Environmental Science Instructional Materials Scoring Rubric

Gateway: The publisher must provide a Tennessee standards alignment guide as a part of the scope and sequence for the material. If this gateway is not met, the materials will not be scored. All Tennessee standards must be addressed within the material. If this is not met, the material will not pass review by the Tennessee Textbook and Instructional Materials Quality Commission.

Introduction:

The following Instructional Materials Scoring Rubric for Science is designed to score materials in the following categories:

- Instructional Focus
- Attending to Multiple Dimensions of Science Instruction
- Accessibility Features
- Alignment of Content

Scoring:

Each section is to be scored using a 0, 1, or 2. Use the following scoring guideline.

Tables 1-2:

- Adhere to the provided rubric statements for scoring.

Tables 3-4:

- 0: The standard is not present within the material.
- 1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.
- 2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.

Table 1: Instructional Focus **Directions:** **Adhere to the provided rubric statements for scoring.**					
Indicator	**0**	**1**	**2**	**Score**	**Evidence**
Central Phenomenon	Unit has **no phenomenon, or only a "hook"** to capture student interest at the beginning of the unit.	All units include one or more **smaller phenomenon or design challenge(s) and/or not all lessons connect to the phenomenon** or design challenge.	All units have a central phenomenon or design challenge that **develops throughout every lesson** of the unit.		
Activity Purpose	Material contains hands-on activities **do not serve** to grade-level scientific ideas	Hands-on activities **reinforce** scientific ideas aligned with grade-level standards.	All hands-on activities serve to **uncover** scientific ideas aligned with grade level standards.		
Use of Science Engineering Practices (SEPs)	Some units **do not provide students opportunities** to use the SEPs.	SEPs are present in all units, but **loosely or not connected to central phenomenon**.	In every unit, the **primary use** of the SEPs ties directly to explaining the central phenomenon or solving the design challenge.		
Student Engagement	**Neither of the given features** are present.	**One of the given features** is present.	Materials give students opportunities to: • expressly connect the DCI content from each lesson to		

Table 1: Instructional Focus					
Directions: **Adhere to the provided rubric statements for scoring.**					
			relevant crosscutting concepts. • practice with the SEP that is relevant to that day's lesson.		
Concepts before vocabulary.	Materials **pre-teach vocabulary.**	In **some instances**, materials develop conceptual meaning first.	In **all instances**, materials provide experiences (e.g., investigations, data analysis, discussions) where students develop conceptual meaning of a scientific idea before introducing technical vocabulary.		
Connections across component ideas.	Materials **describe** connections for students, or connections are absent.	Some units include **standalone questions** in place of activities, where students communicate their understanding of connections between component ideas.	All units include **activities** where students communicate their understanding of connections between science ideas from *two or more component ideas* within the grade (e.g., LS1.A and LS2.C, ESS2.A and PS1.A).		
Connections across disciplines.	Materials **describe** connections for students,	Some units include **standalone questions** in place of activities, where	All units include activities where students communicate their		

Table 1: Instructional Focus Directions: Adhere to the provided rubric statements for scoring.					
	or connections are absent.	students communicate their understanding of connections between component ideas.	understanding of connections between science ideas from *two or more disciplines* within the grade (e.g., LS and PS).		
Review opportunities	End of unit review is **not anchored to a phenomenon**.	End of unit review assesses learning of the **central phenomenon for the unit** only.	Materials provide opportunities for students to transfer new learning to **analogous phenomenon** in a review at the end of every unit.		
			Total		

Table 2: Attending to Multiple Dimensions of Science Learning Directions: Adhere to the provided rubric statements for scoring.					
Indicator	**0**	**1**	**2**	**Score**	**Evidence**
Distribution of SEPs as required by the standards	Materials **do not include** a focal SEP for one or more units.	One or more SEPs are **disproportionately** featured as the focal SEP.	Materials identify one or more focal science and engineering practices (SEPs) for every unit(s) with a **balanced** distribution of all SEPs as a focal SEP throughout the units.		

