LOUISIANA DEPARTMENT OF EDUCATION

Academic Content

Instructional Materials Evaluation Tool

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

Strong science instruction requires that students:

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

Title: **National Geographic Biology**

Grade/Course: **Biology**

Publisher: **Cengage Learning, Inc.**

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Overall Rating: **Tier 3, Not representing quality**

Tier 1, Tier 2, Tier 3 Elements of this review:

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

To evaluate instructional materials for alignment with the standards and determine tiered rating, begin with **Section I: Non-Negotiable Criteria**.

- Review the **required**[1] Indicators of Superior Quality for each **Non-Negotiable** criterion.
- If there is a "Yes" for all **required** Indicators of Superior Quality, materials receive a "Yes" for that **Non-Negotiable** criterion.
- If there is a "No" for any of the **required** Indicators of Superior Quality, materials receive a "No" for that **Non-Negotiable** criterion.
- Materials must meet **Non-Negotiable** Criteria 1 and 2 for the review to continue to **Non-Negotiable** Criteria 3 and 4. Materials must meet all of the **Non-Negotiable** Criteria 1-4 in order for the review to continue to Section II.
- If materials receive a "No" for any **Non-Negotiable** criterion, a rating of Tier 3 is assigned, and the review does not continue.

If all Non-Negotiable Criteria are met, then continue to **Section II: Additional Criteria of Superior Quality**.

- Review the **required** Indicators of Superior Quality for each criterion.
- If there is a "Yes" for all **required** Indicators of Superior Quality, then the materials receive a "Yes" for the additional criteria.
- If there is a "No" for any **required** Indicator of Superior Quality, then the materials receive a "No" for the additional criteria.

Tier 1 ratings receive a "Yes" for all Non-Negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality.

Tier 2 ratings receive a "Yes" for all Non-Negotiable Criteria, but at least one "No" for the Additional Criteria of Superior Quality.

Tier 3 ratings receive a "No" for at least one of the Non-Negotiable Criteria.

[1] **Required Indicators of Superior Quality** are labeled "**Required**" and shaded light orange. Remaining indicators that are shaded white are included to provide additional information to aid in material selection and do not affect tiered rating.

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
SECTION I: NON-NEGOTIABLE CRITERIA OF SUPERIOR QUALITY Materials must meet Non-Negotiable Criteria 1 and 2 for the review to continue to Non-Negotiable Criteria 3 and 4. Materials must meet all of the Non-Negotiable Criteria 1-4 in order for the review to continue to Section II.			
Non-Negotiable **1. THREE-DIMENSIONAL LEARNING:** Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions. ☐ Yes ☒ No	**Required** **1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through **interacting with the three dimensions** of the science standards. The majority of the materials **engage students** in integrating the science and engineering practices (SEP), crosscutting concepts (CCC), and disciplinary core ideas (DCI) to support deeper learning.	**No**	The instructional materials are not designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of materials do not integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI) to support deeper learning. Throughout the majority of the lessons and activities, students often read science content, including definitions and concepts, prior to engaging in exploration activities. Additionally, students often engage in activities that do not integrate the three dimensions. For example, in Unit 3, Interactions of Living Things, Chapter 9, Looking At The Data Section, students analyze and interpret data regarding changes in the amount of time between first bud burst and first flowering. However, this activity is not connected to any specific DCI or CCC. For example, in question 6 students answer, "What will happen to the number of days between first bud and first flowering if the trends in global climate change continue?" However, students are not asked to explain how or why they arrived at their answer, missing an opportunity to make connections to the Crosscutting Concept of Patterns. In Unit 1, Relationships in

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			Ecosystems, Chapter 2, Lesson 2.4, students read information and observe models of how matter cycles through the Earth's systems. An SEP section, instructs students to draw a model that represents the role of photosynthesis and cellular respiration in cycling carbon. However, a model of these processes is provided at the top of the same page in Figure 2-14. Students do not develop models but copy models that are provided for them. In Unit 5, Evolution and Changing Environment, Chapter 15, students read about natural selection and adaptation and then participate in a Mini Lab, Mice and Hawks. Students simulate a predator-prey relationship (SEP, Developing and Using Models) with different fur-colored mice using different colored paper squares to show a Pattern (CCC) of natural selection (DCI, HS.LS4B.a, HS.LS4B.c). Although the activity does integrate the three dimensions, students engage in the Mini Labs at the end of the chapters after students have already read and been told what natural selection is and how it works in nature (Section 15.1). Students miss the opportunity to actively engage with content and make connections on their own.
Non-Negotiable **2. PHENOMENON-BASED INSTRUCTION:** Explaining phenomenon and designing solutions	**Required** **2a) Observing and explaining phenomena** and designing solutions provide the purpose and opportunity for students to engage in a coherent sequence of learning a majority of the time. Phenomena provide students with	**No**	Observing and explaining phenomena and designing solutions do not provide the purpose and opportunity for students to engage in learning a majority of the time. Phenomena in the form of common experiences at the beginning of each unit do not spark students to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
drive student learning. ☐ Yes ☒ No	authentic opportunities to ask questions and define problems, as well as purpose to incrementally build understanding through the lessons that follow.		generate questions and define problems to motivate learning about the core ideas of the unit, and this does not provide a purpose for students to engage in the investigations and lessons that follow as they work towards figuring out the phenomenon. Oftentimes, students receive too much information upfront regarding the phenomenon and do not engage in gathering evidence to explain the phenomenon. Chapter openings typically include descriptions of science ideas but do not provide the purpose for learning. For example, in Unit 3, Interactions of Living Things, the Unit Opener provides a description and video about tropical rainforests, including information such as where on Earth they exist and some of the reasons these ecosystems are important. Students then consider the unit question, “How do rainforest species communicate?” which is followed by “In this unit, you will investigate the systems that allow organisms to survive, grow, reproduce, and respond to their environments.” This opener does not provide students with an experience or observation from which they can generate their own questions. In Unit 5, Evolution and Changing Environment, Chapter 14, Solving the Mystery of Sloth Evolution, students read about organisms that are closely related to the three-toed sloth. Rather than allowing the students to gather evidence to answer the investigative phenomenon, “How do we know species has evolved?” students just read the chapter and list the evidence. At

