DEPARTMENT of EDUCATION
Louisiana Believes

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

FULL CURRICULUM
Instructional Materials

Strong science instruction requires that students:

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

Title: **Miller and Levine** Grade/Course: **Biology**

Publisher: **Pearson** Copyright: **2019**

Overall Rating: **Tier III, Not representing quality**

Tier I, Tier II, Tier III **Elements of this review:**

STRONG	WEAK
	1. Three-dimensional Learning (Non-Negotiable)
	2. Phenomenon-Based Instruction (Non-Negotiable)

To evaluate each set of submitted materials for alignment with the standards, begin by reviewing the indicators listed in Column 2 for the non-negotiable criteria. If there is a "Yes" for all required indicators in Column 2, then the materials receive a "Yes" in Column 1. If there is a "No" for any required indicator in Column 2, then the materials receive a "No" in Column 1. Submissions must meet Criteria 1 and 2 for the review to continue to Criteria 3 and 4. Submissions must meet all of the non-negotiable criteria in order for the review to continue to Section II.

For Section II, begin by reviewing the required indicators in Column 2 for each criterion. If there is a "Yes" for all required indicators in Column 2, then the materials receive a "Yes" in Column 1. If there is a "No" for any required indicators in Column 2, then the materials receive a "No" in Column 1.

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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
SECTION I: NON-NEGOTIABLE CRITERIA: Submissions must meet Criteria 1 and 2 for the review to continue to Criteria 3 and 4. Submissions must meet all of the non-negotiable criteria in order for the review to continue to Section II.			
Non-Negotiable **1. THREE-DIMENSIONAL LEARNING:** Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions. ☐ Yes ☒ No	**REQUIRED** **1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of the materials teach the science and engineering practices, crosscutting concepts and disciplinary core ideas separately when necessary but they are most often integrated to support deeper learning.	**No**	The instructional materials do not present students with multiple opportunities throughout each unit to develop and apply three-dimensional learning. While students have some opportunities to engage with the three dimensions, the majority of the materials in which students engage are presented in a format where students read content information to gain an understanding of scientific ideas. Students do not consistently develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. Unit 2, Chapter 4, Section 2 addresses standard HS-LS2-4. In the quick lab, "Students develop a mathematical model of energy flow through four trophic levels in an ecosystem, model the amount of available energy in the first trophic level, and model how energy transfers to the second, third, and fourth, trophic levels." Although the quick lab addresses Standard HS-LS2-4, use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem, students do not have multiple opportunities to engage with the three dimensions throughout the unit. Unit 3, Chapter 9,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Section 3 partially addresses standard HS-LS1-5. The disciplinary core idea is addressed. The "Rates of Photosynthesis" activity does not address the science and engineering practices, "developing and using models." However, the science and engineering practice of "analyzing and interpreting data" is addressed. The integration of that practice, however is not aligned to what students should do in high school. Students analyze graphs to determine if sun or shade plants have a higher rate of photosynthesis and analyze data to determine if the rate of photosynthesis increases for sun plants in the Sonoran Desert. Students do not apply the concepts of statistics and probability as called for in the progressions of the science and engineering practices. While the program states that the crosscutting concept is addressed in this activity, no evidence could be found to support this claim. Some evidence can be found of students engaging with the science and engineering practices. For example, Unit 4, Chapter 14, Section 1 addresses standard HS-LS1-1. Though the quick lab does not address the science and engineering practice, "constructing explanations and design solutions," it does address the science and engineering practice of "developing and using models." Students develop models of DNA and RNA and use the models to demonstrate how DNA act to specify a

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			molecule of RNA. However, students do not engage frequently and consistently with the science and engineering practices to develop scientific content knowledge and scientific skills. Limited evidence could be found of students engaging with the crosscutting concepts. For example, Unit 2, Chapter 4, Section 3, "The Effect of Fertilizer on Algae," addresses HS-LS2-4 which calls for the crosscutting concept "Energy and Matter." While no evidence could be found of students engaging with the specified crosscutting concept, students do briefly engage with "Cause and Effect." Students complete a lab to determine the effect of fertilizer on algae. They use empirical evidence they collect during the experiment to make a claim about the effect that atmospheric nitrogen has on the growth of algae which is appropriate for this grade level. However, enough evidence could not be found of students engaging frequently and consistently with the crosscutting concepts to develop scientific content knowledge and scientific skills.
Non-Negotiable **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions drive student learning. ☐ Yes ☒ No	**REQUIRED** **2a)** Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time.	**No**	Observing and explaining phenomena do not consistently provide the purpose and opportunity for students to engage in learning. Phenomena are included on the lesson and unit level; however, students do not continuously and meaningfully engage in learning in an attempt to explain how and why the phenomena occur in the real-world.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			At the beginning of each chapter, students are presented with a case study which presents a situation and question for students to consider as they progress through the chapter. For example, the case study in Unit 3, Chapter 8 is centered around a college student that has a disease called Leber's hereditary optic neuropathy (LHON). The phenomenon is briefly touched on in two sections of the chapter. In Section 8.2, students read a short reading segment that states, "One such change in mitochondrial DNA is responsible for LHON, the disorder described in this chapter's case study." In Section 8.4, students are asked to "Explain the relationships among homeostasis, defective mitochondria, and the symptoms caused by LHON." The majority of the resources are not organized to help students explain how and why the student is suffering from the disease. The case study in Unit 1, Chapter 2 introduces students to a region in China which has a large population of people with cretinism. The purpose for learning is not centered around students explaining how and why the phenomenon occurs in the real-world, and the case study tags throughout the chapter do not meaningfully help students connect their learning to the phenomenon. At the conclusion of the chapter, "Case Study Wrap-Up," students are instructed to use library or internet

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			resources to explain the cause of cretinism and goiters. At the beginning of each unit students are presented with a "Problem-Based Learning" activity which is centered around a phenomenon. For example, at the beginning of Unit 2 students select and research an invasive species. The instructions state, “You will be designing a solution to reduce the impact of your chosen invasive on your local ecosystem.” The phenomenon is briefly touched on in Chapter 4, Section 2 when students explain the role of their invasive species in their ecosystem and in Chapter 6, Section 1 when students compare and contrast their invasive species to another species. However, students do not continuously and meaningfully connect their learning to the phenomenon in an attempt to explain how and why it occurs in the real-world.
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **3. ALIGNMENT & ACCURACY:** Materials adequately address the Louisiana Student Standards for Science. ☐ Yes ☐ No	**REQUIRED** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the full **depth of the standards**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	REQUIRED **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	3c) In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy. ☐ Yes ☐ No	**REQUIRED *Indicator for grades 4-12 only** **4a)** Students regularly engage with **authentic sources** that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	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.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	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.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	4d) Materials provide a coherent sequence of authentic science sources that build scientific **vocabulary** and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation of deeper scientific learning.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
SECTION II: ADDITIONAL INDICATORS OF QUALITY			
Additional Criterion **5. LEARNING PROGRESSIONS:** The materials adequately address Appendix A: Learning	**REQUIRED** **5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
Progressions. They are coherent and provide natural connections to other performance expectations including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the the Louisiana Student Standards for Math. ☐ Yes ☐ No	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.		
	5b) Students apply mathematical thinking when applicable. They are not introduced to math skills that are beyond the applicable grade's expectations in the Louisiana Student Standards for Mathematics. Preferably, **math connections** are made explicit through clear references to the math standards, specifically in teacher materials.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
Additional Criterion **6. SCAFFOLDING AND SUPPORT:** Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking. ☐ Yes ☐ No	**REQUIRED** **6a)** There are separate **teacher support** materials including: scientific background knowledge, support in three-dimensional learning, learning progressions, common student misconceptions and suggestions to address them, guidance targeting speaking and writing in the science classroom (i.e. conversation guides, sample scripts, rubrics, exemplar student responses).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	6b) Appropriate suggestions and materials are provided for **differentiated instruction** supporting varying student needs at the unit and lesson level (e.g., alternative teaching approaches, pacing, instructional delivery options, suggestions for addressing common student difficulties to meet standards, etc.).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
Additional Criterion **7. USABILITY:** Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year.	**REQUIRED** **7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	7b) Materials help students build an understanding of standard operating procedures in a science laboratory and include **safety** guidelines, procedures, and	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
☐ Yes ☐ No	equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.		
	7c) The total amount of content is **viable** for a school year.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
Additional Criterion **8. ASSESSMENT:** Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards. ☐ Yes ☐ No	**REQUIRED** **8a) Multiple types** of formative and summative assessments (performance-based tasks, questions, research, investigations, and projects) are embedded into content materials and assess the learning targets.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	REQUIRED **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.

FINAL EVALUATION
Tier 1 ratings receive a "Yes" in Column 1 for Criteria 1 – 8.
Tier 2 ratings receive a "Yes" in Column 1 for all non-negotiable criteria, but at least one "No" in Column 1 for the remaining criteria.
Tier 3 ratings receive a "No" in Column 1 for at least one of the non-negotiable criteria.

Compile the results for Sections I and II to make a final decision for the material under review.

Section	Criteria	Yes/No	Final Justification/Comments
I: Non-Negotiables	1. Three-dimensional Learning	**No**	The materials do not adequately provide the students with opportunities to engaged in three-dimensional learning. The materials teach the Disciplinary Core Ideas (DCIs) in isolation and add the Science and Engineering Practices (SEPs) later, in investigations or labs. Cross cutting concepts (CCCs) are not always explicit in the text or in supplemental activities.
	2. Phenomenon-Based Instruction	**No**	While the materials do include problem based learning activities for each unit, and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			case studies for each chapter, these are not consistently incorporated throughout the lessons and do not provide the driving purpose for the student instruction.
	3. Alignment & Accuracy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	4. Disciplinary Literacy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
II: Additional Indicators of Quality	5. Learning Progressions	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	6. Scaffolding and Support	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	7. Usability	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
	8. Assessment	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.
FINAL DECISION FOR THIS MATERIAL: **Tier III, Not representing quality**			

Appendix I.