Table 2: Attending to Multiple Dimensions of Science Learning **Directions:** **Adhere to the provided rubric statements for scoring.**					
Support for a focal SEP	**No** student facing or teacher facing supports for the SEPs.	Relevant **support strategies are absent** from teacher materials.	Every unit contains a focal SEP is featured in **student-facing materials and teacher materials** including instructional strategies for the particular unit and focal SEP.		
Connections across to crosscutting concepts as required by the standards.	Materials **describe connections with CCCs** or do not specifically address CCCs.	In every unit students make connection between the CCCs and **either** the SEPs or DCIs.	In every unit, students make connections between the crosscutting concepts (CCCs) and **both** the SEPs and disciplinary core ideas (DCIs).		
Developing crosscutting concepts (CCCs)	Materials **provide examples** of other instances of the CCCs or CCCs absent.	Students make connections between CCCs and **content not addressed in other units.**	In every unit, the materials lead students to **make connections between the CCCs in that unit and appearances of the CCCs in other units**.		
			Total		

Table 3: Accessibility Features				
Directions: • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
Digital Materials	**0**	**1**	**2**	**Evidence**
All lessons within the materials are available in digital form and include a printable option.				
In every lesson, materials include recommended supports, accommodations, and modifications for Students with Disabilities and English language learners that will support their regular and active participation in accessing on grade level material (e.g., modifying vocabulary words within word problems, sentence starters, etc.).				
			Total	

Table 4: Alignment of Content				
Directions: • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
Conceptual Understanding: The materials support the intentional development of students' conceptual understanding of key science ideas, practice, and concepts.	**0**	**1**	**2**	**Evidence**
EVSC.LS2.1) Using a variety of data sources, construct an explanation for the impact of climate, latitude, altitude, geology, and hydrology patterns on plant and animal life in various terrestrial biomes.				
EVSC.LS2.2) Develop an explanation of behavioral and physical adaptations organisms have for life in aquatic habitats with varying chemical and physical features.				

Table 4: Alignment of Content				
Directions: • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
EVSC.LS2.3) Using mathematical models, support arguments regarding the effects of biotic and abiotic factors on carrying capacity for populations within an ecosystem.				
EVSC.LS2.4) Compare and contrast production (photosynthesis, chemosynthesis) and respiratory (aerobic respiration, anaerobic respiration, consumption, decomposition) processes responsible for the cycling of matter and flow of energy through an ecosystem. Using evidence, construct an argument regarding the importance of homeostasis in maintaining these processes in ecosystems.				
EVSC.LS2.5) Use a mathematical model to explain energy flow through an ecosystem. Using the first and second laws of thermodynamics, construct an explanation for: A) necessity for constant energy input; B) limitations on energy transfer from one trophic level to the next; and, C) limitations on number of trophic levels that can be supported.				
EVSC.LS2.6) Evaluate the interdependence among major biogeochemical cycles (water, carbon, nitrogen, phosphorus) in an ecosystem and recognize the importance each cycle has in maintaining ecosystem stability.				
EVSC.LS2.7) Examine stability and change within an ecosystem by using a model of succession (primary or secondary) to predict impacts of disruption on an ecosystem.				
EVSC.LS4.1) Construct an explanation based on scientific evidence for mechanisms of natural selection that result in behavioral, anatomical, and physiological adaptations in populations.				

Table 4: Alignment of Content				
Directions: • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
EVSC.LS4.2) Justify claims with scientific evidence that changes in environmental conditions lead to speciation and extinction.				
EVSC.LS4.3) Evaluate the impact of habitat fragmentation and destruction, invasive species, overharvesting, pollution, and climate change on biodiversity (genetic, species, and ecosystem).				
EVSC.LS4.4) Engage in argument from scientific evidence critiquing effectiveness of the Endangered Species Act. Give specific examples to support your argument.				
EVSC.ESS2.1) Research the development of the theory of plate tectonics. Use the theory to construct an explanation for how changes in Earth's crust cause mountain formation, volcanoes, earthquakes, and tsunamis. Provide evidence to support the explanation using information pertaining to plate boundary types (divergent, convergent, transform).				
EVSC.ESS2.2) Considering Earth's position within our solar system, use a model to demonstrate the causes of day length, seasons, and climate.				
EVSC.ESS2.3) Analyze the composition of the Earth's atmosphere. Obtain information and use graphs to observe patterns regarding stability and change within the Earth's atmospheric composition (O2, N2, CO2, etc.) over geologic time.				
EVSC.ESS2.4) Differentiate weather and climate and analyze and interpret data examining naturally occurring patterns pertaining to each.				
EVSC.ESS2.5) Plan and carry out an investigation examining the chemical and physical properties of water and the impact of water on Earth's topography. Analyze data and share findings.				

