a population of wild dogs, using what they have

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			learned about how ecosystems work. In Lesson 6, after the transfer task, students revisit their Driving Question Board, identifying which questions they have been able to answer using the Serengeti as a model conservation area. In Unit 2, Ecosystems: Matter and Energy, Lesson 1 introduces students to the anchor phenomenon, zombie fires in the Arctic. The zombie fire system provides students the purpose and opportunity to answer the unit question, “What causes fires in ecosystems to burn and how should we manage them?” In Lesson 1, students answer the question, “How can fires burn under ice and release so much energy and matter?” They build a Driving Question Board and consider ideas for investigation. In Lesson 2, students observe fuel samples, such as peat, wood, and dried leaves, and read about peat. Afterwards, students develop an investigation plan, determining what tools they can use to collect evidence about the differences between peat and the other fuel sources as they burn, and developing a data table to record evidence during the investigation. Students then conduct an investigation in which they burn the different fuel sources using Bromothymol blue (BTB) to determine how much carbon dioxide is released. In Lesson 3, students conduct another investigation to determine the effect of temperature on yeasts’ decomposition of sugar in order to determine the role of decomposers in the zombie fire system. Using their collected data, students construct an

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			explanation about why there is so much matter and energy in the zombie fire system based on what they figured out in their investigations. In Lesson 4, students read about the changes in Earth's tilt and the amount of direct sunlight the Arctic received thousands of years ago compared to nowadays. Students wonder about how the change in direct sunlight may have affected photosynthesis in the Arctic. In Lesson 5, students conduct an investigation on the effect of direct versus indirect sunlight on photosynthesis. In Lesson 6, students construct an explanation for why there is so much matter and energy in the zombie fire system. At the end of Lesson 6, students return to the Driving Question Board to determine what questions they have answered and what they still need to figure out. In Unit 5, Common Ancestry and Speciation, Lesson 1 introduces students to the anchor phenomenon as students view photographs and videos showing an area of the Arctic where polar, black, and brown bears were seen sharing territory for the first time. They create a Notice and Wonder chart where they record observations they made and questions they have. Then, they investigate the phenomena by analyzing maps of the typical ranges of these species, climate data, and articles about the lifestyles of the bear species. They use their findings to develop initial models predicting what will happen to each species under two conditions - seasonally available ice and permanently available ice - and create a

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			Driving Question Board. 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. Over the course 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.
	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. The lessons incorporate investigative learning, data analysis, and model-based reasoning to explain scientific phenomena, ensuring students actively engage in scientific and engineering practices. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 7, students engage in an agent-based

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			modeling game to investigate predator-prey interactions in the Serengeti ecosystem. The investigation provides hands-on experience with Using Mathematics and Computational Thinking (SEP) while exploring Patterns (CCC) in survival strategies. The use of algorithms to simulate predator-prey dynamics enhances their understanding of real-world ecosystem interactions, supporting both data interpretation and model refinement. In Unit 2, Ecosystems: Matter and Energy, Lesson 2, students plan an investigation (SEP, Planning and Carrying out Investigations) 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. Students conduct the experiment 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 has large amounts of stored energy and releases carbon when it burns. In Unit 4, Natural Selection and Evolution of Populations, Lesson 2, students conduct an investigation (SEP, Planning and Carrying out Investigations) to determine why seeds in urban environments tend to have a different structure than those in rural areas. They continue their investigations in Lessons 3 and 4, focusing on differences in populations

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			of two other species, rats and juncos, which inhabit urban and rural areas. In Lesson 5, students use the results of these investigations to update their initial model of how urbanization influences the evolution of various species and compare their model to those of Lamarck and Darwin (SEP, Developing and Using Models). In Lesson 7, students encounter the case of the Florida panther and apply their model to try to explain changes in the panther population. They use this case study to evaluate their models and ask questions that help them refine the model in later lessons (SEP, Asking Questions and Defining Problems). In Lessons 8 and 9, students engage in Using Mathematics and Computational Thinking (SEP) to explain the effect of fragmentation affects allelic frequencies in nonhuman species and propose changes to urban design to reduce this selective pressure.
	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 experiences and prior knowledge to help them learn and connect to 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. In Unit 1, Ecosystem Interactions and Dynamics, Lesson 9, students