Publisher Response

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: **Miller and Levine** Grade/Course: **Biology**

Publisher: **Pearson** Copyright: **2019**

Overall Rating: **Tier III, Not representing quality**

Tier I, Tier II, Tier III Elements of this review:

STRONG	WEAK
	1. Three-dimensional Learning (Non-Negotiable)
	2. Phenomenon-Based Instruction (Non-Negotiable)

To evaluate each set of submitted materials for alignment with the standards, begin by reviewing the indicators listed in Column 2 for the non-negotiable criteria. If there is a "Yes" for all required indicators in Column 2, then the materials receive a "Yes" in Column 1. If there is a "No" for any required indicator in Column 2, then the materials receive a "No" in Column 1. Submissions must meet Criteria 1 and 2 for the review to continue to Criteria 3 and 4. Submissions must meet all of the non-negotiable criteria in order for the review to continue to Section II.

For Section II, begin by reviewing the required indicators in Column 2 for each criterion. If there is a "Yes" for all required indicators in Column 2, then the materials receive a "Yes" in Column 1. If there is a "No" for any required indicators in Column 2, then the materials receive a "No" in Column 1.

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

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
SECTION I: NON-NEGOTIABLE CRITERIA: Submissions must meet Criteria 1 and 2 for the review to continue to Criteria 3 and 4. Submissions must meet all of the non-negotiable criteria in order for the review to continue to Section II.				
Non-Negotiable **1. THREE-DIMENSIONAL LEARNING:** Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions. ☐ Yes ☒ No	**REQUIRED** **1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of the materials teach the science and engineering practices, crosscutting concepts and disciplinary core ideas separately when necessary but they are most often integrated to support deeper learning.	**No**	The instructional materials do not present students with multiple opportunities throughout each unit to develop and apply three-dimensional learning. While students have some opportunities to engage with the three dimensions, the majority of the materials in which students engage are presented in a format where students read content information to gain an understanding of scientific ideas. Students do not consistently develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. Unit 2, Chapter 4, Section 2 addresses standard HS-LS2-4. In the quick lab, "Students develop a mathematical model of energy flow through four trophic levels in an ecosystem, model the amount of available energy in the first trophic level, and model how energy transfers to the second, third, and fourth, trophic levels." Although the quick lab addresses Standard HS-LS2-4, use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem, students do not have multiple opportunities to engage with the three dimensions throughout the unit. Unit 3, Chapter 9,	In the following document, the Pearson Development Team has provided specific responses to the concerns raised by the Louisiana Program Reviewer. We thought it would be easier to separate the general concerns into sections where we could provide specific program page references and identify the features and online interactives that address the issue raised. We have also revised our description of the program in order to better direct the reviewers to find the program features and online materials that addressed the concerns raised. View digital resources at: PearsonRealize.com UN: LA_Eval_Reviewer PW: Pearson2018. Direct Response to Louisiana Concern 1 The instructional materials do not present students with multiple opportunities throughout each unit to develop and apply three-dimensional learning. While students have opportunities to engage with the three dimensions, the majority of the materials in which students engage are presented in a

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
			Section 3 partially addresses standard HS-LS1-5. The disciplinary core idea is addressed. The "Rates of Photosynthesis" activity does not address the science and engineering practices, "developing and using models." However, the science and engineering practice of "analyzing and interpreting data" is addressed. The integration of that practice, however is not aligned to what students should do in high school. Students analyze graphs to determine if sun or shade plants have a higher rate of photosynthesis and analyze data to determine if the rate of photosynthesis increases for sun plants in the Sonoran Desert. Students do not apply the concepts of statistics and probability as called for in the progressions of the science and engineering practices. While the program states that the crosscutting concept is addressed in this activity, no evidence could be found to support this claim. Some evidence can be found of students engaging with the science and engineering practices. For example, Unit 4, Chapter 14, Section 1 addresses standard HS-LS1-1. Though the quick lab does not address the science and engineering practice, "constructing explanations and design solutions," it does address the science and engineering practice of "developing and using models." Students develop models of DNA and RNA and use the models to demonstrate how DNA act to specify a	format where students read content information to gain an understanding of scientific ideas. Students do not consistently develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. PEARSON RESPONSE: The Student Edition is just one tool for students to use as they undertake the study of biology. The program identifies the multiple opportunities for students to engage in three-dimensional learning outside of just the printed page. It is through the many online experiences found in each chapter and lesson. The student text includes the descriptive narration of the disciplinary core ideas, while the hands-on activity worksheets, visuals to analyze, and online digital interactivities that are central to the overall student experience which support the three-dimensional learning goals of the standards are on the Realize platform. Examples: Chapter 4: In-Text Analysis Analyzing Data (p 117): Ocean Water and Oxygen Concentration - students analyze data (SEP 4 Analyzing and Interpreting Data) to draw inferences about oxygen content of water at different depths. They apply their understanding of the process of photosynthesis (LS2.B) that energy drives the cycling of matter within and between systems (CCC5 Matter and Energy). Atmospheric Carbon Dioxide Concentrations (p 128) - TE notes has students analyze graph

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
			molecule of RNA. However, students do not engage frequently and consistently with the science and engineering practices to develop scientific content knowledge and scientific skills. Limited evidence could be found of students engaging with the crosscutting concepts. For example, Unit 2, Chapter 4, Section 3, "The Effect of Fertilizer on Algae," addresses HS-LS2-4 which calls for the crosscutting concept "Energy and Matter." While no evidence could be found of students engaging with the specified crosscutting concept, students do briefly engage with "Cause and Effect." Students complete a lab to determine the effect of fertilizer on algae. They use empirical evidence they collect during the experiment to make a claim about the effect that atmospheric nitrogen has on the growth of algae which is appropriate for this grade level. However, enough evidence could not be found of students engaging frequently and consistently with the crosscutting concepts to develop scientific content knowledge and scientific skills.	data (SEP 4 Analyzing and Interpreting Data) and use it to construct explanations for the seasonal variations (CCC 1 Patterns) in atmospheric carbon dioxide (LS2.C). Understanding Global Change Model (p 124, 125, 127, 129, 135) - Students interact with this visual created by UC Berkeley that reflects three-dimensional learning. The model organizes the four categories of global processes that carry atoms through the atmosphere, biosphere, geosphere and hydrosphere. Students return to the visual as more complex interactions are described and applied within the chapters of the text, integrating multiple DCIs across the curriculum. Hands-on Labs (see lab recording worksheets on PearsonRealize) Warm-up Lab (p 118): Pass It Along - students identify, explain and create diagrams (SEP 2 Developing and Using Models) of the energy flow (CCC 5 Energy and Matter) from the foods they eat most (LS1.C). Quick Lab (p 121): As noted by the LA reviewer's notes below, this lab "use[s] mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem". Additionally, this lab asks students to 'engage in argument' (SEP 7) by supporting/refuting a claim in Question #2, and Question #3. Further engagement in this standard is found in the online interactivity described below. Warm-up Lab (p 123): Its Raining, Its Pouring

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				- students construct diagrams (SEP 2 Developing and Using Models) to describe the movement of water molecules (LS2.B) through the hydrosphere, atmosphere, geosphere, biosphere (CCC 4 System and System Models). Exploration Lab (p 130): Develop a Solution - The Effect of Fertilizer on Algae - students work with Chlorella, a type of algae that is commonly found in ponds and aquariums. They select nutrient amounts (SEP 3 Planning and Carrying Out Investigations) and compare the growth of Chlorella (LS2.B) when nutrients are limited and when nutrients are abundant (CCC 2 Cause and Effect). Online Digital VIDEO: Chemosynthesis and Photosynthesis: The Flow of Energy (p 115)- students obtain information (SEP 8 Obtaining Information) on the production of energy-rich compounds (LS2.B) by different methods but understand that each method does not produce energy. (CCC Energy is not created or destroyed- just moves between systems, etc..). Interactivity: Producers and Consumers (p 116) - Students understand the relationships (CCC4 System Models) as they explore various producers and consumers (LS2.B) by using different models (SEP 2 Developing and Using Models). Interactivity: Food Webs and Invasives(p 120) - Students use this virtual lab simulation (SEP 3 Planning and Carrying Out Investigation) to explore feeding relationships (LS2.A/LS2.B/

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				LS2.C) in an aquatic ecosystem (CCC 4 System and System Models) and then build their own food web. Interactivity: Ecological Pyramid (p 122) - Students focus on HS-LS2-4 as they calculate (SEP 5 Using Mathematical and Computational Thinking) energy transfers (CCC 5 Energy and Matter) in different trophic levels and in original biomass (LS2.B). Interactivity: Construct a Wetland (p 126) - Students design (SEP 1 Defining Problems and SEP 6 Designing Solutions) a wetland ecosystem to capture the nitrogen run-off of their farm. Students manipulate designs which includes calculations (SEP 5 Using Mathematics and Computational Thinking) of nitrogen uptake of their wetland based on variables of farm animal types and populations (CCC 2 Cause and Effect). Interactivity: Biogeochemical Cycles (p 128) - Students explore the water cycle, the carbon cycle, and the nitrogen cycle (SEP 2 Developing and Using Models) as they examine the biological, geological, and physical/chemical processes (CCC 2 Cause and Effect) as well as the effects of the human processes involved in the movement of matter and energy. Direct Response to Louisiana Concern 2 Unit 2, Chapter 4, Section 2 addresses standard HS-LS2-4. In the quick lab, "Students develop a mathematical model of energy flow through four trophic levels in an

