Biology 1 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

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	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				
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Conceptual Understanding: The materials support the intentional development of students' conceptual understanding of key science ideas, practice, and concepts.	**0**	**1**	**2**	**Evidence**
Bio1.LS1.1) Construct an explanation based on evidence that the essential functions of life are primarily carried out through the work of proteins that are coded for by genes in DNA, as described by the Central Dogma (i.e., transcription, translation).				
Bio1.LS1.2) Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.				

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Bio1.LS1.3) Use a model to describe how differentiation in a multicellular organism creates specialized cells that perform diverse functions to work together to meet the needs of the entire organism, including human development.				
Bio1.LS1.4) Create, or use, a model to describe how the process of photosynthesis converts light energy into the stored chemical energy of bonds created by converting CO_2 and H_2O into sugar and other organic molecules.				
Bio1.LS1.5) Construct an explanation based on evidence that matter taken into an organism can be broken down and recombined to make macromolecules necessary for life functions.				
Bio1.LS1.6) Create, or use, a model to describe how cellular respiration transforms stored chemical energy of food resulting in a net transfer of energy. Compare aerobic respiration to alternative processes of glucose metabolism.				
Bio1.LS1.7) Construct an explanation from evidence to explain how the integrated functions of the brain in complex animals results in successful interpretation of input and generation of behaviors in response to those inputs.				
Bio1.LS2.1) Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.				
Bio1.LS2.2) Create, or use, a mathematical model to describe the transfer of energy from one trophic level to another. Explain how the inefficiency				

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of energy transfer between trophic levels affects the relative number of organisms that can be supported at each trophic level and necessitates a constant input of energy from sunlight and inorganic compounds from the environment.				
Bio1.LS2.3) Obtain, evaluate, and communicate information based on evidence to describe how the impact of varying levels of disturbance is related to the resilience of an ecosystem.				
Bio1.LS2.4) Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.				
Bio1.LS2.5) Analyze data about the role of group behavior on individual and species' chances to survive and reproduce.				
Bio1.LS3.1) Engage in an argument from evidence that the process of cellular division (mitosis) creates diploid daughter cells that are genetically identical to the diploid parent cells.				
Bio1.LS3.2) Engage in an argument from evidence that the process of meiosis exists to create genetic variation in a population from the creation of new combinations of genetic material in each of the haploid gametes.				
Bio1.LS3.3) Ask questions to clarify that variation of traits arises from differences in genes (alleles) and how cells regulate gene expression.				
Bio1.LS3.4) Construct an explanation based on evidence that genetic variations may result from (a) new genetic combinations via the processes of crossing over and random segregation of chromosomes during meiosis, (b) mutations that occur during replication, and/or (c) mutations caused by				

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environmental factors. Evidence should include that mutations that occur in gametes can be passed to offspring.				
Bio1.LS4.1) Analyze and interpret scientific data that common ancestry and biological evolution are supported by multiple lines of empirical evidence (e.g. DNA sequences, amino acid sequences, anatomical structures, the fossil record, biogeography, or order of appearance of structures during embryological development).				
Bio1.LS4.2) Apply concepts of statistics (i.e. probability) to support explanations that organisms in a population with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.				
Bio1.LS4.3) Analyze and interpret data that natural selection is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.				
Bio1.LS4.4) Construct an explanation based on evidence for how natural selection leads to adaptation in populations.				
Bio1.LS4.5) Obtain, evaluate, and communicate information about how changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.				
Total				