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			begin to think about how humans interact with ecosystems after learning about conservation efforts in the Serengeti in previous lessons. Students participate in a Stop and Jot technique, answering 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. They also relate this experience to the other conservation areas they studied at the beginning of the unit. Prompting the students to think about ways in which they interact with ecosystems supports students in understanding motivations for conservation efforts. In Unit 2, Ecosystems: Matter and Energy, Lesson 1, students are introduced to the anchor phenomenon, arctic zombie fires. As they begin to explore these events, they draw connections to their own experience with fires and connect with their community by doing a home-learning assignment. They ask community members how they have been directly or indirectly affected by fires and whether a fire in another community could impact their community. 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 discuss prior knowledge about cancer treatments and explore various treatments through case studies, articles, and

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			an interactive game. In Lesson 12, students analyze data from the Center for Disease Control (CDC) about the relationship between new cancer diagnoses and zip codes and apply the concept of health equity. They consider how their geographic location influences their risk of developing cancer and develop interview protocols to understand the needs of a cancer patient in their community or family so that they can act as a healthcare navigator for that patient.
Non-Negotiable **3. ALIGNMENT AND ACCURACY:** Materials adequately address the Louisiana Student Standards for Science. ☒ Yes ☐ No	**Required** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the **full depth of the standards**.	**Yes**	The majority, (16 out of 20), of the Louisiana Student Standards for Science (LSSS) are incorporated to the full depth of the standards. 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 (24%) 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)

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			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). 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 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 over four to six weeks. Each unit includes lesson condensing suggestions if needed. This does not include any supplemental lessons teachers will need to

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			add to address the missing DCIs. Units are structured to allow for deep exploration of concepts without excessive repetition or gaps. Unit 1 includes five to six weeks of instruction. Unit 2 includes six weeks of instruction. Unit 3 includes five weeks of instruction. Unit 4 includes five weeks of instruction. Unit 5 includes four weeks of instruction.
	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. For example, the Teacher Handbook states that the materials are explicitly aligned to the Next Generation Science Standards, ensuring that students engage with the most current and research-based scientific concepts. In Unit 2, Ecosystems: Matter and Energy, students investigate zombie fires and explain why so much peat is stored under the arctic ice. In Lesson 4, students model the flow of energy and matter during photosynthesis. The molecular structures on the card are accurate representations of glucose, water, oxygen, and carbon dioxide. Students use accurate maps and information to draw a conclusion that the arctic plants grew better in the past due to more sunlight. In Lesson 10, students read case studies to research and evaluate the effects of various fire management plans on ecosystem stability. In Unit 3, Inheritance and Variation of Traits, Lesson 11, students read about the

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			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's environmental conditions and how these changes are affecting bear species. In Lesson 1, students engage with the phenomenon by exploring accurate maps and data published by the Canadian government, as well as articles that cite recently published sources from journals and universities. In Lesson 3, students examine photographs to compare skulls, claws, and jaws from different species of bears. These photographs are of authentic specimens. In Lessons 4 and 7, students analyze real-world data from published studies on genetic variation and species interactions, ensuring that their explanations are based on current scientific consensus on polar bear speciation and extinction events.
	3d) In any one grade or course, instructional materials spend **minimal time on content outside** of the course, grade, or grade-band.	**Yes**	Materials spend minimal time on content outside of the course. The majority of materials are directly aligned to the Biology LSSS. The materials maintain a course-appropriate scope by aligning with the LSSS for Biology, clearly defining boundaries, ensuring scaffolded learning progressions, and avoiding excessive repetition of prior-grade content. Lessons appropriately scaffold biological organization (HS-LS1-2) and population dynamics (HS-LS2-1) without unnecessary focus on middle school

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			content. For each lesson, the Teacher's guide explicitly states where content will and will not go, ensuring that minimal time is spent on content outside of the course. While the LSSS does not have specific ETS standards, these concepts are integrated within the DCIs of the LSSS. NGSS HS-ETS1-3 (Unit 3) is mostly incorporated as a DCI of LSSS HS-LS2-7. ETS1-2 (Unit 2) is not included as a DCI in the LSSS Life Science Standards; however, it is incorporated as an extension and does not detract from the focus on core biology content. Some references to elementary-level ecosystem concepts exist, but do not interfere with high school-level mastery. Unit 1 includes a related environmental science standard, ESS3-3 and one life science standard, LS2-8, that are not part of the LSSS for Biology.. Additionally in Unit 1, LS2-2 is not in the LSSS, but this standard is combined with LSSS HS-LS2-1 and is therefore not outside of the standards for Biology. . In Unit 2, two standards addressed in the materials, ESS2-6 and ESS3-6, are not in the LSSS for Biology. NGSS LS2-3 and LS2-5, are partially embedded within the clarification statement and DCIs of LSSS HS-LS1-7 and HS-LS2-4, respectively.- In Unit 4, LS2-8 is not found in the Biology LSSS. NGSS LS4-6, while not included in the LSSS, is integrated within the DCIs for LSSS HS-LS2-7 and does not spend time on content outside of the course. All of the standards included in Unit 3 and Unit 5 are part of the Biology LSSS.

