# 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: **Smithsonian's STCMS™**

Grade/Course: **6**

Publisher: **Carolina Biological Supply**

Copyright: **2018**

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) |
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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**<br>**1. THREE-DIMENSIONAL LEARNING:**<br>Students have multiple opportunities throughout each unit to develop an understanding and demonstrate application of the three dimensions.<br><br>☒ Yes ☐ No | **REQUIRED**<br>**1a)** Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of the materials teach the science and engineering practices (SEP), crosscutting concepts (CCC) and disciplinary core ideas (DCI) separately when necessary but they are most often integrated to support deeper learning. | **Yes** | Materials are designed so that students develop scientific content knowledge and scientific skills through interacting with the three dimensions of the science standards. The majority of materials integrate the Science and Engineering Practices (SEP), Crosscutting Concepts (CCC), and Disciplinary Core Ideas (DCI) to support deeper learning. For example, the "Electricity, Waves, and Information Transfer" unit, during Investigation 4.2, "Testing Electromagnets," allows for the Development of Questions (SEP) focused on the content associated with electromagnets and factors that address the strength of electric and magnetic forces. Students engage in the SEP, "Asking Questions and Defining Problems," to develop questions to investigate factors that Affect (CCC) the strength of electric and magnetic forces between interacting objects (DCI MS.PS2B.a). Later, in this same unit in Investigation 6.2, "Modeling with a Spring," students use a metal spring to "Develop and Use Models and Mathematical and Computational Thinking" (SEP) while determining the Patterns (CCC) related to longitudinal and transverse waves along with their properties in a metal spring (DCI MS.PS4A.a). This establishes the presence of all three dimensions of the science |

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| | | | standards within one lesson with all three being supported through additional reading and simulations provided by the curriculum. In the "Matter and Its Interactions" unit, Investigation 6.3, "Analyzing Inks," students analyze different inks by asking the following question, "Can chromatography be used to separate a single substance from a mixture of many different substances? Why or why not?" Students study the effects of homogeneous solutions to understand the difference between a mixture and a compound. This investigation incorporates multiple SEPs, establishes the enhanced understanding of the DCI focal content of properties after a physical and/or chemical reaction, and integrates CCCs such as "Energy and Matter" and "Stability and Change." Later in the unit, during Investigation 7.3, "Reaction in a Bag," students Analyze and Interpret (SEP) properties to determine if a chemical reaction has occurred. With this investigation, students Develop a Model (SEP), Construct an Explanation (SEP) about reactants and products, and Analyze and Interpret (SEP) properties to establish a conclusion. Finally, in the "Space Systems Exploration" unit, during Investigation 4.2, "The Moon's Reflected Light," students use a Sun-Earth-Moon board and a flashlight to Develop and Use Models (SEP) and investigate the Patterns (CCC) of lunar phases (DCI MS.ESS1A.a). In this same unit, |

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| | | | during Investigation 8.2, "The Effects of Mass and Distance on an Orbiting Body," students use the Gravity and Orbitals PhET simulation to Develop and Use a Model (SEP) that represents the Sun-Earth-Moon Systemic Model (CCC). Students determine how gravity Affects (CCC) the motion of planets and other celestial bodies along with the role of mass and distance regarding gravitational force and the motion of celestial bodies (DCI MS.ESS1B.c). |
| **Non-Negotiable**<br>**2. PHENOMENON-BASED INSTRUCTION:**<br>Explaining phenomenon and designing solutions drive student learning.<br><br>☐ Yes ☒ No | **REQUIRED**<br>**2a)** Observing and explaining phenomena and designing solutions provide the purpose and opportunity for students to engage in learning a majority of the time. | **No** | The majority of instructional time is not centered around students observing and explaining phenomenon and designing solutions that provide the purpose and opportunity for students to engage in learning. Instead of beginning with an anchoring phenomenon, a majority of the units begin with a Pre-Assessment lesson to examine what students know about a particular topic. For example, Lesson 1 of the "Ecosystems and Their Interactions" unit begins with a "Getting Started" section in which the teacher assesses students' prior knowledge through teacher questioning followed by an activity in which students record and share ideas about various photographs. This is followed by Investigation 1.1 where the students complete a KWL chart. Although the students are accessing prior knowledge, they are not presented with an initial anchor intended to engage the students in exploration and questioning. |

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| | | | While each lesson opens with an initial scenario that introduces students to the topics to be explored within the investigations and reading that follows, this introductory material does not serve as a complex anchoring phenomenon that challenges students to build explanations through further investigation or establish direction for designing solutions to drive the purpose for learning. For example, the "Getting Started" phase of Lesson 2 of the "Space Systems Exploration" unit, explains what learners have probably seen in the sky regarding the moon along with a picture of Earth from the Moon's horizon taken from the space shuttle Columbia. The lesson ends with an exit ticket where learners determine what cycles occur on Earth due to the interactions of the Sun, Earth, and Moon. The lesson objectives include students analyzing scale properties within the Sun-Earth-Moon system. The beginning description and photographs do not drive the learning of the content. In the majority of units, students are given information about the key ideas they will be learning about rather than invited to explore through a complex, anchoring experience. Content and concepts are presented rather than students being provided with an initial opportunity to observe, explore, explain, or design regarding phenomenon-based learning. While lessons and investigations grab the learner's attention, they do not connect |