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				ecosystem, model the amount of available energy in the first trophic level, and model how energy transfers to the second, third, and fourth, trophic levels." Although the quick lab addresses Standard HS-LS2-4, use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem, students do not have multiple opportunities to engage with the three dimensions throughout the unit. PEARSON RESPONSE: The online digital interactive 'Ecological Pyramid' provides specific additional experiences for students to engage in the Performance Expectation HS-LS2-4 where they use mathematical representations (energy pyramid) to describe the energy transfer from one trophic level to another while addressing the CCC Energy and Matter. See description and images from online interactive. SCREEN #1: Opening with Instructions. In screen #1 the complete a food web based on selecting organisms from a visual. [see attached documentation] SCREEN #2: Analyze Energy Pyramid. In screen #2 they analyze and energy pyramid and calculate the energy at different trophic levels (SEP 5 Using Mathematics and Computational Thinking).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				[see attached documentation] SCREEN #3: Analyze a Pyramid of Biomass. In screen #3 they must analyze a given energy pyramid and calculate the initial biomass (SEP 5 Using Mathematics and Computational Thinking). [see attached documentation] SCREEN #4: Analyze - Compare Pyramids. In screen #4 they use a slider to compare the pyramid of biomass to the pyramid of numbers of organisms and complete the statement below (SEP 4 Analyzing and Interpreting Data). [see attached documentation] SCREEN #5: Summarize the Learning. In screen #5 they answer summarize their understandings of energy transfer in the model Energy Pyramid. [see attached documentation] Direct Response to Louisiana Concern 3 Unit 3, Chapter 9, Section 3 partially addresses standard HS-LS1-5. The disciplinary core idea is addressed. The "Rates of Photosynthesis" activity does not address the science and engineering practices, "developing and using models."

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				PEARSON RESPONSE: There are other examples in the chapter where HS-LS1-5 and its associated SEP is addressed fully. The online digital interactives provides multiple opportunities for students to use models to understand how photosynthesis transforms light energy into stored chemical energy (HS-LS1-5). They then apply their understanding throughout the chapter as they illustrate the different parts of the photosynthetic process. The standard is specifically addressed in the following: Hands-on Lab: Plant Pigments and Photosynthesis (p 289) In this lab students investigate the wavelengths of light that are used in photosynthesis, and construct an explanation for how light wavelength affects plant growth. In the Analyze and Interpret Data section of this lab, they create a model to illustrate the process of photosynthesis. See actual lab page. Develop Models Create a sketch or diagram to serve as a model of photosynthesis. The model should show how photosynthesis transforms energy and matter. Begin by drawing an Elodea sprig. Then add labels and arrows to show the reactants, products, and energy source for photosynthesis. Other examples where students make use of models to illustrate the process of photosynthesis. Online Digital: VIDEO: Amazing Autotrophs (p 285)- students obtain information (SEP 8

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Obtaining, Evaluating and Communicating Information) and build understanding on the process of photosynthesis from viewing and discussing the video. Interactivity: ATP and Energy (p 284) - Students examine models (SEP 2 Developing and Using Models) of the ATP model and explore how it powers the chemical reactions within a cell. Interactivity: A Model of Photosynthesis (p 288) - Students use the interactive model (SEP 2 Developing and Using Models) to explore the process of photosynthesis and learn about inputs and outputs. Interactivity: The Details of Photosynthesis (p 294) - Students use an interactive model (SEP 2 Developing and Using Models) to further explore the light dependent and light independent reactions involved in photosynthesis. In-Text Developing and Using Models Reading Tool (p 289): Create a two-column table (model) to describe and compare the light dependent and light independent reactions of photosynthesis. Reading Tool (p 294): Draw a flow chart (model) to show the sequence of events in the Calvin Cycle and include the inputs and outputs. Up Close Figure 9-9: The Light-Dependent Reactions - Make Models: TE directions have students redraw and relabel the visual model using their own words (revise a model).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Direct Response to Louisiana Concern 4 However, the science and engineering practice of "analyzing and interpreting data" is addressed. The integration of that practice, however is not aligned to what students should do in high school. Students analyze graphs to determine if sun or shade plants have a higher rate of photosynthesis and analyze data to determine if the rate of photosynthesis increases for sun plants in the Sonoran Desert. Students do not apply the concepts of statistics and probability as called for in the progression of the science and engineering practices. PEARSON RESPONSE: The progression charts in the front section of the Teacher Edition provides examples of where more statistical analysis and probability can be found when tied to SEP 4 Analyzing and Interpreting Data. See pages TE58 to TE65. Chapter 12 and Chapter 18 Analyzing Data (p 599) Warm-UP Lab: Analyzing Inheritance (p 378) Quick Lab: Simulating Segregation (p 382) Direct Response to Louisiana Concern 5 While the program states that the crosscutting concept is addressed in this activity, no evidence could be found to support this claim. PEARSON RESPONSE: The Crosscutting Concepts are aligned to the Performance Expectations as stated in the standard. It is

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				unclear as to which CCC is not evident here. If it is SEP 2 Developing and Using Models, examples were provided above. If it is SEP 4 Analyzing and Interpreting Data, there are examples provided in the response above. Direct Response to Louisiana Concern 6 Some evidence can be found of students engaging with the science and engineering practices. For example, Unit 4, Chapter 14, Section 1 addresses standard HS-LS1-1. Though the quick lab does not address the science and engineering practice, "constructing explanations and design solutions," it does address the science and engineering practice of "developing and using models." Students develop models of DNA and RNA and use the models to demonstrate how DNA acts to specify a molecule of RNA. However, students do not engage frequently and consistently with the science and engineering practices to develop scientific content knowledge and scientific skills. PEARSON RESPONSE: There are other examples in the chapter where HS-LS1-1 and its associated SEP (6: Constructing Explanation and Designing Solutions) is addressed fully. Hands-on Labs: Analyzing Data (p 447): Crack the Code - students work to translate a given mRNA segment and construct an explanation as to why it could result in three possible amino

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				acids. Modeling Lab: The Effects of Mutations (p 459) How can mutations affect a protein?- students model the process of transcription and translation and the effects of different types of mutations on proteins. Examples of student explanations: Construct an Explanation Is exposure to a mutagen the only way mutations can occur? Explain why or why not, and cite an example to support your answer Construct an Explanation Compare your lab group's results with the results of classmates. Based on this comparison of results, explain how mutations increase genetic variation in a population. Online Digital: Interactivity: RNA and DNA (p 441) - Students compare and contrast RNA and DNA Interactivity: Where Is RNA Made? And Where Does It Go? (p 447) - Students explore the scientific experiment that lead to the understanding that ribosomes build proteins and that DNA provide s the blueprint for the molecules. They then record their explanations in the digital lab notebook. See attached activity and screen shots below from the investigation. 1. Opening Screen: sets the problem to be investigated. [see attached documentation] 2. Students explore the experimental set up [see attached documentation] 3. Students develop a hypothesis

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				[see attached documentation] 4. Students gather data from their experiment and record in the notebook [see attached documentation] 5. Students construct explanations about how DNA provides the blueprints for proteins [see attached documentation] Interactivity: ZIKA and genetically modified mosquitoes (p 455) - Students explore and explain their ideas about how genetically modified mosquitoes could halt the spread of the Zika virus. Students response from lab sheet: Construct an Explanation Explain how genetic modification of mosquitoes can be used to prevent a future outbreak of the Zika virus. Make sure to include a discussion of self-limiting genes and tTAV. Interactivity: Investigating Point Mutations (p 460) - students apply their knowledge of mutations to explain white-eyed fruit flies. Construct explanations based on evidence provided HHMI Animation Damage to DNA Leads to Mutations (p 460) - provides evidence on the effects of X-rays and other forms of electromagnetic radiation can cause mutations in DNA. Direct Response to Louisiana Concern 7 Limited evidence could be found of students engaging with the crosscutting concepts. For example, Unit 2, Chapter 4, Section 3, "The Effect of Fertilizer on Algae," addresses HS-

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				LS2-4 which calls for the crosscutting concept "Energy and Matter." While no evidence could be found of students engaging with the specified crosscutting concept, students do briefly engage with "Cause and Effect." Students complete a lab to determine the effect of fertilizer on algae. They use empirical evidence they collected during the experiment to make a claim about the effect that atmospheric nitrogen has on the growth of algae which is appropriate for this grade level. However, enough evidence could not be found of students engaging frequently and consistently with the crosscutting concepts to develop scientific content knowledge and scientific skills. PEARSON RESPONSE: Throughout Chapter 4, the student experiences repeatedly connections with the crosscutting concept of Matter and Energy. The central understanding that matter is conserved and energy transfer drives the cycles of matter is the central theme of the chapter. Most of the experiences the students have support that concept. As stated above, Lesson 4.2 and Lesson 4.3 focuses on the energy flow in ecosystems and how matter is cycled through those systems. The online digital resources provide direct student interactions to build their understanding of science concepts and reflects three-dimensional learning. Repeat the example from above: Exploration Lab (p 130): Develop a Solution - The Effect of Fertilizer on Algae - students

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				work with Chlorella, a type of algae that is commonly found in ponds and aquariums. They select nutrient amounts (SEP 3 Planning and Carrying Out Investigations) and compare the growth of Chlorella (LS2.B) when nutrients are limited and when nutrients are abundant (CCC2 Cause and Effect). REVISED IMET ANSWERS Question 1A: Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of the materials teach the science and engineering practices, crosscutting concepts and disciplinary core ideas separately when necessary but they are most often integrated to support deeper learning. Three Dimensional Learning in Miller & Levine Biology Miller & Levine Biology integrates three-dimensional learning through multiple learning experiences so that students develop the scientific content knowledge and skills necessary to be informed and productive citizens. Students build skills and understanding necessary to make sense of phenomena and design solutions to the presented problems. Each unit incorporates several methods for 3-dimensional student learning, such as:

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• Unit-level Problem-Based Learning projects, • Chapter-level Case Studies • Lesson-level Inquiry-focused student investigations including: • Quick Labs, • Chapter Exploration Labs, • Data Analysis activities, • STEM Projects, and the online digital experiences such as • Virtual labs and simulations like the Interactivities and Labster Virtual Labs • Performance-Based Assessments. All together, these pieces plus the engaging narrative and innovative digital tools support deeper student learning. Complete descriptions of these features are found below. As a representative example of the learning experience it is important to review BOTH the print and digital resources to see the full extent of how the three-dimensional student learning is implemented. We recommend a review of Unit 2 in the print Teacher Edition along with the online digital resources found on the Pearson Realize platform. Unit 2, Ecology, includes 5 chapters: 3. The Biosphere 4. Ecosystems 5. Populations 6. Communities and Ecosystem Dynamics 7. Humans and Global Change.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Begin your review on page 72 in the Teacher Edition and continue through 235. View digital resources at: PearsonRealize.com UN: LA_Eval_Reviewer PW: Pearson2018. In the Ecology Unit, students engage with the performance expectations that relate to HS-LS2 Ecosystems: Interactions, Energy, and Dynamics, HS-ESS2 Earth's Systems, and HS-ESS3 Human Sustainability as well as the accompanying Crosscutting Concepts and Science and Engineering Practices. All of our units are structured in the same manner with the following examples centered around Unit 2. Science and Engineering Practices in Unit 2: The following SEPs are embedded throughout the student experiences in Unit 2 in both print and in the online digital resources. Additional page references are provided for greater analysis opportunity for the reviewer. 1. Asking Questions (for science) and Defining Problems (for engineering) Students make use of this practice as they engage in the unit-level PBL "Invasives in Your Neighborhood" where they must ask questions, conduct research and define an invasive species problem in their local ecosystem and then develop a solution to control it in their community. (See example on pages 74-75 and in the Explorer's Journal

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				on Pearson Realize.) 2. Developing and Using Models Students develop and make extensive use of models as tools for developing understanding of key concepts from both the text and digital tools. Models include diagrams, physical replicas, mathematical representations, analogies, and computer simulations. They use their own models help illustrate relationships between systems or components of systems; or between nature and the engineered world. (See examples on pages 126, 160, 207, 216.) 3. Planning and Carrying Out Investigations Students engage in the practice of planning and carrying out investigations to generate data to use as evidence or in engineering tasks to improve or provide solutions to design problems. Students generate data as they perform the chapter labs; participate in virtual labs; and work collaboratively on the chapter case studies. See print Exploration lab pages on Realize platform for Chapter 5 Estimating Population Size (reference on SE p. 148); Chapter 6 Biodiversity on the Forest Floor (reference on SE p. 188); Chapter 7 Calculating Ecological Footprints (reference on SE p. 203). 4. Analyzing and Interpreting Data Students use visuals, interactivities and investigations as vehicles for analyzing and interpreting data. By high school, students should be more analytical in their ability to make sense of, and interpret, the data they generate in their labs or in what they view

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				online. They should make use of technology and other tools to assist in their analysis. In addition to Analyzing Data features throughout the chapters, and the Math Connections in the end of chapter assessment, the Unit PBL and Case studies offer additional opportunities for students to engage in this practice. (See examples on pages 93-95, 97, 128, 155, 179, 211.) 5. Using Mathematics and Computational Thinking Students in high school should begin to make use of computational thinking and employ strategies for organizing and searching for data as well as developing simulations that reflect natural and designed systems as support for their explanations. View examples on the interactives online in the Realize platform Ecological Pyramids (p. 122); Predator-Prey Dynamics (p. 179); IPCC Data (p. 219). 6. Constructing Explanations (for science) and Designing Solutions (for engineering) Students construct explanations of the phenomena they investigate and create solutions for the engineering problems posed to them. They should be able to develop their own explanations for the phenomena and should be able to define, build and improve upon their engineered solutions. The Case Studies in each chapter provide students the opportunity to develop these practices in the context of real-world problems and issues. View examples online in the Realize platform or see representative pages in the SE: 30,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				122, 132, 162, 270, 326. 630, 710, 7. Engaging in Argument from Evidence Students use appropriate and sufficient evidence and scientific reasoning to defend and critique the explanations and claims made by others regarding the natural or designed worlds. The unit-level Problem-based Learning issues offer students opportunities to engage in conducting the research and gathering of evidence to successfully argue from evidence. Along with the case studies, students use real-world, relevant problems as the basis for developing their claims, gathering evidence, and articulating their reasoning as they present their solutions. Support for these independent research projects is found in the Explorers Journal. student pages are online on the Realize platform. (See also representative examples on student pages: 74, 102, 106, 181, 185TE, 187TE, 190, 226, 238, 374, 400, 568, 828.) 8. Obtaining, Evaluating, and Communicating Information Students engage with multiple models of information (articles, scientific journals, technical reports, multimedia, videos, etc) to conduct research, access validity/reliability/accuracy and usefulness to develop their arguments and proposed solutions to the PBL, Case Studies, Performance-based Assessments and in the digital interactives like the Authentic Readings, virtual labs, and simulations. Support for these research activities is found

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				online on the Realize platform. (See also representative examples on student pages: 62, 75, 239, 375, 433, 467, 755, 828, 892, 944. Crosscutting Concepts in Unit 2: Crosscutting Concepts appear throughout the Ecology unit in scales that are both micro and macro. Following is an overview of how the major crosscutting concepts for ecology are woven through the unit. The crosscutting concepts are woven throughout the narrative and directly referenced in lesson review questions and in the end of chapter questions. (For some examples, see p. 84, question 6, Chapter 3 assessment questions 36, 37, 38, and 39; p. 117, question 3, p. 131, question 7, p. 140, questions 32 and 33) • Scale, Proportion and Quantity • Students explore scales in the biosphere by learning about levels of organization in ecosystems. Students also explore the quantitative relationships among organisms within ecosystems. Students investigate the algebraic relationships within the ecological pyramids of energy, biomass, and numbers. • Cause and Effect • Students discover how changes to ecosystems affect organisms at all evolve and, in particular, how human activities impact the biosphere. • Systems and System Models • Students explore Earth's global systems and their interrelatedness. They examine Earth's ecosystems and biomes and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				critique a model of Earth's biosphere, developing solutions for its flaws. • Energy and Matter • Both energy and matter flow through ecosystems. Students examine food webs and matter cycles, and they consider how the flow of energy and matter can change over time due to anthropogenic and natural causes. • Stability and Change • Some aspects of the biosphere remain stable for long periods of time, whereas others are in a constant state of flux. Students will consider events that cause change and examine the impact of such change. • Structure and Function • Students explore how the structure of an organism is adapted to optimize its function within the ecosystem. Disciplinary Core Ideas in Unit 2 LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.C: Adaptation LS4.D: Biodiversity and Humans ESS2.D: Weather and Climate ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change The above SEPs, CCC's and DCI's are integrated within the materials below so that students develop scientific content

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				knowledge and scientific skills. Multiple opportunities are provided in each chapter for students to engage in three-dimensional learning. Each chapter, along with the online digital resources, should be reviewed holistically since the students engage in a wide variety of interactions in order to build their understanding. We recommend reviewing in depth the Unit level Problem-Based Learning Project, chapter Case Studies, Chapter Performance Based Assessment and Chapter Labs as examples. Below please find a detailed breakdown of these sections. 1. Problem-Based Learning in Unit 2 The Problem Based Learning Unit Project is one way Miller & Levine Biology actively engages students in the practice and language of science through analytical thinking, collaboration and self-directed learning. While completing the PBL, students develop scientific content knowledge and important scientific skills through interactions with the three dimensions. • Students solve a real-life problem, which provides a motivation from learning. • Students participate in an active learning path of activities including labs, STEM projects, authentic readings, interactivities, and scientific research where they gather evidence and knowledge necessary to present a solution to the presented problem or issue. • Students use scientific reasoning to justify why their evidence supports the conclusion.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• Students argue their position using collected data - building critical claims-evidence-reasoning skills deeply reflecting the goals of three-dimensional learning. The PBL path for Unit 2 includes: • a Problem Launch, • Introduction Video, • Three different digital Interactivities, • STEM Project, • Authentic Reading and a • Problem Wrap-up. • Every unit has a PBL project that follows a similar path. The PBL projects are introduced in the unit opener and student work is completed in the online Explorer's Journal located on Pearson Realize. This science/ engineering notebook allows for ongoing data collection and thought analysis. Below is a list of the DCIs, SEPs, and CCCs covered in the Unit 2 Problem-Based Learning Project: Science & Engineering Practices: • Unit 2 Introduction - Invasives in Your Neighborhood introductory activity - Asking questions (for science) and defining problems (for engineering) and Planning and carrying out investigations • Lesson 4.2 Interactivity Food Webs and Invasives - Developing and using models, Planning and carrying out investigations,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Analyzing and interpreting data, Obtaining, evaluating, and communicating information • Lesson 5.2 Interactivity Pythons in the Everglades - Analyzing and Interpreting Data, Using Mathematics and Computational Thinking, Planning and Carrying Out Investigations • Lesson 5.2 STEM Project Controlling Local Invasives - Asking Questions and Defining Problems Constructing Explanations and Designing Solutions, Engaging in Argument from Evidence. Obtaining, Evaluating, and Communicating Information • Lesson 6.1 Authentic Reading - Asking Questions and Defining Problems • Unit 2 Lesson 7.2 Interactivity Controlling Invasives - Constructing Explanations and Designing Solutions, Engaging in Argument from Evidence • Unit 2 Completion - Invasives in Your Neighborhood Problem Wrap Up - Asking Questions and Defining Problems, Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information Crosscutting Concepts: • Unit 2 Introduction - Invasives in Your Neighborhood introductory activity - Structure and Function and Cause and Effect • Lesson 4.2 Interactivity Food Webs and Invasives - Systems and System Models and Energy and Matter • Lesson 5.2 Interactivity Pythons in the Everglades - Cause and Effect