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Non-Negotiable 4. DISCIPLINARY LITERACY: Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy. ☒ Yes ☐ No	**Required *Indicator for grades 4-12 only 4a)** Students regularly engage with **authentic sources** that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses.	Yes	Students regularly engage with authentic sources that represent the language and style used and produced by scientists. The materials incorporate a variety of authentic sources, including primary source documents, photographs, and authentic data sets. All student-facing resources are cited from credible, recent sources. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 3, students watch an interview with Dr. Simon Mduma, an ecologist, to understand scientific methodologies and field research on migration. Then, students 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. Students explore predator-prey relationships during wildebeest migration using agent-based models, which are based on computer simulations of a complex system. In Unit 2, Ecosystems: Matter and Energy, Lesson 7, students read adapted scientific literature on carbon sinks burning worldwide, including case studies from Cambodia, Brazil, and Australia. They use global fire maps, historical data, and ecosystem models to develop scientific explanations of carbon cycling. In Unit 3, Inheritance and Variation of Traits, Lesson 1, students interact with data from the U.S. Department of Health and Human Services showing the most common cancers in the U.S. in 2018 as an introduction to the anchor phenomenon. In Lesson 5, students

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			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 Biology*, *Genes*, and *ACS Synthetic Biology*. In Unit 4, Natural Selection and Evolution of Populations, Lesson 1, students read a case study about hawksbeard seed dispersal in urban and non-urban environments. The reading includes a citation from the National Academy of Sciences. In Lesson 4, they read about the common garden experiment with juncos, which includes methods and data from a study published in the journal *Behavioral Ecology*.
	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 writing and speaking about scientific phenomena and engineering solutions through constructing scientific explanations based on authentic data, models, and investigations, using peer-reviewed science sources and case studies to support claims and reasoning, and engaging in peer discussion and written argumentation to refine and defend their ideas with evidence. Oftentimes, students discuss and write in response to articles, data sets, and other authentic sources of scientific information. For

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			example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 1, students develop initial models based on four authentic conservation profiles. The next day, students revise their initial models based on teacher feedback. After their revisions, the students participate in a Stay and Stray Gallery Walk in which some students stay to communicate the components and interactions of their model to their peers, while others in the group go to observe and discuss the other models. As students participate in the gallery walk, they write down similarities and differences between the conservation profiles. In Unit 2, Ecosystems: Matter and Energy, Lesson 6, students develop a class consensus model synthesizing data on peat, permafrost, and carbon cycling. They construct individual scientific explanations for the phenomenon of zombie fires using collected evidence. In Lesson 7, students begin by discussing what they have learned about the flow of matter and energy in the zombie fires and what questions remain about this phenomenon. Then they complete a Notice and Wonder T-chart, recording their thoughts as they watch an animation showing global high fire activity in the year 2020. Students review different one-page readings showing the locations of carbon sinks. After reading case studies about carbon sinks in different countries, students develop a written model and provide written peer feedback to other students. At the end of the lesson, students update their Personal Glossaries to include the

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			definition of fire suppression. In Unit 4, Natural Selection and Evolution of Populations, Lesson 10, students participate in a discussion about how the fragmentation of ecosystems reduces the genetic diversity of wildlife species. After reading about the needs of different wildlife species that inhabit the areas around Buckeye, Arizona, students divide into groups. Each group reads and shares with the class one development proposal for the city and summarizes the proposals and possible effects on the wildlife populations. The teacher then facilitates a whole class discussion during which students reach consensus about the benefits and drawbacks of each proposal and share any compromise design ideas they have developed.
	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 discussing, reading, identifying patterns, generating explanations through models, and interpreting data. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 9, students apply scientific reasoning to a real world problem by evaluating road proposals and making recommendations regarding a proposed road through the Serengeti. In Lesson 3, students analyze wildebeest field research data to identify patterns and draw conclusions about why

