Chemistry 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 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				
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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**
Chem1.PS1.1) Obtain, evaluate, and communicate information to compare historical models of the atom (from Democritus to quantum model) and construct explanations to show how scientific knowledge evolves over time based on scientific evidence.				
Chem1.PS1.2) Use the Periodic Table as a model to predict chemical and physical properties of main group elements (e.g. reactivity, number of				

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subatomic particles, valence electrons, electronegativity, ion charge, ionization energy, and atomic radius) based on locations on the periodic table.				
Chem1.PS1.3) Model different representations of atoms (e.g. Lewis Dot Structures, Bohr Models, electron configurations).				
Chem1.PS1.4) Use the periodic table and properties of elements to develop an explanation to predict the types of bonds that are formed between atoms.				
Chem1.PS1.5) Evaluate the components of a substance to write the chemical name and formula using IUPAC criteria, including covalent compounds, ionic compounds, polyatomic ions, and common acids.				
Chem1.PS1.6) Construct and use a model to show that atoms, and therefore mass, are conserved during a chemical reaction. Symbolically represent this by balancing chemical equations.				
Chem1.PS1.7) Perform stoichiometric calculations involving the following relationships: mole-mole; mass-mass; mole-mass; mole-particle; and mass-particle.				
Chem1.PS1.8) Use models to show a qualitative understanding of the concept of percent yield, limiting reactants, and excess reactants in a chemical reaction.				
Chem1.PS1.9) Develop an explanation using the reactants in a chemical reaction to identify reaction type (i.e., synthesis, decomposition,				

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combustion, single replacement, double replacement) and predict products.				
Chem1.PS1.10) Conduct investigations and develop models to characterize the behavior of gases (e.g., pressure, volume, temperature).				
Chem1.PS1.11) Develop an explanation for the behavior of gases using the Kinetic Molecular Theory and the Combined Gas Law.				
Chem1.PS1.12) Use the Ideal Gas Law (PV=nRT) to quantitatively evaluate the relationship among the number of moles, volume, pressure, and temperature for ideal gases.				
Chem1.PS1.13) Create models of solutions to describe solutes and solvents, concentration of solutions, and the process of solvation.				
Chem1.PS1.14) Quantitatively analyze solutions to describe concentration using molarity, percent composition, and ppm.				
Chem1.PS1.15) Demonstrate separation methods such as evaporation, distillation, electrophoresis, and/or chromatography. Construct an argument to justify the use of certain separation methods under different conditions.				
Chem1.PS1.16) Obtain, evaluate, and communicate information to identify acids and bases as a special class of compounds due to their unique properties.				
Chem1.PS1.17) Use models to describe radioactive stability, radioactive decay, fusion, and fission.				

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Chem1.PS1.18) Develop and use models to compare alpha, beta, and gamma radiation in terms of mass, charge, and penetrating power. Identify examples of applications of different radiation types in everyday life.				
Chem1.PS3.1) Construct an explanation of thermal energy as a form of energy, and temperature as a measure of average kinetic energy of a group of particles.				
Chem1.PS3.2) Analyze and interpret data using heating/cooling curves and phase diagrams.				
Chem1.PS3.3) Analyze the energy changes involved in calorimetry by using the law of conservation of energy quantitatively (use of $q=mc\Delta T$) and qualitatively.				
Chem1.PS3.4) Distinguish between endothermic and exothermic reactions by constructing potential energy diagrams and explaining the differences between the two using chemical terms (e.g. activation energy).				
Chem1.PS3.5) Analyze data to explain how energy is absorbed or given off depending on the bonds formed and broken.				
Total				