Table 4: Alignment of Content				
Directions: • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
EVSC.ESS2.6) Develop a model to explain soil formation and the flow of matter in the rock cycle.				
EVSC.ESS3.1) Research Earth's natural resources (renewable and nonrenewable resources). Construct an argument from evidence supporting the claim that a particular type of resource is important for				
EVSC.ESS3.2) Interpret graphical data representing global human population growth over time. Look for patterns within this data and construct possible explanations for the patterns. Revise the explanations as needed based on research.				
EVSC.ESS3.3) Obtain and evaluate information regarding demographics for a variety of countries. Construct an explanation for varying fertility rates and life expectancies between countries and throughout human history. Taking into account demographic transition, predict what trends are likely to occur in various countries over time.				
EVSC.ESS3.4) Gather, organize, analyze, and present data on current land use trends by humans. Based on analysis, predict future trends.				
EVSC.ESS3.5) Plan and carry out an investigation examining best management practices in water usage, agriculture, forestry, urban/suburban development, mining, or fishing and communicate findings.				
EVSC.ESS3.6) Use a model to make predictions regarding the impact of topsoil loss due to erosion resulting from human activity. Design, evaluate, and revise a solution to preserve topsoil.				

Table 4: Alignment of Content **Directions:** • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
EVSC.ESS3.7) Construct an argument including claim, evidence, and scientific reasoning regarding the impact of the Green Revolution on agricultural practices, food availability, and the environment.				
EVSC.ESS3.8) Research information on the environmental impacts of genetically modified organisms and engage in debate regarding pros and cons of this agricultural technology.				
EVSC.ESS3.9) Evaluate ecosystem services provided by forests ecosystems. Construct an explanation for human impact on these services.				
EVSC.ESS3.10) Using scientific data, analyze effectiveness of conservation versus preservation efforts. Obtain and communicate information on organizations involved in protecting natural resources.				
EVSC.ESS3.11) Define problems and suggest solutions associated with using, conserving, and recycling energy and mineral resources taking into account economic, social, and environmental costs and benefits.				
EVSC.ESS3.12) Ask questions about technology needed to develop alternative energy sources and obtain information from various sources to answer those questions.				
EVSC.ESS3.13) Analyze and interpret data on the effects of land, water, and air pollution on the environment and on human health. Propose solutions for minimizing pollution from specific sources.				
EVSC.ESS3.14) Obtain and communicate information on environmental laws pertaining to the regulation of pollution and on regulatory agencies. Provide a specific example of how a given business/industry would comply with such regulations.				

Table 4: Alignment of Content				
Directions: • **0: The standard is not present within the material.** • **1: The standard is present within the material. The intent and/or frequency component of the standard is not fully met.** • **2: A rating of 2 indicates the standard is present and all aspects of the standard are fully met.**				
EVSC.ESS3.15) Evaluate current methods of waste management and reduction and design possible improvements.				
EVSC.ESS3.16) Obtain, evaluate, and communicate scientific information tracing the breakdown of ozone caused by chlorofluorocarbons and the effectiveness of efforts to address this environmental problem.				
EVSC.ESS3.17) Using mathematics and computational thinking, analyze data linking human activity to climate change. Design solutions to address human impacts on climate change.				
EVSC.ESS3.18) Use mathematics to calculate ecological footprints. Develop a personal plan for reducing your impact on the environment.				
EVSC.ETS2.1) Engage in argument from evidence on the role engineering and technology play in a sustainable human society.				
EVSC.ETS2.2) Research and communicate information on an environmental science career. Analyze the role of society, engineering, technology, and science in that career.				
EVSC.ETS3.1) Plan and carry out an investigation of a local ecosystem to assess human impacts. Based on your findings, design and evaluate a solution to minimize impacts.				
Total				