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			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 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. Students 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 students play the game, they record what part of mitosis each part of the game represents and discuss their ideas with peers. Then, students watch a video of skin cells dividing and refine their answer to how non-cancer cells become cancer cells. After students play another round of the previous game, they consider what questions remain and how they might approach answering them. Students review evidence from a graph, participate in a card sort activity, and, finally, reach a class consensus about the

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			differences between cancerous and non-cancerous cells. In Unit 5, Common Ancestry and Speciation, Lesson 5, students begin the lesson by sharing with a partner information gained about how polar and brown bears became different species. This is followed by a class discussion reviewing the class consensus model and answering the question, “What will happen to arctic bears as their environment changes?” Students discuss in terms of what it explains and what can be added 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 **4d)** Materials provide a coherent sequence of learning experiences that **build scientific vocabulary** and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation of deeper scientific learning.	**Yes**	The materials provide a coherent sequence of authentic science sources that build scientific vocabulary and knowledge over the course of study. Vocabulary is addressed as needed, but only after students have first had the opportunity to build conceptual understanding of the term. Students co-construct definitions of the words they encounter and then add them to their Personal Glossaries. The materials introduce vocabulary within the context of deeper conceptual understanding rather than isolated memorization. Vocabulary terms are introduced within relevant investigations, and unit-based learning progressions ensure that terms are revisited in multiple contexts to reinforce understanding. For example, in Unit 1, Ecosystem Interactions and Dynamics, Lesson 3, students update their

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			personal glossaries with terms such as empirical evidence and mortality factors as they analyze population data and migration patterns in the Serengeti. Rather than simply defining words, students encounter them in real-world applications and co-construct definitions. In Unit 2, Ecosystems: Matter and Energy, Lesson 1, students read and annotate an article about arctic fires. As they read, students update their Personal Glossaries to record definitions of words they encounter in the reading. After the class discusses the reading, students share words they added to their glossaries and reach a consensus on the definitions of the terms. In Lesson 5, students investigate how photosynthesis affects carbon storage and develop vocabulary related to chemical energy and directional hypotheses. This connects to future lessons where they model the carbon cycle and discuss the role of feedback loops. 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 5, Common Ancestry and Speciation, 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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			the environment that caused bear populations to adapt, students co-construct a more formal definition of speciation.
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 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 clear, organized, and coordinated over time. The clear progression of learning, which incorporates the three dimensions of the science standards throughout, supports student mastery of the Performance Expectations and prevents misunderstanding. For example, the first six lessons of Unit 1, Ecosystem Interactions and Dynamics, focus on DCI LS2A.a. In order to support student mastery of this DCI, students are first introduced to the idea of conservation through the 30 by 30 initiative in Lesson 1. In this lesson, students begin to develop ecosystem models based on real-world conservation profiles and develop a model of a conservation profile. In Lesson 2, students explore how ecosystems can remain stable or shift based on human decisions. In Lesson 4, students see how rainfall can cause an

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			ecosystem to remain stable or change (CCC, Stability and Change). In Lesson 3, students figure out that most wildebeest deaths are due to starvation, not predators, establishing food as the main driver of migration. Through Lessons 2 and 3, students obtain and evaluate information through an information scavenger hunt about the Serengeti and analyze empirical data on wildebeest 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, figuring out that these factors shape population dynamics. Using CODAP, students use cause-and-effect reasoning to connect rainfall to grass growth, which affects wildebeest migration. In Lesson 5, students simulate how carrying capacity is determined by limiting factors using a kinesthetic model. In these two lessons, students construct mathematical representations of rainfall and wildebeest location using CODAP to build models of carrying capacity. The kinesthetic model in Lesson 5 provides 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 how limiting factors affect the carrying capacity of an ecosystem to a population of African wild dogs. Throughout Lessons 1-6, students apply the SEPs and CCCs to further

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			support students' mastery of the performance expectation. 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. In Lesson 8, students learn about two individuals who survived multiple cancers and use pedigree charts 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. They synthesize this information in Lesson 10 by creating a model showing how people develop cancer through inheritance and mutations. In Unit 4, Natural Selection and Evolution of Populations, Lesson 2, students discuss a case study about hawksbeard to begin to consider the importance of seed dispersal strategies. They engage in an investigation of how fragmentation in urban environments affects the success of leathery and feathered seeds differently and consider the effects of selection pressures on the types of seeds that plants in different environments produce. In Lesson 3, students read about mice in Tokyo where a mutation causes them to be resistant to poison, and through a simulation, they determine that exposure to poison in the environment causes changes in the percentage