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			the end of each unit, the students revisit the Unit Opener and answer the driving question; however, the lessons in between are disconnected from the question. For example, in Unit 1, Relationships of Ecosystems, Chapter 3, the Case Study investigates how ecological disturbances affect an ecosystem's community of organisms in the context of a forest fire in Yellowstone. Effects of disturbances on organisms are not tied back to the anchor phenomenon until the sea pig revisit section at the end of the chapter when students are asked, "How might a change in the stability of a deep-ocean ecosystem affect sea pig survival?" Additionally, the anchor phenomena for some units are too vague or complicated for students to explore on their own. For example, in Unit 4, Genetics, the anchor phenomenon is "How can we slow the spread of a virus?" At the end of Chapter 12, Revisit Virus Spread Section, students examine and read a text with diagrams that includes the following statement and question: "The spike protein of SARS-CoV-2 enables the virus to infect human cells and it is the target of most COVID-19 vaccines. The D614G mutation changes a single amino acid in the spike protein, making the spike proteins more stable. How do you think a mutation such as D614G can impact science, technology, and society?" Although each section includes a box that notes what evidence the students should gather, such as "How might mutations in the surface proteins affect the ability of a virus to

CRITERIA	INDICATORS OF SUPERIOR QUALITY	MEETS METRICS (YES/NO)	JUSTIFICATION/COMMENTS WITH EXAMPLES
			infect an individual?" the content within the box does not help the students answer the end of the chapter question.
	Required **2b)** Materials are designed to provide sufficient opportunities for students to **design and engage in investigations at a level appropriate to their grade band** to explain phenomena. This includes testing theories or models, generating data, and using reasoning and scientific ideas to provide evidence to support claims.	**No**	As evidenced in Indicator 2a, observing and explaining phenomena and designing solutions do not provide the purpose and opportunity for students to engage in learning a majority of the time; therefore, students do not have sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena.
	2c) Materials provide frequent opportunities for students to **make meaningful connections** to their own knowledge and experiences as well as those of their community during sense-making about the phenomena.	**No**	Materials do not provide frequent opportunities for students to make meaningful connections to their own knowledge and experiences as well as those of their community during sense-making about the phenomena. The phenomena are mentioned within the lessons occasionally, but the information presented and investigations provided do not clearly and consistently relate to those phenomena. While students are asked how the content is related to their lives, the questions are not often connected to a phenomenon and are not often integrated into the student activities. For example, in Unit 1, Relationships of Ecosystems, Chapter 2, students make a connection between American eating habits and energy pyramids, but this does not help students make sense of how energy and matter move through an ecosystem nor the anchor phenomenon, "How do sea pigs live deep in the ocean?" In Unit 5,

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			Evolution and Changing Environment, Teacher Edition, Chapter 14, Lines of Evidence, the teacher asks students what they think of the word, evidence, and how they have seen it used in everyday life. This question does not support students in making connections to the phenomenon they are investigating, "How do we know species has evolved?"
Non-Negotiable **3. ALIGNMENT AND ACCURACY:** Materials adequately address the Louisiana Student Standards for Science. ☐ Yes ☐ No	**Required** **3a)** The majority of the Louisiana Student Standards for Science are incorporated, to the **full depth of the standards**.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.
	Required 3b) 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.
	Required **3c)** 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.
	3d) 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.
Non-Negotiable **4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and	**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	**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
writing to develop scientific literacy. ☐ Yes ☐ No	authentic sources should increase in higher grade levels and courses.		
	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.
	Required **4d)** Materials provide a coherent sequence of learning experiences that **build scientific vocabulary** and knowledge over the course of study. Vocabulary is addressed as needed in the materials but not taught in isolation of deeper scientific learning.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.
SECTION II: ADDITIONAL CRITERIA OF SUPERIOR QUALITY			
5. LEARNING PROGRESSIONS: The materials adequately	**Required** **5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, 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
address Appendix A: Learning Progressions. They are coherent and provide natural connections to other performance expectations, including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the Louisiana Student Standards for Math. ☐ Yes ☐ No	crosscutting concepts are **coherent within and across** units. The **progression of learning** is coordinated over time, clear, and organized to prevent student misunderstanding and supports student mastery of the performance expectations.		
	5b) Students **apply grade-appropriate mathematical** thinking in meaningful ways, when applicable. They are not introduced to math skills that are beyond or far below the applicable grade level expectations in the Louisiana Student Standards for Mathematics. Preferably, math connections are made explicit through clear references to the math standards, specifically in teacher materials.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.
6. SCAFFOLDING AND SUPPORT: Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking. ☐ Yes ☐ No	**Required** **6a)** There are separate **teacher support materials** including: scientific background knowledge, support in three-dimensional learning, learning progressions, strategies for addressing diverse emerging conceptions, guidance targeting speaking and writing in the science classroom (i.e., conversation guides, rubrics, exemplar student responses). Support also includes teacher guidance in the materials' **approach to phenomenon-based instruction** and provides explicit guidance on how the materials **address, build, and integrate the three dimensions**.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.
	Required **6b)** Teacher resources include **educative**	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.