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• Lesson 5.2 STEM Project Controlling Local Invasives - Stability and Change, Cause and Effect • Lesson 6.1 Authentic Reading - Structure and Function, Stability and Change • Unit 2 Lesson 7.2 Interactivity Controlling Invasives - Cause and Effect, Structure and Function • Unit 2 Completion - Invasives in Your Neighborhood Problem Wrap Up - Cause and Effect, System and System Models,Stability and Change, Structure and Function DCI's: • Unit 2 Introduction - Invasives in Your Neighborhood introductory activity - HS-ETS1-2 • Lesson 4.2 Interactivity Food Webs and Invasives - HS-LS2-5 • Lesson 5.2 Interactivity Pythons in the Everglades - HS-LS2-1, HS-LS2-2 • Lesson 5.2 STEM Project Controlling Local Invasives - HS-ETS1-2 • Lesson 7.2 Interactivity Controlling Invasives HS-LS2-7, HS-LS4-6, HS-ET21-1, HS-ESS3-3, HS-ESS3-4, HS-ESS3-6 • Unit 2 End - Invasives in Your Neighborhood Problem Wrap Up - HS-ETS1-2 Break down of 3-Dimensional Integration by PBL Activity: Unit 2 PBL Introduction - Invasives in Your Neighborhood introductory activity - (Review Explorer's Journal Pg 35-39) • This activity Introduces the problem to students.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• Students research their local ecosystem and select a species to focus their project. • During the research process, students need to ask questions and define the problem (SEP) and develop a plan to carry out their investigations (SEP). • As part of their investigation students explore how changes to ecosystems affect organisms and how invasive species as possible (CCC Cause and Effect). • Students consider how human activities impact the biosphere (CCC Cause and Effect). • Students explore how organisms adapt to optimize their function within the ecosystem. (CCC Structure and Function) • During the project launch - students develop a plan to design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering (DCI HS-ETS1-2) • See example questions in the Explorer's Journal available on Pearson Realize Section EJ Problem Launch: Invasives in your Neighborhood for evidence of 3 Dimensional Learning in the PBL introductory activity (Pg 35-39) [see attached documentation] Unit 2 PBL Lesson 4.2 Interactivity Food Webs and Invasives (Review Student/Teacher Edition p 120 for interactivity, Complete

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Interactivity in Pearson Realize and review PBL research and analysis in Explorer's Journal page 40-42) • During the interactvitiy students use this virtual lab simulation (SEP3 Plan and Carry Out Investigation) to explore feeding relationships (LS2.A/LS2.B/ LS2.C) in an aquatic ecosystem (CCC System and System Models) and then build their own food web. • Both energy and matter flow through ecosystems. Students examine food webs and matter cycles, and they consider how the flow of energy and matter can change over time due to anthropogenic and natural causes. (CCC Energy and Matter) • After completing the Interactivity, students connect to the Unit Problem in the Explorer's Journal. They analyze how the introduction of nutria affects a pond ecosystem food-web (SEP Analyzing and Interpreting Data). They develop two food chain models from the food web that involve nutria (SEP Developing and Using Models, DCI HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere and CCC Systems and System Models) • Students take the knowledge gained from completing the Inveractivity and apply it to the Unit PBL Problem. (SEP Obtaining, evaluating, and communicating information). • See example questions in the Explorer's Journal available on Pearson Realize Section EJ (Explorers Journal) Science

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Skills Worksheet: Food Webs and Invasives for evidence of 3 Dimensional Learning in the PBL Interactivity (Pg 40-42) [see attached documentation] Unit 2 PBL Lesson 5.2 Interactivity Pythons in the Everglades • During the interactivity, students simulate releasing and monitoring radio-collared marsh rabbits in two different study areas then collect and analyze data related to the populations. (SEP Analyzing and Interpreting Data, Using Mathematics and Computational Thinking, DCI HS-LS2-1, HS-LS2-2) • Students conduct an experiment to see how the introduction of a non-native species affects a native population (SEP Planning and Carrying Out Investigations, CCC Cause and Effect) • After completing the Interactivity, students connect to the Unit Problem in the Explorer’s Journal. They record data and observations and use evidence based reasoning to predict which site is likely to have surviving rabbits. (DCI HS-LS2-1, HS-LS2-2) • See example questions in the Explorer’s Journal available on Pearson Realize Section EJ Science Skills Worksheet: Pythons in the Everglades for evidence of 3 Dimensional Learning in the PBL Interactivity (Pg 43-45)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				[see attached documentation] Unit 2 Lesson 5.2 STEM Project Controlling Local Invasives • During the STEM project, students restate the problem, design a solution, and evaluate the solutions of others. Proposing and testing the solution helps students answer the Unit Problem question and prepares them to communicate their ideas and findings. (SEP Asking Questions and Defining Problems Constructing Explanations and Designing Solutions CCC Stability and Change, Cause and Effect, DCI HS-ETS1-2) • Students present their findings to classmates then determine how to revise their ideas for the project wrap up. (SEP Engaging in Argument from Evidence. Obtaining, Evaluating, and Communicating Information DCI HS-ETS1-2) See example questions in the Explorer's Journal available on Pearson Realize Section EJ PBL STEM PROJECT: Controlling Local Invasives for evidence of 3 Dimensional Learning in the PBL Interactivity (Pg 46-50) [see attached documentation] Unit 2 Lesson 6.1 Authentic Reading • Students consider a specific species in an ecosystem. They use reading skills together information, make inferences and draw conclusions. They then try to relate what they read to the problem they are trying to solve. (SEP Asking Questions and Defining Problems,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				CCC Structure and Function, Stability and Change) • See example questions in the Explorer's Journal available on Pearson Realize Section EJ (Explorers Journal) PBL Authentic Reading To Tame a "Wave" of Invasive Bugs, Park Service Introduces Predator Beetles for evidence of 3 Dimensional Learning in the PBL Interactivity (Pg 51-53) [see attached documentation] Unit 2 Lesson 7.2 Interactivity Controlling Invasives • Students investigate the effects of the invasive American bullfrog on the native leopard frog population in Buenos Aires Wildlife Refuge. Students test solutions for controlling a different invasive species from the ones they have chosen. They discuss what to consider when evaluating a solution as it relates to this lab and the student designs for the unit problem. (SEP Constructing Explanations and Designing Solutions, Engaging in Argument from Evidence CCC Cause and Effect, Structure and Function DCI HS-LS2-7, HS-LS4-6, HS-ET21-1, HS-ESS3-3, HS-ESS3-4, HS-ESS3-6) • See example questions in the Explorer's Journal available on Pearson Realize Section EJ (Explorers Journal) PBL Science Skills Worksheet Controlling Invasives for evidence of 3 Dimensional Learning in the PBL Interactivity (Pg 54-55)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				[see attached documentation] Unit 2 End - Invasives in Your Neighborhood Problem Wrap Up • In the Problem-Wrap us students tie together all that they have learned and researched about invasive species. Over the course of the unit, students define the problem, conduct research develp a solution and communicate information. (SEP Asking Questions and Defining Problems, Constructing Explanations and Designing Solutions. ... Engaging in Argument from Evidence. CCC Cause and Effect, System and System Models,Stability and Change, Structure and Function DCI HS-ETS1-2) • Students present their solutions to the class and evaluate the presentations of their classmates. (SEP Obtaining, Evaluating, and Communicating Information CCC DCI HS-ETS1-2) 2. Case Studies in Unit 2 Case Studies serve as the anchoring phenomena for each chapter and provide a storyline tying the chapters' concepts together. Each chapter introduces a real-world example of science phenomena. The case study is revisited repeatedly throughout the lesson in Case Study connections. At the end of the chapter, students complete the Make Your Case feature to develop solutions and construct arguments central to the case.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				In the Make Your Case Feature students build science and engineering practices and use the cross cutting concepts as they devise their solutions. Performance Expectations are bundled around this central storyline to build student proficiency of chapter concepts. Science and Engineering Practices in Case Studies Asking Questions and Defining Problems • Every Case Study Introduction (located in chapter openers for representative examples see P 77, 111, 143, 173, 201) concludes with several questions for students to consider. Throughout the chapter, students look for connections to the case study to answer these questions. • Students consider how human activities contributed to Algal blooms in different ways. They examine limiting factors for algal growth as they gather evidence to support their argument. (pg 132) • Students conduct research to define issues and challenges, and evaluate their severity as it relates to issues resulting from the world's growing human population. (p 162) • Students conduct research to compare the Yellowstone wolf story with a situation in their region where human activity affected one or more species resulting in a trophic cascade. They consider aspects similar and different to Yellowstone. (P 190)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Developing and Using Models • Students evaluate the Biosphere 2 model and discuss the limitations of the model. (p 102) • Students develop a model to illustrate how oxygen fits into the carbon cycle (p 131) Planning and Carrying Out Investigations • Students simulate ocean acidification by examining the effects of an acid on calcium carbonate. (p 208) Analyzing and Interpreting Data • Students interpret a computer model to infer relationships between predator and prey populations. The model shows how prey survival can have a large impact on a population of predators. (p 179) • Students study the graph of ice mass on Antarctica from 2002-2016 as measured from satellite imagery to assess trends and make inferences about global warming. (p 221) Using Mathematics and Computational Thinking • Students interpret a computer model to infer relationships between predator and prey populations. The model shows how prey survival can have a large impact on a population of predators. (p 179) • Students study graphs with IPCC data to discover and investigate the relationships between Arctic sea ice, sea level change and