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			of mice that have this mutation. In the next lesson, students investigate how urban environments provide selective pressure for juncos to behave boldly, which is negatively correlated with a particular gene. In Lesson 5, students use what they learned in the previous lessons to build a model of inheritance and evolution through natural selection. In Lesson 9, students investigate how habitat connectivity affects genetic diversity and ecosystem resilience. The application of mathematical and statistical reasoning to evaluate the effectiveness of wildlife corridors bridges scientific content with engineering solutions, reinforcing meaningful connections across lessons and preparing students to apply knowledge to novel problems. In Unit 5, Common Ancestry and Speciation, Lesson 3, students use anatomical and DNA evidence to understand evolutionary relationships among bear species. The shift from anatomical comparisons to genetic evidence illustrates an authentic scientific progression, supporting deeper understanding and preventing misconceptions.
	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 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 occasionally 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, Ecosystem Interactions and Dynamics, Lesson 1, students begin to explore how ecosystems are protected and develop initial models of changes over time, which implicitly lays the groundwork for graphing, data interpretation, and systems modeling, all key mathematical and computational thinking skills, aligned to the SEP, Using Mathematics and Computational Thinking. 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, 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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			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, applying descriptive statistics and critical data comparison. In Unit 4, Natural Selection and Evolution of Populations, Lesson 8, students model the changes in allele frequency over time in a population of panthers and how fragmentation of their environment leads to lower genetic diversity. During this investigation, they calculate frequencies and notice that the frequencies change over time, resulting in some alleles being missing from the population.
6. SCAFFOLDING AND SUPPORT: Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking. ☒ Yes ☐ No	**Required** **6a)** There are separate **teacher support materials** including: scientific background knowledge, support in three-dimensional learning, learning progressions, 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**.	**Yes**	There are separate teacher support materials provided. Within each lesson, support materials include the following: standards alignment, materials list, a summary of the navigation between lessons, suggestions for navigating within the lesson, sample scripts and conversation guides, and student look-fors with color-coded highlights to call attention to the three dimensions. The Teacher Portal includes unit-level resources, including a Teacher Edition, Student Edition, and a Spanish Student Edition, in addition to a linked document outlining where and how each of the three dimensions is addressed within the unit and an overview of materials. The Teacher Edition for each unit begins with an overview of the guiding question for the unit that summarizes the work students will do to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			answer the overarching question of the unit and the standards they are working toward. The overview outlines the Unit Storyline by describing the lesson-level phenomenon or design problem and what students figure out. It also includes an example of how the concepts are represented. There is a lab safety section, a description of how the unit fits into the scope and sequence of the course, and an explanation of the anchoring phenomenon, including why it was chosen. Then it describes the three dimensions that are addressed in the unit, specifically citing the performance objectives, SEPS, DCIs, and CCCs, crossing out any parts that are not addressed in the unit. It also gives teachers suggestions for how to shorten and extend the unit, resources for building their own content knowledge, and the vocabulary introduced in each lesson. The lessons are designed with a phenomenon-based instructional approach, and teacher materials explicitly support this approach with guidance on how to help students construct explanations based on evidence. Teachers are equipped with discussion prompts, sample scripts, and student look-fors to guide formative checks of understanding. Additionally, the materials include electronic exit tickets and transfer tasks supported by teacher guidance and rubrics or exemplars, ensuring clarity around expectations and support for student reasoning and communication. The beginning of each lesson provides several important teacher supports.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			First, the lesson objective is written clearly and color-coded under the section What Students Will Do. The SEPS utilized in the lesson are in blue, the CCC are in green, and the DCIs are in orange. The standards that students will work towards in the lesson are written next to the objective. Under the objective, what the students will figure out in the lesson is explicitly stated. In the box above the objective, guidance includes information on how the current lesson ties to what was previously learned and what will be learned in future lessons. In the Where We Are Going and Where We Are Not Going section of the lesson plan, teacher guidance is provided that either narrows or expands the scope of the lesson. The teacher is also provided with a materials list needed to successfully complete the lesson. Finally, throughout the lesson, key scientific vocabulary is gradually introduced with explanations to ensure that teachers can facilitate accurate instruction. The learning progression is outlined clearly in each lesson in the Where We Are Going and Where We Are Not Going section. 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.
	Required **6b)** Teacher resources include **educative resources** that are designed to **promote teacher learning** and support the wide range of teachers	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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
	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.		developmentally appropriate. The materials include educational teacher resources intentionally designed to promote teacher learning and support teachers across varying experience levels. It provides explicit guidance on how to support student engagement in science and engineering practices, construct evidence-based explanations, and connect learning across units and ensures that all students experience meaningful learning anchored in real-world phenomena. 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 suggestions for supporting students' three-dimensional learning and suggested prompts to help teachers guide their students through the storyline. For example, in Unit 3, Inheritance and Variation of Traits, Lesson 1, the supports guide teachers through introducing cancer as a complex but personally relevant phenomenon. In Lesson 5, guidance supports teachers in facilitating student understanding of DNA replication, mutation, and protein repair mechanisms, helping teachers link these biological concepts to cancer formation. The Progress Trackers and Gotta-Have-It Checklists provided in the materials support a wide range of teachers and students in tracking conceptual development and serve as formative assessment supports. In Lesson 7, teachers use the Progress Tracker and Gotta-Have-It Checklist to guide the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			development of a consensus model for the genetic basis of cancer. These tools allow teachers to differentiate instruction and focus student attention on essential mechanisms and interactions. 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 for this lesson provides suggestions for the teacher on how to initiate this discussion, orients them to the purpose of the discussion, gives a rationale for having students work in 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 **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,	**Yes**	Materials provide support for diverse learners, including English Learners and students with disabilities. The materials provide appropriate suggestions for supporting varying student needs at the unit and lesson levels 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 lesson includes a Teacher