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	resources that are designed to **promote teacher learning** and support the wide range of teachers who use the materials. Unit and lesson planning resources include explicit guidance designed to ensure that students experience phenomena, design solutions, and apply scientific knowledge and skills in ways that are aligned to the Louisiana Student Standards for Science and associated learning progressions.		
	Required **6c)** Support for **diverse learners**, including English Learners and students with disabilities, are provided. Appropriate suggestions and materials are provided for **supporting varying student needs** at the unit and lesson level using an accelerating learning approach. The language in which questions and problems are posed is not an obstacle to understanding the content, and if it is, additional supports are included (e.g., alternative teacher approaches, pacing and instructional delivery options, strategies or suggestions for supporting access to text and/or content, suggestions for modifications, suggestions for vocabulary acquisition, extension activities, etc.). Materials include **teacher guidance to help support special populations** and provide the opportunities for these students to meet the expectations of the standards and enable regular progress monitoring.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.

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7. USABILITY: Materials are easily accessible, promote safety in the science classroom, and are viable for implementation given the length of a school year. ☐ Yes ☐ No	**Required** **7a)** Text sets (when applicable), laboratory, and other scientific materials are **readily accessible** through vendor packaging or certified partners.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.
	Required **7b)** Materials help students build an understanding of standard operating procedures in a science laboratory and include **safety** guidelines, procedures, and equipment. Science classroom and laboratory safety guidelines are embedded in the curriculum.	**Not Evaluated**	This section was not evaluated because the Non-Negotiable Criteria were not met.
8. ASSESSMENT: Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards. ☐ Yes ☐ No	**Required** **8a) Multiple types of formative and summative assessments** (iterative student models, student-centered discussions, data analysis, self-reflection and peer feedback investigations, and projects) are embedded into unit materials and allow teachers to evaluate student progress toward demonstrating standards.	**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** and include opportunities to engage students in applying understanding to new contexts.	**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	**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
	measurable.		

FINAL EVALUATION
Tier 1 ratings receive a "Yes" for all Non-Negotiable Criteria and a "Yes" for each of the Additional Criteria of Superior Quality.
Tier 2 ratings receive a "Yes" for all Non-Negotiable Criteria, but at least one "No" for the Additional Criteria of Superior Quality.
Tier 3 ratings receive a "No" for at least one of the Non-Negotiable Criteria.

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

Section	Criteria	Yes/No	Final Justification/Comments
I: Non-Negotiable Criteria of Superior Quality[2]	1. Three-dimensional Learning	**No**	The instructional materials are not designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of materials do not integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI) to support deeper learning.
	2. Phenomenon-Based Instruction	**No**	Observing and explaining phenomena and designing solutions do not provide the purpose and opportunity for students to engage in learning a majority of the time. Materials are not designed to provide sufficient opportunities for students to design and engage in investigations at a level appropriate to their grade band to explain phenomena. Materials do not provide frequent opportunities for students to make meaningful connections to their own knowledge and

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

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			experiences as well as those of their community during sense-making about the phenomena.
	3. Alignment and 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 Criteria of Superior Quality[3]	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 3, Not representing quality**			

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

Reviewer Information

Instructional Materials Review

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

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

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

The 2023-2024 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Allen, Ascension, Bienville, Caddo, Calcasieu, Catholic Diocese of Baton Rouge -REACH Department, CSAL, D'Arbonne Woods Charter School, East Baton Rouge, Hynes Charter School Corporation, Iberia, Iberville, Jefferson, Lafayette, Lafourche, Lincoln, LSU Laboratory School, Madison, Natchitoches, Orleans, Ouachita, Rapides, Richland, St. Landry, St. Martin, St. Mary, St. Tammany, Tangipahoa, University View Academy, Vermillion, Webster, West Feliciana, and Zachary Community Schools. This review represents the work of current classroom teachers with experience in grades 6-12.

Appendix I.

Publisher Response

The publisher had no response.

Appendix II.

Public Comments

There were no public comments submitted.