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Global Anthropogenic COs Emissions. (219) • Students study the graph of ice mass on Antarctica from 2002-2016 as measured from satellite imagery to assess trends and make inferences about global warming. (p 221) Constructing Explanations and Designing Solutions • Students evaluate and revise Biosphere 2 and propose a new design that would attempt to avoid the problems scientists faced. (p 102) • Students construct a solution of actions that could be taken in Florida to help prevent Algal Blooms from occurring in Lake Okeechobeeagain. They conduct research and cite evidence to support their solution. (p 132) Engaging in Argument from Evidence • Students defend their classification of the approach to ecological investigation illustrated in Biosphere 2. (p 84) • Students apply scientific reasoning to determine why the biodiversity of an ecosystem affects its resilience. (p 189) • Students develop an argument, supported by evidence, about ways to protect or restore the ecosystem they researched. (p190) • Students use evidence and logical reasoning from their Quick Lab findings to answer how ocean acidification can become a severe problem. (p 208)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• Students write a persuasive, evidence based argument to support their ideas to develop a course of action to address related global change issues in their local area. (p 226) Obtaining, Evaluating, and Communicating Information • Students write a persuasive, evidence based argument to support their ideas to develop a course of action to address related global change issues in their local area. (p 226) Cross Cutting Concepts in Case Studies Scale, Proportion and Quantity • Students interpret a computer model to infer relationships between predator and prey populations. The model shows how prey survival can have a large impact on a population of predators. (p 179) • Students study graphs with IPCC data to discover and investigate the relationships between Arctic sea ice, sea level change and Global Anthropogenic COs Emissions. (219) • Students study the graph of ice mass on Antarctica from 2002-2016 as measured from satellite imagery to assess trends and make inferences about global warming. (p 221) Cause and Effect • Students consider how human

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				activities contributed to Algal blooms in different ways. They examine limiting factors for algal growth as they gather evidence to support their argument. (pg 132) • Students conduct research to define issues and challenges, and evaluate their severity as it relates to issues resulting from the world's growing human population. (p 162) • Students apply scientific reasoning to determine why the biodiversity of an ecosystem affects its resilience. (p 189) • Students use evidence and logical reasoning from their Quick Lab findings to answer how ocean acidification can become a severe problem. (p 208) • Students study the graph of ice mass on Antarctica from 2002-2016 as measured from satellite imagery to assess trends and make inferences about global warming. (p 221) Systems and System Models • Students explore Earth's global systems and their interrelatedness. They examine Earth's ecosystems and biomes and critique a model of Earth's biosphere, developing solutions for its flaws. • Students describe the four major earth systems and examples why it is difficult to study these systems individually, relating to the Case Study Topic of Biosphere 2. (P 84) Energy and Matter • Students conduct research to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				compare the Yellowstone wolf story with a situation in their region where human activity affected one or more species resulting in a trophic cascade. They consider aspects similar and different to Yellowstone. (P 190) Stability and Change • Students conduct research to compare the Yellowstone wolf story with a situation in their region where human activity affected one or more species resulting in a trophic cascade. They consider aspects similar and different to Yellowstone. (P 190) DCIs in Unit 2 Case Studies • HS-LS2 • HS-LS4 • HS-ETS1 • HS-ESS2 • HS-ESS3 For representative Case Studies, Case Study Connections and Make Your Case Wrap-Ups please see the following pages • Chapter 3 Case Study Can we make a working model of our living planet (P 77, 80, 84, 91, 102-103) • Chapter 4 Case Study From harmless algal bloom to toxic menace: What's to blame? (P 113, 129, 130, 131, 132-133) • Chapter 5 Case Study What can we learn from China? (P143, 147, 159, 162-163) • Chapter 6 Case Study How do species interactions shape ecosystems? (P 173, 179, 180, 189, 190-191) • Chapter 7 Case Study How can a rising

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				tide be stopped? (P 201, 204, 208, 209, 212, 217, 219, 22, 226- 227) 3. Performance Based Assessments in Unit 2 Every chapter in Miller & Levine Biology includes a Performance Based Assessment to evaluate student understanding of three-dimensional learning related to the chapter concepts. These include projects focused on scientific inquiry or engineering design. Through the PBAs, students will again get an opportunity to demonstrate mastery of the performance expectations as well as practice the science and engineering practices and cross-cutting concepts. Below are specific examples from the Unit 2 Performance Based Assessments. Chapter 3 Performance-Based Assessment (PBA) - Meet the Anthromes (P 106-107) • In this PBA students use their knowledge of major anthropogenic biomes of the world to classify the properties of their home city. (SEP Analyzing and interpreting data) • Students compare the distribution of anthromes across the world to the distribution of biomes (CCC Cause and Effect, CCC Systems and System Models) • Students use evidence to construct an argument about how the world's natural biomes and anthromes will change in the future. (SEP Analyzing and interpreting data, Engaging in argument from evidence, CCC Cause and Effect and Stability and Change,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				DCI HS-ETS1-1) • Students communicate their argument with evidence from the chapter and their research. (SEP Analyzing and interpreting data, Constructing explanations (for science) and designing solutions (for engineering) Engaging in argument from evidence Obtaining, evaluating, and communicating information) [see attached documentation] Chapter 4 Performance-Based Assessment - Can Algal Blooms be Useful? (P 136-137) In this PBA students develop models that focus on carbon cycle pathways in the ocean. (SEP Developing and using models, CCC Systems and System Models, DCI HS-LS2-5) Students construct an argument by examining their model and making assumptions about the rate of processes to reduce atmosphere carbon dioxide concentrations. (SEP Developing and using models, Analyzing and interpreting data, Engaging in argument from evidence CCC Systems and System Models, Energy and Matter, Structure and Function, DCI HS-LS2-5) Students conduct research on ocean iron fertilization solutions. Students communicate and evaluation of ocean iron fertilization solution to climate change, supported with evidence from their model and additional research. (SEP Obtaining, evaluating, and communicating information, Developing and using models, Engaging in argument from

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				evidence CCC Energy and Matter, Systems and System Models, DCI HS-ETS1-3 HS-LS2-5) [see attached documentation] Chapter 5 Performance-Based Assessment (PBA) - A Tale of Two Countries China and India (p 166 -167) • In this PBA Students interpret graphs to determine the population trends. (SEP 4. Analyzing and interpreting data 5. Using mathematics and computational thinking CCC Scale, Proportion and Quantity, DCI HS-LS2-2.) • Students conduct research to identify factors that affect human populations and predict future change. (SEP 1. Asking questions (for science) and defining problems (for engineering) 4. Analyzing and interpreting data 5. Using mathematics and computational thinking, CCC Stability and Change, Scale, Proportion and Quantity, DCI HS-LS2-2) • Students construct an explanation to compare the age distributions and use evidence about government policies and logical reasoning to explain the differences they see. (SEP 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence CCC Scale, Proportion and Quantity, DCI HS-LS2-2.) • Students conduct research to predict the population changes over the next 100

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				years in one of the world's most populous countries. (SEP 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information CCC Cause and Effect, Stability and Change DCI HS-LS2-2) • Students Communicate and present their findings in a presentation to explain their predictions and the likely effects of these changes based on data and analysis. (SEP 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information. CCC Cause and Effect, Stability and Change DCI HS-LS2-2, HS-LS2-7) [see attached documentation] Chapter 6 Performance Based Assessment (PBA) - The Populations of YellowStone (Pg 194-195) • In this PBA students analyze graphics to describe trends in animal populations. (SEP 4. Analyzing and interpreting data 5. Using mathematics and computational thinking CCC Scale, Proportion and Quantity, DCI HS-LS2-2) • Students construct an explanation using evidence from the graph for how changes in the wolf population may have affected other populations. (SEP 4. Analyzing and interpreting data 6. Constructing explanations (for science) and designing solutions (for engineering) CCC Scale, Proportion and Quantity, Cause and Effect, DCI HS-LS2-2)

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• Students identify other biotic and abiotic factors that could explain trends in data. (SEP 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence, CCC Scale, Proportion and Quantity, Cause and Effect, DCI HS-LS2-2 HS-LS2-6) • Students construct a simulation of the reintroduction of wolves to Yellowstone, modeling changes in the population. They use the simulation to predict the effects of possible changes and discuss the limitations of their design. (SEP 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information CCC, Cause and Effect, Systems and System Models and Stability and Change. DCI HS-LS2-6.HS-LS2-7) [see attached documentation] Chapter 7 Performance Based Assessment (PBA) - Biodiversity in the Everglades (pg 230-231) • In this PBA, students conduct research on the biodiversity of the Everglades ecosystem and the threats to it and the efforts to protect it. Students define one or

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				more of the problems in the Everglades that human activity has caused. (SEP 1. Asking questions (for science) and defining problems (for engineering) CCC Scale, Proportion and Quantity, Cause and Effect DCI HS-ETS1-1) • Students work in groups to design and outline solutions for one or more of the identified problems. Students choose one solution to develop further and evaluate this solution using potential effectiveness, costs and constraints. (SEP 1. Asking questions (for science) and defining problems (for engineering) 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations (for science) and designing solutions (for engineering), CCC Scale, Proportion and Quantity, Cause and Effect DCI, HS-LS2-7, HS-ETS1-1, HS-ESS3-3, HS-ESS3-4, HS-ESS3-5, HS-ESS3-6) • Students present their solutions and refine their original proposals to their class. (SEP 6. Constructing explanations (for science) and designing solutions (for engineering) 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information, CCC Scale, Proportion and Quantity, Cause and Effect DCI, HS-LS2-7, HS-ETS1-1, HS-ESS3-3, HS-ESS3-4, HS-ESS3-5, HS-ESS3-6) [see attached documentation] Unit 2: Assessment Questions, Quick Labs,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Chapter Labs and Interactivities Throughout the Miller Levine Biology program, hands-on activities are used to reinforce the three-dimensional learning experience. For example, HS-LS2-6 asks students to: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. • The concept of ecosystem interactions is introduced in the Case Study, How do species interactions shape ecosystems? In the Case Study Wrap-up (p. 190), students will identify a situation in which human activity has resulted in a trophic cascade (CCC: stability and Change). They will then develop an argument supported by evidence (SEP: Engaging in Argument from Evidence) that suggests ways to protect that ecosystem. • In the quick lab, How Does Succession Occur? (p. 184) students are able to observe succession in a closed aquatic ecosystem to see how the environment changes over time (CCC: Stability and Change). The synthesis questions ask students to use evidence to support their answers (SEP 7: Engaging in argument from evidence) as well as evaluate their evidence. • Further practice for this standard occurs in the chapter lab, Biodiversity on the Forest Floor (p. 188 reference in Student