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	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.		Edition that provides multiple supports for teachers to effectively engage all students. The Teacher Edition provides explicit suggestions of ways in which to support diverse learners, including English Learners and students with disabilities. The lessons are designed with flexibility in pacing and materials and include progress monitoring tools, such as Exit Tickets and numerous formative assessments. Overall, the materials promote engagement for all students while enabling students to meet rigorous science standards. For example, in Unit 1, Ecosystem Interaction and Dynamics, Lesson 10, students evaluate real-world conservation plans with a focus on multiple stakeholder perspectives. This complex task is scaffolded with teacher prompts and structured comparison frameworks that help students organize information and make claims with evidence. Supports such as sentence starters, discussion stems, and criteria checklists are available to assist all learners, particularly those with language needs or who require support in constructing explanations. Lessons avoid presenting content-specific definitions too early. Instead, terms like carbon sink, zombie fire, photosynthesis, and feedback loop are co-constructed with students after shared experiences. In Unit 2, Ecosystem: Matter and Energy, Lesson 1, the teacher guidance states that "words should be defined and recorded after your class has developed a shared understanding of their meaning." In Lesson 3,

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			students engage in a laboratory investigation to determine why matter does not decompose in permafrost. As they prepare for this activity, students 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 is different. Later in the lesson, students use molecule cards to trace the flow of energy and matter during cellular respiration. The teacher materials suggest that teachers can 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 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 offers students redundancy of content and the opportunity to hear scientific language in multiple contexts.
7. USABILITY: Materials are easily accessible, promote safety	**Required** **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. All text sets, laboratory instructions, and other print

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
in the science classroom, and are viable for implementation given the length of a school year. ☒ Yes ☐ No			materials are linked in the Teacher Portal and online on the Lesson Launch Page. All print materials including student-facing and teacher-facing documents are free to download and print. Print materials and lab kits can be purchased through the vendor website. Many lessons can be implemented without purchasing anything or with minimal, locally sourced, reusable items that can be easily found at local or online retailers. For example, in Unit 4, Natural Selection and Evolution of Populations, Lesson 6, the lesson centers on a transfer task related to bacterial resistance to antibiotics. The activity relies on the interpretation of real-world phenomena, application of prior learning, and potentially the use of data visuals or informational text sets that are either provided in the materials or are easily accessible. There is no indication of hard-to-source lab materials or equipment needed for this task. In Unit 5, Common Ancestry and Speciation, Lesson 6, students use a model involving chips of two colors on a map. This is a low-tech, high-impact modeling activity that uses basic manipulatives and is fully supported by teacher guidance and illustrations. The modeling materials are either included in the materials' instructional toolkit or easily obtainable at low cost from common classroom supply vendors.
	Required **7b)** Materials help students build an understanding of standard operating	**Yes**	Materials help students build an understanding of standard operating procedures in a science laboratory and include