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| | | | back to a central phenomenon or elicit the introduction and curiosity necessary to drive and focus the student learning sequence. For example, in the "Energy, Forces, and Motion," students are exposed to the key concepts about force and its effects prior to Investigation 2.2, "Investigating Forces." This exposure negates the opportunity for phenomenon-based instruction and minimizes the opportunity for students to explore and build as they complete a unit. Additionally, in the unit "Electricity, Waves, and Energy Transfer," "Extending Your Knowledge" activity, "Twitching Frog Legs," students are provided with the phenomenon of twitching frog legs. However, students will have completed multiple investigations that explain the transfer of electricity prior to this investigation which negates the desire for students to explore and inquire in order to drive their learning and also affects students' ability to explore and question natural occurrences. |
| **Non-Negotiable (only reviewed if criteria 1 and 2 are met)**<br><br>**3. ALIGNMENT & ACCURACY:** Materials adequately address the Louisiana Student Standards for Science. | **REQUIRED**<br>**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**<br>**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. |

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| ☐ Yes ☐ No | **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. |
| **Non-Negotiable (only reviewed if criteria 1 and 2 are met)**<br><br>**4. DISCIPLINARY LITERACY:** Materials have students engage with authentic sources and incorporate speaking, reading, and writing to develop scientific literacy.<br><br>☐ Yes ☐ No | **REQUIRED *Indicator for grades 4-12 only**<br>**4a)** Students regularly engage with **authentic sources** that represent the language and style that is used and produced by scientists; e.g., journal excerpts, authentic data, photographs, sections of lab reports, and media releases of current science research. Frequency of engagement with authentic sources should increase in higher grade levels and courses. | **Not Evaluated** | This section was not evaluated because the non-negotiable criteria were not met. |
| | **REQUIRED**<br>**4b)** Students regularly engage in **speaking and writing** about scientific phenomena and engineering solutions using authentic science sources; e.g., authentic data, models, lab investigations, or journal excerpts. Materials address the necessity of using **scientific evidence** to support scientific ideas. | **Not Evaluated** | This section was not evaluated because the non-negotiable criteria were not met. |
| | **REQUIRED**<br>**4c)** There is **variability** in the tasks that students are required to execute. For example, students are asked to produce solutions to problems, models of phenomena, explanations of theory development, and conclusions from 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** | | | |

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| **Additional Criterion**<br>**5. LEARNING PROGRESSIONS:**<br>The materials adequately address Appendix A: Learning Progressions. They are coherent and provide natural connections to other performance expectations including science and engineering practices, crosscutting concepts, and disciplinary core ideas; the content complements the the Louisiana Student Standards for Math.<br>☐ Yes ☐ No | **REQUIRED**<br>**5a)** The overall organization of the materials and the development of disciplinary core ideas, science and engineering practices, and crosscutting concepts are coherent within and across units. The **progression of learning** is coordinated over time, clear and organized to prevent student misunderstanding and supports student mastery of the performance expectations. | **Not Evaluated** | This section was not evaluated because the non-negotiable criteria were not met. |
| | **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**<br>**6. SCAFFOLDING AND SUPPORT:**<br>Materials provide teachers with guidance to build their own knowledge and to give all students extensive opportunities and support to explore key concepts using multiple, varied experiences to build scientific thinking.<br>☐ Yes ☐ No | **REQUIRED**<br>**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**<br>**7. USABILITY:**<br>Materials are easily accessible, promote safety in the science | **REQUIRED**<br>**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. |

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| classroom, and are viable for implementation given the length of a school year.<br><br>☐ Yes ☐ No | **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. |
| | **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**<br>**8. ASSESSMENT:**<br>Materials offer assessment opportunities that genuinely measure progress and elicit direct, observable evidence of the degree to which students can independently demonstrate the assessed standards.<br><br>☐ Yes ☐ No | **REQUIRED**<br>**8a) Multiple types** of formative and summative assessments (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**<br>**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 | **Yes** | Students have multiple opportunities throughout each unit to demonstrate application of the three dimensions. The three dimensions are most often integrated with one another to support a deeper learning of the performance expectations. |
| | 2. Phenomenon-Based Instruction | **No** | The majority of instructional time is not centered around students observing and |

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|---|---|---|---|
| | | | explaining phenomenon and designing solutions that provide the purpose and opportunity for students to engage in learning. |
| | 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** | | | |

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 2018-2019 Teacher Leader Advisors are selected from across the state and represent the following parishes and school systems: Ascension, Bossier, Caddo, Central, Desoto, East Baton Rouge, Einstein Charter Schools, Iberia, InspireNOLA, Jefferson, KDHSA (Jefferson Parish Charter), Lafayette, Lincoln, Livingston, Orleans, Ouachita, Pointe Coupee, Rapides, Recovery School District, RSD - Choice Foundation, RSD – FirstLine, RSD – NOCP, St. Charles, St. Mary, St. Tammany, Tangipahoa, Vermilion, West Baton Rouge, West Feliciana, Zachary. This review represents the work of current classroom teachers with experience in grades 3-12.

# Appendix I.

# Publisher Response

The publisher had no response.

# Appendix II.

# Public Comments

There were no public comments submitted.