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				book, full length lab on Realize). In this lab, students engage in argument from evidence (SEP 7: Engaging in argument from evidence) about the role of biodiversity in the cycling of nutrients in the forest floor ecosystem.
Non-Negotiable **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions drive student learning. ☐ Yes ☒ No	**REQUIRED** **2a)** Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time.	**No**	Observing and explaining phenomena do not consistently provide the purpose and opportunity for students to engage in learning. Phenomena are included on the lesson and unit level; however, students do not continuously and meaningfully engage in learning in an attempt to explain how and why the phenomena occur in the real-world. At the beginning of each chapter, students	Phenomena-based learning is an integral part of the Miller Levine Biology program. At both the unit and chapter level, students are given the opportunity to engage in real-world phenomena. As a representative example of the learning experience it is important to review both the print and digital resources to see the full extent of how students observe and explain the phenomena.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
			are presented with a case study which presents a situation and question for students to consider as they progress through the chapter. For example, the case study in Unit 3, Chapter 8 is centered around a college student that has a disease called Leber's hereditary optic neuropathy (LHON). The phenomenon is briefly touched on in two sections of the chapter. In Section 8.2, students read a short reading segment that states, "One such change in mitochondrial DNA is responsible for LHON, the disorder described in this chapter's case study." In Section 8.4, students are asked to "Explain the relationships among homeostasis, defective mitochondria, and the symptoms caused by LHON." The majority of the resources are not organized to help students explain how and why the student is suffering from the disease. The case study in Unit 1, Chapter 2 introduces students to a region in China which has a large population of people with cretinism. The purpose for learning is not centered around students explaining how and why the phenomenon occurs in the real-world, and the case study tags throughout the chapter do not meaningfully help students connect their learning to the phenomenon. At the conclusion of the chapter, "Case Study Wrap-Up," students are instructed to use library or internet resources to explain the cause of cretinism and goiters.	We recommend a review of Unit 2 in the print Teacher Edition and of the online digital resources on the Pearson Realize platform. Unit 2, Ecology, includes 5 chapters: 3. The Biosphere 4. Ecosystems 5. Populations 6. Communities and Ecosystem Dynamics 7. Humans and Global Change. Begin your review on page 72 in the Teacher Edition and continue through 235. View digital resources at: PearsonRealize.com UN: LA_Eval_Reviewer PW: Pearson2018. Unit Level Problem Based Learning In the student edition, at the unit level, students are presented with a problem that they will work on throughout the unit. A brief introduction and "roadmap" are included so students have a general idea where and how the problem will be reinforced. The Teacher Edition gives the teacher teaching tips and additional support for the various activities throughout the unit. The "meat" of the problem phenomena however is presented in the Explorers Journal (found on Pearson Realize) as well as in the interactivities (also found on Realize).

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
			At the beginning of each unit students are presented with a "Problem-Based Learning" activity which is centered around a phenomenon. For example, at the beginning of Unit 2 students select and research an invasive species. The instructions state, “You will be designing a solution to reduce the impact of your chosen invasive on your local ecosystem.” The phenomenon is briefly touched on in Chapter 4, Section 2 when students explain the role of their invasive species in their ecosystem and in Chapter 6, Section 1 when students compare and contrast their invasive species to another species. However, students do not continuously and meaningfully connect their learning to the phenomenon in an attempt to explain how and why it occurs in the real-world.	See representative example on the TE pg 74-75B, 112B, 142B, 172B, 200B and Student Explorer's Journal located on Pearson Realize. In Unit 2, for example, students are asked to develop a plan to reduce the impact of an invasive species in their local ecosystem. Throughout the reading of the ecology chapters in the student edition (chapters 3 through 7), students learn about ecosystems, organism interactions in ecosystems, as well as invasive and introduced species and their impacts on ecosystems. In addition, throughout the unit, they are exposed to various activities that will help them gather the information they need for their final project. In the Explorers Journal pages (found on Pearson Realize), students are given the tools they need to work through the problem. There is the same roadmap that was in the student edition which allows students to check off activities as they do them. There is a tracking document (Solve the Problem) which provides students a place in which to take notes about the various activities in the PBL. Students can keep track of what they learned, how it helps towards solving the problem, and questions they still have after completing the activity. (For a detailed description of each individual PBL activity please view question 1A) Following this tracking document are worksheets to go along with each of the

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				activities. Students are able to take notes and synthesize the information from the activity so they are better able to develop their solution. All of the units are set up in a similar fashion. There is always a video that introduces the problem; various digital activities that allow students to interface with the content, a STEM project, lab investigations if they are appropriate, an Authentic Reading piece from a newspaper, magazine, or other periodical that relates to the problem, and then a wrap-up. These pieces are woven throughout the unit in various locations in chapters so that there is regular reinforcement of the problem. Chapter Level Anchoring Phenomena through Case Studies and Investigative Phenomena through Labs, Activities and Analyzing Data. Each chapter is introduced by a Case Study, which serves as the chapter's anchoring phenomena. The Case Study as previously described above, presents a real-world issue or problem that presents students with an opportunity to investigate. The chapter opening photo provides a visual to initiate student discourse. As students progress through the chapter, they are given opportunities in both print and through digital interactivities to interact with the case study phenomena. These are identified as Case Study Connections. Through these activities, students apply three-dimensional

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				thinking and skills necessary to make sense of the phenomena. They present their evidence and present an argument to defend their claim in the Make Your Case feature in the Case-Study Wrap-Up. For a detailed description of each individual Case Study activity in Unit 2 please revisit the information presented in Question 1A. Throughout chapter 6, for example, students interact with the phenomena of the impact of species interactions on ecosystems. (Chapter 6 Case Study How do species interactions shape ecosystems? P 173, 179, 180, 189, 190-191) Throughout the chapter, students are exposed to various hands-on activities including quick labs, analyzing data features, and a full-length chapter lab that help them understand the phenomena as well as gain critical knowledge to aid in sensemaking. In addition, there are various digital activities (available on Realize) that also reinforce the concept and give students the opportunity to engage in a different ways a sthey gather evidence to support their position. Students manipulate variables that impact ecosystems and ecosystem diversity. Some of these features are labeled as Case Study Connections - which shows students they directly relate to the chapter's case. Other features serve as investigative phenomena. These features provide more opportunities for students to make sense of phenomena that will help them solve the case study and grasp the chapter's content

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				but may not directly tie into the case study topic. At the end of the chapter, in the Case Study Wrap-up, students take the information they learned in both the SE and the digital activities, and develop a solution about protecting species diversity in their area. In this case (chapter 6) the performance based assessment activity also relates to the case study and give students another form of engaging with the content. The engaging Case Study provides a storyline to the chapter, a motivation for learning, and a series of related activities to deepen student comprehension and engagement in the chapter material. Chapter Level Performance Based Assessments (PBA) Each chapter in Miller & Levine Biology includes a Performance-Based Assessment. These assessments introduce students to a new phenomena related to the chapter's concepts. Students then demonstrate evidence of their understanding by developing models, constructing arguments, conducting research, evaluating solutions and communicating their reasoning. These include projects focused on scientific inquiry, STEM or engineering design. Through the PBAs, students will again get an

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				opportunity to demonstrate mastery of the performance expectations as well as the science and engineering practices and cross cutting concepts. Evaluation rubrics are available in the Teacher Edition. (For a detailed description of each individual Performance Based Assessment in Unit 2 please view question 1A See representative example on the SE/TE pg 106-107, 136-137, 166-167, 194-195, 230-231) Direct Response to Louisiana Concern 1 At the beginning of each chapter, students are presented with a case study which presents a situation and question for students to consider as they progress through the chapter. For example, the case study in Unit 3, Chapter 8 is centered around a college student that has a disease called Leber's hereditary optic neuropathy (LHON). The phenomenon is briefly touched on in two sections of the chapter. In Section 8.2, students read a short reading segment that states, "One such change in mitochondrial DNA is responsible for LHON, the disorder described in this chapter's case study." In Section 8.4, students are asked to "Explain the relationships among homeostasis, defective mitochondria, and the symptoms caused by LHON." The majority of the resources are not organized to help students explain how and why the student is suffering from the disease.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Response: At the beginning of Chapter 8, students read the Case Study - What's happening to me? This Case Study is about a college student with LHON's disease. (P241) This is a real-world example of phenomena that relates to the upcoming chapter concepts. Students interact with the Case Study through Case Study connections. These connections plus additional chapter content help students gather the information they need to make sense of the phonmeona. They wonder how a problem with just one part of a cell can cause a major disorder such as blindness. The chapter content explains the parts of cells and how they help cells function in their environment. • The first Case Study Connection, Diagram Cellular Powerhouses, (p254) encourages students to explore mitochondria and chloroplasts, organelles involved in energy conversion process in eukaryotic cells. • In another Case Study Connection, Analyzing Data lab (p 268) Mitochondria in a Mouse, students explore the distribution of mitochondria in mouse cells. Here students analyze data to investigate how the number of mitochondria varies in specialized mice cells. They relate this analysis to the Case Study by discussing how mitochondria play an important role in maintaining the balance of energy in cells. The mitochondria in David's (the college student) optic nerve cells did not function properly because the mitochondria in those cells were defective.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				• In the lesson review questions (pg 269) that ties into the Case Study students are asked to “Explain the relationships among homeostasis, defective mitochondria, and the symptoms caused by LHON.” They use the knowledge gained in the lesson, from the chapter narrative and chapter activities - such as the Multicellular Life interactivity (pg 267 on Pearson Realize) where students investigate the role of cell specialization in maintaining homeostasis in multicellular organisms and the • interactivity Levels of Organization (p 268 on Pearson Realize), where students explore how levels or organization allows multicellular organisms to maintain homeostasis. • In the Case Study Wrap Up (p270) students are promoted to explain the phenomena and Make their Case. Direct Response to Louisiana Concern 2 The case study in Unit 1, Chapter 2 introduces students to a region in China which has a large population of people with cretinism. The purpose for learning is not centered around students explaining how and why the phenomenon occurs in the real-world, and the case study tags throughout the chapter do not meaningfully help students connect their learning to the phenomenon. At the conclusion of the chapter, "Case Study Wrap-Up," students are instructed to use library or internet resources to explain the cause of cretinism