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	procedures in a science laboratory and include **safety** guidelines, procedures, and equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.		safety guidelines, procedures, and equipment. The materials provide embedded support to help students understand standard procedures in scientific investigations, including how to handle materials responsibly, make ethical decisions involving living organisms, and conduct data analysis or model-based investigations safely and appropriately. Many investigations involve simulations that mimic steps taken in authentic research facilities. When students engage in laboratory investigations, the materials include safety information at the Unit and Lesson levels. For example, in Unit 2, Ecosystem: Matter and Energy, Lesson 2, Burning Fuel investigation, the materials provide explicit safety guidelines, including 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 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.” In Lesson 5, Earth’s Tilt investigation, the materials provide the following explicit safety instructions: “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

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			sources." The materials include guidance to reinforce safety lab procedures, as the guidance explains demonstrations of 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 at the beginning as well as at the beginning of Lesson 9. The included slide deck includes two Safety Considerations slides to share and discuss with students before beginning the experiment. In Unit 5, Common Ancestry and Speciation, Lesson 8, students conduct research on species conservation strategies and write evidence-based arguments about whether humans should intervene to protect polar bears. Although this lesson is not lab-based, it involves the evaluation of real-world conservation strategies and encourages critical thinking about scientific methods and implications. Teacher materials include discussion protocols and norms for handling diverse opinions and guidance on how to structure research tasks safely and ethically, supporting academic integrity and proper sourcing.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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. The materials embed multiple types of formative and summative assessments across lessons, offering opportunities for teachers to monitor student understanding and progress toward mastery of performance expectations. The Assessment System includes and outlines the following for each unit: a pre-assessment, formative and summative assessment opportunities, and a student self-assessment. Integrated into the learning sequence, the assessments include iterative modeling, student-centered discussions, data analysis, peer feedback, and transfer tasks. Most lessons provide an opportunity for formative assessment including discussions, models, card sorts, simulations, laboratory investigations, and skills practice. Transfer tasks are also included as summative assessments. For example, in Unit 1, Ecosystem Interactions and Dynamics, students engage with iterative models throughout the unit. In Lesson 2, students develop a consensus model to explain the creation of Serengeti National Park and its conservation purpose. In Lesson 4, students revise their models based on new data about rainfall and food availability for wildebeest. In Lesson 8, students use computational models to test predictions and refine models of biodiversity and ecosystem resilience. Lastly, in Lesson 9, students revise the class

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			consensus model again to incorporate human interactions in the ecosystem. Unit 1 also incorporates student-centered discussions. Building understanding discussions are featured in Lessons 4, 5, 7, and 8, where students discuss ideas around rainfall patterns, population regulation, predator-prey dynamics, and ecosystem resilience. In Lesson 10, students present and discuss conservation plans, analyzing trade-offs and stakeholder impacts across ecosystems. Unit 3, Inheritance and Variation of 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 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 that can be used as a summative assessment. In Unit 4, Natural Selection and Evolution of Population, Lesson 6, the Antibiotic Resistance Transfer Task serves as a summative assessment where

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			students apply their understanding of natural selection in a new context. Teachers use a scoring rubric to evaluate student responses. The assessment requires students to construct explanations (SEP) based on evidence, demonstrating their knowledge of DCI, LS4.C.a and cause and effect relationships (CCC).
	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. Throughout the materials, students engage in the actions of the SEPs and apply CCCs as they build and demonstrate mastery of the DCIs. The materials provide evidence that assessment items and tasks are structured around the integration of the three dimensions and offer opportunities for students to apply understanding in new contexts. These assessments are embedded throughout the units and designed to progressively build conceptual understanding through modeling, simulations, investigations, and transfer tasks. 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, 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,

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			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, LS1.A.b and 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 Lesson 10, students complete a Transfer Task requiring them to apply everything they have learned about mutations, inheritance, and environmental factors to explain cancer in a new scenario. The Transfer Task incorporates the SEP, Using Models and Constructing Explanations, the DCIs, LS3.B.a and LS3.B.b, and the CCC, System Models and Cause and Effect. This task is designed to assess understanding in a new context, which helps the teacher determine whether students can apply ideas beyond the initial phenomenon. In Unit 5, Common Ancestry and Speciation, Lesson 6, students use models to make predictions about sea ice and how this selective pressure will affect the survival of polar bears (DCI, HS.LS4C.c; SEP, Developing and Using Models; CCC, Cause and Effect). In Lesson 9, students engage in a Transfer Task that requires them to analyze data and make claims about the future of bumblebee populations worldwide (SEP, Analyzing and Interpreting Data; CCC, Scale, Proportion, and Quantity). They read about the role bumblebees play in the ecosystem and use

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			data about their historic range to explain how a disease could spread between populations and how pesticides affect mortality rates to evaluate claims about the future health of bumblebee populations worldwide (DCI, HS.LS4C.d). In Lesson 7, students investigate historical mass extinctions and apply that understanding to explain modern extinction threats. Assessments require students to construct and revise arguments using patterns of evidence, analyze climate, biological, and geological data from past mass extinctions, and relate them to present-day extinction events, and integrate CCCs such as Patterns to support claims.
	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. The materials include scoring guidelines, rubrics, and look-for and listen-for opportunities that align to performance expectations and incorporate specific, observable, and measurable criteria. These tools guide both teachers and students in evaluating mastery of the three dimensions of the LSSS. The materials provide in-the-moment guidance for teachers on what to look for and listen for during instruction which helps teachers 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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			1, Ecosystems Interactions and Dynamics, Lesson 3, as students analyze the wildebeest data cards, teachers are prompted to look and listen for specific scientific patterns students uncover, such as bone marrow health, anthrax timing, and fat content. The teacher edition gives the following guidance for teachers in the What to look for/listen for in the moment section in the assessment opportunity box: “Live wildebeest have a higher percentage of fat in their bone marrow than dead wildebeest,” “June and July were the only months where anthrax was found in the population,” and “There was no difference of anthrax infection percentages between living and dead wildebeest.” The assessment opportunity box also has a What to do section, which provides questioning guidance such as “Ask, What empirical evidence did you find to help explain why the wildebeest migrate?” In Lesson 6, students complete a Transfer Task applying their knowledge of limiting factors and carrying capacity to a new scenario involving African wild dogs. A peer-assessment rubric is provided with clear criteria including: accuracy of scientific explanation (SEP, Constructing Explanations), use of data to support claims (SEP, Analyzing and Interpreting Data and Engaging in Argument from Evidence), and clarity and coherence of reasoning. The teacher guide states that “partners use a rubric to evaluate answers on one question from the Transfer Task and suggest ways to improve the quality

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			of their responses." The materials also include a Transfer Task key for the teacher that outlines correct responses and explains how those responses demonstrate understanding of the related DCIs, SEPs, and CCCs. At the end of Unit 2, Ecosystem: Matter and Energy, Lesson 4, students complete an Exit Ticket. The provided key includes the Performance Expectation (PE) that is assessed and aligns each question with the SEP, CCC, and/or DCI that it evaluates. For the multiple choice questions, it indicates 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 that asks them to develop models to explain the flow of matter and energy in the Gulf of Mexico's dead zone. The associated key provides the aligned PE and outlines the SEP, CCC, and DCI that are assessed and indicates which questions align with each dimension. Like the rubric for the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			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 4, Natural Selection and Evolution of Populations, Lesson 10, the Buckeye Plan Evaluation Tool serves as both a formative and summative assessment with an answer key that incorporates performance expectations and specific criteria. The assessment evaluates students on how well they apply scientific ideas to urban planning, considering constraints, biodiversity, and habitat connectivity. The rubric includes criteria, such as recognizing the presence of wildlife corridors, evaluating corridor sufficiency, and articulating trade-offs, with each one measurable and observable in student responses. The tool provides a clear structure for teachers to assess the application of Engaging in Argument from Evidence (SEP), DCI's ETS1.B.1 and LS4.D.a, and Systems and System Models (CCC) in the context of a complex, real-world scenario.
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**

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
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.
	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

[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
			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. 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 guidance to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in such a way that is developmentally appropriate. Appropriate suggestions and materials are provided for differentiated instruction supporting varying student needs at the unit and lesson 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
	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 integration of the three dimensions and include opportunities to engage students in applying understanding to new contexts. Scoring guidelines and rubrics align to performance expectations and incorporate criteria that are specific, observable, and measurable.
FINAL DECISION FOR THIS MATERIAL: **Tier 1, Exemplifies quality**			

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 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.