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				and goiters. Response: The Unit 1 Chapter 2 Case Study (p 41) does introduce students to Daxin, an area of China which has a large population of people with cretinism. This chapter Case Study connects students to an interesting real-world problem that relates to upcoming chapter concepts. (Chapter 2 is The Chemistry of Life) Students consider how the environment plays a role in people developing cretinism. They learn from the case study that this disorder is not inherited, nor is it caused by pollution or toxic chemicals, and it is not communicable. Students must consider what types of chemistry knowledge scientists would need to model solutions to this problem. Throughout the chapter, students are exposed to Case Study Connections to connect their learning back to the Case Study. • In the first Case Study connection, students study an image of a radioactive imaging of the Thyroid (p 44). Here they learn that radioactive iodine quickly travel to the thyroid. This is relevant to the case, as in the introduction they discovered Goiter is produced when the thyroid increases in size and that this condition is common in places where cretinism occurs. Here they begin to connect their learning to the phenomena. • In another Case Study Connection,

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Analyzing Data Trace Elements, (p 54) students use data to evaluate elements that have key roles in the body, but are present in small quantities. Students relate this analysis to the Case Study by discussing how the absence of a trace element might cause health problems in humans. • Students begin to recognize that cretinism in the people of Daxin might be related to a nutritional deficiency involving a travel element required for proper body and brain development. • In another Case Study Connection, Diagram Amino Acids (p55) students discover that amino acids are the building blocks for thyroxine. • Finally, in the Case Study Wrap-Up students identify the missing element and discuss why it is so important to human health. The Case Study Wrap-Up builds science skills as students as they argue from evidence and discuss their explanations for what caused cretinism in Daxin. Students construct explanations on the connection between amino acids and human nutrition. They learned in Lesson 2.3 that thyroxine has several important roles in the body - by applying it to the real-world case study they are able to explain this phenomena. Direct Response to Louisiana Concern 3 At the beginning of each unit students are presented with a "Problem-Based Learning" activity which is centered around a phenomenon. For example, at the beginning

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				of Unit 2 students select and research an invasive species. The instructions state, “You will be designing a solution to reduce the impact of your chosen invasive on your local ecosystem.” The phenomenon is briefly touched on in Chapter 4, Section 2 when students explain the role of their invasive species in their ecosystem and in Chapter 6, Section 1 when students compare and contrast their invasive species to another species. However, students do not continuously and meaningfully connect their learning to the phenomenon in an attempt to explain how and why it occurs in the real-world. Response: The majority of the work for the Problem-Based Learning activities is completed in Student Explorer’s Journal (located on Pearson Realize.) The Unit 2 PBL is introduced at the start of Unit 2 (p 74-75) and is revisited throughout the Unit beginning with the introductory video and includes five activities before the Problem-Wrap-UP. These activities include: • Food Webs and Invasives Interactivity (Chapter 4, Lesson 2), • Pythons in the Everglades Interactivity (Chapter 5, Lesson 2), • STEM Project (Chapter 5, Lesson 2), • Authentic Reading (Chapter 6, Lesson 1) and • Controlling Invasives Interactivity

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				(Chapter 7, Lesson 2). Students continually and meaningfully connect their learning in each chapter back to the Invasive Species phenomena through their work in the Explorer's Journal. In this journal students ask their own questions, conduct independent research, conduct experiments, analyze data and draw connections between the PBL activities and their chosen invasive species. These activities expose students to related phenomena to help them build their understanding of the major concepts as well as hone the skills they need to develop a solution to reduce the impact of their chosen invasive species on their local ecosystem. For example, review the Chapter 4, Lesson 2 - Interactivity Food Webs and Invasives. By completing the digital activity - students consider how an invasive species affects the other organisms in a food web. This helps them develop a solution because understanding how an invasive species affects the flow of energy in an ecosystem enables students to recognize the effect of their local invasive species and consider solutions for controlling it. Students will understand how food chains and webs are models that are helpful when studying the flow of energy through ecosystems. Once they complete their activities online, they turn to the Explorer's Journal.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
				Please review Explorer's Journal pages 40-42 that correspond with this interactivity. In the journal, students record data and observations, construct an explanation based on evidence of how organisms can exist in more than one trophic level, they develop two additional food web models, and analyze how the introduction of nutria can affect a pond's food web. Then they take their new knowledge and apply it to the Unit Problem. All 5 of the activities in the PBL path follow a similar procedure. (For a detailed description of each individual PBL activity please view question 1A). [see attached documentation]
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **3. ALIGNMENT & ACCURACY:** Materials adequately address the Louisiana Student Standards for Science. ☐ Yes ☐ No	**REQUIRED** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the full **depth of the standards**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	REQUIRED **3b)** Science content is **accurate**, reflecting the most current and widely accepted explanations.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	3c) In any one grade or course, instructional materials spend minimal time on content outside of the course, grade, or grade-band.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
Non-Negotiable (only reviewed if criteria 1 and 2 are met) **4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy. ☐ Yes ☐ No	**REQUIRED *Indicator for grades 4-12 only** **4a)** Students regularly engage with **authentic sources** that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	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.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	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.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	4d) Materials provide a coherent sequence of authentic science sources that build scientific **vocabulary** and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation of deeper scientific learning.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
SECTION II: ADDITIONAL INDICATORS OF QUALITY				
Additional Criterion **5. LEARNING PROGRESSIONS:** The materials adequately address Appendix A: Learning	**REQUIRED** **5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
Progressions. They are coherent and provide natural connections to other performance expectations including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the the Louisiana Student Standards for Math. ☐ Yes ☐ No	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.			
	5b) Students apply mathematical thinking when applicable. They are not introduced to math skills that are beyond the applicable grade's expectations in the Louisiana Student Standards for Mathematics. Preferably, **math connections** are made explicit through clear references to the math standards, specifically in teacher materials.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
Additional Criterion **6. SCAFFOLDING AND SUPPORT:** Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking. ☐ Yes ☐ No	**REQUIRED** **6a)** There are separate **teacher support** materials including: scientific background knowledge, support in three-dimensional learning, learning progressions, common student misconceptions and suggestions to address them, guidance targeting speaking and writing in the science classroom (i.e. conversation guides, sample scripts, rubrics, exemplar student responses).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	6b) Appropriate suggestions and materials are provided for **differentiated instruction** supporting varying student needs at the unit and lesson level (e.g., alternative teaching approaches, pacing, instructional delivery options, suggestions for addressing common student difficulties to meet standards, etc.).	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
Additional Criterion **7. USABILITY:** Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year.	**REQUIRED** **7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	7b) Materials help students build an understanding of standard operating procedures in a science laboratory and include **safety** guidelines, procedures, and	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
☐ Yes ☐ No	equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.			
	7c) The total amount of content is **viable** for a school year.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
Additional Criterion **8. ASSESSMENT:** Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards. ☐ Yes ☐ No	**REQUIRED** **8a) Multiple types** of formative and summative assessments (performance-based tasks, questions, research, investigations, and projects) are embedded into content materials and assess the learning targets.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	REQUIRED **8b)** Assessment items and tasks are structured on integration of the **three-dimensions**.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	8c) Scoring guidelines and rubrics **align** to performance expectations, and incorporate criteria that are specific, observable, and measurable.	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
FINAL EVALUATION ***Tier 1 ratings*** receive a "Yes" in Column 1 for Criteria 1 – 8. ***Tier 2 ratings*** receive a "Yes" in Column 1 for all non-negotiable criteria, but at least one "No" in Column 1 for the remaining criteria. ***Tier 3 ratings*** receive a "No" in Column 1 for at least one of the non-negotiable criteria.				
Compile the results for Sections I and II to make a final decision for the material under review.				
Section	**Criteria**	**Yes/No**	**Final Justification/Comments**	
I: Non-Negotiables	1. Three-dimensional Learning	**No**	The materials do not adequately provide the students with opportunities to engaged in three-dimensional learning. The materials teach the Disciplinary Core Ideas (DCIs) in isolation and add the Science and Engineering Practices (SEPs) later, in investigations or labs. Cross cutting concepts (CCCs) are not always explicit in the text or in supplemental activities.	
	2. Phenomenon-Based Instruction	**No**	While the materials do include problem based learning activities for each unit, and	

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES	PUBLISHER RESPONSE TEMPLATE
			case studies for each chapter, these are not consistently incorporated throughout the lessons and do not provide the driving purpose for the student instruction.	
	3. Alignment & Accuracy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	4. Disciplinary Literacy	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
II: Additional Indicators of Quality	5. Learning Progressions	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	6. Scaffolding and Support	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	7. Usability	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
	8. Assessment	**Not Evaluated**	This section was not evaluated because the non-negotiable criteria were not met.	
FINAL DECISION FOR THIS MATERIAL: **Tier III, Not representing quality**				

Appendix II.

Public Comments